# State Implementation of the Texas Watershed Steward Program

**Final Report**

**TSSWCB Project 07-09**

Prepared by:
Galen Roberts, Jennifer Peterson, and Mark McFarland
Texas AgriLife Extension Service
Department of Soil and Crop Sciences
College Station, Texas

FUNDING PROVIDED THROUGH A CLEAN WATER ACT §319(h) NONPOINT SOURCE GRANT FROM THE TEXAS STATE SOIL AND WATER CONSERVATION BOARD AND THE U.S. ENVIRONMENTAL PROTECTION AGENCY

# 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 that minimize or prevent water impairment, and community-driven watershed planning. The program was developed through a collaborative effort between the Texas 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, USDA Natural Resources Conservation Service, and others. TWS is delivered as an intensive, 1-day, 7-hour 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 39 workshops have been delivered in watersheds across the state of Texas. Through these events, 1,945 individuals have received a combined total of approximately 13,615 hours of training in topics specifically focused on watershed management and protection. In addition, over 3,080 hours of continuing education units have been provided by the program for a variety of professional certifications. 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 and has been completed by 74 individuals. In addition, compact discs of the complete program were produced and made available upon request to various groups and individuals.

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 each event to determine changes in knowledge and understanding, as well as intentions to adopt appropriate best management practices (BMPs). A 6-month delayed post test was employed to assess actions taken and to verify practice adoption. Overall, knowledge gained by individuals participating in the training was an impressive 30.6%. Sixty-five percent of participants reported an intention to

adopt BMPs to help protect their watershed, and 98% believed the TWS program enabled them to be a better

steward of their watershed. Results of the delayed, 6-month survey showed that 85% of trainees had participated or planned to participate in at least one community cleanup, 68% had participated or planned to participate in local planning/zoning decisions, and 82% indicated that they had or would communicate with their elected officials regarding water quality issues.

Over 85% of attendees indicated they now more closely monitor individual actions that might impact water quality, and 76% have either adopted or maintained management practices that have a positive impact on water quality. Finally, an overwhelming 97% of attendees were satisfied with the TWS training materials, and 84% have used those resources since the training.

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## 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 high 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 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 and Total Maximum Daily Load development). With funding through a Clean Water Act §319(h) grant from the TSSWCB, the project sought to continue the watershed-based training program initiated with TSSWCB project 05-05 entitled, *A Community Based Water Quality Curriculum Which Enhances Stakeholder Involvement in Watershed Protection Initiatives: A Pilot Project,* now known as the Texas Watershed Steward (TWS) program, by developing and delivering 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: Coordinate and deliver watershed based TWS trainings in selected watersheds

***Subtask 1.1****: Employ an Extension Program Specialist to coordinate and deliver the TWS watershed-based training events.*

An Extension Program Specialist was hired in 2007 to coordinate the development and delivery of the TWS training curriculum and facilitate stakeholder groups. Work on the TWS program began in 2005 with the development of the Texas Watershed Steward Handbook and PowerPoint training modules under TSSWCB project 05-05. Improvements to the initial presentations utilized for education and training began immediately, alongside the development of an on-line version of the curriculum.

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 1.2:*** *Select watersheds where TWS trainings will be implemented. AgriLife Extension will work in concert with state and local organizations to select locations for the watershed-based TWS training events. AgriLife Extension will coordinate efforts with state agencies and organizations already involved in WPP/TMDL process or who are planning future WPP/TMDL processes in specific watersheds. Additional watersheds will be selected based on impairment status, environmental sensitivity, and/or other priority issues identified by a partner agency or organization.*

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 1.3:*** *Actively market watershed-based TWS trainings through news releases, internet postings, newsletter announcements, public/conference presentations, flyers, etc. to enhance awareness and utilization. This component of the project will be led by personnel from AgriLife Extension Agricultural Communications.*

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

Press releases and flyers were developed and distributed approximately 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 (CEA) working both within the targeted watershed and in surrounding counties were solicited to assist with distribution of marketing materials. Furthermore, numerous newsletter articles also were distributed through the TSSWB, local CEAs, Master Naturalist and Master Gardener programs, and other local associations (Appendix C).

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 D).

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 6 months at the biannual state watershed coordinators roundtable meeting included information regarding future workshop locations.

Extension coordinated with TWRI to develop and routinely update a website posted at: http://tws.tamu.edu. The website includes all resources related to the program, offers on-line pre-registration for events, and provides access to the on-line training course.

In addition, promotional materials were imprinted with the program logo, slogan ("Know Your Watershed" or "We Know Watersheds") and web address were provided to participants. These included t-shirts, water bottles, magnets, stickers, pens and pencils. Attendees were encouraged to use and display the materials publically as a means of advertising the program. This was an effective method of creating a sense of community among participants, and t-shirts have been seen being worn by Texas Watershed Stewards at many other unrelated events and on television.

***Subtask 1.4:*** *Deliver 6-hour TWS trainings in selected watersheds, with the minimum goal being 6 watersheds in each year, and increasing that number, especially in years two and three, when and where possible.*

Watershed-based trainings were delivered as 1-day, 7-hour 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 E). Participants also were given a copy of the TWS handbook and supplemental literature from Extension and TCEQ (Appendix F).

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. For example, a virtual watershed flyover created using Google Earth software was developed for each event. The watershed flyover provides a visual representation of the watershed concept, illustrates land use patterns and land/water interrelationships, and enhances visualization of the concept of nonpoint source pollution utilizing the target watershed. 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.

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**Texas Watershed Steward workshop in Baytown, 2011.**

Between October 1, 2007 and March 31, 2012 a total of 39 TWS watershed-based trainings were conducted in 36 watersheds throughout Texas. Average event attendance was 50 individuals, with a program total of 1,945 participants.

Trainings were conducted on the following dates and locations:

- December 4, 2007: Kyle, TX (Plum Creek Watershed)
- January 24, 2008: Wellington, TX (Buck Creek Watershed)
- March 25, 2008: Pflugerville, TX (Gilleland Creek Watershed)
- April 2, 2008: Brady, TX (Brady Creek Watershed)
- May 30, 2008: Lake Jackson, TX (Bastrop Bayou Watershed)
- June 10, 2008: Georgetown, TX (Lake Granger Watershed)
- July 23, 2008: Denton, TX (Hickory Creek Watershed)
- August 6, 2008: Luling, TX (Plum Creek Watershed)
- September 25, 2008: Lampasas, TX (Lampasas River Watershed)
- October 30, 2008: Comanche, TX (Leon River Watershed)
- November 20, 2008: Monte Alto, TX (Arroyo Colorado Watershed)
- March 3, 2009: Franklin, TX (Little Brazos River Watershed)
- June 30, 2009: Granbury, TX (Lake Granbury Watershed)
- July 15, 2009: Fort Worth, TX (Eagle Mountain Watershed)
- August 25, 2009: Kaufman, TX (Cedar Creek Watershed)
- October 22, 2009: Wimberley, TX (Cypress Creek Watershed)
- November 10, 2009: Seguin, TX (Geronimo and Alligator Creeks Watershed)
- December 3, 2009: Jefferson, TX (Caddo Lake Watershed)
- January 21, 2010: West Columbia, TX (San Bernard River Watershed)
- March 25, 2010: Boerne, TX (Upper Cibolo Creek Watershed)
- April 29, 201o: Junction, TX (South Llano River Watershed)
- May 12, 2010: Seven Points, TX (Cedar Creek Watershed)
- August 26, 2010: Kerrville, TX (Guadalupe River above Canyon Lake)
- September 9, 2010: Nacogdoches, TX (Attoyac Bayou Watershed)
- September 21, 2010: Utopia, TX (Sabinal River Watershed)
- October 21, 2010: Athens, TX (Middle Trinity River Watershed)
- January 27, 2011: Panna Maria, TX (Lower Cibolo Creek Watershed)
- March 29, 2011: College Station, TX (Carters and Burton Creeks Watershed)
- May 12, 2011: Corpus Christi, TX (Lower Nueces Watershed)
- June 28, 2011: Pecos, TX (Pecos River Watershed)
- June 29, 2011: Iraan, TX (Pecos River Watershed)
- July 14, 2011: Temple, TX (City of Temple Watersheds)

- August 30, 2011: Baytown, TX (Cedar Bayou Watershed)
- September 28, 2011: Uvalde, TX (Leona River Watershed)
- October 24, 2011: Orange, TX (Adams/Cow Bayous Watershed)
- November 9, 2011: Dallas, TX (City of Dallas Watersheds)
- November 10, 2011: Dallas, TX (City of Dallas Watersheds)
- February 22, 2012: La Marque, TX (Highland Bayou Watershed)
- March 23, 2012: San Angelo, TX (Concho River Watershed)

The TWS program obtained/maintained certification to provide continuing education units (CEU) 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. Qualified 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) CEUs for pesticide license holders
- 3 TFMA (Texas Floodplain Management Association) CECs for Certified Floodplain Managers

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 CEUs.

***Subtask 1.5:*** *Foster the establishment of local watershed action groups spawned by the TWS program. 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 and bolstering support for existing WPP/TMDL efforts and stakeholder groups, creation of new watershed groups, and initiation of community watershed events and activities.

**TASK 2: Develop, distribute, and manage computer-based training tools for the TWS program.**

***Subtask 2.1:*** *Acquire the needed multimedia software packages and external technological support to facilitate the development of the web-based and CD ROM-based versions of the TWS program.*

An extensive comparison of authoring programs was conducted to determine the best software to utilize in the development of the TWS on-line course. Toolbook Instructor 9.5 by Sum Total Systems was ultimately selected for its ease of use, its compatibility across various internet browsers, and its capacity to present information in several interactive formats. Design of the TWS on-line follows the framework presented in the TWS Curriculum Handbook as well as content delivered at watershed-based TWS workshops. Users of the on-line course have access to 5 different modules as well as simulations of hands-on activities conducted at TWS workshops. For example, users can experience a virtual watershed tour, drag and drop labels on jars representing the major types of nonpoint sources of pollution, and mix and match water quality monitoring equipment to the parameter the equipment is designed to measure. Furthermore, users have the ability to work through the material at their own pace and receive a Certificate of Completion at the end of the course. In order to receive a certificate, however, participants must complete both a pre-test at the beginning of the course as well as a post-test. This allows knowledge gain and course usage to be tracked. To take advantage of the national eXtension network and to better reach a broad audience, the TWS on-line course is accessible through eXtension's Moodle platform. This also allows course use and participation to be tracked and allows all material to be housed in a secure, accessible, and nationally-recognized location.

***Subtask 2.2:*** *Design and develop web-based and CD-ROM based versions of the TWS program.*

Using Toolbook Instructor 9.5, an interactive training version of the TWS program was created and made available on-line (Appendix G). The on-line course materials were made accessible from the program website at http://tws.tamu.edu/online-course/ . The on-line based version allows those unable to attend a watershed-based workshop to complete the course curriculum, providing more flexible and widespread access to the program. The on-line course was designed to be an interactive experience, providing videos, user activated animations, and the ability to navigate course material freely. The course can be accessed anonymously however, in order to receive a certificate of completion participants must enroll in the course and complete the pre

and post test evaluations. Enrollment in the course is open to all, and requires users to submit their country, state, and city of residence along with a valid email address.

***Subtask 2.3:*** *Duplicate, package, and distribute the CD ROM –based version of the TWS program. Initially, CDs will be distributed to District and/or County Extension Offices across the state. Distributions also will be made at the request of project partners, and in response to marketing efforts accomplished under Task 2.4.*

CD-ROMs were created and distributed upon request after a workshop which contained watershed-based TWS training materials. CD ROMs included event-specific versions of the PowerPoint presentations, virtual watershed tours, and watershed maps. With growing access and availability to computers and the internet, the need for CD ROM-based versions of the TWS program was not as great as anticipated. The on-line course quickly became the preferred method by stakeholders for remote access to the TWS training curriculum.

***Subtask 2.4:*** *Actively market computer-based TWS resources through news releases, internet postings, newsletter announcements, public/conference presentations, flyers, etc. to enhance utilization and public participation.*

Participants at watershed-based TWS trainings were made aware of the on-line course availability and were encouraged to pass that information along. Press releases were distributed announcing the availability of the TWS on-line course and were published through a number of media outlets (Appendix H).

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 “On-line Course” would readily produce a link to the TWS website. Because of these efforts, 74 participants have enrolled in the on-line course since it was made available early in 2011.

***Subtask 2.5:*** *Develop and implement a method for tracking website usage and CD ROM distribution. This will involve development of a participation feedback mechanism for the web-based tool and periodic evaluation of CD utilization at distribution points.*

The Moodle platform used to support the on-line course has built in mechanisms for tracking usage. On-line course administrators are able to view participant information and their activity. Moodle provides reports for pre and post test responses and course access data from those enrolled in the course (Appendix I). The on-line course allows users to view course content without enrolling in the course however, only enrolled users are able to complete the pre/post tests and receive a certificate of completion.

Google Analytics was used to track overall website traffic. Since the TWS website went live in 2008 it has been visited 13,875 times by 9,083 unique visitors. The vast majority of visits

originated from users in the USA: however, the website received traffic from 63 different countries on 6 continents. The on-line course section of the website specifically has been viewed 855 times by 651 unique users. A method for evaluating CD distribution and usage was never merited because utilization of the on-line course became the preferred method of participation.

**TASK 3: Evaluate the effectiveness of watershed-based trainings and computer-based training tools.**

***Subtask 3.1:*** *Develop and deliver Phase 1 pre/post test evaluation strategy (for both watershed-based and computer based trainings) to evaluate increased knowledge by individuals within the watershed regarding watershed principles, appropriate BMPs, and other activities to address impairments caused by nonpoint source pollution, to evaluate participant satisfaction with the program, and to evaluate participant's intentions to change their behavior as a result of the program.*

Phase 1 pre- and post-test evaluations were developed through a collaboration of Extension personnel from the Agricultural Leadership Education & Communications (ALEC) and Organizational Development Departments at Texas A&M University. Phase 1 evaluations were designed primarily to measure participants' knowledge gain and intent to adopt water quality management practices as a result of a training event. Furthermore, pre- and post-test evaluations collected participants' demographics, occupation, education level, place of residence, and overall satisfaction with the TWS training curriculum and delivery. Data were collected in the form of multiple choice, true/false, and open answer questions and were recorded on a scannable form (Appendix J). Pre- and post-tests were utilized for both watershed-based and computer-based trainings. While the computer-based test responses were recorded electronically through Moodle, completed watershed-based evaluations were sent to the Organizational Development Department for analysis.

***Subtask 3.2:*** *Develop and deliver Phase 2 follow-up survey assessment (6-12 month follow-up for both watershed-based and computer based-trainings) to ascertain any behavior changes adopted by participants.*

Collaborators from the ALEC and Organizational Development at Texas A&M University were also involved in the development of Phase 2 survey assessments. Assessments were designed to ascertain the adoption of best management practices and how participants have utilized the educational material provided to them at the TWS training. Phase 2 surveys were distributed via email approximately 6 months after participants completed a watershed-based or computer-based TWS training and responses were received electronically using Instant Survey software. Phase 2 surveys consisted of 15 multiple choice questions (Appendix K).

***Subtask 3.3:*** *Analyze results obtained from Phase 1 and Phase 2 evaluations using descriptive, correlational, and analysis of variances statistical procedures.*

*Phase 1*

With the assistance of personnel in Organizational Development, Phase 1 pre- and post-test data were collected and analyzed using SPSS software. Individual questions were analyzed for pre/post test comparison and were cross-tabulated for better interpretation of results (Appendix L).

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, after accounting for the one missing answer the question below shows a valid pre-correct response of 70%. Conversely, the valid post-correct response is 96.7%. Therefore, knowledge gain for this question would be 26.7%, which is the difference between the valid percent of pre-correct and post-correct responses.

**(Pre - Correct vs. Incorrect) 16. Structural and non-structural practices used to protect water quality are referred to as:**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 21 | 67.7 | 70.0 | 70.0 |
| | Incorrect | 9 | 29.0 | 30.0 | 100.0 |
| | Total | 30 | 96.8 | 100.0 | |
| Missing | System | 1 | 3.2 | | |
| Total | | 31 | 100.0 | | |

**(Post - Correct vs. Incorrect) 16. Structural and non-structural practices used to protect water quality are referred to as:**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 29 | 93.5 | 96.7 | 96.7 |
| | Incorrect | 1 | 3.2 | 3.3 | 100.0 |
| | Total | 30 | 96.8 | 100.0 | |
| Missing | System | 1 | 3.2 | | |
| Total | | 31 | 100.0 | | |

**(Pre-Post Comparison) 16. Structural and non-structural practices used to protect water quality are referred to as:**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Pre Incorrect - Post Incorrect | 1 | 3.2 | 3.3 | 3.3 |
| | Pre Incorrect - Post Correct * | 8 | 25.8 | 26.7 | 30.0 |
| | Pre Correct - Post Correct * | 21 | 67.7 | 70.0 | 100.0 |
| | Total | 30 | 96.8 | 100.0 | |
| Missing | System | 1 | 3.2 | | |
| Total | | 31 | 100.0 | | |

**Example of Pre and Post Test individual question analysis**

Individual question analysis indicated that almost 80% of all participants answered the same 5 questions correctly on both the pre- and post-tests. These 5 questions were therefore considered to be common knowledge for the majority of participants and were excluded from the final knowledge gain calculation. The 5 questions excluded are pre/post test questions 1, 4, 5, 6, 11, 12, and 13 (Appendix J).

Results of the pre-post survey indicated an overall knowledge gain of over 31.2% among those without a post graduate degree. For questions relating to watersheds there was an overall knowledge increase of 32% and for questions relating to fresh water there was an increase of approximately 23%. Furthermore there was a knowledge increase of over 36% for pollution questions, and an increase of 30% for policy and government questions regarding water quality. Overall knowledge gain for those with an advanced degree was 30.6%, indicating that there was not a significant difference between those with and without advanced degrees.

Pre/post-test data indicated a high percentage of participants overall intended to engage in activities aimed at improving water quality. Of all respondents, 23% left trainings with the intention to participate in community cleanup activities and over 21% wanted to get involved in local planning/zoning decisions. Thirty percent intended to communicate water issues with elected officials, 24% intended to help develop a plan for their watershed, and 22% percent intended to help form or become a member of a local watershed group. Most importantly, over 65% percent of participants reported an intention to adopt BMPs to help protect their watershed and 98% 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 6 months after a training event via email using addresses collected through event registrations and sign-in sheets. The survey consisted of 15 multiple choice questions relating to adoption of management practices 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 summarized reports for analysis and interpretation (Appendix K).

Among respondents, 42% had participated in at least one community cleanup in the past six months and another 43% indicated that they had plans to participate in a future cleanup. Approximately 37% of attendees had participated in local planning/zoning decisions, and another 31% planned to get involved in those types of activities in the near future. Fifty-two percent stated that they had communicated with their elected officials regarding water quality issues, and an additional 30% were still planning to do so. Approximately 26% of individuals had participated in a volunteer monitoring program, and an additional 31% planned to get involved.

Forty-four percent of participants had given a water quality presentation to a school class or community group and another 28% still planned to do so. Surveys also showed that 73% of attendees had encouraged others to participate in the training. Over 85% of attendees indicated they now more closely monitor individual actions that might impact water quality and 76% had either adopted or maintained management practices that have a positive impact on water quality. Approximately 24% had adopted soil testing practices, while another 40% stated that they plan to conduct soil testing in the future to better manage fertilizer application.

Ninety-seven percent of attendees were satisfied with the TWS training materials, and 84% have used those resources since the training. Over 73% of respondents had shared the materials with their peers.

***Subtask 3.4:*** *Develop research briefs summarizing results and project updates. Briefs will be developed for the purposes of documenting and enhancing the success of future TWS and similar training programs.*

Periodic summaries of Phase 1 and Phase 2 evaluation data were compiled by personnel in Organizational Development. Summaries included individual question analysis, knowledge gain, and intent to adopt management practices (Appendix M). These summaries were used for reporting purposes and to enhance the analytical process. Research summaries also provided a valuable tool for identifying areas of the watershed-based training curriculum that needed modification or improvement.

**TASK 4: Develop a final report assessing the effectiveness of the TWS program.**

***Subtask 4.1:*** *With assistance from TSSWCB and other pertinent organizations/community groups involved in the project, develop a final report assessing the effectiveness of the TWS program, including the watershed-based trainings and computer-based distance training tools.*

*The final report will detail the activities of the project and will summarize results obtained from Phase 1 and Phase 2 assessments outlined in Task 3. In addition, the report will discuss the statewide impact of the program and its future role/need in the state of Texas*.

Under TSSWCB project 05-05, Extension worked with the TSSWCB to develop and implement a watershed based training curriculum that became known as the Texas Watershed Steward program. Since the first workshop in December 2007, efforts have been on-going to expand upon and improve TWS program materials and their delivery. Extension has worked with program partners to ensure that the information provided through TWS is current and accurate, and that methods for evaluating program success are as comprehensive as possible.

Working with faculty in 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 altered to remove easier questions and replace them with more difficult ones (Appendix N). The revised version of the pre/post test was first used in October 2008 and has been the version used thereafter. Furthermore, analysis of individual questions from October 2008 until now 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 3.3. These 7 questions were therefore excluded from the final analysis, and the remaining eleven questions were used to calculate knowledge gain.

Using the revised analytical methods, there was an overall knowledge gain of over 31.2% among those without a post graduate degree. For questions relating to watersheds there was an overall knowledge increase of 32% and for questions relating to fresh water there was an increase of approximately 23%. Furthermore there was a knowledge increase of over 36% for pollution questions and an increase of 30% for policy and government questions regarding water quality.

Specifically for those with an advanced degree, overall knowledge gain was 30.6%, indicating that there was not a significant difference in knowledge gain between those with and without advanced degrees.

Pre/post-test data indicated a high percentage of participants overall intended to engage in activities aimed at improving water quality. Out of all respondents, 23% left trainings with the intention to participate in community cleanup activities and over 21% wanted to get involved in local planning/zoning decisions. Furthermore, 30% intended to communicate water issues with elected officials, 24% intended to help develop a plan for their watershed, and 22% percent intended to help form or become a member of a local watershed group. Most importantly, over 65% percent of participants reported an intent to adopt BMPs to help protect their watershed and 98% felt that the TWS program provided them with the ability to be a better steward of their watershed.

Six months after each workshop delayed post-surveys were distributed to workshop participants and responses were received electronically. These follow-up evaluations continued to indicate positive impacts, even several months after the training. Among respondents, 42% had participated in at least one community cleanup in the past six months and another 43% indicated that they had plans to participate in a future cleanup. Approximately 37% of attendees had participated in local planning/zoning decisions, and another 31% planned to get involved in those types of activities in the near future. Furthermore, 52% stated that they had communicated with their elected officials regarding water quality issues and an additional 30% planned to do so.

Another positive result of TWS training, as indicated in the delayed post-survey, is the resulting level of involvement of attendees in volunteer water quality monitoring programs. Approximately 26% of individuals had participated in such programs and 31% 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, 44% had given a water quality presentation to a school class or community group and another 28% planned to do so. Surveys also showed that 73% of attendees had encouraged others to participate in the training.

Over 85% of attendees indicated they now more closely monitor individual actions that might impact water quality, and 76% have either adopted or maintained management practices that protect water quality. For example, approximately 24% had adopted soil testing practices and another 40% indicated they plan to conduct soil testing in the future to better manage fertilizer application.

Finally, an overwhelming 97% of attendees were satisfied with the TWS training materials, and 84% have used those resources since the training. Over 73% of respondents had already shared the materials with their peers.

## CONCLUSIONS

In close coordination with the TSSWCB and other state, federal and local partners, the Texas AgriLife Extension Service has conducted 39 watershed-based training events across the state of Texas that have educated 1,945 stakeholders through 13,680 contact hours. Both face-to-face and on-line training resources have been developed and delivered to citizens providing flexible access to science-based watershed management information.

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 training. Continued statewide implementation of the TWS program will support and enhance current and future watershed management and protection efforts undertaken by water resource management agencies and organizations in Texas, and most importantly, will continue to engage and empower local citizens to be the driving force for protection of their watershed.

# Appendix A

# Texas Watershed Steward Tentative Schedule and Training Location Map

Texas State Soil and Water Conservation Board
Texas AgriLife Extension Service

**Texas Watershed Steward Program**
Tentative Schedule - Revised 3/8/2012

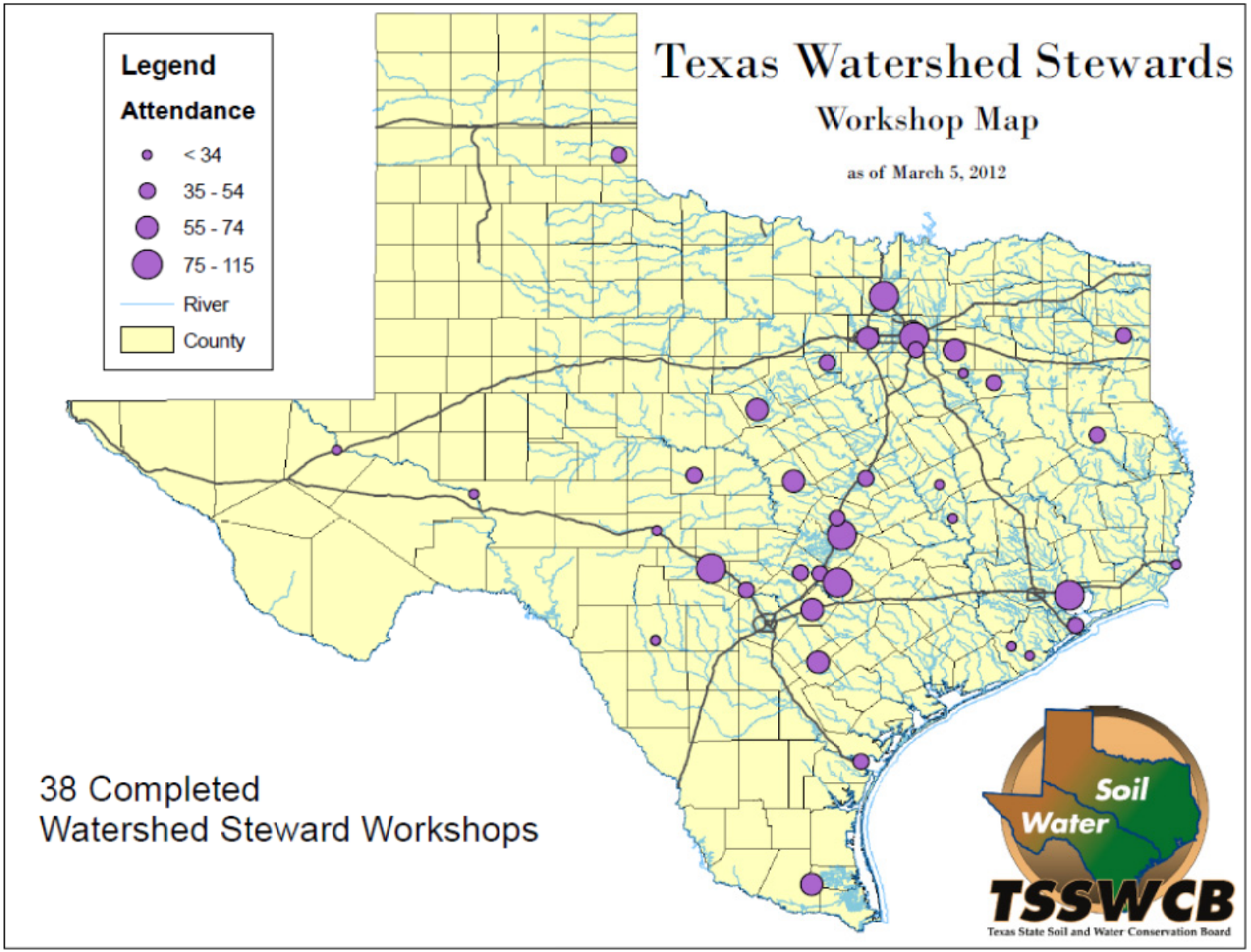
| Watershed | Type | FY | Q | Date | City | County | Contact Name | Affiliation | Attended |
|---|---|---|---|---|---|---|---|---|---|
| Adams/Cow Bayous | TMDL | 2012 | 1 | 10/24/2011 | Orange | Orange | Miles Hall | SRA | 30 |
| Urban Watersheds in City of Dallas 1 | Other | 2012 | 1 | 11/09/2011 | Dallas | Dallas | Fred Burrell | Dallas County Extension | 87 |
| Urban Watersheds in City of Dallas 2 | Other | 2012 | 1 | 11/10/2011 | Lancaster | Dallas | Fred Burrell | Dallas County Extension | 50 |
| Highland Bayou | WPP | 2012 | 2 | 2/22/2012 | Texas City | Galveston | Steven Mikulencak | Texas Sea Grant | 38 |
| Concho River | WPP | 2012 | 3 | 3/23/2012 | San Angelo | Tom Green | Christy Youker | UCRA | 35 |
| San Antonio Bay | Other | 2012 | 2 | 4/18/2012 | Victoria | Victoria | James Dodson | San Antonio Bay Partnership | |
| Paso del Norte | WPP | 2012 | 3 | 5/9/2012 | El Paso | El Paso | Brian Hanson | New Mexico Dept. Agriculture | |
| Colorado River | Other | 2012 | 4 | June 2012 | Bastrop | Bastrop | Steve Box | Envirnomental Stewardship, Inc. | |
| College Station | | 2012 | | June 2012 | | | | | |
| Leon River 2 | WPP | 2012 | 3 | Summer 2012 | Hamilton | Hamilton | Pamela Casebolt | TSSWCB | |
| Urban Watersheds in City of San Antonio | TMDL | 2012 | 4 | Summer 2012 | San Antonio | Bexar | Brian Mast | SARA | |
| Upper Llano River | WPP | 2013 | 1 | Falll 2012 | Junction | Kimble | Kevin Wagner | TWRI | |
| San Marcos River, Upper | WPP | 2013 | 1 | October 2012 | San Marcos | Hays | Emily Warren | RSI@TSU | |
| Plum Creek 3 | WPP | 2013 | 1 | Fall 12/ Early 13 | Lockhart | Caldwell | Nikki Dictson | AgriLife Extension | |
| Double Bayou | WPP | 2013 | 1 | Early 2012 | Anahuac | Chambers | Lisa Gonzalez | HARC | |
| Armand Bayou | WPP | | | | Pasadena @ Armand Bayou Nature Center | Harris | Linda Shead | Shead Conservation Solutions | |
| Atascosa River | Other | | | | Pleasanton | Atascosa | Dania Grundmann | TCEQ | |
| Chocolate Bayou | Other | | | | Alvin | Brazoria | Steven Johnston | GBEP | |
| Colorado River Watch Network | Other | | | | | | Lisa Benton | LCRA | |
| Copano Bay & Mission & Aransas Rivers | TMDL | | | | Refugio | Refugio | Natalie Bell | TCEQ | |
| Dickinson Bayou | WPP/TMDL | | | | Dickinson | Galveston | Marc Reid | Texas Sea Grant | |
| Lampasas River 2 | WPP | | | | Lampasas | Lampasas | Lisa Prcin | AgriLife Research - Blackland | |
| Nolan Creek | WPP | | | | Belton/ Killeen | Bell | Nikki Jackson | TIAER | |
| Onion Creek/Barton Springs | WPP | | | | Dripping Springs | Hays | Craig Smith | BSEACD | |
| Oso Creek/Bay | TMDL | | | | Corpus Christi | Nueces | Rocky Freund | NRA | |
| Richland-Chambers Reservoir | WPP | | | | Corsicana | Navarro | Clint Wolfe | AgriLife Research - Dallas | |
| San Antonio River, Lower | Other | | | | Goliad | Goliad | Steve Lusk | SARA | |
| Urban Houston ( Harris County Watersheds | Other | | | | Houston | Harris | | | |

| | |
|---|---|
| TOTAL | 1,945 |
| AVERAGE | 50 |

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

http://tws.tamu.edu

Printed on 3/27/2012


Legend
Attendance
< 34
35 - 54
55 - 74
75 - 115
River
County
Texas Watershed Stewards
Workshop Map
as of March 5, 2012
38 Completed
Watershed Steward Workshops
Soil
Water
TSSWCB
Texas State Soil and Water Conservation Board

# Appendix B

## Example of Project News Release and Flyer

July 18, 2011

Water quality training will focus on Cedar Bayou
Training to address issues regarding water quality

Contact: Galen Roberts, 979-862-8070 or groberts@ag.tamu.edu
Jeff Koch, 281-855-5600 or JWKoch@ag.tamu.edu
Tyler Fitzgerald, 409-267-8347 or tsfitzgerald@ag.tamu.edu
Ronald Holcomb, 936-336-4558 or rholcomb@ag.tamu.edu
Justin Bower, Houston-Galveston Area Council, 713-499-6653 or Justin.Bower@h-gac.com

BAYTOWN – A Texas Watershed Steward workshop addressing water quality issues related to Cedar Bayou watershed will be held from 8 a.m.-4 p.m. on August 30 at the Baytown Community Center, 2407 Market Street in Baytown.

The workshop is free and seating will be limited, so participants are encouraged to pre-register at http://tws.tamu.edu.

The Texas Watershed Steward program is sponsored by the Texas AgriLife Extension Service and the Texas State Soil and Water Conservation Board in coordination with the Houston-Galveston Area Council.

"The training is open to anyone interested in improving water quality in Cedar Bayou," said Jeff Koch, AgriLife Extension agent for natural resources, Harris County. “The training is designed to help watershed residents improve and protect their water resources by becoming involved in local watershed protection and management activities.”

Koch said the workshop will include an overview of water quality and watershed management in Texas and will primarily focus on water quality issues relating to Cedar Bayou, including current efforts to help improve and protect the health of this important water resource.

The training also provides a discussion of watershed systems, types and sources of water pollution, and ways to improve and protect water quality. There also will be a group discussion on community-driven watershed protection and management.

“Cedar Bayou is a critical resource for the area,” said Tyler Fitzgerald, AgriLife Extension agent for natural resources, Chambers County. “For example, Cedar Bayou, which feeds into Galveston Bay, supports oyster production, recreational activities, commercial fishing and other economic

assets. The estuaries of Cedar Bayou are considered to be a critical wildlife habitat area by the Texas Parks and Wildlife Department."

This workshop is being held in support of ongoing watershed management activities for the Cedar Bayou watershed in Chambers, Harris, and Liberty Counties. Cedar Bayou has been listed on the state list of impaired waters since 2002 for elevated dioxin levels in edible tissues of marine life, and was later listed for PCBs and high concentrations of bacteria.

Efforts are currently under way to reduce pollutant levels in Cedar Bayou through working with local residents and property owners to develop a watershed protection plan. More information about the WPP can be found at www.cedarbayouwatershed.com.

"Management strategies to be included in the plan are intended to provide direction to local stakeholders and deliver educational programming such as the Texas Watershed Steward Program," said Justin Bower of the Houston-Galveston Area Council and watershed coordinator for the Cedar Bayou Watershed Partnership.

"Along with the free training, participants receive a copy of the Texas Watershed Steward Handbook and a certificate of completion," said Ron Holcomb, AgriLife Extension agent for natural resources, Liberty County.

The program also offers seven continuing education units in soil and water management for certified crop advisers, seven units for professional engineers and certified planners, and seven continuing education credits for certified teachers. It also offers three general continuing education units for Texas Department of Agriculture pesticide license holders, three for certified landscape architects and three for certified floodplain managers.

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

For more information and to pre-register, go to http://tws.tamu.edu or contact Galen Roberts, AgriLife Extension program coordinator at 979-862-8070, or groberts@ag.tamu.edu; Koch at 254-933-5305, JWKoch@ag.tamu.edu; Fitzgerald at 409-267-8347, tsfitzgerald@ag.tamu.edu, or Holcomb at 936-336-4558, rholcomb@ag.tamu.edu.

For more information on the watershed planning efforts in the Cedar Bayou watershed, contact Bower at 713-499-6653 or Justin.Bower@h-gac.com.

The Texas Watershed Steward program is funded through a Clean Water Act §319(h) nonpoint source grant from the Texas State Soil and Water Conservation Board and the U.S. Environmental Protection Agency.

-30-

# TEXAS Watershed Steward

## Cedar Bayou Watershed

TEXAS Watershed Steward

The Texas Watershed Steward program is a free, one-day educational workshop designed to help watershed residents improve and protect their water resources by getting involved in local watershed protection and management activities.

**August 30, 2011: 8:00am-4pm**
Baytown Community Center
2407 Market Street
Baytown, TX 77520

The workshop will provide an overview of water quality and watershed management in Texas. It will primarily focus on water quality issues in the Cedar Bayou Watershed as well as efforts by the Cedar Bayou Watershed Partnership, Houston-Galveston Area Council, Texas State Soil and Water Conservation Board, and area residents to help improve water resources and the health of the surrounding watersheds. For project information visit: http://www.cedarbayouwatershed.com

Pre-register for the workshop by going to:
*http://tws.tamu.edu*
or call 979.862.8070

TSSWCB

AgriLIFE EXTENSION

# Appendix C

## Example of Newsletter Publication



### Purple Martins Soon to Return to Galveston

By Jim Stevenson, Editor of Gulls 'n Herons Magazine and Director of the Galveston Ornithological Society

One of our most beloved birds is the Purple Martin. It is actually a large swallow, and our only one with sexual dimorphism. Males are bluish purple while the females are brownish with light bellies.

Very soon, you will hear you first martin of the spring, chirping high in the air. They are our first non-wintering arrival in spring, usually seen initially the first week of February. By March, they are settling in to peoples' yards, tame and abiding. It's hard to tell whether they or bluebirds are more popular, but since there are none of the latter in Galveston, martins get a lot of attention!

Martins also are very early fall migrants, with some beginning their southward plunge as early as late May! The funny thing is, some northern-nesting martins have even arrived in late May, so it is possible to see a spring migrant and fall migrant Purple Martin cross paths high in the Galveston sky!

Throughout our summer, martins think it's fall, as they continue to fly further south than we might imagine. They actually winter on the Amazon, often seen in flocks of tens (or hundreds!) of thousands. To be sure, no tropical bug would be safe! Returning, they do NOT send "scouts" from South America!

Actually, the topic of their diet is fraught with confusion and misinformation. The wonderful people who erect martin houses have visions of their visitors eating thousands of mosquitoes, and would hope that it were true. Truthfully, there are seldom of those flying blood-suckers high in the daytime sky. What they do eat is an insect predator called Odonates, which, sorry to say, eats mosquitoes. Oops.

Purple Martin

Photo Courtesy of Jim Stevenson

There are other martins in the World as well. The Southern Martin lives in southern South America and migrates to the Interior of the Continent from the South, just as our hero does from the North – only at opposite times of the year.

There are other martins in-between, like the Gray-breasted Martin. And actually the term "martin" is also used in the Old World (like Africa and Europe) for birds we would call "swallows." There are even cat-like mammals in North and South America called Martens (note fifth letter), as well as the inhabitants of the fourth planet. OK, not really.

If you want to know more about Purple Martins, just Google them!

### Texas Watershed Steward Program

By Galen Roberts, Program Specialist, Texas AgriLife Extension Service

In 2010 Lower Galveston Bay joined Upper Galveston Bay on the state list of impaired waters, also known as the 303(d) list. In fact there are numerous segments in Galveston and Harris Counties also listed as impaired, most for elevated bacteria and low dissolved oxygen. The report, still waiting for approval by the EPA, is submitted every 2 years in compliance with federal law and is part of the Texas Integrated Report for Clean Water Act Sections 305(b) and 303(d).

"Initiation of improvement projects has a great potential to improve the situation in the bay and surrounding watersheds, which are integral parts of the local economy and a critical wildlife habitat," according to Dr. John Jacob, Texas A&M University Professor and Director of the Texas Coastal Watershed Program. "However, it will take a coordinated effort and several years of implementing best management practices in the bay and surrounding watersheds to bring pollution levels within acceptable levels."

One of the most important components of these improvement efforts is public involvement. Unfortunately it seems that many of those who live, work, and recreate in watersheds across Texas are unaware that water quality problems exist or – if they are aware – know little about what they can do to help the situation.

The Texas Watershed Steward (TWS) program, sponsored by the Texas AgriLife Extension Service and Texas State Soil and Water Conservation Board, was initiated in 2007 to help improve the quality of Texas' water resources. How? By educating and informing local stakeholders about their watershed, potential impairments, and steps that can be taken to help improve and protect water quality in their watershed.

In support of ongoing improvement efforts in Galveston County's Highland Bayou watershed, and other watersheds in the Houston-Galveston area, a free TWS training will be held Wednesday, February 22nd in La Marque, Texas. The training will be held from 8 a.m.-4 p.m. at the Galveston County AgriLife Extension Office located at 4102 Main Street.

This no-cost training also offers continuing education units or credits for Professional Engineers, Certified Planners, TDA Pesticide Applicators, Landscape Architects, Teachers, Certified Crop Advisors, Nutrient Managers, and Floodplain Managers.

Additional TWS training locations are currently being scheduled for 2012. For more information and to preregister for an event, visit http://tws.tamu.edu or call 979-862-8070 and leave a message with your name and contact information so your call may be returned.

**Are You a WGIPOA Sponsor?**

A Benefit for WGIPOA Corporate Level Sponsors is one FREE Ad Space in our next Newsletter

**Ads must be submitted by April 1, 2012 and will be sized to fit to 1/9th page max height and/or width including margin and border allowances.**

**Submit Ads via email to:** editor@galvestonwestender.com

**For WGIPOA Sponsorship Rates see:** http://www.wgipoa.com/Member.htm

*Exerpt taken from the Galveston Bay Westender Newsletter, January 2012*

# Appendix D

## Example of Workshop Invitation Letter

Dear Landowner,

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 Shangri La Gardens and Nature Center on 2111 West Park Ave. in Orange, TX on October 24th from 8am-4pm.

Texas Watershed Stewards is a one-day educational program sponsored by the Texas AgriLife Extension Service, and Texas State Soil and Water Conservation Board, in coordination with the Sabine River Authority. 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 October 24th will be the Adams and Cow Bayous Watershed which includes parts of Orange, Jasper, and Newton Counties. Cow Bayou first appeared on the State's list of impaired waters in 1996 and Adams was listed in 2010; both for elevated levels of bacteria.

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 lunch will be provided. You can pre-register for this event by visiting our website at http://tws.tamu.edu or by calling Shangri La Nature Center at 409-670-9113.

As a part of the free training, we also offer the following Continuing Education Units.

- 3 TDA (Texas Department of Agriculture) CEUs for pesticide license holders
- 7 CCA (Certified Crop Advisor) CEUs in Soil and Water Management
- 4 NM (Nutrient Management Certification) CEUs for Nutrient Management Specialists

In addition CEUs are available for AICP Certified Planners (*7*), ASLA Landscape Architects (*7*), TBPE Professional Engineers (*7*), SBEC Certified Educators (*7*), & TFMA Certified Floodplain Managers (*3*).

If you have any questions or need more information about the workshop, please contact Galen Roberts or Roy Stanford.

We hope to see you there.

Galen Roberts
Extension Program Specialist
979-862-8070
groberts@ag.tamu.edu

Roy Stanford
Orange County Extension Agent
409-882-7010
rlstanford@ag.tamu.edu

# Appendix E

# Example of TWS Workshop Agenda

**TEXAS WATERSHED STEWARD WORKSHOP:** AGENDA
WEDNESDAY– FEBRUARY 22, 2012
HIGHLAND BAYOU – AGRILIFE EXTENSION OFFICE
LA MARQUE, TX

***Sign-In/Register/Coffee***
***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

***Questions/Discussion***
**LUNCH BREAK**

***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

**Rainfall Simulator Demonstration**
**BREAK**

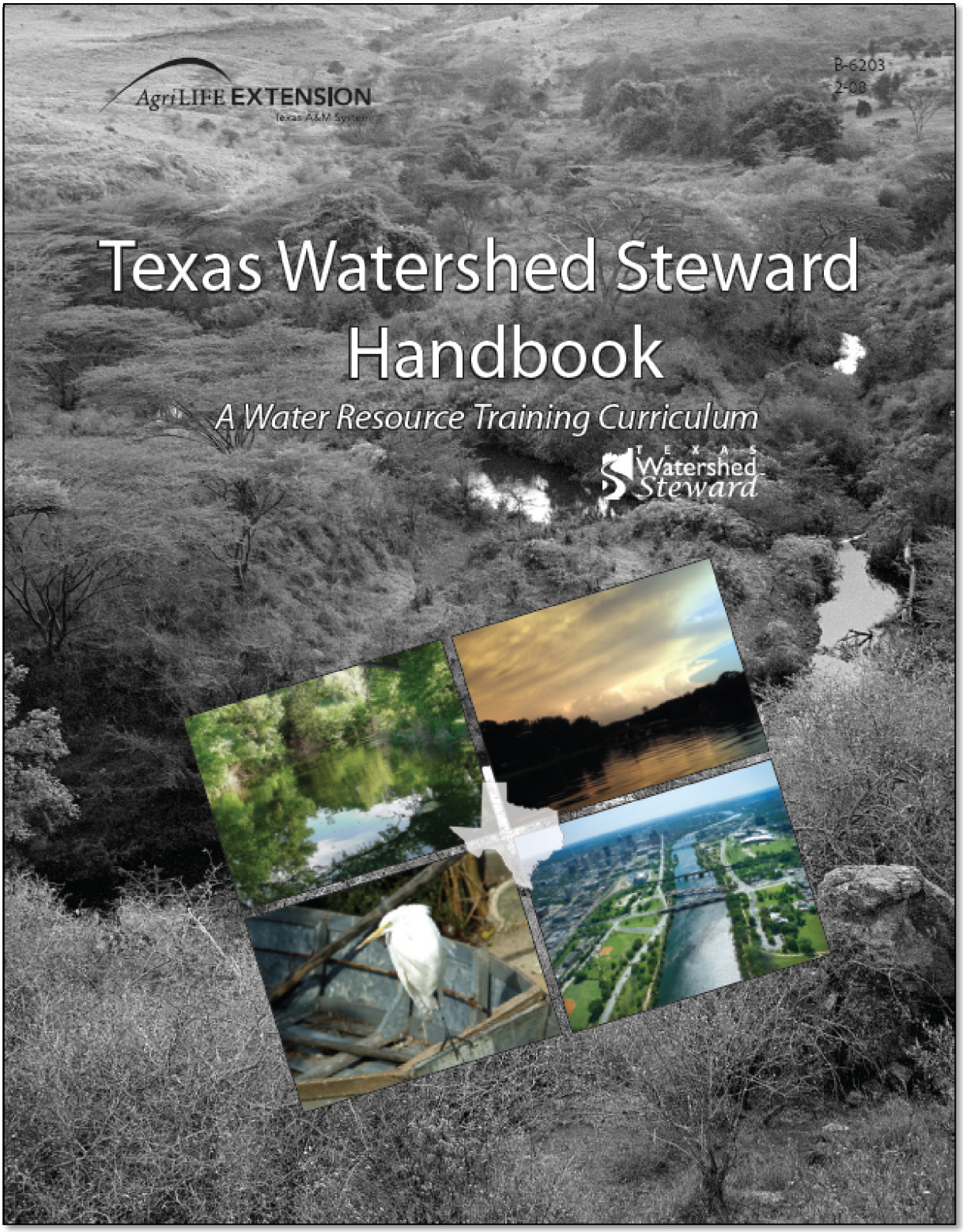
***Group Discussion***
***Module 5: Community-Driven Watershed Protection and Management***
Importance of Local Watershed Involvement
Forming and Sustaining Community Watershed Organizations and Partnerships

***Questions, Discussions, Conclusions***

***Post-Test***

**Appendix F**

**Excerpt from TWS Handbook**



# How Land Use Affects Water Quantity and Quality

The quality and quantity of our water resources are determined by natural environmental influences and the activities of humans. In this section, you will learn about the ways human actions can impair water quality and quantity. In later sections, we will focus on ways people can benefit the land by implementing various watershed management and protection strategies.

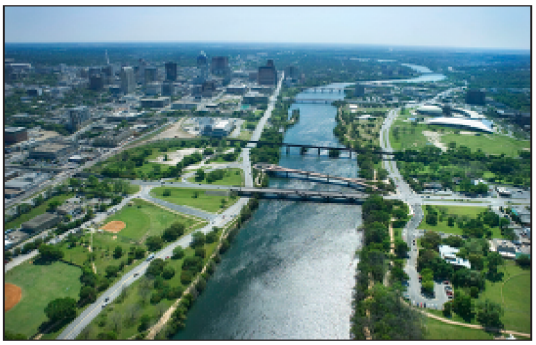


Figure 21. Overhead view of Austin, Texas showing different land use and land cover characteristics. (Photo courtesy of © 2007 JupiterImages Corporation.)

Water quality and quantity are closely linked to the way land is used and the type of land cover (Fig. 21). Specific **land use** categories include agriculture, industry, recreation, residential and urban. Most of the ways people use land has the potential to generate pollutants that can impair water quality and reduce water quantity.

**Land cover** refers to the biological or physical features of the land surface. Types of land cover include forests, agricultural fields, lakes, rivers and even parking lots. When people change the way land is used in a watershed, they usually alter the land cover at the same time. For example, when a new housing development is built, forests and fields are replaced by a new type of land cover-pavement.

Here are some activities that can degrade water quality and quantity (Fig. 22):

- Storing water and irrigating crops
- Using fertilizers
- Using industrial or agricultural chemicals
- Extracting resources
- Constructing buildings and expanding towns and cities
- Applying wastewater

The effects of these land use activities can be severe. Such activities can alter the natural hydrology of a system, alter the land cover, create pollution, increase erosion and sedimentation, allow exotic species to invade at the expense of native vegetation, and harm biodiversity.

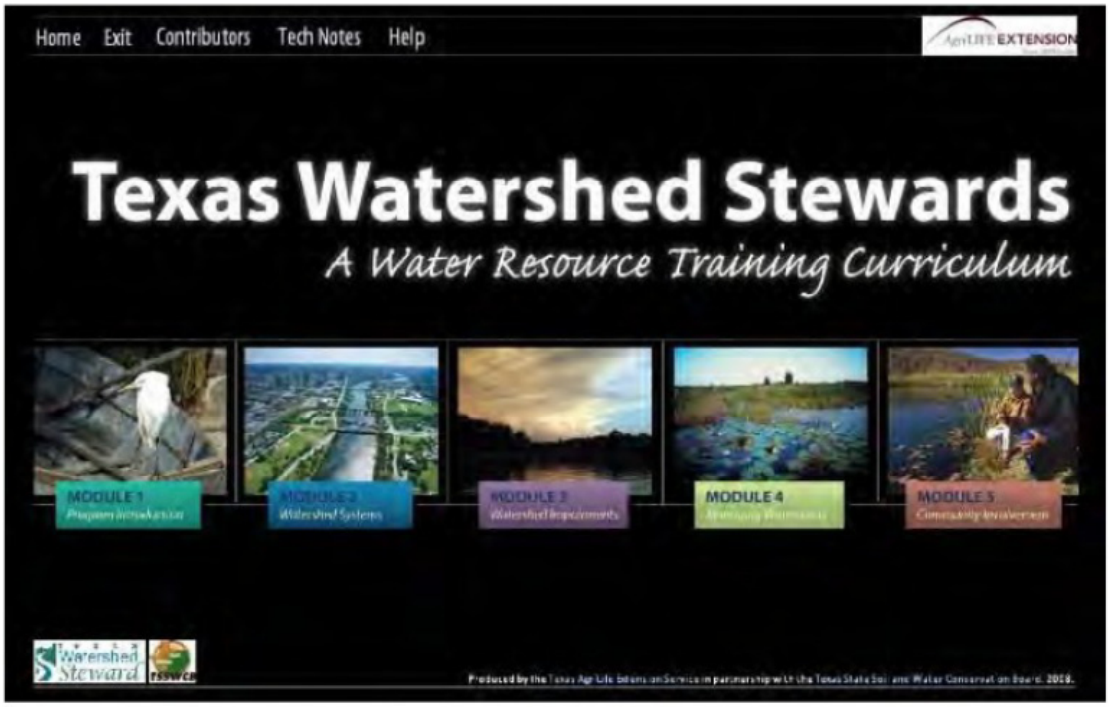
Adequate supplies of good quality water are vital to the health and social and economic well-being of all Texans. Yet water quality and quantity are at risk in many areas of the state because our population is growing and our use of the land is changing so rapidly (Table 4). We must ensure the safety of our water resources for generations to come.

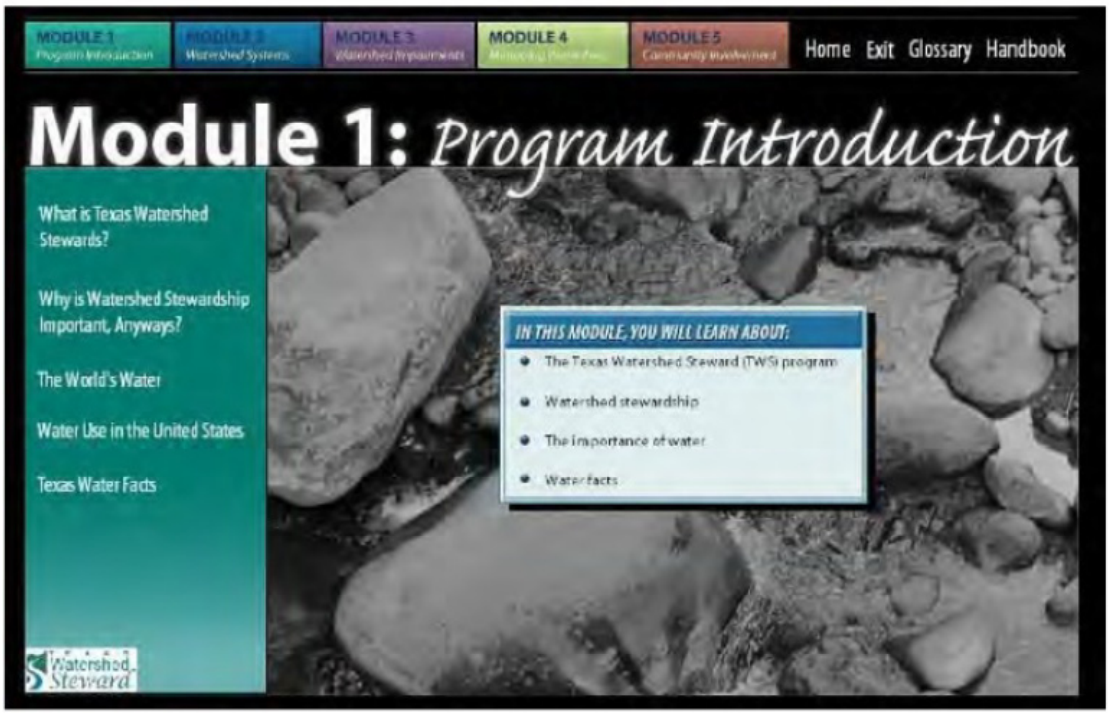
Table 4. Population projections for Texas through 2040. (Source: Texas State Data Center and Office of the State Demographer.)

| YEAR | POPULATION ESTIMATE |
|---|---|
| 2010 | 26,058,565 |
| 2015 | 29,213,801 |
| 2020 | 32,736,693 |
| 2025 | 36,682,163 |
| 2030 | 41,117,624 |
| 2035 | 46,105,933 |
| 2040 | 51,707,500 |

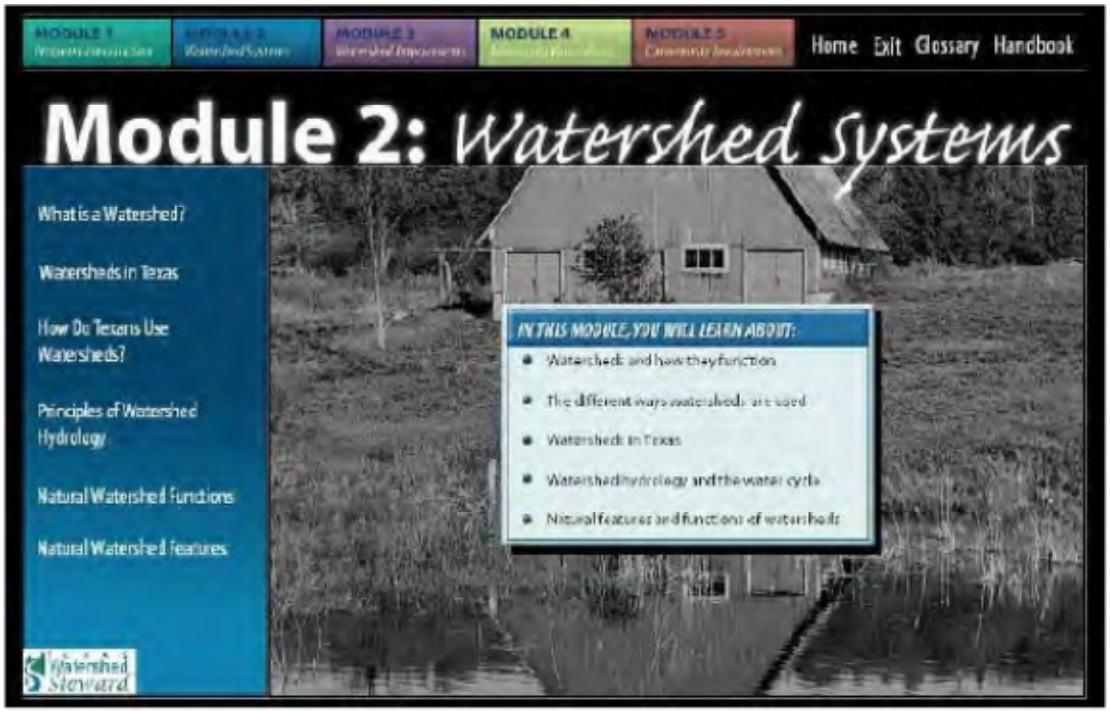
# Appendix G

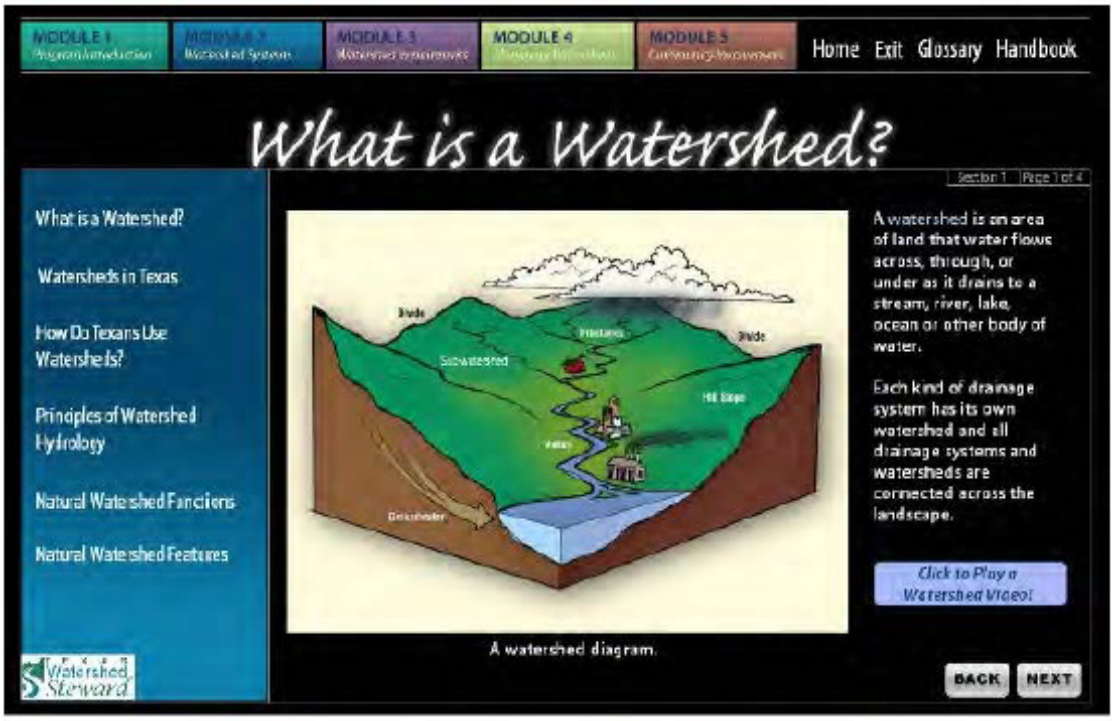
## Screenshots of TWS Online-Course

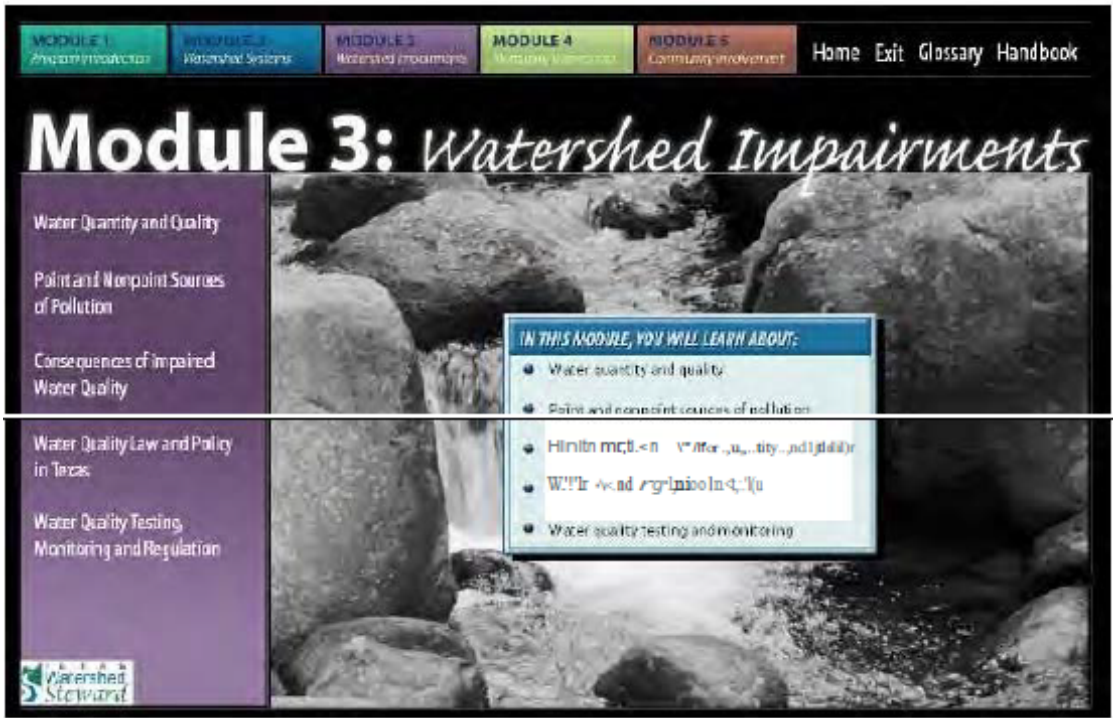


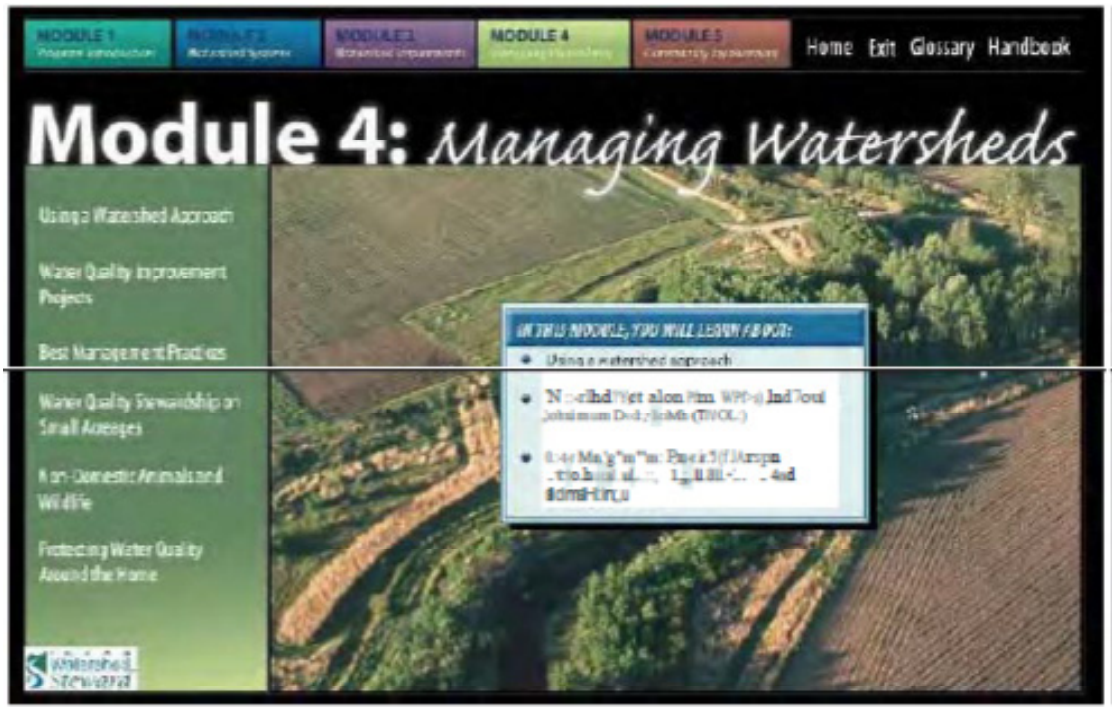



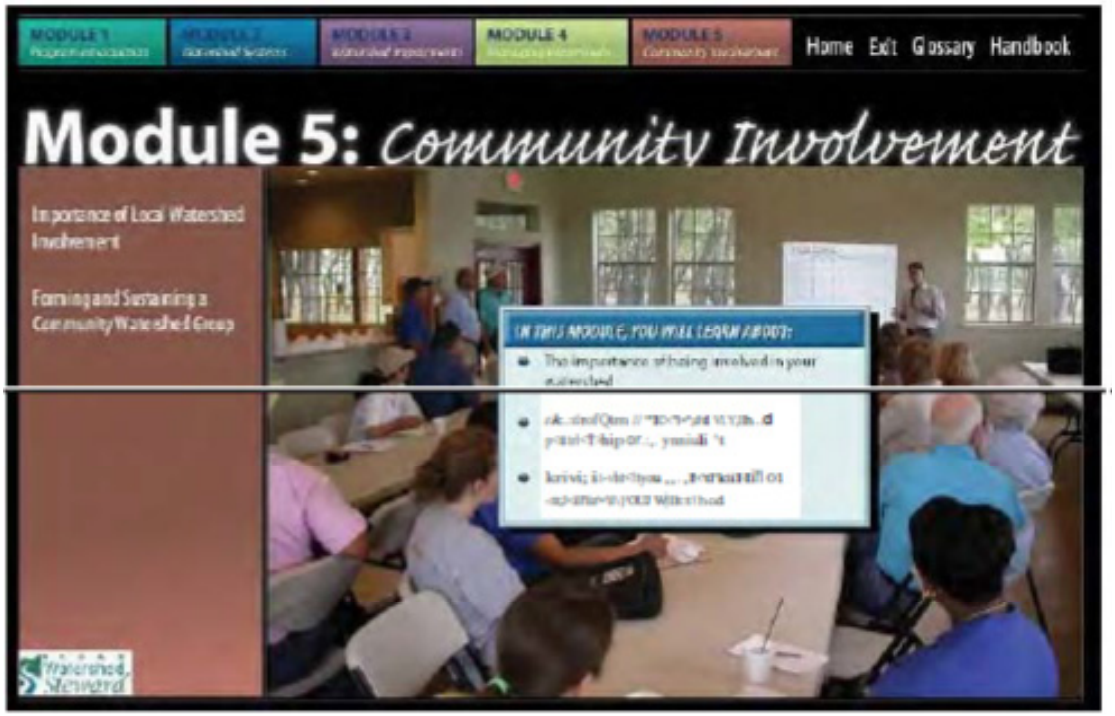
MODULE 1
MODULE 2
MODULE 3
MODULE 4
MODULE 5
Home Exit Glossary Handbook
The World's Water
What is Texas Watershed Stewards?
Why is Watershed Stewardship Important, Anyways?
The World's Water
Water Use in the United States
Texas Water Facts
We live on a water planet. In fact, roughly 75 percent of the Earth is covered by water. However, most of the world's water is contained in oceans or seas or is tied up in ice caps and glaciers. Less than 0.65 percent of all the water on Earth today is liquid fresh water, amounting to only 0.01 percent of the Earth's total water resources. For this reason, it is vital that we protect our limited water resources.
You may ask yourself where all of our water is going. About 70 percent of the world's water is being used for agricultural purposes, primarily for irrigated farming. In the past 40 years, the amount of irrigated land in the world has doubled. Roughly 8 percent of the world's freshwater resources are used for human consumption and sanitation, while the remaining 22 percent is used by industry.
If all of the Earth's water (an estimated 325 quintillion gallons) were squeezed into a gallon jug and you poured out what was not drinkable (too salty, frozen, or polluted), you'd be left with only one drop, and even that might not pass U.S. water quality standards.
DID YOU KNOW?
BACK
NEXT
Watershed Steward


MODULE 1
MODULE 2
MODULE 3
MODULE 4
MODULE 5
Home Exit Glossary Handbook
Module 2: Watershed Systems
What is a Watershed?
Watersheds in Texas
How Do Texans Use Watersheds?
Principles of Watershed Hydrology
Natural Watershed Functions
Natural Watershed features
IN THIS MODULE, YOU WILL LEARN ABOUT:
Watersheds and how they function
The different ways watersheds are used
Watersheds in Texas
Watershed hydrology and the water cycle
Natural features and functions of watersheds
Watershed Steward


MODULE 4
Home Exit Glossary Handbook
What is a Watershed?
Section 1 Page 1 of 4
What is a Watershed?
Watersheds in Texas
How Do Texans Use Watersheds?
Principles of Watershed Hydrology
Natural Watershed Functions
Natural Watershed Features
Divide
Subwatershed
Divide
Hill Slope
Groundwater
A watershed is an area of land that water flows across, through, or under as it drains to a stream, river, lake, ocean or other body of water.
Each kind of drainage system has its own watershed and all drainage systems and watersheds are connected across the landscape.
Click to Play a Watershed Video!
A watershed diagram.
BACK
NEXT
Watershed Steward


MODULE 4
Home Exit Glossary Handbook
Module 3: Watershed Impairments
Water Quantity and Quality
Point and Nonpoint Sources of Pollution
Consequences of Impaired Water Quality
Water Quality Law and Policy in Texas
Water Quality Testing, Monitoring and Regulation
IN THIS MODULE, YOU WILL LEARN ABOUT:
Water quantity and quality
Water quality testing and monitoring
Watershed Steward


MODULE 1
MODULE 2
MODULE 3
MODULE 4
MODULE 5
Home Exit Glossary Handbook
Module 4: Managing Watersheds
Using a Watershed Approach
Water Quality Improvement Projects
Best Management Practices
Water Quality Stewardship on Small Acreages
Non-Domestic Animals and Wildlife
Protecting Water Quality Around the Home
IN THIS MODULE, YOU WILL LEARN ABOUT:
Using a watershed approach


MODULE 1
MODULE 2
MODULE 3
MODULE 4
MODULE 5
Home Exit Glossary Handbook
Module 5: Community Involvement
Importance of Local Watershed Involvement
Forming and Sustaining a Community Watershed Group
IN THIS MODULE, YOU WILL LEARN ABOUT:
The importance of being involved in your watershed

# Appendix H

## Example of Online-Course Press Release and Announcement

agrilife.org http://agrilife.org/today/2011/02/15/texas-water-stewards-training-online/

# Texas Watershed Steward training course now available online

February 15, 2011 By: Paul Schattenberg

AgriLife TODAY
Sharing Stories of Everyday Solutions

COLLEGE STATION — The Texas Watershed Steward program recently made its popular watershed steward training course available online, according to program coordinators.

Training for the popular Texas Watershed Steward program is now available online and at no cost. The training consists of five modules with users having the option to receive a certificate of completion. (Texas AgriLife Extension Service photo)

"If you are unable to attend one of our many watershed steward workshops across the state, you can still benefit from all of the information simply by viewing our materials online," said Nikki Dictson, Texas AgriLife Extension Service program specialist and Texas Watershed Steward program coordinator.

Dictson said the online course can be found at http://tws.tamu.edu/online-course. The course consists of five modules, a glossary of terms and acronyms, and additional information on water quality agencies and information sources.

Those wishing to take the course can register on the site. There is no cost for the online training and no time limit for completing the course materials.

"Visitors can view the materials as a guest user or may enroll in the course to receive a certificate of completion, which requires completing all the course modules and a quick pre- and post-test," she said. "They'll also have access to all of the same information supplied in the face-to-face workshops we hold around the state."

Dictson said the Texas Watershed Steward program is implemented through a partnership between AgriLife Extension and the Texas State Soil and Water Conservation Board. She said it is open to any individual or group interested in water quality and healthy watersheds, including landowners, urban residents, agricultural producers, conservation districts, city planners, business owners and community leaders. Funding is provided through a Clean Water Act Section 319(h) nonpoint source grant from the soil and water board and U.S. Environmental Protection Agency.

"Participants who attend one of the multiple workshops held throughout the state or use our new online training will learn about watershed systems, water quality regulation and monitoring, methods to improve water quality, and community-driven watershed protection and management," she said.

Dictson said the training gives participants the basic knowledge and tools they need to form a watershed action group, participate in watershed protection activities, and become more involved in protecting and enhancing their community water resources.

She added that all watersheds in Texas are threatened by nonpoint sources of pollution and that federal and state water-resource management agencies have adopted a watershed-scale approach for managing water quality.

“One vital component of this approach involves engaging local stakeholders to become actively involved in planning and implementing water resource management and protection programs in their watershed,” Dictson said. “The Texas Watershed Steward program was initiated to provide science-based, watershed education to help citizens identify and take action to address local water quality impairments.”

Dictson said the online watershed steward course currently may be viewed in Internet Explorer or Mozilla Firefox, and that course module sections can be viewed by clicking on the individual links found below each module.

“There’s also a glossary of terms and acronyms that appears on the left-hand side of the screen to help online users if they are unfamiliar with a word or organization and need more information,” she said.

Dictson said once visitors have completed the online training, including pre- and post-tests, they become an official Texas Watershed Steward and receive a certificate of completion.
The online course consists of five modules:

– Program Introduction — the importance of watershed stewardship, the world’s water, U.S. water use and Texas water facts.

– Overview of Watershed Systems — what constitutes a watershed, watersheds in Texas, principles of watershed hydrology, and natural watershed features and functions.

– Overview of Watershed Impairments — point and nonpoint sources of pollution, consequences of impaired water quality, water quality law and policy, and water quality testing and monitoring.

– Managing to Improve Watershed Function — using the watershed approach, best management practices to protect water quality in urban areas, on agricultural land and around the home.

– Community-Driven Watershed Protection and Management — the importance of local involvement in watershed protection, and how to form and sustain a community-based watershed group.

For more information on the Texas Watershed Steward program, visit http://tws.tamu.edu . For more information about either statewide face-to-face workshops and online training, contact Dictson at 979-458-3478 or ndictson@ag.tamu.edu.

-30-

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## Texas Watershed Steward Online Training Course

**Free online training for individuals, groups interested in 'healthy' watersheds. Click on the link below for more information and to sign up for the training.**

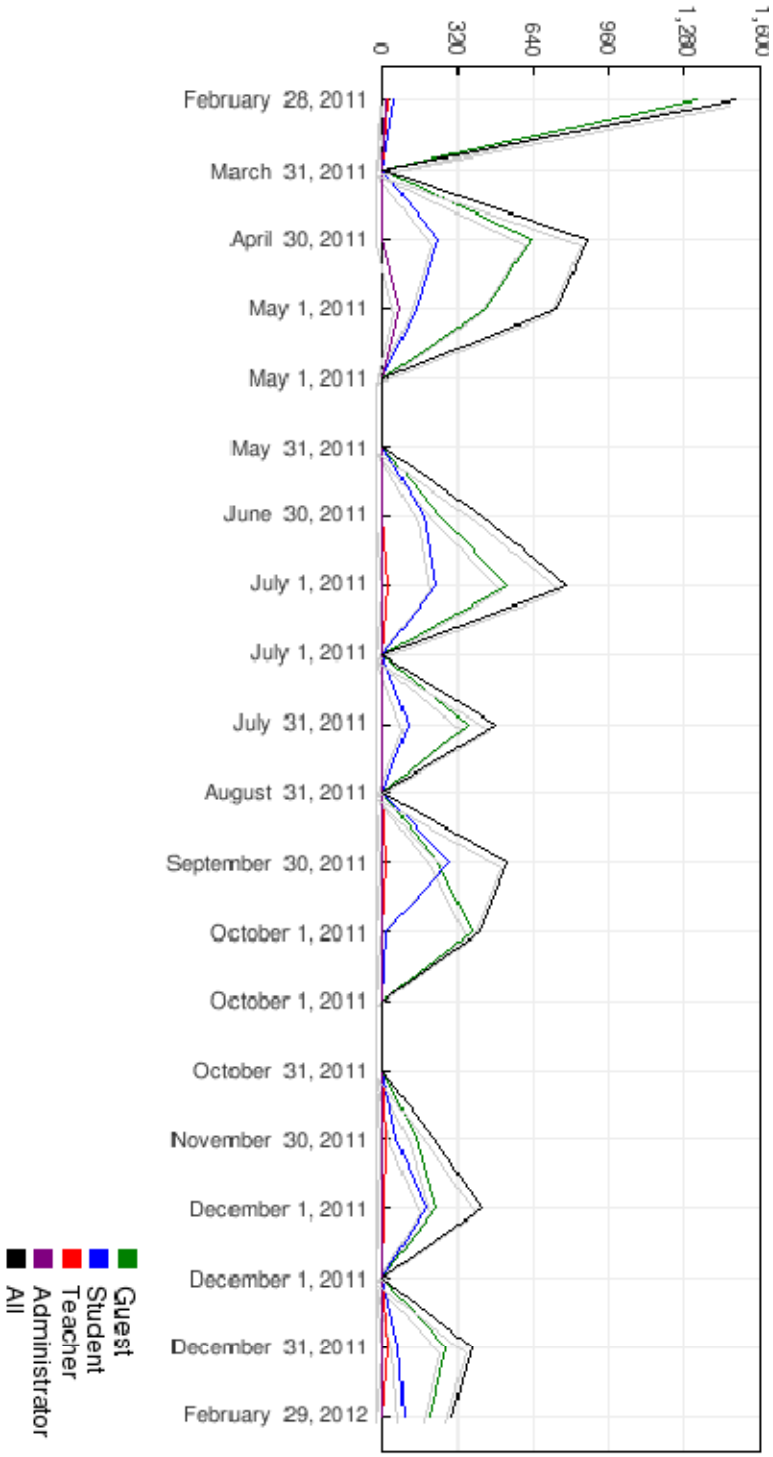
The Texas Watershed Steward (TWS) Online Training Course

Printer-friendly Version

# Appendix I

## Excerpts from Moodle Data

TWS Online Course -Views (all roles)



# *Pre-Test: Texas Watershed Steward Program*

***The purpose of this pre-test is to help us learn more about you and to determine the baseline data on watershed related to 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!!!***

**1.** Watershed hydrology is the study of how:

| Response | Average | Total |
|---|---|---|
| Water interacts with various parts of a watershed including the land, the sea, and the sky | 70% | 47 |
| Water quality and quantity are affected by point and non-point source pollution | 12% | 8 |
| Chemical, physical, and biological water quality parameters change over time | 12% | 8 |
| Unsure | 6% | 4 |
| Total | 100% | 67/67 |

**2.** pH is measured on a scale of:

| Response | Average | Total |
|---|---|---|
| 1-5 | 4% | 3 |
| 1-12 | 13% | 9 |
| 0-10 | 12% | 8 |
| 0-14 | 49% | 33 |
| 0-20 | 4% | 3 |
| Unsure | 16% | 11 |
| Total | 100% | 67/67 |

# *Post-Test: Texas Watershed Steward Program*

***The purpose of this post-test is to help us learn more about you and to determine the baseline data on watershed related to 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!!!***

**1.** Overall, how satisfied are you with this activity?

| Response | Average | Total |
|---|---|---|
| Mostly | 19% | 8 |
| Completely | 81% | 34 |
| Total | 100% | 42/42 |

**4.** 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.

| Response | Average | Total |
|---|---|---|
| 6 | 2% | 1 |
| 7 | 2% | 1 |
| 8 | 5% | 2 |
| 9 | 17% | 7 |
| 10 (Likely) | 74% | 31 |
| Total | 100% | 42/42 |

# Appendix J

# Current Versions of Pre- and Post-Test Evaluations

AgriLIFE EXTENSION
Texas A&M System

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

**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

**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!**

AgriLIFE EXTENSION
Texas A&M System

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

**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

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

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

49705

**THANK YOU!**

# Appendix K

# Example of 6 month post-test results

## Texas Watershed Stewardship Program Follow-Up Survey
## May 5, 2010

*Developed by Jennifer Peterson–Extension Program Specialist – Water Quality*
*with support from the Organization Development Unit,*
*Department of Leadership, Education & Communications, Texas A&M University.*

In order to measure adoption of recommended practices promoted by the Texas Watershed Stewardship Program, along with other post-program activities, a follow-up survey of participants was conducted several months after the program. The following results are based on responses from 347 participants from the Kyle, Wellington, Pflugerville, Lake Jackson, Brady, Luling, Lampasas, Comanche, Rio Farms and Franklin, Lake Granbury, Hickory C, Wimberly, Kaufman, and Eagle Mountain events.

**Adoption of Practices:**

- **120 of 347 (34.6%)** participants have participated in at least one community clean-up activity.
  - **124 of 347 (35.7%)** participants have not but still plan to.
  - **25 of 347 (7.2%)** participants have not and don't plan to.
  - **18 of 347 (5.2%)** participants are still undecided.
  - **60 of 347 (17.3%)** participants did not respond to the question.

- **104 of 347 (30.0%)** participants have gotten involved in local planning/zoning decisions.
  - **94 of 347 (27.1%)** participants have not but still plan to.
  - **48 of 347 (13.8%)** participants have not and don't plan to.
  - **38 of 347 (11.0%)** participants are still undecided.
  - **63 of 347 (18.2%)** participants did not respond to the question.

- **145 of 347 (41.8%)** participants have communicated water issues with elected officials.
  - **87 of 347 (25.1%)** participants have not but still plan to.
  - **25 of 347 (7.2%)** participants have not and don't plan to.
  - **26 of 347 (7.5%)** participants are still undecided.
  - **64 of 347 (18.4%)** participants did not respond to the question.

- **77 of 347 (22.2%)** participants have helped develop a plan for their watershed (Watershed Protection Plan).
  - **105 of 347 (30.3%)** participants have not but still plan to.
  - **61 of 347 (17.6%)** participants have not and don't plan to.
  - **45 of 347 (13.0%)** participants are still undecided.
  - **59 of 347 (17.0%)** participants did not respond to the question.

- **78 of 347 (22.5%)** participants have helped form or became a member of a local watershed group.
  - **96 of 347 (27.7%)** participants have not but still plan to.
  - **56 of 347 (16.1%)** participants have not and don't plan to.
  - **53 of 347 (15.3%)** participants are still undecided.
  - **64 of 347 (18.4%)** participants did not respond to the question.

- **71 of 347 (20.5%)** participants have gotten involved in a volunteer water quality monitoring program.
  - **87 of 347 (25.1%)** participants have not but still plan to.
  - **66 of 347 (19.0%)** participants have not and don't plan to.
  - **55 of 347 (15.9%)** participants are still undecided.
  - **68 of 347 (19.6%)** participants did not respond to the question.

- **66 of 347 (19.0%)** participants have not and don't plan to.
- **55 of 347 (15.9%)** participants are still undecided.
- **68 of 347 (19.6%)** participants did not respond to the question.

- **121 of 347 (34.9%)** participants have given a presentation to a school class or other community group on watershed stewardship/water quality issues.
  - **66 of 347 (19.0%)** participants have not but still plan to.
  - **60 of 347 (17.3%)** participants have not and don't plan to.
  - **33 of 347 (9.5%)** participants are still undecided.
  - **67 of 347 (19.3%)** participants did not respond to the question.

- **203 of 347 (58.5%)** participants encouraged others in their community to attend a TWS workshop.
  - **48 of 347 (13.8%)** participants have not but still plan to.
  - **13 of 347 (3.7%)** participants have not and don't plan to.
  - **18 of 347 (5.2%)** participants are still undecided.
  - **65 of 347 (18.7%)** participants did not respond to the question.

- **240 of 347 (69.2%)** participants more closely monitor their individual actions that can impair water quality.
  - **17 of 347 (4.9%)** participants have not but still plan to.
  - **11 of 347 (3.2%)** participants have not and don't plan to.
  - **7 of 347 (2.0%)** participants are still undecided.
  - **72 of 347 (20.7%)** participants did not respond to the question.

- **211 of 347 (60.8%)** participants have adopted/maintained Best Management Practices (BMPs) on their property or in their community related to improving water quality.
  - **44 of 347 (12.7%)** participants have not but still plan to.
  - **9 of 347 (2.6%)** participants have not and don't plan to.
  - **15 of 347 (4.3%)** participants are still undecided.
  - **68 of 347 (19.6%)** participants did not respond to the question.

- **62 of 347 (17.9%)** participants have adopted soil testing practices.
  - **120 of 347 (34.6%)** participants have not but still plan to.
  - **54 of 347 (15.6%)** participants have not and don't plan to.
  - **41 of 347 (11.8%)** participants are still undecided.
  - **70 of 347 (20.2%)** participants did not respond to the question.

**Resources Used.**

The following section focuses on the TWS resources used by the participants after the TWS workshop.

- **232 of 347 (66.9%)** participants have used the resources/materials provided to them at the workshop. 66 of 347 (19.0%) participants did not respond to the question
- **268 of 347 (77.2%)** participants were satisfied with the resources/materials provided to them at the workshop. 69 of 347 (19.9%) participants did not respond to the question
- **207 of 347 (59.7%)** participants have shared the resources/materials provided to them at the workshop with others. 67 of 347 (19.3%) participants did not respond to the question
- **240 of 347 (69.2%)** participants would be interested in TWS on-line modules if they were available in the future. 69 of 347 (19.9%) participants did not respond to the question

# Appendix L

## Example of pre- and post-test dataset

TWS Results Aggregated - Filtered on 'Post-Graduate Degree' (Cases Removed)
March 2012

(PRE) 19a. Interest in protecting my watershed

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Definitely interested | 657 | 81.7 | 84.1 | 84.1 |
| | Probably interested | 81 | 10.1 | 10.4 | 94.5 |
| | Possibly interested | 38 | 4.7 | 4.9 | 99.4 |
| | Not interested | 5 | .6 | .6 | 100.0 |
| | Total | 781 | 97.1 | 100.0 | |
| Missing | System | 23 | 2.9 | | |
| Total | | 804 | 100.0 | | |

(PRE) 19b. Interest in participating in additional watershed education workshops or seminars

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Definitely interested | 366 | 45.5 | 47.5 | 47.5 |
| | Probably interested | 284 | 35.3 | 36.9 | 84.4 |
| | Possibly interested | 99 | 12.3 | 12.9 | 97.3 |
| | Not interested | 21 | 2.6 | 2.7 | 100.0 |
| | Total | 770 | 95.8 | 100.0 | |
| Missing | System | 34 | 4.2 | | |
| Total | | 804 | 100.0 | | |

(PRE) 19c. Interest in becoming active in a local watershed group

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Definitely interested | 235 | 29.2 | 31.0 | 31.0 |
| | Probably interested | 234 | 29.1 | 30.9 | 61.9 |
| | Possibly interested | 241 | 30.0 | 31.8 | 93.7 |
| | Not interested | 48 | 6.0 | 6.3 | 100.0 |
| | Total | 758 | 94.3 | 100.0 | |
| Missing | System | 46 | 5.7 | | |
| Total | | 804 | 100.0 | | |

(PRE) 19d. Interest in having a leadership role in a local watershed group

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Definitely interested | 130 | 16.2 | 17.3 | 17.3 |
| | Probably interested | 133 | 16.5 | 17.7 | 35.1 |
| | Possibly interested | 240 | 29.9 | 32.0 | 67.1 |
| | Not interested | 247 | 30.7 | 32.9 | 100.0 |
| | Total | 750 | 93.3 | 100.0 | |
| Missing | System | 54 | 6.7 | | |
| Total | | 804 | 100.0 | | |

(PRE) 19e. Interest in participating in a volunteer water quality monitoring program

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Definitely interested | 212 | 26.4 | 27.6 | 27.6 |
| | Probably interested | 215 | 26.7 | 28.0 | 55.7 |
| | Possibly interested | 252 | 31.3 | 32.9 | 88.5 |
| | Not interested | 88 | 10.9 | 11.5 | 100.0 |
| | Total | 767 | 95.4 | 100.0 | |
| Missing | System | 37 | 4.6 | | |
| Total | | 804 | 100.0 | | |

(PRE) 20a. Have you received water quality information from Television

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | 411 | 51.1 | 54.7 | 54.7 |
| | No | 296 | 36.8 | 39.4 | 94.1 |
| | NA | 44 | 5.5 | 5.9 | 100.0 |
| | Total | 751 | 93.4 | 100.0 | |
| Missing | System | 53 | 6.6 | | |
| Total | | 804 | 100.0 | | |

(PRE) 20b. Have you received water quality information from Newspapers

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | 487 | 60.6 | 64.9 | 64.9 |
| | No | 224 | 27.9 | 29.9 | 94.8 |
| | NA | 39 | 4.9 | 5.2 | 100.0 |
| | Total | 750 | 93.3 | 100.0 | |
| Missing | System | 54 | 6.7 | | |
| Total | | 804 | 100.0 | | |

(PRE) 20c. Have you received water quality information from Internet

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | 547 | 68.0 | 72.6 | 72.6 |
| | No | 166 | 20.6 | 22.0 | 94.7 |
| | NA | 40 | 5.0 | 5.3 | 100.0 |
| | Total | 753 | 93.7 | 100.0 | |
| Missing | System | 51 | 6.3 | | |
| Total | | 804 | 100.0 | | |

(PRE) 20d. Have you received water quality information from Texas AgriLife Extension Service

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | 481 | 59.8 | 63.4 | 63.4 |
| | No | 232 | 28.9 | 30.6 | 93.9 |
| | NA | 46 | 5.7 | 6.1 | 100.0 |
| | Total | 759 | 94.4 | 100.0 | |
| Missing | System | 45 | 5.6 | | |
| Total | | 804 | 100.0 | | |

(PRE) 20e. Have you received water quality information from Texas AgriLife Research

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | 322 | 40.0 | 43.9 | 43.9 |
| | No | 341 | 42.4 | 46.5 | 90.3 |
| | NA | 71 | 8.8 | 9.7 | 100.0 |
| | Total | 734 | 91.3 | 100.0 | |
| Missing | System | 70 | 8.7 | | |
| Total | | 804 | 100.0 | | |

(PRE) 20f. Have you received water quality information from Universities

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | 359 | 44.7 | 49.2 | 49.2 |
| | No | 309 | 38.4 | 42.3 | 91.5 |
| | NA | 62 | 7.7 | 8.5 | 100.0 |
| | Total | 730 | 90.8 | 100.0 | |
| Missing | System | 74 | 9.2 | | |
| Total | | 804 | 100.0 | | |

(PRE) 20g. Have you received water quality information from Environmental Agencies (government)

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | 534 | 66.4 | 71.3 | 71.3 |
| | No | 173 | 21.5 | 23.1 | 94.4 |
| | NA | 42 | 5.2 | 5.6 | 100.0 |
| | Total | 749 | 93.2 | 100.0 | |
| Missing | System | 55 | 6.8 | | |
| Total | | 804 | 100.0 | | |

(PRE) 20h. Have you received water quality information from Environmental groups (citizens groups)

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | 398 | 49.5 | 54.3 | 54.3 |
| | No | 288 | 35.8 | 39.3 | 93.6 |
| | NA | 47 | 5.8 | 6.4 | 100.0 |
| | Total | 733 | 91.2 | 100.0 | |
| Missing | System | 71 | 8.8 | | |
| Total | | 804 | 100.0 | | |

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

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Other | 213 | 26.5 | 28.7 | 28.7 |
| | Extension | 173 | 21.5 | 23.3 | 52.0 |
| | Internet | 146 | 18.2 | 19.7 | 71.7 |
| | Friend | 86 | 10.7 | 11.6 | 83.3 |
| | Newspaper | 72 | 9.0 | 9.7 | 93.0 |
| | Newsletter | 47 | 5.8 | 6.3 | 99.3 |
| | Texas Coop Magazine | 3 | .4 | .4 | 99.7 |
| | Utility insert | 2 | .2 | .3 | 100.0 |
| | Total | 742 | 92.3 | 100.0 | |
| Missing | System | 62 | 7.7 | | |
| Total | | 804 | 100.0 | | |

(PRE) 22. How would you best describe yourself?

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Rural landowner | 156 | 19.4 | 20.5 | 20.5 |
| | Urban landowner | 114 | 14.2 | 15.0 | 35.5 |
| | Agency Professional | 122 | 15.2 | 16.0 | 51.5 |
| | Watershed council member | 35 | 4.4 | 4.6 | 56.1 |
| | Member of a non-governmental organization | 68 | 8.5 | 8.9 | 65.0 |
| | Teacher / educational professional | 252 | 31.3 | 33.1 | 98.2 |
| | Other | 14 | 1.7 | 1.8 | 100.0 |
| | Total | 761 | 94.7 | 100.0 | |
| Missing | System | 43 | 5.3 | | |
| Total | | 804 | 100.0 | | |

(PRE) 23. Your are . . .

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Female | 331 | 41.2 | 42.4 | 42.4 |
| | Male | 450 | 56.0 | 57.6 | 100.0 |
| | Total | 781 | 97.1 | 100.0 | |
| Missing | System | 23 | 2.9 | | |
| Total | | 804 | 100.0 | | |

(PRE) 24. Your age

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 18-24 | 46 | 5.7 | 5.8 | 5.8 |
| | 25-29 | 60 | 7.5 | 7.6 | 13.4 |
| | 30-34 | 44 | 5.5 | 5.6 | 19.0 |
| | 35-39 | 52 | 6.5 | 6.6 | 25.6 |
| | 40-44 | 46 | 5.7 | 5.8 | 31.4 |
| | 45-49 | 62 | 7.7 | 7.8 | 39.2 |
| | 50-54 | 103 | 12.8 | 13.0 | 52.3 |
| | 55-59 | 115 | 14.3 | 14.6 | 66.8 |
| | 60-64 | 96 | 11.9 | 12.2 | 79.0 |
| | 65-69 | 91 | 11.3 | 11.5 | 90.5 |
| | 70-74 | 51 | 6.3 | 6.5 | 97.0 |
| | 75+ | 24 | 3.0 | 3.0 | 100.0 |
| | Total | 790 | 98.3 | 100.0 | |
| Missing | System | 14 | 1.7 | | |
| Total | | 804 | 100.0 | | |

(PRE) 25. Your place of residence

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | A | 99 | 12.3 | 12.4 | 12.4 |
| | AC | 4 | .5 | .5 | 12.9 |
| | AD | 2 | .2 | .3 | 13.2 |
| | AF | 1 | .1 | .1 | 13.3 |
| | B | 128 | 15.9 | 16.0 | 29.3 |
| | BD | 3 | .4 | .4 | 29.7 |
| | BF | 1 | .1 | .1 | 29.8 |
| | C | 118 | 14.7 | 14.8 | 44.6 |
| | CD | 7 | .9 | .9 | 45.5 |
| | CE | 1 | .1 | .1 | 45.6 |
| | D | 115 | 14.3 | 14.4 | 60.0 |
| | DG | 1 | .1 | .1 | 60.2 |
| | E | 112 | 13.9 | 14.0 | 74.2 |
| | EF | 1 | .1 | .1 | 74.3 |
| | F | 102 | 12.7 | 12.8 | 87.1 |
| | FG | 3 | .4 | .4 | 87.5 |
| | G | 100 | 12.4 | 12.5 | 100.0 |
| | Total | 798 | 99.3 | 100.0 | |
| Missing | 19 | 6 | .7 | | |
| Total | | 804 | 100.0 | | |

(PRE) 25A. Farm or ranch 0 - 100 acres

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | 106 | 13.2 | 13.3 | 13.3 |
| | No | 694 | 86.3 | 86.8 | 100.0 |
| | Total | 800 | 99.5 | 100.0 | |
| Missing | System | 4 | .5 | | |
| Total | | 804 | 100.0 | | |

(PRE) 25B. Farm or ranch > 100 acres

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | 132 | 16.4 | 19.1 | 19.1 |
| | No | 559 | 69.5 | 80.9 | 100.0 |
| | Total | 691 | 85.9 | 100.0 | |
| Missing | System | 113 | 14.1 | | |
| Total | | 804 | 100.0 | | |

(PRE) 25C. Rural area, not a farm / ranch

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | 130 | 16.2 | 16.3 | 16.3 |
| | No | 670 | 83.3 | 83.8 | 100.0 |
| | Total | 800 | 99.5 | 100.0 | |
| Missing | System | 4 | .5 | | |
| Total | | 804 | 100.0 | | |

(PRE) 25D. Town under 10,000

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | 128 | 15.9 | 16.0 | 16.0 |
| | No | 672 | 83.6 | 84.0 | 100.0 |
| | Total | 800 | 99.5 | 100.0 | |
| Missing | System | 4 | .5 | | |
| Total | | 804 | 100.0 | | |

(PRE) 25E. Town or city between 10,000 and 50,000 persons

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | 114 | 14.2 | 14.3 | 14.3 |
| | No | 686 | 85.3 | 85.8 | 100.0 |
| | Total | 800 | 99.5 | 100.0 | |
| Missing | System | 4 | .5 | | |
| Total | | 804 | 100.0 | | |

(PRE) 25F. City between 50,000 and 250,000 persons

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | 108 | 13.4 | 13.5 | 13.5 |
| | No | 692 | 86.1 | 86.5 | 100.0 |
| | Total | 800 | 99.5 | 100.0 | |
| Missing | System | 4 | .5 | | |
| Total | | 804 | 100.0 | | |

(PRE) 25G. City over 250,000 persons

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | 104 | 12.9 | 13.0 | 13.0 |
| | No | 696 | 86.6 | 87.0 | 100.0 |
| | Total | 800 | 99.5 | 100.0 | |
| Missing | System | 4 | .5 | | |
| Total | | 804 | 100.0 | | |

(PRE) 26. Highest level of education

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Some high school or less | 22 | 2.7 | 2.7 | 2.7 |
| | High school graduate or GED | 61 | 7.6 | 7.6 | 10.3 |
| | Vocational or technical degree | 30 | 3.7 | 3.7 | 14.1 |
| | Some college | 184 | 22.9 | 22.9 | 36.9 |
| | Bachelor degree | 507 | 63.1 | 63.1 | 100.0 |
| | Total | 804 | 100.0 | 100.0 | |

1. Overall, how satisfied are you with this activity?

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Completely | 870 | 63.7 | 69.0 | 69.0 |
| | Mostly | 367 | 26.9 | 29.1 | 98.2 |
| | Somewhat | 21 | 1.5 | 1.7 | 99.8 |
| | Slightly | 1 | .1 | .1 | 99.9 |
| | Not at all | 1 | .1 | .1 | 100.0 |
| | Total | 1260 | 92.2 | 100.0 | |
| Missing | System | 106 | 7.8 | | |
| Total | | 1366 | 100.0 | | |

2a. How satisfied were you with the quality of course materials?

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Completely | 1038 | 76.0 | 76.5 | 76.5 |
| | Mostly | 306 | 22.4 | 22.5 | 99.0 |
| | Somewhat | 11 | .8 | .8 | 99.9 |
| | Slightly | 1 | .1 | .1 | 99.9 |
| | Not at all | 1 | .1 | .1 | 100.0 |
| | Total | 1357 | 99.3 | 100.0 | |
| Missing | System | 9 | .7 | | |
| Total | | 1366 | 100.0 | | |

2b. How satisfied were you with the location of the activity?

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Completely | 957 | 70.1 | 70.5 | 70.5 |
| | Mostly | 298 | 21.8 | 21.9 | 92.4 |
| | Somewhat | 84 | 6.1 | 6.2 | 98.6 |
| | Slightly | 13 | 1.0 | 1.0 | 99.6 |
| | Not at all | 6 | .4 | .4 | 100.0 |
| | Total | 1358 | 99.4 | 100.0 | |
| Missing | System | 8 | .6 | | |
| Total | | 1366 | 100.0 | | |

2c. How satisfied were you with the accuracy of information?

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Completely | 993 | 72.7 | 74.1 | 74.1 |
| | Mostly | 323 | 23.6 | 24.1 | 98.2 |
| | Somewhat | 21 | 1.5 | 1.6 | 99.8 |
| | Slightly | 2 | .1 | .1 | 99.9 |
| | Not at all | 1 | .1 | .1 | 100.0 |
| | Total | 1340 | 98.1 | 100.0 | |
| Missing | System | 26 | 1.9 | | |
| Total | | 1366 | 100.0 | | |

2d. How satisfied were you with the information being new to you?

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Completely | 346 | 25.3 | 25.7 | 25.7 |
| | Mostly | 431 | 31.6 | 32.0 | 57.7 |
| | Somewhat | 386 | 28.3 | 28.7 | 86.3 |
| | Slightly | 157 | 11.5 | 11.7 | 98.0 |
| | Not at all | 27 | 2.0 | 2.0 | 100.0 |
| | Total | 1347 | 98.6 | 100.0 | |
| Missing | System | 19 | 1.4 | | |
| Total | | 1366 | 100.0 | | |

2e. How satisfied were you with the Information being easy to understand?

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Completely | 876 | 64.1 | 64.8 | 64.8 |
| | Mostly | 421 | 30.8 | 31.1 | 95.9 |
| | Somewhat | 46 | 3.4 | 3.4 | 99.3 |
| | Slightly | 7 | .5 | .5 | 99.9 |
| | Not at all | 2 | .1 | .1 | 100.0 |
| | Total | 1352 | 99.0 | 100.0 | |
| Missing | System | 14 | 1.0 | | |
| Total | | 1366 | 100.0 | | |

2f. How satisfied were you with the range of topics covered?

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Completely | 852 | 62.4 | 63.0 | 63.0 |
| | Mostly | 449 | 32.9 | 33.2 | 96.2 |
| | Somewhat | 43 | 3.1 | 3.2 | 99.4 |
| | Slightly | 8 | .6 | .6 | 100.0 |
| | Total | 1352 | 99.0 | 100.0 | |
| Missing | System | 14 | 1.0 | | |
| Total | | 1366 | 100.0 | | |

2g. How satisfied were you with the completeness of information given?

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Completely | 851 | 62.3 | 62.9 | 62.9 |
| | Mostly | 450 | 32.9 | 33.3 | 96.2 |
| | Somewhat | 42 | 3.1 | 3.1 | 99.3 |
| | Slightly | 8 | .6 | .6 | 99.9 |
| | Not at all | 1 | .1 | .1 | 100.0 |
| | Total | 1352 | 99.0 | 100.0 | |
| Missing | System | 14 | 1.0 | | |
| Total | | 1366 | 100.0 | | |

2h. How satisfied were you with the timeliness of information (being received in time to be useful)?

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Completely | 888 | 65.0 | 65.9 | 65.9 |
| | Mostly | 387 | 28.3 | 28.7 | 94.6 |
| | Somewhat | 69 | 5.1 | 5.1 | 99.7 |
| | Slightly | 3 | .2 | .2 | 99.9 |
| | Not at all | 1 | .1 | .1 | 100.0 |
| | Total | 1348 | 98.7 | 100.0 | |
| Missing | System | 18 | 1.3 | | |
| Total | | 1366 | 100.0 | | |

2i. How satisfied were you with the helpfulness of the information in decisions about your own situation?

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Completely | 751 | 55.0 | 55.8 | 55.8 |
| | Mostly | 461 | 33.7 | 34.3 | 90.1 |
| | Somewhat | 114 | 8.3 | 8.5 | 98.6 |
| | Slightly | 16 | 1.2 | 1.2 | 99.8 |
| | Not at all | 3 | .2 | .2 | 100.0 |
| | Total | 1345 | 98.5 | 100.0 | |
| Missing | System | 21 | 1.5 | | |
| Total | | 1366 | 100.0 | | |

2j. How satisfied were you with the instructor's knowledge level of subject matter?

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Completely | 1095 | 80.2 | 81.1 | 81.1 |
| | Mostly | 241 | 17.6 | 17.9 | 99.0 |
| | Somewhat | 13 | 1.0 | 1.0 | 99.9 |
| | Slightly | 1 | .1 | .1 | 100.0 |
| | Total | 1350 | 98.8 | 100.0 | |
| Missing | System | 16 | 1.2 | | |
| Total | | 1366 | 100.0 | | |

2k. How satisfied were you with the instructor's responses to questions?

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Completely | 1042 | 76.3 | 77.1 | 77.1 |
| | Mostly | 287 | 21.0 | 21.2 | 98.4 |
| | Somewhat | 16 | 1.2 | 1.2 | 99.6 |
| | Slightly | 4 | .3 | .3 | 99.9 |
| | Not at all | 2 | .1 | .1 | 100.0 |
| | Total | 1351 | 98.9 | 100.0 | |
| Missing | System | 15 | 1.1 | | |
| Total | | 1366 | 100.0 | | |

## Statistics

**3. 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?**

| | | |
|---|---|---|
| N | Valid | 1348 |
| | Missing | 18 |
| Mean | | 9.45 |
| Median | | 10.00 |
| Std. Deviation | | 1.116 |
| Minimum | | 1 |
| Maximum | | 10 |

3. 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?

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 10 | 939 | 68.7 | 69.7 | 69.7 |
| | 9 | 234 | 17.1 | 17.4 | 87.0 |
| | 8 | 105 | 7.7 | 7.8 | 94.8 |
| | 7 | 38 | 2.8 | 2.8 | 97.6 |
| | 6 | 13 | 1.0 | 1.0 | 98.6 |
| | 5 | 7 | .5 | .5 | 99.1 |
| | 4 | 5 | .4 | .4 | 99.5 |
| | 3 | 1 | .1 | .1 | 99.6 |
| | 2 | 1 | .1 | .1 | 99.6 |
| | 1 | 5 | .4 | .4 | 100.0 |
| | Total | 1348 | 98.7 | 100.0 | |
| Missing | System | 18 | 1.3 | | |
| Total | | 1366 | 100.0 | | |

Net Promoter Score

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 84.64 | 1 | 100.0 | 100.0 | 100.0 |

(POST) 19a. Your intentions to participate in community cleanup activities.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Definitely will | 305 | 22.3 | 23.0 | 23.0 |
| | Probably will | 538 | 39.4 | 40.6 | 63.6 |
| | Undecided | 147 | 10.8 | 11.1 | 74.7 |
| | Probably will not | 54 | 4.0 | 4.1 | 78.7 |
| | Definitely will not | 8 | .6 | .6 | 79.3 |
| | Already adopted | 274 | 20.1 | 20.7 | 100.0 |
| | Total | 1326 | 97.1 | 100.0 | |
| Missing | System | 40 | 2.9 | | |
| Total | | 1366 | 100.0 | | |

(POST) 19b. Your intentions to get involved in local planning / zoning decisions.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Definitely will | 279 | 20.4 | 21.2 | 21.2 |
| | Probably will | 468 | 34.3 | 35.6 | 56.8 |
| | Undecided | 278 | 20.4 | 21.1 | 77.9 |
| | Probably will not | 96 | 7.0 | 7.3 | 85.2 |
| | Definitely will not | 15 | 1.1 | 1.1 | 86.4 |
| | Already adopted | 179 | 13.1 | 13.6 | 100.0 |
| | Total | 1315 | 96.3 | 100.0 | |
| Missing | System | 51 | 3.7 | | |
| Total | | 1366 | 100.0 | | |

(POST) 19c. Your intentions to communicate water issues with elected officials.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Definitely will | 401 | 29.4 | 30.3 | 30.3 |
| | Probably will | 471 | 34.5 | 35.6 | 65.9 |
| | Undecided | 180 | 13.2 | 13.6 | 79.5 |
| | Probably will not | 59 | 4.3 | 4.5 | 83.9 |
| | Definitely will not | 14 | 1.0 | 1.1 | 85.0 |
| | Already adopted | 199 | 14.6 | 15.0 | 100.0 |
| | Total | 1324 | 96.9 | 100.0 | |
| Missing | System | 42 | 3.1 | | |
| Total | | 1366 | 100.0 | | |

(POST) 19d. Your intentions to help develop a plan for my watershed (WPP)

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Definitely will | 320 | 23.4 | 24.3 | 24.3 |
| | Probably will | 445 | 32.6 | 33.8 | 58.0 |
| | Undecided | 315 | 23.1 | 23.9 | 81.9 |
| | Probably will not | 92 | 6.7 | 7.0 | 88.9 |
| | Definitely will not | 10 | .7 | .8 | 89.7 |
| | Already adopted | 136 | 10.0 | 10.3 | 100.0 |
| | Total | 1318 | 96.5 | 100.0 | |
| Missing | System | 48 | 3.5 | | |
| Total | | 1366 | 100.0 | | |

(POST) 19e. Your intentions to help form or become a member of a local watershed group.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Definitely will | 285 | 20.9 | 21.6 | 21.6 |
| | Probably will | 455 | 33.3 | 34.4 | 56.0 |
| | Undecided | 331 | 24.2 | 25.1 | 81.1 |
| | Probably will not | 79 | 5.8 | 6.0 | 87.1 |
| | Definitely will not | 14 | 1.0 | 1.1 | 88.1 |
| | Already adopted | 157 | 11.5 | 11.9 | 100.0 |
| | Total | 1321 | 96.7 | 100.0 | |
| Missing | System | 45 | 3.3 | | |
| Total | | 1366 | 100.0 | | |

20. Are there any Best Management Practices (BMPs) that you plan to adopt to help be a better steward of your watershed?

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | 847 | 62.0 | 65.1 | 65.1 |
| | No | 57 | 4.2 | 4.4 | 69.4 |
| | Unsure | 398 | 29.1 | 30.6 | 100.0 |
| | Total | 1302 | 95.3 | 100.0 | |
| Missing | System | 64 | 4.7 | | |
| Total | | 1366 | 100.0 | | |

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

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | 1318 | 96.5 | 97.7 | 97.7 |
| | No | 7 | .5 | .5 | 98.2 |
| | Unsure | 24 | 1.8 | 1.8 | 100.0 |
| | Total | 1349 | 98.8 | 100.0 | |
| Missing | System | 17 | 1.2 | | |
| Total | | 1366 | 100.0 | | |

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

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | $0 - $9 | 144 | 10.5 | 12.0 | 12.0 |
| | $10 - $19 | 168 | 12.3 | 13.9 | 25.9 |
| | $20 - $29 | 256 | 18.7 | 21.2 | 47.1 |
| | $30 - $39 | 138 | 10.1 | 11.5 | 58.6 |
| | $40 - $49 | 110 | 8.1 | 9.1 | 67.7 |
| | $50 - $59 | 219 | 16.0 | 18.2 | 85.9 |
| | $60 - $69 | 30 | 2.2 | 2.5 | 88.4 |
| | $70 - $79 | 28 | 2.0 | 2.3 | 90.7 |
| | $80 - $89 | 9 | .7 | .7 | 91.5 |
| | $90 - $100 | 103 | 7.5 | 8.5 | 100.0 |
| | Total | 1205 | 88.2 | 100.0 | |
| Missing | System | 161 | 11.8 | | |
| Total | | 1366 | 100.0 | | |

Version of Form

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Current form | 379 | 100.0 | 100.0 | 100.0 |

(Pre - Correct vs. Incorrect) 1. Watershed hydrology is the study of how:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 208 | 54.9 | 54.9 | 54.9 |
| | Incorrect | 171 | 45.1 | 45.1 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Post - Correct vs. Incorrect) 1. Watershed hydrology is the study of how:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 289 | 76.3 | 76.3 | 76.3 |
| | Incorrect | 90 | 23.7 | 23.7 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(PRE) 1. Watershed hydrology is the study of how:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Water interacts with various parts of a watershed including the land, the sea, and the sky [CORRECT] | 208 | 54.9 | 54.9 | 54.9 |
| | Water quality and quantity are affected by point and nonpoint source ... | 40 | 10.6 | 10.6 | 65.4 |
| | Chemical, physical, and biological water quality parameters change over time | 40 | 10.6 | 10.6 | 76.0 |
| | Water is formed on the Earth | 9 | 2.4 | 2.4 | 78.4 |
| | Unsure | 33 | 8.7 | 8.7 | 87.1 |
| | Blank | 2 | .5 | .5 | 87.6 |
| | Adjusted | 47 | 12.4 | 12.4 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(POST) 1. Watershed hydrology is the study of how:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Water interacts with various parts of a watershed including the land, the sea, and the sky [CORRECT] | 289 | 76.3 | 76.3 | 76.3 |
| | Water quality and quantity are affected by point and nonpoint source ... | 58 | 15.3 | 15.3 | 91.6 |
| | Chemical, physical, and biological water quality parameters change over time | 23 | 6.1 | 6.1 | 97.6 |
| | Water is formed on the Earth | 2 | .5 | .5 | 98.2 |
| | Unsure | 3 | .8 | .8 | 98.9 |
| | Blank | 4 | 1.1 | 1.1 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre-Post Comparison) 1. Watershed hydrology is the study of how:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Post Incorrect | 90 | 23.7 | 23.7 | 23.7 |
| | Pre Incorrect - Post Correct * | 81 | 21.4 | 21.4 | 45.1 |
| | Pre Correct - Post Correct * | 208 | 54.9 | 54.9 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre - Correct vs. Incorrect) 2. pH is measured on a scale of:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 203 | 53.6 | 53.6 | 53.6 |
| | Incorrect | 176 | 46.4 | 46.4 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Post - Correct vs. Incorrect) 2. pH is measured on a scale of:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 360 | 95.0 | 95.0 | 95.0 |
| | Incorrect | 19 | 5.0 | 5.0 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(PRE) 2. pH is measured on a scale of:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 1-5 | 11 | 2.9 | 2.9 | 2.9 |
| | 1-12 | 42 | 11.1 | 11.1 | 14.0 |
| | 0-10 | 58 | 15.3 | 15.3 | 29.3 |
| | 0-14 [CORRECT] | 203 | 53.6 | 53.6 | 82.8 |
| | 0-20 | 8 | 2.1 | 2.1 | 85.0 |
| | Unsure | 52 | 13.7 | 13.7 | 98.7 |
| | Blank | 1 | .3 | .3 | 98.9 |
| | Adjusted | 4 | 1.1 | 1.1 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(POST) 2. pH is measured on a scale of:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 1-5 | 3 | .8 | .8 | .8 |
| | 1-12 | 5 | 1.3 | 1.3 | 2.1 |
| | 0-10 | 5 | 1.3 | 1.3 | 3.4 |
| | 0-14 [CORRECT] | 360 | 95.0 | 95.0 | 98.4 |
| | 0-20 | 1 | .3 | .3 | 98.7 |
| | Unsure | 3 | .8 | .8 | 99.5 |
| | Blank | 2 | .5 | .5 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre-Post Comparison) 2. pH is measured on a scale of:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Post Incorrect | 19 | 5.0 | 5.0 | 5.0 |
| | Pre Incorrect - Post Correct * | 157 | 41.4 | 41.4 | 46.4 |
| | Pre Correct - Post Correct * | 203 | 53.6 | 53.6 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre - Correct vs. Incorrect) 3. All of the following are natural features found in healthy, functioning watersheds EXCEPT:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 145 | 38.3 | 38.3 | 38.3 |
| | Incorrect | 234 | 61.7 | 61.7 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Post - Correct vs. Incorrect) 3. All of the following are natural features found in healthy, functioning watersheds EXCEPT:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 275 | 72.6 | 72.6 | 72.6 |
| | Incorrect | 104 | 27.4 | 27.4 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(PRE) 3. All of the following are natural features found in healthy, functioning watersheds EXCEPT:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Upland | 61 | 16.1 | 16.1 | 16.1 |
| | Erosion zone [CORRECT] | 145 | 38.3 | 38.3 | 54.4 |
| | Floodplain | 7 | 1.8 | 1.8 | 56.2 |
| | Riparian zone | 28 | 7.4 | 7.4 | 63.6 |
| | Water body | 28 | 7.4 | 7.4 | 71.0 |
| | Unsure | 89 | 23.5 | 23.5 | 94.5 |
| | Blank | 6 | 1.6 | 1.6 | 96.0 |
| | Adjusted | 15 | 4.0 | 4.0 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(POST) 3. All of the following are natural features found in healthy, functioning watersheds EXCEPT:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Upland | 25 | 6.6 | 6.6 | 6.6 |
| | Erosion zone [CORRECT] | 275 | 72.6 | 72.6 | 79.2 |
| | Floodplain | 13 | 3.4 | 3.4 | 82.6 |
| | Riparian zone | 15 | 4.0 | 4.0 | 86.5 |
| | Water body | 28 | 7.4 | 7.4 | 93.9 |
| | Unsure | 14 | 3.7 | 3.7 | 97.6 |
| | Blank | 9 | 2.4 | 2.4 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre-Post Comparison) 3. All of the following are natural features found in healthy, functioning watersheds EXCEPT:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Post Incorrect | 104 | 27.4 | 27.4 | 27.4 |
| | Pre Incorrect - Post Correct * | 130 | 34.3 | 34.3 | 61.7 |
| | Pre Correct - Post Correct * | 145 | 38.3 | 38.3 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre - Correct vs. Incorrect) 4. The most commonly tested fecal bacteria indicator in freshwater is:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 262 | 69.1 | 69.1 | 69.1 |
| | Incorrect | 117 | 30.9 | 30.9 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Post - Correct vs. Incorrect) 4. The most commonly tested fecal bacteria indicator in freshwater is:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 333 | 87.9 | 87.9 | 87.9 |
| | Incorrect | 46 | 12.1 | 12.1 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(PRE) 4. The most commonly tested fecal bacteria indicator in freshwater is:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | E. coli [CORRECT] | 262 | 69.1 | 69.1 | 69.1 |
| | Cyanobacteria | 38 | 10.0 | 10.0 | 79.2 |
| | Streptococcus | 7 | 1.8 | 1.8 | 81.0 |
| | Giardia | 11 | 2.9 | 2.9 | 83.9 |
| | Cryptosporidium | 11 | 2.9 | 2.9 | 86.8 |
| | Unsure | 40 | 10.6 | 10.6 | 97.4 |
| | Blank | 3 | .8 | .8 | 98.2 |
| | Adjusted | 7 | 1.8 | 1.8 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(POST) 4. The most commonly tested fecal bacteria indicator in freshwater is:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | E. coli [CORRECT] | 333 | 87.9 | 87.9 | 87.9 |
| | Cyanobacteria | 34 | 9.0 | 9.0 | 96.8 |
| | Streptococcus | 3 | .8 | .8 | 97.6 |
| | Giardia | 3 | .8 | .8 | 98.4 |
| | Cryptosporidium | 1 | .3 | .3 | 98.7 |
| | Unsure | 1 | .3 | .3 | 98.9 |
| | Blank | 4 | 1.1 | 1.1 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre-Post Comparison) 4. The most commonly tested fecal bacteria indicator in freshwater is:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Post Incorrect | 46 | 12.1 | 12.1 | 12.1 |
| | Pre Incorrect - Post Correct * | 71 | 18.7 | 18.7 | 30.9 |
| | Pre Correct - Post Correct * | 262 | 69.1 | 69.1 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre - Correct vs. Incorrect) 5. _____is a term used to describe the chemical, physical, and biological characteristics of water.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 289 | 76.3 | 76.3 | 76.3 |
| | Incorrect | 90 | 23.7 | 23.7 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Post - Correct vs. Incorrect) 5. _____is a term used to describe the chemical, physical, and biological characteristics of water.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 336 | 88.7 | 88.7 | 88.7 |
| | Incorrect | 43 | 11.3 | 11.3 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(PRE) 5. _____is a term used to describe the chemical, physical, and biological characteristics of water.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Water quantity | 22 | 5.8 | 5.8 | 5.8 |
| | Water clarity | 14 | 3.7 | 3.7 | 9.5 |
| | Water quality [CORRECT] | 289 | 76.3 | 76.3 | 85.8 |
| | Water availability | 2 | .5 | .5 | 86.3 |
| | Unsure | 11 | 2.9 | 2.9 | 89.2 |
| | Blank | 20 | 5.3 | 5.3 | 94.5 |
| | Adjusted | 21 | 5.5 | 5.5 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(POST) 5. _____is a term used to describe the chemical, physical, and biological characteristics of water.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Water quantity | 26 | 6.9 | 6.9 | 6.9 |
| | Water clarity | 9 | 2.4 | 2.4 | 9.2 |
| | Water quality [CORRECT] | 336 | 88.7 | 88.7 | 97.9 |
| | Water availability | 1 | .3 | .3 | 98.2 |
| | Unsure | 2 | .5 | .5 | 98.7 |
| | Blank | 5 | 1.3 | 1.3 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre-Post Comparison) 5. _____is a term used to describe the chemical, physical, and biological characteristics of water.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Post Incorrect | 43 | 11.3 | 11.3 | 11.3 |
| | Pre Incorrect - Post Correct * | 47 | 12.4 | 12.4 | 23.7 |
| | Pre Correct - Post Correct * | 289 | 76.3 | 76.3 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre - Correct vs. Incorrect) 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.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 316 | 83.4 | 83.4 | 83.4 |
| | Incorrect | 63 | 16.6 | 16.6 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Post - Correct vs. Incorrect) 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.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 368 | 97.1 | 97.1 | 97.1 |
| | Incorrect | 11 | 2.9 | 2.9 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(PRE) 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.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | True [CORRECT] | 316 | 83.4 | 83.4 | 83.4 |
| | False | 23 | 6.1 | 6.1 | 89.4 |
| | Unsure | 14 | 3.7 | 3.7 | 93.1 |
| | Blank | 19 | 5.0 | 5.0 | 98.2 |
| | 7 | 7 | 1.8 | 1.8 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(POST) 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.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | True [CORRECT] | 368 | 97.1 | 97.1 | 97.1 |
| | False | 9 | 2.4 | 2.4 | 99.5 |
| | Unsure | 1 | .3 | .3 | 99.7 |
| | Blank | 1 | .3 | .3 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre-Post Comparison) 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.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Post Incorrect | 11 | 2.9 | 2.9 | 2.9 |
| | Pre Incorrect - Post Correct * | 52 | 13.7 | 13.7 | 16.6 |
| | Pre Correct - Post Correct * | 316 | 83.4 | 83.4 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre - Correct vs. Incorrect) 7. The most common nonpoint source impairment in Texas is:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 70 | 18.5 | 18.5 | 18.5 |
| | Incorrect | 309 | 81.5 | 81.5 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Post - Correct vs. Incorrect) 7. The most common nonpoint source impairment in Texas is:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 274 | 72.3 | 72.3 | 72.3 |
| | Incorrect | 105 | 27.7 | 27.7 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(PRE) 7. The most common nonpoint source impairment in Texas is:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Bacteria [CORRECT] | 70 | 18.5 | 18.5 | 18.5 |
| | Dissolved oxygen | 23 | 6.1 | 6.1 | 24.5 |
| | Sediment | 138 | 36.4 | 36.4 | 60.9 |
| | Hazardous and Toxic Substances | 54 | 14.2 | 14.2 | 75.2 |
| | Unsure | 76 | 20.1 | 20.1 | 95.3 |
| | Blank | 18 | 4.7 | 4.7 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(POST) 7. The most common nonpoint source impairment in Texas is:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Bacteria [CORRECT] | 274 | 72.3 | 72.3 | 72.3 |
| | Dissolved oxygen | 12 | 3.2 | 3.2 | 75.5 |
| | Sediment | 74 | 19.5 | 19.5 | 95.0 |
| | Hazardous and Toxic Substances | 11 | 2.9 | 2.9 | 97.9 |
| | Unsure | 6 | 1.6 | 1.6 | 99.5 |
| | Blank | 2 | .5 | .5 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre-Post Comparison) 7. The most common nonpoint source impairment in Texas is:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Post Incorrect | 105 | 27.7 | 27.7 | 27.7 |
| | Pre Incorrect - Post Correct * | 204 | 53.8 | 53.8 | 81.5 |
| | Pre Correct - Post Correct * | 70 | 18.5 | 18.5 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre - Correct vs. Incorrect) 8. All of the following are examples of major sources of nonpoint source pollution, EXCEPT:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 99 | 26.1 | 26.1 | 26.1 |
| | Incorrect | 280 | 73.9 | 73.9 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Post - Correct vs. Incorrect) 8. All of the following are examples of major sources of nonpoint source pollution, EXCEPT:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 260 | 68.6 | 68.6 | 68.6 |
| | Incorrect | 119 | 31.4 | 31.4 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(PRE) 8. All of the following are examples of major sources of nonpoint source pollution, EXCEPT:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Bacteria | 14 | 3.7 | 3.7 | 3.7 |
| | Nutrients | 38 | 10.0 | 10.0 | 13.7 |
| | Algae [CORRECT] | 99 | 26.1 | 26.1 | 39.8 |
| | Sediment | 28 | 7.4 | 7.4 | 47.2 |
| | Toxic Chemicals | 114 | 30.1 | 30.1 | 77.3 |
| | Unsure | 54 | 14.2 | 14.2 | 91.6 |
| | Blank | 16 | 4.2 | 4.2 | 95.8 |
| | Adjusted | 16 | 4.2 | 4.2 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(POST) 8. All of the following are examples of major sources of nonpoint source pollution, EXCEPT:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Bacteria | 5 | 1.3 | 1.3 | 1.3 |
| | Nutrients | 7 | 1.8 | 1.8 | 3.2 |
| | Algae [CORRECT] | 260 | 68.6 | 68.6 | 71.8 |
| | Sediment | 9 | 2.4 | 2.4 | 74.1 |
| | Toxic Chemicals | 81 | 21.4 | 21.4 | 95.5 |
| | Unsure | 13 | 3.4 | 3.4 | 98.9 |
| | Blank | 4 | 1.1 | 1.1 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre-Post Comparison) 8. All of the following are examples of major sources of nonpoint source pollution, EXCEPT:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Post Incorrect | 119 | 31.4 | 31.4 | 31.4 |
| | Pre Incorrect - Post Correct * | 161 | 42.5 | 42.5 | 73.9 |
| | Pre Correct - Post Correct * | 99 | 26.1 | 26.1 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre - Correct vs. Incorrect) 9. Which nutrients most commonly cause water quality concerns?

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 163 | 43.0 | 43.0 | 43.0 |
| | Incorrect | 216 | 57.0 | 57.0 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Post - Correct vs. Incorrect) 9. Which nutrients most commonly cause water quality concerns?

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 295 | 77.8 | 77.8 | 77.8 |
| | Incorrect | 84 | 22.2 | 22.2 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(PRE) 9. Which nutrients most commonly cause water quality concerns?

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Nitrogen and Potassium | 27 | 7.1 | 7.1 | 7.1 |
| | Phosphorus and Sulfur | 31 | 8.2 | 8.2 | 15.3 |
| | Nitrogen and Sulfur | 19 | 5.0 | 5.0 | 20.3 |
| | Nitrogen and Phosphorus [CORRECT] | 163 | 43.0 | 43.0 | 63.3 |
| | Phosphorus and Potassium | 50 | 13.2 | 13.2 | 76.5 |
| | Unsure | 50 | 13.2 | 13.2 | 89.7 |
| | Blank | 18 | 4.7 | 4.7 | 94.5 |
| | Adjusted | 21 | 5.5 | 5.5 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(POST) 9. Which nutrients most commonly cause water quality concerns?

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Nitrogen and Potassium | 31 | 8.2 | 8.2 | 8.2 |
| | Phosphorus and Sulfur | 2 | .5 | .5 | 8.7 |
| | Nitrogen and Sulfur | 3 | .8 | .8 | 9.5 |
| | Nitrogen and Phosphorus [CORRECT] | 295 | 77.8 | 77.8 | 87.3 |
| | Phosphorus and Potassium | 43 | 11.3 | 11.3 | 98.7 |
| | Unsure | 5 | 1.3 | 1.3 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre-Post Comparison) 9. Which nutrients most commonly cause water quality concerns?

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Post Incorrect | 84 | 22.2 | 22.2 | 22.2 |
| | Pre Incorrect - Post Correct * | 132 | 34.8 | 34.8 | 57.0 |
| | Pre Correct - Post Correct * | 163 | 43.0 | 43.0 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre - Correct vs. Incorrect) 10. The over-enrichment of water with nutrients is called:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 156 | 41.2 | 41.2 | 41.2 |
| | Incorrect | 223 | 58.8 | 58.8 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Post - Correct vs. Incorrect) 10. The over-enrichment of water with nutrients is called:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 282 | 74.4 | 74.4 | 74.4 |
| | Incorrect | 97 | 25.6 | 25.6 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(PRE) 10. The over-enrichment of water with nutrients is called:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Apnea | 3 | .8 | .8 | .8 |
| | Anoxia | 18 | 4.7 | 4.7 | 5.5 |
| | Aeration | 3 | .8 | .8 | 6.3 |
| | Eutrophication [CORRECT] | 156 | 41.2 | 41.2 | 47.5 |
| | Hyperhydrosis | 53 | 14.0 | 14.0 | 61.5 |
| | Unsure | 110 | 29.0 | 29.0 | 90.5 |
| | Blank | 18 | 4.7 | 4.7 | 95.3 |
| | Adjusted | 18 | 4.7 | 4.7 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(POST) 10. The over-enrichment of water with nutrients is called:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Apnea | 2 | .5 | .5 | .5 |
| | Anoxia | 28 | 7.4 | 7.4 | 7.9 |
| | Aeration | 3 | .8 | .8 | 8.7 |
| | Eutrophication [CORRECT] | 282 | 74.4 | 74.4 | 83.1 |
| | Hyperhydrosis | 32 | 8.4 | 8.4 | 91.6 |
| | Unsure | 24 | 6.3 | 6.3 | 97.9 |
| | Blank | 8 | 2.1 | 2.1 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre-Post Comparison) 10. The over-enrichment of water with nutrients is called:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Post Incorrect | 97 | 25.6 | 25.6 | 25.6 |
| | Pre Incorrect - Post Correct * | 126 | 33.2 | 33.2 | 58.8 |
| | Pre Correct - Post Correct * | 156 | 41.2 | 41.2 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre - Correct vs. Incorrect) 11. The Clean Water Act of 1972 was passed to:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 314 | 82.8 | 82.8 | 82.8 |
| | Incorrect | 65 | 17.2 | 17.2 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Post - Correct vs. Incorrect) 11. The Clean Water Act of 1972 was passed to:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 369 | 97.4 | 97.4 | 97.4 |
| | Incorrect | 10 | 2.6 | 2.6 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

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

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Protect the water quality of all of the nation's waterbodies [CORRECT] | 314 | 82.8 | 82.8 | 82.8 |
| | Protect threatened and endangered plant and animal species | 9 | 2.4 | 2.4 | 85.2 |
| | Enable dredging in water bodies to prevent sedimentation and erosion | 5 | 1.3 | 1.3 | 86.5 |
| | Increase the funding for water treatment plants | 5 | 1.3 | 1.3 | 87.9 |
| | Unsure | 28 | 7.4 | 7.4 | 95.3 |
| | Blank | 15 | 4.0 | 4.0 | 99.2 |
| | Adjusted | 3 | .8 | .8 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

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

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Protect the water quality of all of the nation's waterbodies [CORRECT] | 369 | 97.4 | 97.4 | 97.4 |
| | Protect threatened and endangered plant and animal species | 3 | .8 | .8 | 98.2 |
| | Enable dredging in water bodies to prevent sedimentation and erosion | 2 | .5 | .5 | 98.7 |
| | Increase the funding for water treatment plants | 1 | .3 | .3 | 98.9 |
| | Unsure | 3 | .8 | .8 | 99.7 |
| | Blank | 1 | .3 | .3 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre-Post Comparison) 11. The Clean Water Act of 1972 was passed to:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Post Incorrect | 10 | 2.6 | 2.6 | 2.6 |
| | Pre Incorrect - Post Correct * | 55 | 14.5 | 14.5 | 17.2 |
| | Pre Correct - Post Correct * | 314 | 82.8 | 82.8 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre - Correct vs. Incorrect) 12. The three types of water quality standards established by the Clean Water Act are surface water, effluent, and drinking water quality standards.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 295 | 77.8 | 77.8 | 77.8 |
| | Incorrect | 84 | 22.2 | 22.2 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Post - Correct vs. Incorrect) 12. The three types of water quality standards established by the Clean Water Act are surface water, effluent, and drinking water quality standards.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 355 | 93.7 | 93.7 | 93.7 |
| | Incorrect | 24 | 6.3 | 6.3 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(PRE) 12. The three types of water quality standards established by the Clean Water Act are surface water, effluent, and drinking water quality standards.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | True [CORRECT] | 295 | 77.8 | 77.8 | 77.8 |
| | False | 33 | 8.7 | 8.7 | 86.5 |
| | Unsure | 18 | 4.7 | 4.7 | 91.3 |
| | Blank | 18 | 4.7 | 4.7 | 96.0 |
| | Adjusted | 15 | 4.0 | 4.0 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(POST) 12. The three types of water quality standards established by the Clean Water Act are surface water, effluent, and drinking water quality standards.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | True [CORRECT] | 355 | 93.7 | 93.7 | 93.7 |
| | False | 21 | 5.5 | 5.5 | 99.2 |
| | Unsure | 2 | .5 | .5 | 99.7 |
| | Blank | 1 | .3 | .3 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre-Post Comparison) 12. The three types of water quality standards established by the Clean Water Act are surface water, effluent, and drinking water quality standards.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Post Incorrect | 24 | 6.3 | 6.3 | 6.3 |
| | Pre Incorrect - Post Correct * | 60 | 15.8 | 15.8 | 22.2 |
| | Pre Correct - Post Correct * | 295 | 77.8 | 77.8 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre - Correct vs. Incorrect) 13. Which state agency is the primary water quality agency in Texas?

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 218 | 57.5 | 57.5 | 57.5 |
| | Incorrect | 161 | 42.5 | 42.5 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Post - Correct vs. Incorrect) 13. Which state agency is the primary water quality agency in Texas?

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 323 | 85.2 | 85.2 | 85.2 |
| | Incorrect | 56 | 14.8 | 14.8 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

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

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Environmental Protection Agency (EPA) | 13 | 3.4 | 3.4 | 3.4 |
| | Texas Water Development Board (TWDB) | 29 | 7.7 | 7.7 | 11.1 |
| | Texas Commission on Environmental Quality (TCEQ) ... | 218 | 57.5 | 57.5 | 68.6 |
| | Texas State Soil and Water Conservation Board (TSSWCB) | 40 | 10.6 | 10.6 | 79.2 |
| | Unsure | 45 | 11.9 | 11.9 | 91.0 |
| | Blank | 16 | 4.2 | 4.2 | 95.3 |
| | Adjusted | 18 | 4.7 | 4.7 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

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

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Environmental Protection Agency (EPA) | 24 | 6.3 | 6.3 | 6.3 |
| | Texas Water Development Board (TWDB) | 11 | 2.9 | 2.9 | 9.2 |
| | Texas Commission on Environmental Quality (TCEQ) ... | 323 | 85.2 | 85.2 | 94.5 |
| | Texas State Soil and Water Conservation Board (TSSWCB) | 19 | 5.0 | 5.0 | 99.5 |
| | Unsure | 1 | .3 | .3 | 99.7 |
| | Blank | 1 | .3 | .3 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre-Post Comparison) 13. Which state agency is the primary water quality agency in Texas?

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Post Incorrect | 56 | 14.8 | 14.8 | 14.8 |
| | Pre Incorrect - Post Correct * | 105 | 27.7 | 27.7 | 42.5 |
| | Pre Correct - Post Correct * | 218 | 57.5 | 57.5 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre - Correct vs. Incorrect) 14. A flexible framework for managing the quantity and quality of water resources found within specified watershed boundaries is referred to as:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 161 | 42.5 | 42.5 | 42.5 |
| | Incorrect | 218 | 57.5 | 57.5 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Post - Correct vs. Incorrect) 14. A flexible framework for managing the quantity and quality of water resources found within specified watershed boundaries is referred to as:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 280 | 73.9 | 73.9 | 73.9 |
| | Incorrect | 99 | 26.1 | 26.1 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

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

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Environmental planning | 75 | 19.8 | 19.8 | 19.8 |
| | Watershed approach [CORRECT] | 161 | 42.5 | 42.5 | 62.3 |
| | Restoration strategy | 12 | 3.2 | 3.2 | 65.4 |
| | Pollution control strategy | 10 | 2.6 | 2.6 | 68.1 |
| | Community action plan | 19 | 5.0 | 5.0 | 73.1 |
| | Unsure | 60 | 15.8 | 15.8 | 88.9 |
| | Blank | 15 | 4.0 | 4.0 | 92.9 |
| | Adjusted | 27 | 7.1 | 7.1 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

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

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Environmental planning | 54 | 14.2 | 14.2 | 14.2 |
| | Watershed approach [CORRECT] | 280 | 73.9 | 73.9 | 88.1 |
| | Restoration strategy | 2 | .5 | .5 | 88.7 |
| | Pollution control strategy | 9 | 2.4 | 2.4 | 91.0 |
| | Community action plan | 22 | 5.8 | 5.8 | 96.8 |
| | Unsure | 10 | 2.6 | 2.6 | 99.5 |
| | Blank | 2 | .5 | .5 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

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

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Post Incorrect | 99 | 26.1 | 26.1 | 26.1 |
| | Pre Incorrect - Post Correct * | 119 | 31.4 | 31.4 | 57.5 |
| | Pre Correct - Post Correct * | 161 | 42.5 | 42.5 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre - Correct vs. Incorrect) 15. Which of the following are important types of water quality improvement projects in Texas?

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 141 | 37.2 | 37.2 | 37.2 |
| | Incorrect | 238 | 62.8 | 62.8 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Post - Correct vs. Incorrect) 15. Which of the following are important types of water quality improvement projects in Texas?

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 288 | 76.0 | 76.0 | 76.0 |
| | Incorrect | 91 | 24.0 | 24.0 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

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

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | A. Watershed protection plans (WPP) | 72 | 19.0 | 19.0 | 19.0 |
| | B. Water quality standards assessment | 10 | 2.6 | 2.6 | 21.6 |
| | C. Total maximum daily loads (TMDL) | 5 | 1.3 | 1.3 | 23.0 |
| | A and C [CORRECT] | 141 | 37.2 | 37.2 | 60.2 |
| | B and C | 35 | 9.2 | 9.2 | 69.4 |
| | Unsure | 73 | 19.3 | 19.3 | 88.7 |
| | Blank | 16 | 4.2 | 4.2 | 92.9 |
| | Adjusted | 27 | 7.1 | 7.1 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

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

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | A. Watershed protection plans (WPP) | 59 | 15.6 | 15.6 | 15.6 |
| | B. Water quality standards assessment | 3 | .8 | .8 | 16.4 |
| | C. Total maximum daily loads (TMDL) | 6 | 1.6 | 1.6 | 17.9 |
| | A and C [CORRECT] | 288 | 76.0 | 76.0 | 93.9 |
| | B and C | 17 | 4.5 | 4.5 | 98.4 |
| | Unsure | 5 | 1.3 | 1.3 | 99.7 |
| | Blank | 1 | .3 | .3 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre-Post Comparison) 15. Which of the following are important types of water quality improvement projects in Texas?

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Post Incorrect | 91 | 24.0 | 24.0 | 24.0 |
| | Pre Incorrect - Post Correct * | 147 | 38.8 | 38.8 | 62.8 |
| | Pre Correct - Post Correct * | 141 | 37.2 | 37.2 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre - Correct vs. Incorrect) 16. Structural and non-structural practices used to protect water quality are referred to as:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 173 | 45.6 | 45.6 | 45.6 |
| | Incorrect | 206 | 54.4 | 54.4 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Post - Correct vs. Incorrect) 16. Structural and non-structural practices used to protect water quality are referred to as:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 305 | 80.5 | 80.5 | 80.5 |
| | Incorrect | 74 | 19.5 | 19.5 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

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

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Environmental protection practices | 83 | 21.9 | 21.9 | 21.9 |
| | Best management practices [CORRECT] | 173 | 45.6 | 45.6 | 67.5 |
| | Water restoration practices | 46 | 12.1 | 12.1 | 79.7 |
| | Unsure | 45 | 11.9 | 11.9 | 91.6 |
| | Blank | 19 | 5.0 | 5.0 | 96.6 |
| | Adjusted | 13 | 3.4 | 3.4 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

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

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Environmental protection practices | 51 | 13.5 | 13.5 | 13.5 |
| | Best management practices [CORRECT] | 305 | 80.5 | 80.5 | 93.9 |
| | Water restoration practices | 15 | 4.0 | 4.0 | 97.9 |
| | Unsure | 8 | 2.1 | 2.1 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre-Post Comparison) 16. Structural and non-structural practices used to protect water quality are referred to as:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Post Incorrect | 74 | 19.5 | 19.5 | 19.5 |
| | Pre Incorrect - Post Correct * | 132 | 34.8 | 34.8 | 54.4 |
| | Pre Correct - Post Correct * | 173 | 45.6 | 45.6 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre - Correct vs. Incorrect) 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.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 121 | 31.9 | 31.9 | 31.9 |
| | Incorrect | 258 | 68.1 | 68.1 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Post - Correct vs. Incorrect) 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.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 366 | 96.6 | 96.6 | 96.6 |
| | Incorrect | 13 | 3.4 | 3.4 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(PRE) 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.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 404(a) | 19 | 5.0 | 5.0 | 5.0 |
| | 303(d) [CORRECT] | 121 | 31.9 | 31.9 | 36.9 |
| | 615(b) | 8 | 2.1 | 2.1 | 39.1 |
| | 208(b) | 4 | 1.1 | 1.1 | 40.1 |
| | 503(b) | 19 | 5.0 | 5.0 | 45.1 |
| | Unsure | 189 | 49.9 | 49.9 | 95.0 |
| | Blank | 19 | 5.0 | 5.0 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(POST) 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.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 404(a) | 1 | .3 | .3 | .3 |
| | 303(d) [CORRECT] | 366 | 96.6 | 96.6 | 96.8 |
| | 615(b) | 1 | .3 | .3 | 97.1 |
| | 503(b) | 3 | .8 | .8 | 97.9 |
| | Unsure | 5 | 1.3 | 1.3 | 99.2 |
| | Blank | 3 | .8 | .8 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre-Post Comparison) 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.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Post Incorrect | 13 | 3.4 | 3.4 | 3.4 |
| | Pre Incorrect - Post Correct * | 245 | 64.6 | 64.6 | 68.1 |
| | Pre Correct - Post Correct * | 121 | 31.9 | 31.9 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre - Correct vs. Incorrect) 18. The primary regulatory water quality monitoring program in Texas is:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 97 | 25.6 | 25.6 | 25.6 |
| | Incorrect | 282 | 74.4 | 74.4 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Post - Correct vs. Incorrect) 18. The primary regulatory water quality monitoring program in Texas is:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Correct | 204 | 53.8 | 53.8 | 53.8 |
| | Incorrect | 175 | 46.2 | 46.2 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

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

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Texas Coastal Management Program | 20 | 5.3 | 5.3 | 5.3 |
| | Texas Stream Team | 21 | 5.5 | 5.5 | 10.8 |
| | Texas Coordinated Monitoring Program | 55 | 14.5 | 14.5 | 25.3 |
| | Texas Clean Rivers Program [CORRECT] | 97 | 25.6 | 25.6 | 50.9 |
| | Texas Bay Monitoring Program | 37 | 9.8 | 9.8 | 60.7 |
| | Unsure | 109 | 28.8 | 28.8 | 89.4 |
| | Blank | 17 | 4.5 | 4.5 | 93.9 |
| | Adjusted | 23 | 6.1 | 6.1 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

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

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Texas Coastal Management Program | 22 | 5.8 | 5.8 | 5.8 |
| | Texas Stream Team | 52 | 13.7 | 13.7 | 19.5 |
| | Texas Coordinated Monitoring Program | 49 | 12.9 | 12.9 | 32.5 |
| | Texas Clean Rivers Program [CORRECT] | 204 | 53.8 | 53.8 | 86.3 |
| | Texas Bay Monitoring Program | 36 | 9.5 | 9.5 | 95.8 |
| | Unsure | 15 | 4.0 | 4.0 | 99.7 |
| | Blank | 1 | .3 | .3 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Pre-Post Comparison) 18. The primary regulatory water quality monitoring program in Texas is:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Post Incorrect | 175 | 46.2 | 46.2 | 46.2 |
| | Pre Incorrect - Post Correct * | 107 | 28.2 | 28.2 | 74.4 |
| | Pre Correct - Post Correct * | 97 | 25.6 | 25.6 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

Statistics

| | | (Pre) Number of Correct on Knowledge Questions (out of 18 possible) | (Post) Number of Correct on Knowledge Questions (out of 18 possible) | Difference in number correct (post vs. pre) |
|---|---|---|---|---|
| N | Valid | 379 | 379 | 379 |
| | Missing | 0 | 0 | 0 |
| Mean | | 9.0528 | 14.6755 | 5.6227 |
| Std. Deviation | | 3.76525 | 2.73091 | 2.93899 |
| Minimum | | .00 | 4.00 | .00 |
| Maximum | | 18.00 | 18.00 | 15.00 |

(Pre) Number of Correct on Knowledge Questions
(out of 18 possible)

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 18.00 | 3 | .8 | .8 | .8 |
| | 17.00 | 6 | 1.6 | 1.6 | 2.4 |
| | 16.00 | 12 | 3.2 | 3.2 | 5.5 |
| | 15.00 | 12 | 3.2 | 3.2 | 8.7 |
| | 14.00 | 19 | 5.0 | 5.0 | 13.7 |
| | 13.00 | 22 | 5.8 | 5.8 | 19.5 |
| | 12.00 | 30 | 7.9 | 7.9 | 27.4 |
| | 11.00 | 23 | 6.1 | 6.1 | 33.5 |
| | 10.00 | 36 | 9.5 | 9.5 | 43.0 |
| | 9.00 | 44 | 11.6 | 11.6 | 54.6 |
| | 8.00 | 30 | 7.9 | 7.9 | 62.5 |
| | 7.00 | 42 | 11.1 | 11.1 | 73.6 |
| | 6.00 | 33 | 8.7 | 8.7 | 82.3 |
| | 5.00 | 27 | 7.1 | 7.1 | 89.4 |
| | 4.00 | 19 | 5.0 | 5.0 | 94.5 |
| | 3.00 | 5 | 1.3 | 1.3 | 95.8 |
| | 2.00 | 9 | 2.4 | 2.4 | 98.2 |
| | 1.00 | 6 | 1.6 | 1.6 | 99.7 |
| | .00 | 1 | .3 | .3 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

(Post) Number of Correct on Knowledge Questions (out of 18 possible)

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 18.00 | 55 | 14.5 | 14.5 | 14.5 |
| | 17.00 | 63 | 16.6 | 16.6 | 31.1 |
| | 16.00 | 61 | 16.1 | 16.1 | 47.2 |
| | 15.00 | 44 | 11.6 | 11.6 | 58.8 |
| | 14.00 | 40 | 10.6 | 10.6 | 69.4 |
| | 13.00 | 35 | 9.2 | 9.2 | 78.6 |
| | 12.00 | 29 | 7.7 | 7.7 | 86.3 |
| | 11.00 | 20 | 5.3 | 5.3 | 91.6 |
| | 10.00 | 13 | 3.4 | 3.4 | 95.0 |
| | 9.00 | 10 | 2.6 | 2.6 | 97.6 |
| | 8.00 | 3 | .8 | .8 | 98.4 |
| | 7.00 | 4 | 1.1 | 1.1 | 99.5 |
| | 6.00 | 1 | .3 | .3 | 99.7 |
| | 4.00 | 1 | .3 | .3 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

Difference in number correct (post vs. pre)

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 15.00 | 2 | .5 | .5 | .5 |
| | 14.00 | 2 | .5 | .5 | 1.1 |
| | 13.00 | 1 | .3 | .3 | 1.3 |
| | 12.00 | 3 | .8 | .8 | 2.1 |
| | 11.00 | 14 | 3.7 | 3.7 | 5.8 |
| | 10.00 | 19 | 5.0 | 5.0 | 10.8 |
| | 9.00 | 26 | 6.9 | 6.9 | 17.7 |
| | 8.00 | 29 | 7.7 | 7.7 | 25.3 |
| | 7.00 | 41 | 10.8 | 10.8 | 36.1 |
| | 6.00 | 46 | 12.1 | 12.1 | 48.3 |
| | 5.00 | 54 | 14.2 | 14.2 | 62.5 |
| | 4.00 | 46 | 12.1 | 12.1 | 74.7 |
| | 3.00 | 39 | 10.3 | 10.3 | 85.0 |
| | 2.00 | 33 | 8.7 | 8.7 | 93.7 |
| | 1.00 | 14 | 3.7 | 3.7 | 97.4 |
| | .00 | 10 | 2.6 | 2.6 | 100.0 |
| | Total | 379 | 100.0 | 100.0 | |

**Appendix M**

**Example of research brief**

# *Texas Watershed Data – September 2011*

# Progress Report for Program Implementation

**(February 08 – September 11)**

**Program Locations:**
**Athens, Attoyac Bayou, Baytown, Boerne, Brady, Brazosport, Canyon Lake, College Station, Comanche, Corpus Christi, Denton, Eagle Mt, Fort Worth, Franklin, Geronimo Creek, Georgetown, Granbury, Hickory C, Jefferson, Junction, Kaufman, Kerrville, Kyle, Lake Granbury, Lampasas, Lower Cibola, Luling, Middle Trinity, Nacogdoches, Pflugerville, Rio Farms, Sabinal River, Seguin, Seven Points, Utopia, Wellington, West Columbia, and Wimberley**
**(n = 1283)**

***Summary provided by Jean Suh (jean_suh@tamu.edu)***

***Summary.*** Listed below are some of the highlights of the pretest and post test from the Texas Watershed Program.

**KNOWLEDGE**

- There was an overall knowledge increase of ***+21.3*** percentage points from the pretest and post test for all eighteen questions (original and revised questions combined).
- For *watersheds* questions, there was an overall knowledge increase of ***+*20.0** percentage points from the pretest and post test (original and revised questions combined).
- For *fresh water* questions, there was an overall knowledge increase of +**17.7** percentage points from the pretest and post test (original and revised questions combined).
- For *pollution* questions, there was an overall knowledge increase of **+25.8** 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 **+20.6** percentage points from the pretest and post test (original and revised questions combined).

**INTENTIONS TO CHANGE**

- **252 of 1159 (21.7%)** said they intend to participate in community cleanup activities. **239** (**20.6**%) said they have already done this before the program.
- **241 of 1147 (21.0%)** said they intend to get involved in local planning / zoning decisions. **162** (**14.1**%) said they have already done this before the program.
- **345 of 1157 (29.8%)** said they intend to communicate water issues with elected officials. **182** (**15.7**%) said they have already done this before the program.
- **285 of 1154 (24.7%)** said they intend to help develop a plan for my watershed. **128** (**11.1**%) said they have already done this before the program.
- **247 of 1155 (21.4%)** said they to help form or become a member of a local watershed group. **145** (**12.6**%) said they have already done this before the program.

**OTHER POST-EVENT MEASURES**

- **738 of 1136 (65.0%)** said there were Best Management Practices (BMPs) that they plan to adopt to help them be a better steward of their watershed.
- **1147 of 1177 (97.5%)** felt what they learned provided them with the ability to be a better steward of their watershed.

**Other Data**

- **54.4%** said they have received water quality information from television.
- **67.4%** said they have received water quality information from newspapers.
- **74.0%** said they have received water quality information from the Internet.
- **62.2%** said they have received water quality information from Texas AgriLife Extension Service.
- **41.3%** said they have received water quality information from Texas AgriLife Extension Research.
- **54.2%** said they have received water quality information from universities.
- **74.3%** said they have received water quality information from Environmental Agencies (government).
- **56.6%** said they have received water quality information from Environmental groups (citizens).

# Appendix N

## Old version of pre-test evaluation

AgriLIFE EXTENSION
Texas A&M System

TEXAS Watershed Steward

Birthdate: ☐☐ / ☐☐ / ☐☐

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. **A healthy watershed exhibits which of the following natural hydrologic functions?**
   - O Water capture
   - O Water storage
   - O Water release
   - O All of the above
   - 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 quantity and quality of freshwater in Texas are not affected by the state's climate.**
   - O True O False O Unsure

63913

**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. The actions of humans can significantly impair water quantity and quality through which of the following land use activities?

- O Construction and urbanization
- O Fertilizer application
- O Resource extraction
- O Wastewater discharge
- O All of the above
- O Unsure

10. Who lives in a watershed?

- O Farmers and ranchers
- O City residents
- O Small and large businesses
- O Everyone
- O Unsure

**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 watershed approach is a flexible framework for managing the quantity and quality of water resources found within specified watershed boundaries.**

O True O False 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. Best Management Practices (BMPs) should be widely used to minimize and/or prevent the harmful impacts of nonpoint source pollution in urban and rural areas.**

O True O False O Unsure

**17. Local involvement is not critical to the success of watershed management and protection activities.**

O True O False O Unsure

**18. Which of the following are benefits to forming a watershed group?**

- O Strength in numbers
- O Increased resources
- O Diverse expertise
- O Creative/collaborative solutions
- O All of the above
- O Unsure

**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 Rural landowner
O Urban landowner
O Agency Professional
O Watershed council member
O Member of a non-governmental organization
O Teacher / educational professional
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
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)

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**THANK YOU!**