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2013 ANNUAL REPORT

Managing

nonpoint source pollution in Texas

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY • TEXAS STATE SOIL & WATER CONSERVATION BOARD

SFR-066/13 January 2014

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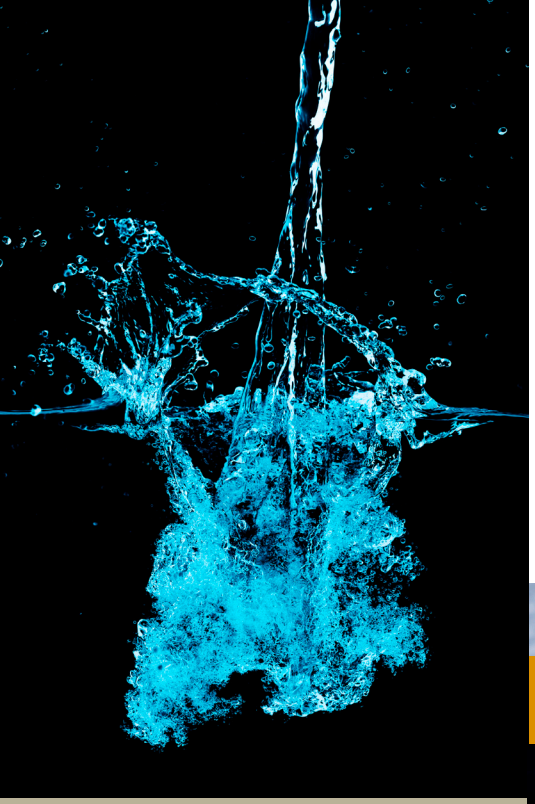

2013 ANNUAL REPORT

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Texas Commission on Environmental Quality

Texas State Soil & Water Conservation Board

Letter *From the* Executive Directors

The U.S. Environmental Protection Agency (EPA) provides grant funding to Texas to implement the *Texas Nonpoint Source (NPS) Management Program*. The *NPS Management Program* outlines Texas' comprehensive strategy to protect and restore waters impacted by NPS pollution. The *NPS Management Program* utilizes voluntary, regulatory, financial, and technical assistance approaches to achieve a balanced program. The responsibility for implementing this program is divided between the TCEQ and the TSSWCB.

On April 12, 2013, the EPA issued new *Nonpoint Source Program and Grants Guidelines for States and Territories*. These guidelines replace those which were in effect since fiscal year 2004. An increased emphasis is now being placed on the implementation of nine-element watershed-based plans (WBPs) within impaired waters. Despite significant funding cuts since 2009, Texas has consistently worked with partners across the state to develop WBPs. Since September 2012, four plans were finalized. Three Watershed Protection Plans (WPPs) were accepted by the EPA, and one Total Maximum Daily Load (TMDL) Implementation Plan (I-Plan) Bridge Document. The I-Plan Bridge Document is an innovative and cost-effective approach which demonstrates how existing TMDL/I-Plan efforts fulfill the nine elements required within WBPs.

The NPS Program has continued to achieve additional successes, including recognition by the EPA for two water-quality improvement "Success Stories" and implementing the state's Watershed Action Planning (WAP) process. The WAP process emphasizes the role of partner agencies and stakeholders, relies on sound technical information, and makes available multiple options to provide the flexibility needed to address varied watershed conditions and circumstances. This process will be integral to the continued development and implementation of WBPs in Texas, especially considering the funding limitations and budget cuts which are projected to persist. The ultimate goal of the WAP process is to achieve restoration of designated uses in impaired water bodies. This is accomplished by attaining socially acceptable and economically bearable solutions based on environmental goals which are grounded in defensible water quality standards and supported by credible water quality data.

We are pleased to present the *2013 Annual Report* of the state's *NPS Management Program*. The report highlights our achievements in managing NPS pollution and meeting the goals of the program in 2013. In partnership with the EPA and other federal, state, regional, and local watershed stakeholders, the TCEQ and the TSSWCB look forward to implementing an effective program that has the support of stakeholders, and is accountable and transparent to the citizens of Texas.

Sincerely,

Rex Isom
Executive Director
Texas State Soil and
Water Conservation Board

Richard A. Hyde, P.E.
Executive Director
Texas Commission on
Environmental Quality

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Introduction

CHAPTER 1

Defining Nonpoint Source Pollution

What Guides Nonpoint Source Pollution Management in Texas?

Defining Nonpoint Source Pollution

Nonpoint source (NPS) pollution is all water pollution that does not come from point sources. Point sources are regulated "end-of-pipe" outlets for wastewater or stormwater from industrial or municipal treatment systems.

NPS pollution occurs when rainfall or snowmelt flows off the land, roads, buildings, and other features of the landscape. This runoff carries pollutants into drainage ditches, lakes, rivers, wetlands, coastal waters, and even underground sources of water. NPS pollution also includes flow of polluted water from sources such as car washing and leaking septic tanks. Common NPS pollutants include:

- fertilizers, herbicides, and insecticides from agricultural lands and residential areas
- oil, grease, and toxic chemicals from spills, roads, urban areas, and energy production
- sediment from construction sites, crop and forest lands, and eroding stream banks
- bacteria and nutrients from livestock, pet waste, and leaking septic systems

Some NPS pollution originates as air pollution deposited onto the ground and into waterways, called atmospheric deposition. Changes in the flow of waterways due to dams and other structures—hydromodification—can also cause NPS pollution.

What Guides Nonpoint Source Pollution Management in Texas?

Under the federal Clean Water Act (CWA), Texas and other states must establish water quality standards for waters in the state, regularly assess the status of water quality, and implement actions necessary to achieve and maintain those standards. The long-term goal of the *Texas NPS Management Program* is to protect and restore the quality of the state's water resources from the adverse effects of NPS pollution. This is accomplished through cooperative implementation using the organizational tools and strategies defined below.

Partnerships

The Texas Commission on Environmental Quality (TCEQ) is designated by law as the lead state agency for water quality in Texas, including the issuance of permits for point source discharges and abatement of NPS pollution from sources other than agricultural or

silvicultural. The Texas State Soil and Water Conservation Board (TSSWCB) is the lead agency in the state for planning, implementing, and managing programs and practices for preventing and abating agricultural and silvicultural NPS pollution. The TCEQ and TSSWCB jointly administer the *Texas NPS Management Program*.

Management of NPS pollution in Texas involves partnerships with many organizations to coordinate, develop, and implement the *Texas NPS Management Program*. With the extent and variety of NPS issues across Texas, cooperation across political boundaries is essential. Many local, regional, state, and federal agencies play an integral part in managing NPS pollution, especially at the watershed level. They provide information about local concerns and infrastructure and build support for the pollution controls that are necessary to prevent and reduce NPS pollution. By coordinating with these partners to share information and resources and to develop and implement strategies together, the state can more effectively focus its water quality protection and restoration efforts.

The Texas Nonpoint Source Management Program

In Texas, the water quality assessment indicates NPS pollution contributes to approximately 45 percent of the water quality impairments to rivers and streams and 48 percent of the water quality impairments to lakes in Texas. To address these issues, the *Texas NPS Management Program* has been developed to utilize regulatory, voluntary, financial, and technical assistance approaches to achieve a balanced program. NPS pollution is managed through assessment, planning, implementation, and education. The state has established long- and short-term goals and objectives for guiding and tracking the progress of NPS management in Texas. This report documents the success in achieving these goals and objectives.

Implementation of the *Texas NPS Management Program* involves partnerships among many organizations. Many local, regional, state, and federal agencies provide information about local concerns and infrastructure and build support for the kind of pollution controls that are necessary to prevent and reduce NPS pollution. By establishing coordinated frameworks to share information and resources, the state can more effectively focus its water quality protection efforts.

The U.S. Environmental Protection Agency's (EPA) NPS Program makes available CWA Section 319(h) federal grant funds through the EPA to states. The grant funds can support a wide variety of activities including implementation of best management practices (BMPs), technical assistance, financial assistance, education, training, technology transfer, demonstration projects, and monitoring to assess the success of specific NPS implementation projects. In 2013, Texas received $7,044,000 in CWA Section 319(h) federal grant funds.

Goals for Nonpoint Source Management

Long-Term Goal

The long-term goal of the *Texas NPS Management Program* is to protect and restore water quality affected by NPS pollution through implementing the short-term goals of assessment, implementation, and education.

Short-Term Goals

Goal One—Data Collection and Assessment

Coordinate with appropriate federal, state, regional, and local entities, and stakeholder groups to target water quality assessment activities in high priority, NPS-impacted watersheds, vulnerable and impacted aquifers, or areas where additional information is needed.

Goal Two—Implementation

Implement Total Maximum Daily Load (TMDL) Implementation Plans (I-Plans) and/or Watershed Protection Plans (WPPs) and other state, regional, and local plans/programs to reduce NPS pollution by targeting implementation activities to the areas identified as impacted or potentially degraded with respect to use criteria by NPS pollution.

Goal Three—Education

Conduct education and technology transfer activities to increase awareness of NPS pollution and activities that contribute to the degradation of water bodies, including aquifers, by NPS pollution.

The Environmental Protection Agency Updates Clean Water Act Section 319(h) Grant Guidelines

On April 12, 2013 the EPA issued new *Nonpoint Source Program and Grants Guidelines for States and Territories*. This guidance applies to recipients of CWA Section 319(h) grant funds, and replaces the previous guidelines that have been in effect since fiscal year 2004. These guidelines are effective starting in fiscal year 2014. The following is a link to the updated guidelines: <water.epa.gov/polwaste/nps/upload/319-guidelines-fy14.pdf>.

The new guidelines provide updated program direction, an increased emphasis on watershed project implementation in watersheds with impaired water bodies, and increased accountability measures. In an effort to increase the focus of CWA Section 319(h) funding on watershed project implementation, the new guidelines indicate states should set aside at least 50 percent of their allocation for watershed projects to provide an appropriate balance between implementation of watershed-based plans (WBPs) and other important planning, assessment, management, and statewide NPS programs and projects.

Other significant changes in the revised guidelines include:

- emphasis on the importance of states updating their NPS management programs to ensure that funds are targeted to the highest priority activities
- emphasis on taking a watershed-based approach to restore NPS-impaired waters
- provision of a limited amount of funding to protect unimpaired/high quality waters
- specifications for supplemental information to be submitted with TMDLs developed using CWA Section 319(h) funds
- increased emphasis on coordination with the United States Department of Agriculture (USDA) Farm Bill programs as a way to leverage water quality investments
- flexibility for statewide NPS monitoring and assessment activities, for measuring success, and in targeting watershed restoration and protection efforts
- incentives to use the Clean Water State Revolving Fund (CWSRF) and other state or local funding for NPS watershed projects by providing additional flexibility with CWA Section 319(h) funds when states provide funding for watershed projects equal to their total CWA Section 319(h) allocation

The Watershed Approach

Protecting the state's streams, lakes, bays, and aquifers from the impacts of NPS pollution is a complex process. Texas uses the Watershed Approach to focus efforts on the highest priority water quality issues of both surface water and groundwater. The Watershed Approach is based on the following principles:

- geographic focus based on hydrology rather than political boundaries
- water quality objectives based on scientific data
- coordinated priorities and integrated solutions
- diverse, well-integrated partnerships

For groundwater management, the geographic focus is on aquifers rather than watersheds. Wherever interactions between surface water and groundwater are identified, management activities will support the quality of both resources.

The Watershed Approach recognizes that to achieve restoration of impaired water bodies, solutions to water quality issues must be socially accepted, economically bearable, and based on environmental goals.

Figure 1-1.
Social, Economic, and Environmental Considerations to Achieve Water Quality Restoration

Watershed Action Planning

A major element in the *Texas NPS Management Program* is the inclusion of the Watershed Action Planning (WAP) process and the Priority Watersheds Report. The WAP process is an initiative of the water quality programs in the state that guides statewide water quality planning. Management strategies to address water quality issues are selected through a collaborative approach and documented in the Priority Watersheds Report. This comprehensive planning approach facilitates greater coordination and leveraging of resources.

Reduced funding, new guidelines, increasing populations, and evolving environmental policies create new challenges for the state water quality planning programs. These challenges elevate the importance of incorporating the WAP process into the NPS Program to direct funding to watersheds with nine-element WBPs. The WAP process encourages sufficient planning of WBPs prior to implementation in order to ensure that NPS funds are spent efficiently and targeted towards well-planned projects.

The WAP process supports the integration of state water quality planning programs by providing a framework and a mechanism for enhanced coordination among state water quality planning programs and stakeholders. Coordination at the local level allows stakeholders opportunities to provide a local perspective and provide input into water quality management strategies and priorities. Interagency workgroups of surface water quality planning professionals meet to consider local input and other information for integration into program activities. Interagency coordination at the state and federal level allows for more effective development of projects, leveraging of resources, and the implementation of water quality management strategies with watershed stakeholder support.

The WAP process integrates information from existing planning tools and from the coordination process to develop and track water quality management strategies. In the first phase of the WAP process, water quality management strategies are documented and periodically updated with cooperation of the WAP partners including the TSSWCB, the Clean Rivers Program (CRP) partners (typically river authorities), and the five TCEQ Water Quality Planning Division program areas—Texas Surface Water Quality Standards (TSWQS) Group, Surface Water Quality Monitoring (SWQM) Program, CRP, TMDL Program, and the NPS Program. Information collected includes segment identification, the water quality impairment

or priority interest, what will be done to address the water quality issue (i.e. which strategy will be applied), the current status of that strategy, and the lead entity. The recommended strategies are documented and published in the WAP Table, a public document summarizing the water quality management information maintained by the agencies. The WAP Table can be found on the TCEQ's Watershed Action Planning website: <http://www.tceq.texas.gov/waterquality/planning/wap/>. An interactive, web-based application is being developed to replace the existing WAP Table (Excel spreadsheet) that captures the WAP decisions.

Overall, the WAP process increases the transparency of the state's water quality planning programs by presenting a list of priority waters in such a manner as to communicate activities and intentions collectively to affected stakeholders and the public at large. Water quality management strategies identified through the WAP process are implemented on a continuing basis. Since September 2012, the WAP process has helped facilitate revisions to the TSWQS, the collection of water quality data, the adoption of 64 TMDLs in the Houston area, and the completion of WPPs for Upper Cibolo Creek, Lampasas River, and Geronimo and Alligator Creek watersheds.

Texas hill country

Progress in Improving Water Quality

CHAPTER 2

Reductions in Pollutant Loadings

Water Quality Improvements

Section 319(h) of the CWA requires that state NPS annual reports include, "…to the extent that appropriate information is available, reductions in nonpoint source pollutant loading and improvements in water quality… resulting from implementation of the management program." This specifically applies to the water bodies that have previously been identified as requiring NPS pollution control actions in order to "…attain or maintain applicable water quality standards or the goals and requirements of the Clean Water Act."

The two primary ways of measuring improvement in water quality are through:

- reductions in pollutant loadings resulting from management measures implemented, estimated with the help of models or other calculations
- water quality improvements measured by changes in pollutant concentrations before and after implementation of management measures

Other indicators of progress toward water quality improvements include land use or behavioral changes that are associated with reductions in loadings or pollutant concentrations in water bodies. Examples include restored riparian or aquatic habitat and reduced use of fertilizers and pesticides.

Reductions in Pollutant Loadings

Lower Colorado River Authority's Creekside Conservation Program

The Creekside Conservation Program, administered by the Lower Colorado River Authority (LCRA) and funded by CWA Section 319(h) grant funds through the TSSWCB, is a partnership between LCRA, private landowners, the USDA Natural Resources Conservation Service (NRCS), and local soil and water conservation districts (SWCDs). The Creekside Conservation Program provides a financial incentive to help reduce soil erosion and agricultural NPS pollution on privately owned land. The Creekside Conservation Program is being conducted in Bastrop, Blanco, Burnet, Colorado, Fayette, Lampasas, Llano, Matagorda, San Saba, Travis, and Wharton counties.

In fiscal year 2013, this effort placed 14,358 acres under conservation management. BMPs installed in the last year included one pond, 11,858 linear feet of cross fencing, and 422 acres of brush management. Additionally, prescribed grazing and upland wildlife habitat management practices were implemented on all 14,358 management acres.

According to the Texas BMP Evaluation Tool, these BMPs achieved the following load reductions:

Sediment	141 tons
Phosphorus	15,020 lbs
Nitrogen	133,975 lbs

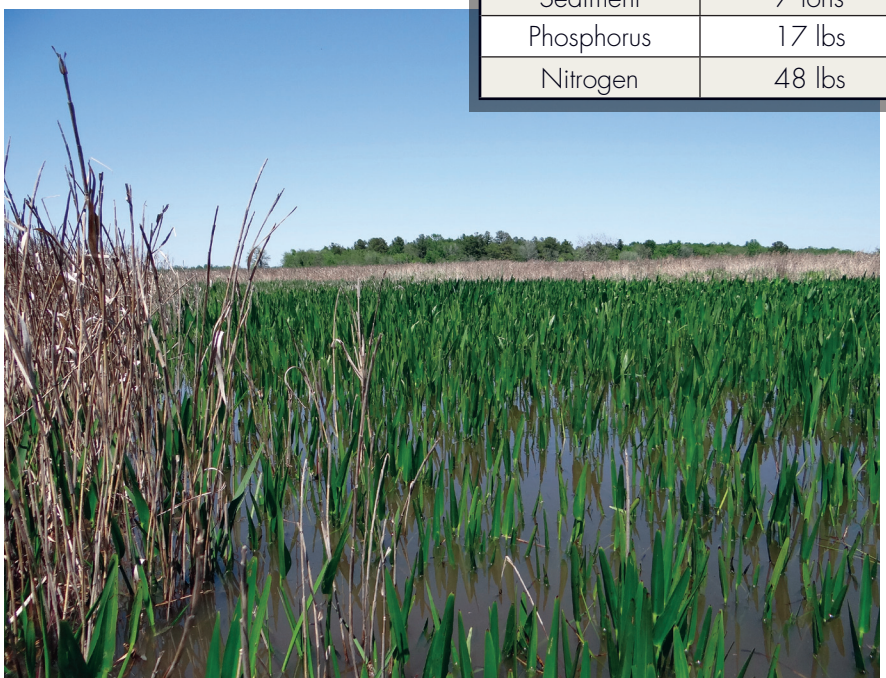
In addition to technical and financial assistance, two workshops were held to promote implementation of BMPs and the Creekside Conservation Program with approximately 200 attendees.

Coastal Prairie Wetland Restoration at Sheldon Lake State Park

The TSSWCB and the EPA partnered with the Texas A&M AgriLife Extension Service, local Texas Master Naturalist volunteers, and the Texas Sea Grant in a wetland restoration project at Sheldon Lake State Park near Houston, Texas. The freshwater coastal prairie project involved new planning and development methods combined with traditional restoration techniques. Such a unique combination is atypical of wetland restoration projects to date. Most projects involve the creation of new wetlands. This project involved an intense investigation of the landscape history, and the identification and mapping of the original locations of small, dome-shaped mounds, known as mima mounds, and depressional areas, known as prairie potholes. Once identified on a map, and verified on the ground, the ponds were excavated and subsequently planted as densely as possible with local native wetland plants. Throughout the planting process, Wetland Restoration Team mentors worked with volunteer groups and students, taking advantage of opportunities to engage eager volunteers and educate them about the function and importance of wetlands.

Wetlands play an important water quality role by both capturing and filtering pollutants from incoming waters. The plants within a wetland matrix physically slow down inflowing waters which subsequently causes sediments to drop out of the water column. Any pollutants attached to those sediments are also removed by microbial interactions. The soils within a wetland then act as a "sink" for sediments and pollutants like nutrients. Micro-organisms within the soil bed chemically act upon the pollutants, altering their structure and rendering pollutants inert. These water quality functions make wetlands a valuable system to re-establish in areas where waters are physically and chemically impaired. The restoration of wetland habitat can restore water quality and habitat function. Through innovative restoration efforts, 44 acres of coastal prairie wetlands have been restored resulting in the following pollutant load reductions:

Sediment	7 tons
Phosphorus	17 lbs
Nitrogen	48 lbs



Upper Guadalupe River Best Management Practices

The Upper Guadalupe River Authority (UGRA) received a CWA Section 319(h) grant from the TCEQ to implement several BMPs outlined in the TMDL I-Plan for bacteria in the Guadalupe River above Canyon Lake (Segment 1806). The ultimate goal of the project is to reduce bacteria concentrations in the Upper Guadalupe River to levels that meet the contact recreation criteria defined in the TSWQS. Sources of *Escherichia coli* (*E. coli*) in this watershed have been attributed to birds nesting on bridges, large flocks of domestic waterfowl congregating in the lakes, septic systems, pet waste, and pollution from general urban runoff. A community approach was taken to develop and implement the BMPs through the partnership of UGRA with the City of Kerrville, Kerr County, and the Texas Department of Transportation (TxDOT).

In fiscal year 2013, the following BMPs were implemented:

- netting was installed on the SH 16 Bridge in Kerrville to prevent birds from roosting directly over the Guadalupe River
- routine street sweeping was carried out throughout the watershed by the City of Kerrville
- a total of 24,075 pounds of litter was removed from the watershed through the routine river crossing cleanup and annual river cleanup programs
- seven pet waste stations were installed in Kerrville, which includes four stations at an off-leash dog park

Strategies to reduce *E. coli* pollution from pet waste was one of the first implementation measures, and pet waste stations continue to be used frequently. The quantity of waste collected in the pet waste station trash cans is weighed by UGRA staff on a weekly basis. In fiscal year 2013, a total of 978 pounds of pet waste was documented. The following is the quantified annual load

reduction based on literature values for the number of colony-forming units (CFU) of *E. Coli* per gram of waste. Load reductions for the other BMPs will be reported once water quality monitoring and results have been completed.

E. coli	22 trillion CFU

Additional information can be found at <www.ugra.org/projects.html>.

McAllen Enhanced Stormwater Detention Facilities

The City of McAllen is located in the Lower Rio Grande Valley (LRGV) which has been experiencing rapid urban growth and consequently increased urban stormwater runoff. A large portion of the region drains to the Arroyo Colorado and eventually the Lower Laguna Madre.

Texas A&M University at Kingsville (A&M Kingsville) and the City of McAllen received a CWA Section 319(h) grant from the TCEQ to enhance several stormwater detention facilities with water quality protection features and monitor the water quality benefits. At a detention facility near McAuliffe Elementary School in McAllen, a microscreen and wetland were installed. During storm events, high flows are first diverted through the microscreen for pollutant removal and then directed to the wetland for additional treatment. Inlet and outlet flows and pollutant concentrations for the enhanced detention facilities were monitored from June 2011 through April 2013. The results demonstrate that large detention and retention system basins, enhanced for water quality treatment, can be an effective water quality treatment option in the LRGV. Based on monitoring results over a 22-month period of relatively dry weather, the following are conservative estimates of the total annual load reductions for the detention facilities.

Sediment	330 tons
Phosphorus	447 lbs
Nitrogen	1,474 lbs

Microscreen filter installed upstream of a stormwater detention facility in McAllen.

Arroyo Colorado Agriculture Implementation

Through multiple CWA Section 319(h) grants provided by the TSSWCB, the Southmost and Hidalgo SWCDs have allocated funds for technical and financial assistance to reduce agricultural NPS pollution in the Arroyo Colorado watershed. Since 1999, 436 water quality management plans (WQMPs) covering over 32,650 acres have been implemented across the watershed.

In fiscal year 2013, seven WQMPs were installed across the watershed. A total of 127 acres of irrigation land leveling and 6,766 feet of irrigation pipeline have been installed, making them the top two most commonly installed practices. These two practices are synergistic and have enabled producers to better utilize their resources. Continued technical and financial assistance has been provided to producers when available. According to the Texas BMP Evaluation Tool, these BMPs achieved the following load reductions:

Sediment	182 tons
Phosphorus	940 lbs
Nitrogen	187 lbs

Additional information regarding the efforts in the Arroyo Colorado watershed may be found at <arroyocolorado.org>.

Water Quality Improvements

Texas' lead NPS agencies, the TSSWCB and the TCEQ, work together to identify stream water quality improvements where the implementation of NPS BMPs is a contributing factor to the improvement. Once a strong candidate is identified, a "success story" is written and sent to the EPA for approval. During fiscal year 2013, success stories were written and approved by the EPA for both the Oso Bay (Segment 2485) and Trinity River Above Bridgeport Reservoir (Segment 0812) segments.

Oso Bay Success Story

The combined watersheds of Oso Creek and Oso Bay drain a small area of approximately 235 square miles in Nueces County, Texas. Oso Bay (Segment 2485) is a shallow tertiary bay of about 2,963 acres that empties into Corpus Christi Bay. The watershed is dominated by cropland in the western portion, and developed residential areas in the eastern protion. Petroleum exploration and refining, manufacturing, and tourism also exist in the watershed. Oso Bay was initially included on the state's *1996 CWA Section 303(d) List* of impaired waters for failure to meet the TSWQS for dissolved oxygen (DO).

In order to help address the water quality issues in Oso Bay, over $761,100 in CWA Section 319(h) funds and over $27,700 in state funds from the TSSWCB, paired with over $385,600 in non-federal matching funds from Texas A&M AgriLife Research and local landowners supported implementation efforts. Implementation efforts included collecting and analyzing water samples and providing technical and financial assistance for voluntary BMP implementation by agricultural producers in the watershed. Additionally, the NRCS provided over $90,900 in federal Farm Bill funding for technical and financial assistance to develop conservation plans in the watershed. More than $180,000 in CWA Section 319(h) funds from the TCEQ combined with $120,000 in non-federal matching funds from the Coastal Bend Bays Estuaries Program (CBBEP), Coastal Bend Council of Governments, and Nueces County were used to install, replace, or repair on-site sewage facilities (OSSFs); perform litter and dumping cleanups; and provide stormwater outreach and education in the Oso Bay watershed.

Water quality monitoring data from the 2001-2008 assessment period shows that the DO daily minimum and 24-hour average levels in Upper and Lower Oso Bay (Segments 2485_01 and 2485_03) comply with the TSWQS. As a result, the TCEQ removed the segments' low DO impairments from the state's *2010 CWA Section 303(d) List* of impaired waters. Figure 2-1 shows DO levels for TCEQ station 17118 from September 21, 2000 to August 30, 2005. Landowners continued to implement agricultural BMPs with assistance from the TSSWCB, Nueces SWCD, and NRCS after the assessment period, along with continued OSSF implementation, trash cleanup, and stormwater outreach.

West Fork Trinity River Success Story

The West Fork Trinity River (Segment 0812) is an intermittent stream located in the headwaters region of the Trinity River Basin slightly northwest of the Dallas–Fort Worth Metroplex. It begins immediately upstream of the confluence of Bear Hollow in Jack County and continues 85 miles until it empties into Bridgeport Reservoir, an important water source for the Tarrant Regional Water District. The segment was initially included on the state's *1998 CWA Section 303(d) List* of impaired waters for failure to meet the TSWQS for chloride. Historically, the Trinity River drainage basin had excessive chloride loadings. These loadings are a result of both natural and human-generated NPS pollution. Leaking oil well casings, improper brine disposal, and the overpressurization of downhole formations are some of the sources of human-generated pollution.

Figure 2-1.
Dissolved Oxygen Levels Between 2000 and 2005 at TCEQ Station 17118 Oso Bay Segment 2485_03

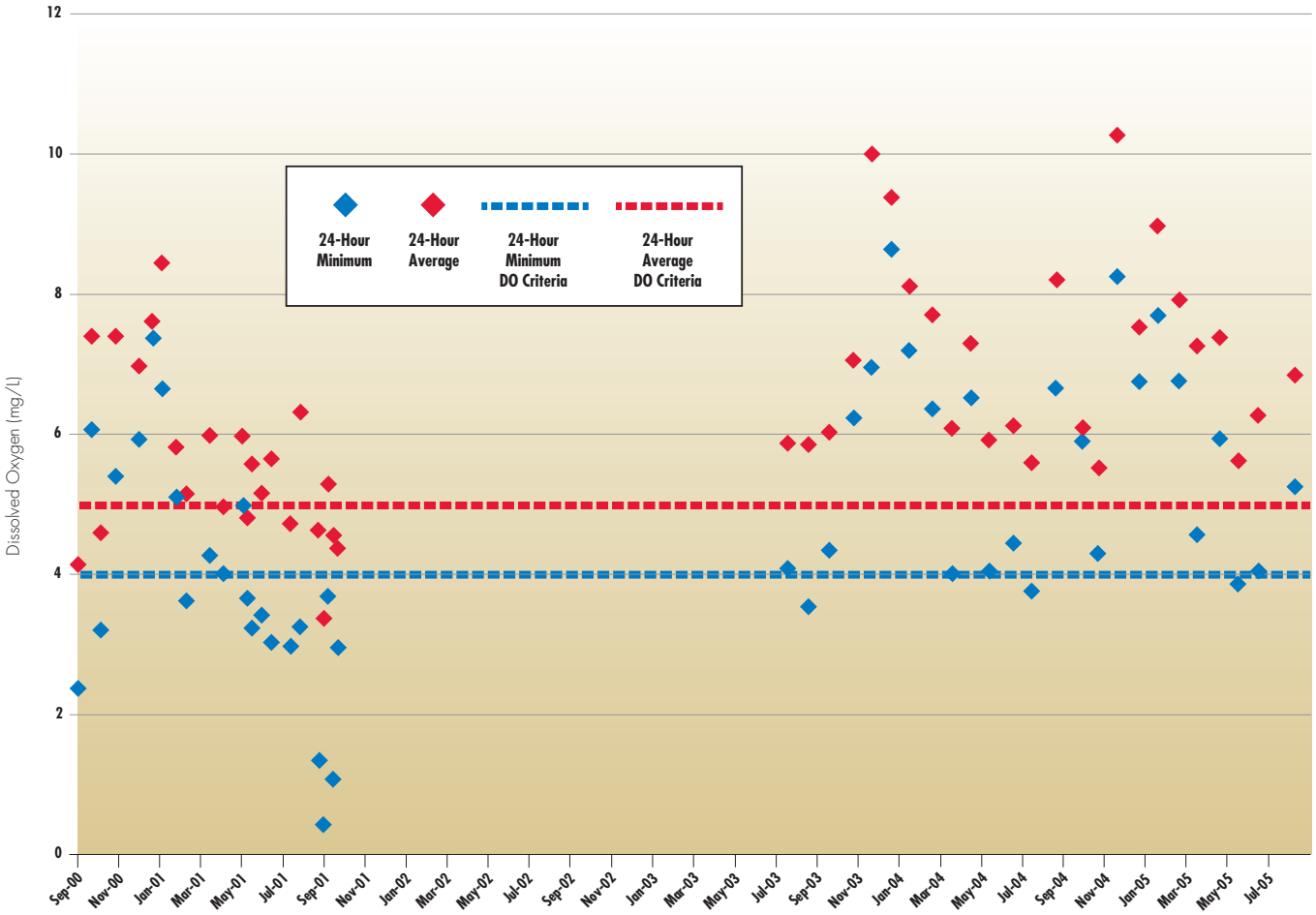
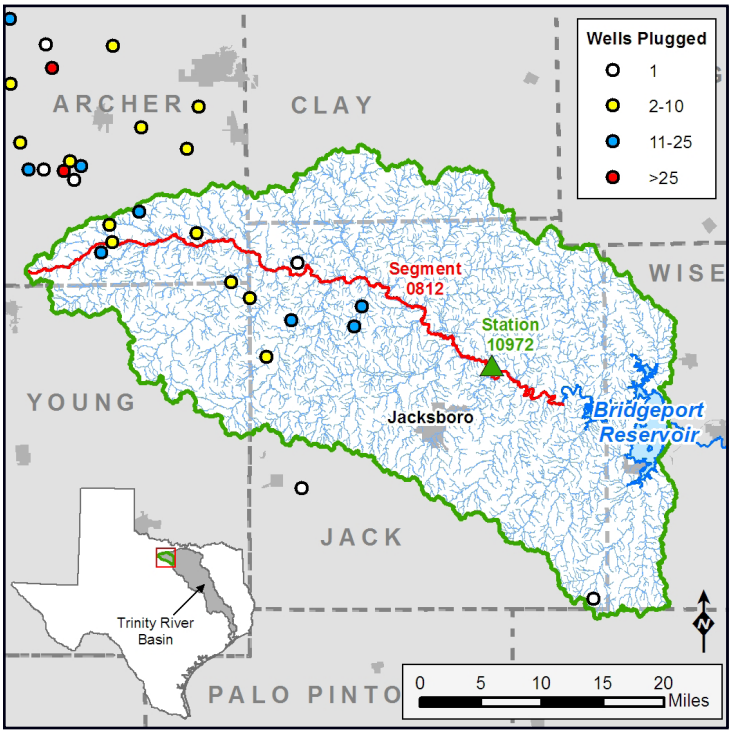


Figure 2-2.

Map Showing Segment 0812 and Wells Plugged During the RRC Project



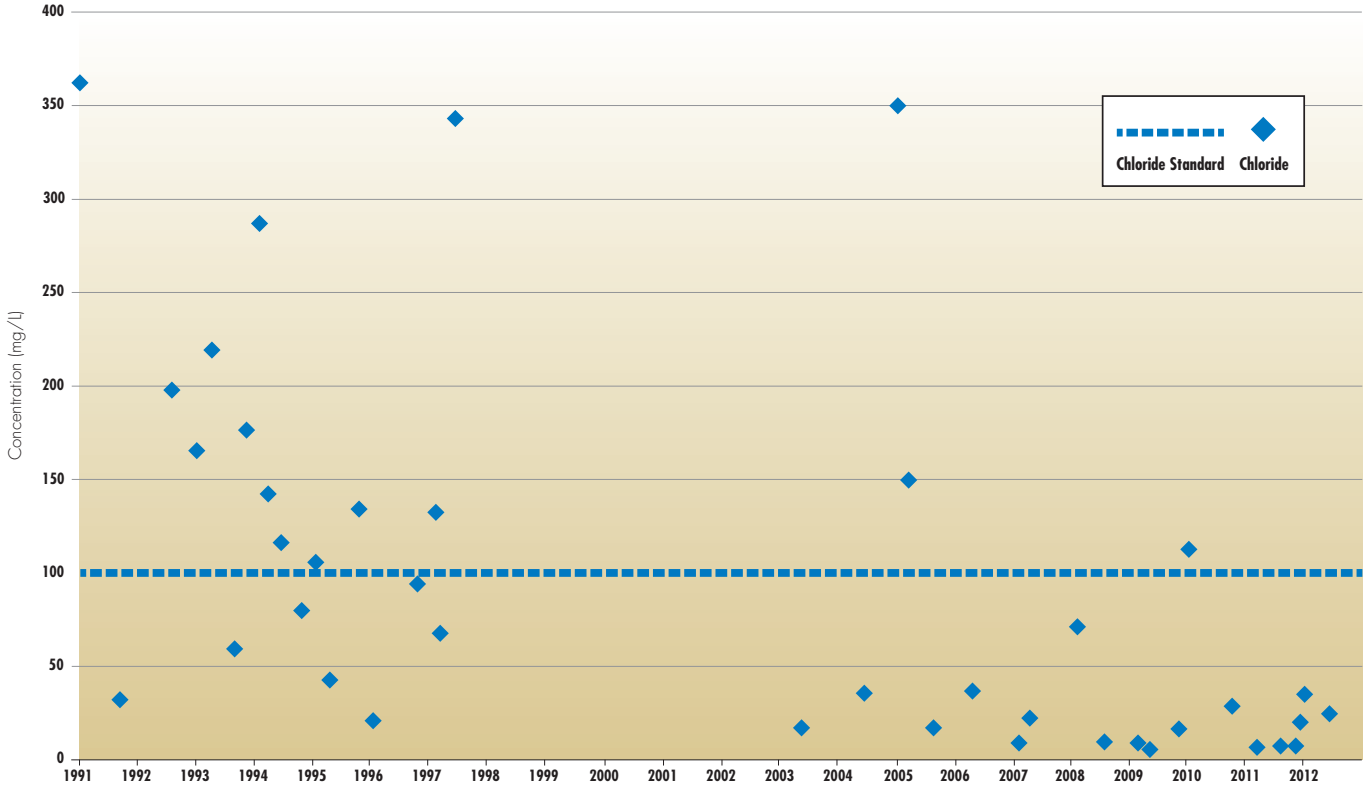
The Texas Railroad Commission (RRC) received a CWA Section 319(h) grant from the TCEQ to plug 436 wells in Archer and Jack counties from May 2004 through August 2007. During that time, approximately 98 wells were plugged in the Segment 0812 watershed. Beginning in 2003, the TSSWCB partnered with Jack SWCD, Archer County SWCD, and local landowners to implement BMPs in the watershed. During this effort, 15 WQMPs encompassing 7,204 acres were developed and certified. Education and outreach was provided by the TSSWCB and SWCDs through technical assistance to landowners in the watershed.

As a result of these efforts, measurable water quality improvements were achieved. Recently, the TCEQ determined that the segment met the TSWQS for chloride and removed the impairment from the *2012 CWA Section 303(d) List*.

Funding for the well plugging effort was provided by the EPA and the RRC. A total of $600,000 of CWA Section 319(h) funds were used for the well plugging project. In addition, the RRC provided $481,430 of matching funds, which included $243,144 in plugging expenses from the Texas Oil Field Cleanup Fund. $100,000 in CWA Section 319(h) funds and over $41,300 in state funds from the TSSWCB, paired with over $45,000 in matching funds were used to support local landowner efforts in the Segment 0812 watershed and to provide technical and financial assistance for voluntary BMP implementation by agricultural producers in the watershed.

Figure 2-3.

Chloride Grab Samples Taken Between 1991 and 2012 at TCEQ Station 10972 West Fork Trinity River Segment 0812



Twin Falls, Austin

CHAPTER 3

Progress Toward Meeting the Goals and Objectives of the Texas Nonpoint Source Management Program

Clean Water Act Section 319(h) Grant Program

Status of Clean Water Act Section 319(h) Grant-Funded Projects

Short-Term Goals and Milestones of the Texas Nonpoint Source Management Program

The TCEQ and the TSSWCB have established goals and objectives for guiding and tracking the progress of NPS management in Texas. The goals describe high-level guiding principles for all activities under the *Texas NPS Management Program*. The objectives specify the key methods that will be used to accomplish the goals. Although not comprehensive, this chapter reports on a variety of programs and projects that directly support the goals and objectives of the *Texas NPS Management Program*.

Clean Water Act Section 319(h) Grant Program

Section 319(h) of the CWA established a grant that is appropriated annually by Congress to the EPA. The EPA then allocates these funds to the states to implement activities supporting the Congressional goals of the CWA. The TCEQ and the TSSWCB target these grant funds toward NPS activities consistent with the long- and short-term goals defined in the *Texas NPS Management Program*.

Status of Clean Water Act Section 319(h) Grant-Funded Projects

In fiscal year 2013, the TCEQ had 39 active multi-year CWA Section 319(h) grant-funded projects totaling in a budget of approximately $14 million in federal funds, addressing a wide range of NPS issues (Figure 3-1). These projects focus on the development and implementation of WPPs and TMDLs where the primary sources of NPS pollution are not agricultural or silvicultural. Other project types include low impact development (LID) projects, support of a statewide volunteer water quality monitoring program, urban stormwater retrofits, OSSF maintenance and education, and a variety of BMPs chosen on the basis of local water quality priorities.

In fiscal year 2013, the TSSWCB had 51 active multi-year CWA Section 319(h) grant-funded projects totaling in a budget of approximately $15 million in federal funds addressing a wide array of agricultural and silvicultural NPS issues (Figure 3-2). Specific projects include developing and implementing

Figure 3-1.
TCEQ Fiscal Year 2013 Nonpoint Source Grant-Funded Projects

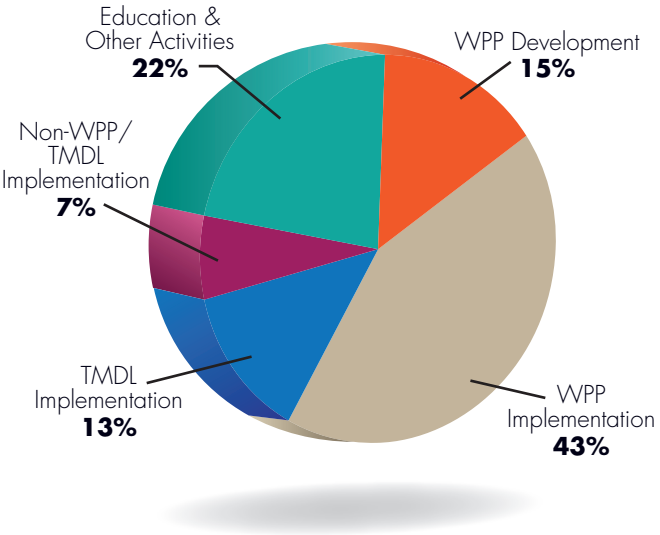
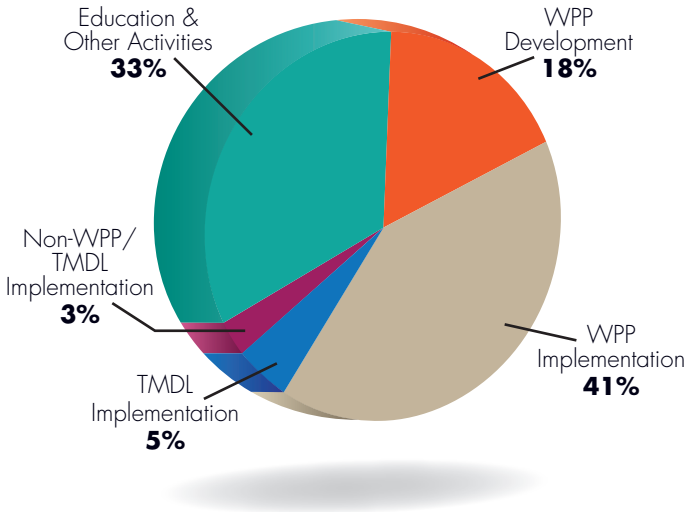


Figure 3-2.
TSSWCB Fiscal Year 2013 Nonpoint Source Grant-Funded Projects



WPPs and TMDLs, supporting targeted educational programs, and implementing BMPs to abate NPS pollution from dairy and poultry operations, silvicultural activities, grazing operations, and row crop operations.

Short-Term Goals and Milestones of the Texas Nonpoint Source Management Program

Goal One—Data Collection and Assessment

One of the goals of the *Texas NPS Management Program* is to collect and assess water quality data. Data collection requires the coordination of appropriate federal, state, regional, and local entities as well as private sector and citizen groups. The TCEQ's SWQM Program, operating from the Austin central office and 16 regional offices, conducts both routine ambient monitoring and special studies. In addition, the CRP, a collaboration between the TCEQ and 15 regional water agencies, collects surface water quality data throughout the state in response to both state needs and local stakeholder interests. Furthermore, the TCEQ acquires water quality data from other state and federal agencies, river authorities, and municipalities after assuring the quality of the data is comparable to that of data collected by the TCEQ's programs.

Data are assessed by the TCEQ to determine if a water body meets its designated uses or if water quality improvement activities are achieving their intended goals. For impaired waters, water quality data can be used in the development of WPPs and TMDLs. Data are also used to determine potential sources of pollution and the adequacy of regulatory measures, watershed improvements, and restoration plans. The data collection guides the distribution of CWA Section 319(h) grant funds toward water quality assessment activities in high priority, NPS-impacted watersheds, vulnerable and impacted aquifers, or areas where additional information is needed.

Texas Integrated Report

Section 305(b) of the CWA requires all states to assess the quality of surface waters every two years. The *2012 Integrated Report* describes the status of all surface water bodies of the state evaluated for the given assessment period. The TCEQ used data collected during the most recent seven-year period (December 1, 2003 - November 30, 2010) to assess the quality of surface water bodies of the state. The descriptions of water quality for each assessed water body in the *Integrated Report* present a snapshot of conditions during the limited time period considered in the assessment. Water bodies identified as impaired by NPS pollution are given priority for CWA Section 319(h) grants and other available funding through the WAP process. Guidance for developing the assessment is based on a set of methods that apply the TSWQS, or goals for water quality. These methods are developed by the TCEQ with the advice of a diverse group of stakeholders, and are detailed in the *2012 Guidance for Assessing and Reporting Surface Water Quality in Texas* (available online at <www.tceq.texas.gov/assets/public/waterquality/swqm/assess/12twqi/2012_guidance.pdf>).

The *CWA Section 303(d) List* is an important management tool produced as part of the *Integrated Report*. It identifies waters for which the existing preventative measures are not sufficient to meet TSWQS (impairments). The *CWA Section 303(d) List* must be approved by the EPA prior to being implemented by TCEQ water quality management programs.

Table 3-1.

Number of Water Bodies Assigned to Each Assessment Category in the 2012 Integrated Report

Category	Definition	Number of Water Bodies
1	Attaining all the water quality standards and no use is threatened.	38
2	Attaining some of the designated uses, no use is threatened, and insufficient or no data and information are available to determine if the remaining uses are attained or threatened.	385
3	Insufficient or no data and information to determine if any designated use is attained. Many of these water bodies are intermittent streams and small reservoirs.	300
4	The standard is not supported or is threatened for one or more designated uses but does not require the development of a TMDL.	81
5	The water body does not meet applicable water quality standards or is threatened for one or more designated uses by one or more pollutants. Category 5 is the *CWA Section 303(d) List*.	410
Totals		1214

Categories Indicate Water Quality Status

The *2012 Integrated Report* assigns each assessed water body to one of five categories in order to report water quality status and potential management options to the public, the EPA, state agencies, federal agencies, municipalities, and environmental groups. These categories indicate the status of a water body and describe how the state will approach identified water quality problems. Table 3-1 defines the five categories and shows the number of water bodies assigned to each assessment category in 2012.

Water bodies on the *CWA Section 303(d) List* (Category 5 of the *Integrated Report*) are those water bodies that require remedial action to restore water quality. The combination of the water body with the pollutant or condition of concern is called an impairment. For example, the concentration of DO is one of the criteria used to determine the support of the aquatic life use. If DO concentrations are too low, the water body being evaluated will have an aquatic life use impairment. In some cases a single water body may be impaired for multiple parameters. This explains why the total number of impairments in Table 3-2 is greater than the number of water bodies in Category 5 in Table 3-1. Since a water body has multiple uses, it may fall into different categories for different uses. In that case, the overall category for the water body is the one with the highest category number.

The *Integrated Report* further divides these water bodies into subcategories to reflect additional options for addressing impairments.

- for water bodies in Category 5a, a TMDL is underway, scheduled, or will be scheduled
- water bodies in Category 5b require a review of the water quality standards for the water body to be conducted before a management strategy is selected
- those water bodies in Category 5c require additional data and information to be collected or evaluated before a management strategy is selected

Table 3-2 shows the total number of impairments broken down by the

Table 3-2.

Number of Impairments in the 2012 Integrated Report Requiring Remedial Action

Category	Definition	Water Body Classification		Total Number of Impairments
		Classified	Unclassified	
5	5a—TMDL scheduled or underway	81	85	166
	5b—Water Quality standards review scheduled or under way or undergoing Use Attainability Analysis	60	142	202
	5c—Need additional monitoring	110	90	200
Total Number of Impairments in Category 5		251	317	568

category designation. The categories must be applied to each combination of water body and parameter for determining support.

Summary of the 2012 Integrated Report

The *2012 Integrated Report* assessed the water quality of 1,214 water bodies. Sufficent data was available to assess uses for 914 water bodies. Of these, 492 were determined to not be attaining one or more of the uses.

Of the 1,214 water bodies, 410 were classified as Category 5 water bodies. This was a slight decrease from the *2010 CWA Section 303(d) List*, which included 440 water bodies. The total number of impairments also decreased from 621 to 568 (Table 3-2). Public comment was solicited from October 19 through November 19, 2012. The *2012 Integrated Report* was approved by the TCEQ on February 13, 2013, and the EPA on May 9, 2013.

Summary of 2012 Impairments

Impairments identified in the *2012 Integrated Report* have been grouped by the parameter and the beneficial use of the water body affected (Table 3-3). Elevated levels of bacteria represent 45 percent of the listed impairments. Many of these bacteria impairments are the result of urban and agricultural NPS pollution. Low DO, impairing many of the same water bodies, was found to be the cause in about 16 percent of the impairments. Low DO can result in an unhealthy environment for aquatic life.

Continuous Water Quality Monitoring Network

In 2001, the TCEQ established a continuous water quality monitoring network (CWQMN). The purpose of the network is to use advanced technologies to enhance the state's SWQM Program. CWQMN sites are designed to meet site-specific data needs. Most sites monitor conventional parameters such as temperature, pH, DO, and specific conductance. Several of the sites can also monitor nutrients, turbidity, and/or chlorophyll.

The CWQMN collects and displays ambient water quality data in near real time, meaning that the data collected in the field are reported almost immediately to the TCEQ. The stations, located throughout Texas, use a combination of *in situ* probes and automated analysis instruments. Data are transmitted from the stations to the TCEQ using phone modems, wireless modems, and satellite telemetry. Once data are transferred, they are stored in the Leading Environmental Analysis and Display System database. The data

Table 3-3.
Summary of Impairments Identified on the *CWA Section 303(d) List* for the *2012 Integrated Report*

Impairment Group	Media	2010 Number of Impairments	2012 Number of Impairments	Use
Bacteria	in water	303	257	recreation
	in shellfish	15	15	oyster waters
	beaches	1	1	beach use
Dissolved oxygen	in water	94	90	aquatic life
Toxicity	in ambient water	2	2	aquatic life
	in ambient sediment	6	6	
Organics	in water	0	0	fish consumption, aquatic life
	in fish or shellfish	94	99	
Metals (except mercury)	in water	6	4	fish consumption, oyster waters, aquatic life
	in fish or shellfish	0	0	
Mercury	in water	1	1	fish consumption, oyster waters, aquatic life
	in fish or shellfish	23	23	
Dissolved solids	chloride	13	11	general
	sulfate	9	9	
	total dissolved solids	13	14	
Temperature	in water	0	0	general
pH	in water	17	17	general
Nutrients	nitrogen	0	0	general, public water supply
Biological	habitat, macrobenthic community, or fish community	24	19	aquatic life
Totals		621	568	

can be accessed by the public at: <www.texaswaterdata.org>.

During fiscal year 2013, the TCEQ deployed two new stations in the Middle Rio Grande near Rio Bravo, Texas, and near Eagle Pass, Texas. The stations monitor temperature and specific conductance in order to characterize the quality of water released from Amistad Reservoir and delivered to Falcon Reservoir for use in the LRGV. The quantity and quality of this water is important for agricultural producers in the LRGV. The TCEQ also worked to improve data return, data management, operator training, and instrument selection; and, continued incorporating measurement of bio-fouling and drift at selected sites. These efforts will be continued in fiscal year 2014. Additional CWQMN sites may be deployed, relocated, or removed in fiscal year 2014.

The TCEQ maintains a prioritized list of continuous monitoring proposals for deployment in fiscal year 2014 and beyond. Personnel from water programs throughout the TCEQ, with input from cooperators outside the agency, base the list on the following criteria:

- demonstrated data needs
- availability of monitoring technology to address the specific data needs
- intended use of data
- availability of personnel—internal or external—for operation and maintenance (including data validation)

Several of the CWQMN sites have been established based on a need to monitor NPS pollution. The NPS sites include:

- four sites in the North Bosque watershed
- three Edwards Aquifer recharge monitoring sites
- five sites in the Upper Rio Grande watershed
- two sites in the Middle Rio Grande
- seven sites in the Lower Rio Grande watershed
- five in the Guadalupe River watershed
- nine sites in the Pecos River watershed
- two sites in the Upper Colorado River watershed

Guadalupe River Basin Continuous Water Quality Monitoring Network

The Guadalupe–Blanco River Authority (GBRA) received a CWA Section 319(h) grant to establish five real-time CWQMN stations throughout the Guadalupe River Basin from 2010 to 2012. The GBRA recently renewed its commitment to maintain the five ambient monitoring stations throughout the Guadalupe River Basin without the assistance of grant funding. All five of the GBRA CWQMN stations support ongoing watershed protection activities and/or TMDLs in watersheds with known impairments or concerns on the *CWA Section 303(d) List*. Monitoring stations on the Cypress Creek near Wimberley, Geronimo Creek near Geronimo, and Plum Creek near Lockhart are all used to inform stakeholders in these watersheds about the effectiveness of implementation activities. The monitoring station on the Sandies Creek, near Westhoff continues to reaffirm the known DO impairment on Segment 1803B. The 24-hour average DO of <4 mg/L and DO minimum value of 0.1 mg/L obtained by the Sandies Creek monitoring station is consistent with the impairment for aquatic life use. The monitoring station also may capture changing conditions to surface water quality in the region should Eagle Ford shale activities continue to develop. All five monitoring stations have also been impacted by the current drought conditions and will continue to serve as a means of tracking the impacts of these harsh weather conditions on the streams of the Guadalupe River Basin.

Texas Stream Team

Texas Stream Team is a statewide network of citizen scientists, and partner organizations that is dedicated to improving water quality through citizen led data collection, stakeholder engagement, and watershed education. The program is based at The Meadows Center for Water and the Environment, formerly known as the River Systems Institute at Texas State University - San Marcos, and is administered primarily through a cooperative CWA Section 319(h) grant-funded partnership between The Meadows Center, the TCEQ, and the EPA. Citizen monitors sample streams, reservoirs, and tidal areas for various parameters including DO, specific conductivity, pH, temperature, *E. coli*, nitrate-nitrogen, orthophosphate, turbidity, and streamflow. The monitors also conduct field observations, including flow severity. Data are collected in accordance with a Quality Assurance Project Plan and a citizen training certification process.

The data are uploaded online to an interactive map where visitors can click on a specific site and download the water quality data collected at the site. Watershed-wide data are compiled and analyzed in summary reports in order to give a more complete picture of the quality of local water bodies. In 2013, data summary reports for the Plum Creek, Pedernales River, San Bernard River, and White Rock Lake watersheds were published.

Over the past year, Texas Stream Team has become more involved in the development and implementation of WPPs and TMDL I-Plans. Citizen scientists have become knowledgeable of their local water bodies and are informed and engaged stakeholders in local water quality planning efforts. Recently, the Texas Stream Team has become involved with the Carters Creek TMDL I-Plan to reduce bacteria by assisting the Texas Water Resources Institute (TWRI) in the establishment of a local volunteer stream team in the watershed. The data collected by the local team will be used for tracking water quality changes during implementation of the I-Plan. Texas Stream Team staff provided training for the local group, and certified the group leader as a Stream Team Trainer. Now the local

group can provide training for new members at their convenience while Texas Stream Team staff help provide logistical support and data management. Texas Stream Team also works with its partners to find additional sources of funding for equipment to provide the citizen scientists. This year, a $20,000 grant from the Communities Foundation of Texas was leveraged to provide additional monitoring equipment for citizen scientists in North Texas, and to pay travel expenses for the certified trainers in the region. The collaborative effort of Texas Stream Team and its partners to recruit new groups of citizen scientists, and find funding for their monitoring equipment, has allowed the program to expand greatly. In 2013, 259 new citizen scientists were certified to collect water quality data, 1,322 monitoring events occurred, and 72 new monitoring sites were created. More information can be found at: <http://txstreamteam.meadowscenter.txstate.edu/>.

Goal Two—Implementation

The second goal of the *Texas NPS Management Program* is to implement activities that prevent and reduce NPS pollution in surface water, groundwater, wetlands, and coastal areas. Activities include the implementation of TMDL I-Plans, WPPs, and the Texas Groundwater Protection Strategy; the development of TSSWCB-certified WQMPs; implementation of BMPs on agricultural and silvicultural lands; and other identified priorities. Implementation of management practices involves the effective management of grant funds and the leveraging of additional funds.

Total Maximum Daily Loads and Implementation Plans

The state's TMDL program works to improve the quality of impaired or threatened water bodies in Texas. It is a major component of the state's strategy for managing water quality. The federal mandate for state TMDL programs is contained in Section 303(d) of the CWA. The EPA's implementing regulations in Title 40, Code of Federal Regulations, Part 130, require states to identify waters where effluent limitations alone are not sufficient to meet surface water quality standards (SWQS). The CWA further requires that, where point source controls and enforcement of them are not sufficient to attain SWQS, a TMDL may be required to account for and allocate loadings from point, nonpoint, and natural sources of pollution.

The TCEQ and the TSSWCB are both responsible for developing

(ABOVE) Citizen scientists learn to collect field observation data at Jacob's Well in Wimberly - *Courtesy of Texas Stream Team*

(RIGHT) A Texas Stream Team Citizen Scientist collects a water sample in Beaumont - *Courtesy of Texas Stream Team*

TMDLs for Texas' water bodies. The TCEQ develops most TMDLs in Texas; however, the TSSWCB is involved in and may take the lead in developing TMDLs in watersheds where agricultural or silvicultural nonpoint sources are significant contributing pollutant sources. The TCEQ and the TSSWCB coordinate closely on all TMDLs in which agricultural or silvicultural NPS pollutants are involved, no matter which agency leads TMDL development. Regardless of who develops a TMDL, the TCEQ has jurisdiction for managing the overall quality of surface waters in Texas. The TCEQ must therefore adopt all TMDLs developed for Texas and is responsible for submitting adopted TMDLs to the EPA for approval.

The state is committed to developing TMDLs in a timely manner and implementing all approved TMDLs. Figure 3-3 illustrates the status of the TCEQ's TMDL and TMDL I-Plan development.

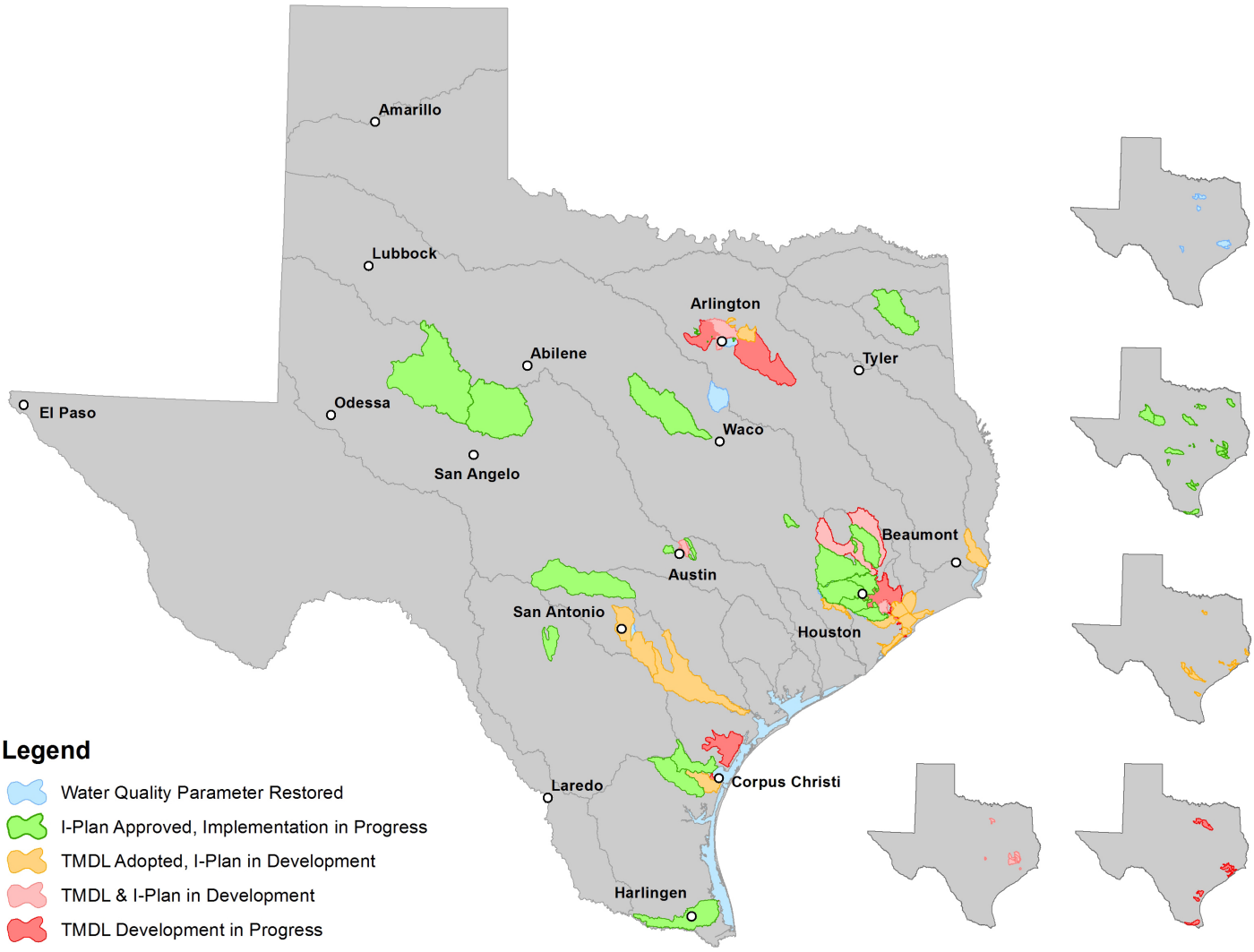
Stakeholder groups are important to the development of I-Plans for TMDLs. The TCEQ encourages stakeholders to begin work on an I-Plan before the TMDL is completed. This early start means that problems can be addressed more quickly.

It is essential to engage stakeholders in the watershed when developing plans to reduce pollution. Stakeholders—anyone whose interests may be affected by a TMDL project—provide the local expertise for identifying site-specific problems, targeting those areas for cleanup, and determining what measures will be most effective. Stakeholders include, among others, permitted wastewater dischargers, municipal and county governments, regional or state governmental agencies, agricultural producers, recreational clubs, homeowners associations, environmental groups, industry groups and lobbyists, and interested individuals. Experts from universities and local, regional, state, and federal agencies also participate by giving technical and scientific support.

As of August 2013, stakeholders are implementing 123 TMDLs under 15 approved I-Plans for waterways that are impaired, in part, by NPS pollution. Table 3-4 lists TMDL watersheds with primarily NPS impairments, the uses of concern, the status toward meeting the designated uses, and total area restored or underway.

Figure 3-3.

TCEQ Total Maximum Daily Load and Implementation Plan Watersheds



Texas Coastal Nonpoint Source Pollution Control Program

Section 6217 of the federal Coastal Zone Act Reauthorization Amendments of the Coastal Management Act requires coastal states and territories with federally approved Coastal Zone Management Programs to develop and implement a Coastal NPS Pollution Control Program. At the federal level, Section 6217 is jointly administered by the National Oceanic and Atmospheric Administration (NOAA) and the EPA.

State coastal programs must provide for implementation of management measures in conformity with guidance published by the EPA and NOAA. Management measures are defined as economically achievable measures for the control of NPS pollution that reflect the greatest degree of pollutant reduction achievable through the application of the best available NPS pollution control practices.

NOAA and the EPA have approved the majority of the management measures in the Texas Coastal NPS Pollution Control Program, granting conditional approval to the program. Only a few measures relating to operating OSSFs; roads, highways, and bridges; new development; existing development; watershed protection; and site development remain to be fully addressed. Texas continues to implement its NPS Program in the coastal zone and communicate with the federal agencies to achieve full approval of the outstanding conditions.

State coastal programs are collaborating to implement the following special projects which address outstanding federal conditions on the state's Coastal NPS Pollution Control Program.

Table 3-4.

Total Maximum Daily Load Implementation Status for Nonpoint Source Related Water Quality Impairments

Uses of Concern & Watershed Name	Status of Restoration[1]	Number of Impairments Addressed	Stream Miles	Reservoir Acres
Aquatic Life				
Lake O' the Pines	Underway	1		2,102
Contact Recreation				
Carters Creek	Underway	3	24	
Houston–Galveston Region	Underway	72	640	
Gilleland Creek	Underway	1	5	
Guadalupe River Below Canyon Lake	Underway	1	4	
Fish Consumption				
Arroyo Colorado	Some Improvement	12	65	608
Trinity River Basin in Dallas & Tarrant counties	Some Improvement	9	124	2,434
Trinity River Basin in Fort Worth	Some Improvement	11	11	35
Lake Worth	Underway	1		3,540
General				
Clear Creek: TDS and Chloride	Restored	2	26	
Colorado River Below E.V. Spence Reservoir	Some Improvement	2	72	
E.V. Spence Reservoir	Some Improvement	2		15,829
North Bosque River	Significant Improvement	2	119	
Petronila Creek	Underway	3	40	
Public Water Supply				
Aquilla Reservoir	Restored	1		3,004
TOTAL Area Affected by TMDLs			1,130	27,552
TOTAL Area Restored			26	3,004

[1] *Restored only for the parameter listed in the table: the water body may have other impairments.*

Implementation of On-Site Sewage Facility Measures

Texas A&M AgriLife Research received a CWA Section 319(h) grant from the TCEQ to inspect, and if needed, replace malfunctioning, anaerobic OSSFs in Brazoria, Galveston, and Nueces counties. OSSFs are a potential contributor to nutrient and bacteria concerns and impairments in Dickinson Bayou, Lower Oyster Creek, Galveston Bay, Oso Bay, Corpus Christi Bay, and other coastal watersheds. During fiscal year 2013, 44 people attended a training for homeowners in order to understand more about their OSSFs. The training addressed homeowner frequently asked questions (FAQs) and provided a base understanding regarding the operation and maintenance of OSSFs. Responses to the course evaluations were positive and indicated a willingness to adopt practices that limit loading to OSSFs and to pump out septic tanks.

Inspection of an On-Site Sewage Facility - *Courtesy of Texas A&M AgriLife Research*

In 2013, AgriLife Research continued work with authorized agents in Brazoria County to discuss areas of potential OSSF failure. AgriLife Research sent letters to these areas and visited with residents to encourage participation in the inspection program. Over 11,600 gallons of septage was removed to allow the inspection of 22 OSSFs. Residents were actively engaged in the inspection process and willing to take corrective measures to maintain their OSSF. Fifteen of the inspected systems were identified as candidates for a new OSSF. Six of the new OSSF installations are complete, and the remaining nine systems are scheduled for replacement in 2014. Contaminant loading can be reduced through public awareness and behavioral change, as well as replacement of malfunctioning OSSFs in coastal watersheds. The following are the annual load reductions calculated for replacing six failing septic systems.

Phosphorus	27 lbs
Nitrogen	85 lbs
E. Coli	62 trillion CFU

Implementation of Roadway and Urban Development Measures

Agencies involved with the Texas Coastal Management Program are sponsoring a project to provide technical assistance to local jurisdictions in the coastal zone for the implementation of off-system roadway and urban development management measures in accordance with Section 6217 of the Coastal Zone Management Act. Technical guidance, training, planning, and implementation assistance is being provided by the state to facilitate the use of water quality BMPs for off-system roadways and urban development. The project consists of identifying jurisdictions responsible for managing coastal roadways and urban stormwater systems, implementing an outreach program targeting coastal jurisdictions, developing an inventory of existing management practices and watershed characteristics, providing technical guidance, providing training on the technical guidance, providing planning assistance to coastal jurisdictions, and providing assistance to coastal jurisdictions for the implementation of management measures in accordance with Section 6217 guidance. The project was initiated in the spring of 2013 and will be completed in the summer of 2015. During fiscal year 2013, baseline maps were prepared, a project website was set up, county personnel were interviewed, nonregulated municipal separate storm sewer system (MS4) municipalities were contacted, and four project listening sessions were scheduled. For more information please visit the project website <txcoastalbmp.org/>.

The Galveston Bay Estuary Program

The Galveston Bay Estuary Program (GBEP) is part of a network of 28 National Estuary Programs in the United States working with local stakeholders to restore and protect estuaries that are threatened by pollution, development, and overuse. GBEP addressed NPS pollution through development and implementation of WPPs and TMDL I-Plans, NPS outreach and education through GBEP's stewardship campaign, and development and implementation of structural and nonstructural BMPs through water quality improvement projects. With the help of the Estuary Program's strategic planning and direction, 80 percent of impaired water bodies in the Galveston Bay area are managed under a WBP.

GBEP watershed activity updates as of fiscal year 2013 are as follows:

Moses–Karankawa Bayous

GBEP partnered with Texas A&M AgriLife's Coastal Watershed Program to initiate development of a WPP for Highland Bayou in 2010. Highland Bayou is listed on the *CWA Section 303(d) List* for low DO and high bacteria concentration. Phase I was funded by American Recovery and Reinvestment Act funds and included a watershed characterization report and public participation plan, which was completed in 2011. For phase II, funded by CWA Section 320 funds, the project area has expanded to include all waters from Moses to the Karankawas Bayous in order to more holistically include area land use activities

and stakeholders. Development of the plan continued in 2013.

Double Bayou

GBEP partnered with the Houston Advanced Research Center to initiate a WPP for Double Bayou in 2010. Double Bayou is listed on the *CWA Section 303(d) List* for low DO and high bacteria concentration. Phase I was funded by American Recovery and Reinvestment Act funds and included a watershed characterization report and public participation plan, which was completed in 2011. Project partners received fiscal year 2011 CWA Section 319(h) funding from the TSSWCB to complete the WPP.

Cedar Bayou

GBEP partnered with the Houston–Galveston Area Council (H-GAC) to begin developing a WPP for Cedar Bayou in 2011 to address impaired benthic community in the above tidal segment, elevated levels of bacteria, and provide outreach concerning the dioxin and polychlorinated biphenyl impairments in the tidal portions. GBEP helped develop the proposal and provided state funds to help match a CWA Section 319(h) grant administered by the TSSWCB. The WPP is expected to be completed in 2014.

Armand Bayou

GBEP partnered with the University of Houston at Clear Lake's Environmental Institute to retrofit a three-acre detention pond and create a stormwater treatment wetland. The Armand Bayou wetland treats runoff from 19 acres on the University proper including buildings, parking lots, and managed landscapes. The wetland flows into Horsepen Bayou, a tributary to Armand Bayou, which is impaired for high levels of bacteria and low levels of DO. The wetland was monitored prior to and after the wetland was completed to provide valuable data to share with local and regional stormwater managers and watershed protection programs. Data and results are being compiled and will be reported in 2014.

League City

GBEP provided technical support to the City of League City for development of a CWA Section 319(h) grant proposal to the TCEQ's NPS Program. In addition, GBEP provided state funds for match. League City is creating a three-acre municipal park with LID BMPs that will be monitored and evaluated on the basis of environmental effectiveness, functionality, and costs. Information obtained from the project will be available to developers, the public, and surrounding communities. As a part of the project, modeling of stormwater runoff in the city will be conducted. The modeling results will be used to evaluate and develop appropriate stormwater ordinances. Finally, a program will be developed that will include strategies for retrofitting commercial, residential, and public properties with green infrastructure and to gauge LID effectiveness. The project got underway in the fall of 2011. The first major output was a public meeting to review the park and seek feedback on the type of LID practices that would be of interest to the residents and users of the park.

Galveston Bay Oyster Waters

GBEP partnered with the Galveston Bay Foundation to establish an education campaign to reduce boater waste in and around marinas. The results of an Oyster Waters TMDL acknowledged boater waste as one of several sources of bacteria entering bay waters and recommended the creation of an I-Plan. I-Plan activities to improve boater waste management and reduce bacterial contributions from these sources included the education campaign. Under the campaign, an active stakeholder group was developed, relevant educational materials were created, and briefs regarding current laws and regulations affecting boater waste were developed. The Galveston Bay Foundation continues to implement the campaign. Campaign efforts have resulted in a 30 percent increase in the number of pump-out stations around the bay from 2008 to 2012. In 2013, the Galveston Bay Foundation began planning for a "Cease the Grease" campaign to increase awareness of the damage fats, oils, and grease can do to sewer lines, resulting in leaks and overflows.

The Texas Groundwater Protection Committee and Pesticide Management

The Texas Groundwater Protection Committee (TGPC) was established by the Texas Legislature in 1989 as an interagency committee with representatives from nine state agencies and the Texas Alliance of Groundwater Districts. The TGPC actively identifies opportunities to improve existing groundwater quality programs and promotes coordination between agencies. The TGPC also strives to improve or identify areas where new or existing programs could be enhanced to provide added protection. Major responsibilities of the TGPC are:

- to improve interagency coordination in the area of groundwater protection

Great Egret with Striped Mullet - *Photo by Jason Leifester*

- to develop and update a comprehensive groundwater protection strategy for the state
- to study and recommend to the Legislature groundwater protection programs for areas in which groundwater is not protected by current regulation
- to publish an interagency groundwater monitoring and contamination report
- to file with the governor, lieutenant governor, and speaker of the House of Representatives a report of the TGPC's activities during the biennium preceding each regular legislative session, including any recommendations for legislation for groundwater protection
- to develop the form and content of notices of groundwater contamination
- to advise the TCEQ on the development of agricultural chemical plans to prevent groundwater pollution

The TCEQ and the TGPC have developed the *Texas State Management Plan for the Prevention of Pesticide Contamination of Groundwater (PMP)* (2001), located at: <www.tceq.state.tx.us/assets/public/comm_exec/pubs/sfr/070_01.pdf>, for the implementation of management practices that prevent groundwater degradation by the use of pesticides or help to remediate groundwater degraded by the use of pesticides.

Agricultural Chemicals Subcommittee

The Agricultural Chemicals Subcommittee (ACS) of the TGPC is the primary mechanism for interagency coordination and communication regarding pesticide groundwater issues and for the implementation of the PMP. Using the PMP as a guide, monitoring continues to focus on the management of pesticides by first assessing and classifying them as pesticides of interest or concern. The ACS oversees groundwater pesticide monitoring by member agencies in the Texas Panhandle for cotton crop areas and public water supply wells with known atrazine detections. Monitoring of general urban and golf course wells has been added to the PMP in recent years to cover possible NPS contamination of urban areas.

Pesticide monitoring analyses are compiled in the TCEQ's *Interagency Pesticide Database* (IPD). The IPD includes data for more than 197,000 pesticide or other chemical analyses performed on 10,193 groundwater samples, collected from 5,944 wells. Data was provided by 12 agencies and other entities. During the 2013 monitoring period, 239 samples were collected under a cooperative program by the Texas Water Development Board (TWDB) for immunoassay analysis only, and another 18 samples were collected by the TCEQ for both immunoassay and laboratory analyses for a combined total of 257 groundwater samples.

The groundwater pesticide monitoring conducted by the TCEQ, and other entities cooperating with the TCEQ, is guided by the ACS under the guidelines and objectives outlined in the PMP. The results of this monitoring, which has been carried out since 1994, indicate that there is no significant groundwater contamination from pesticides in Texas. The only consistently detected pesticide has been atrazine, but within most areas it is well below levels of concern.

Nonpoint Source Task Force

In January of 2013, the TGPC formally approved deactivation of the TGPC NPS Task Force in accordance with recommendations made by that committee. In the future, the NPS Task Force can be reactivated if deemed necessary. In addition, changes regarding the charges for two subcommittees were recommended by the NPS Task Force in 2012. In 2013, the TGPC approved the recommended changes to the Groundwater Research Subcommittee Charge regarding NPS pollution project recommendations for CWA Section 319(h) grant funding and to the Data Management Subcommittee Charge regarding the use and availability of groundwater-related geospatial data. These subcommittees have been developing procedures for implementing these changes.

Public Outreach and Education Subcommittee

The primary goals of the Public Outreach and Education Subcommittee are to develop and implement educational outreach programs for landowners concerned with groundwater protection and environmental health issues and to facilitate interagency communication and coordination to provide support for landowner educational outreach projects. Activities include developing educational materials, coordination of outreach programs and special projects with a focus on the NPS-related issues of abandoned well closure, OSSF maintenance, and domestic drinking well sampling. The subcommittee has developed a number of FAQs in order to assist statewide newsletter editors and webmasters in disseminating groundwater-related information to the public. NPS-related FAQ topics include groundwater quality (pesticides and radionuclides) and septic systems. In fiscal year 2013, FAQ fact sheets regarding pesticides and groundwater conservation districts (GCDs) were developed. In addition, seven web links to TGPC member FAQs regarding brush control/management, hydraulic fracturing, OSSFs, abandanded water wells, the Texas Well Owner Network (TWON), and GCDs were added. TGPC FAQs can be found at <www.tgpc.state.tx.us/FAQs.php>.

Clean Water State Revolving Fund Loans for Nonpoint Source Projects

Another tool for addressing NPS pollution available in Texas is the CWSRF, which is administered by the TWDB. The CWSRF is a loan program authorized under the federal CWA and is capitalized by an annual grant from the EPA. This program provides funding

assistance in the form of 20- to 30-year loans at interest rates lower than the market offers. Although the majority of the loans are made to publicly owned wastewater treatment and collection systems, the TWDB can also provide loans for NPS pollution abatement projects through the CWSRF. Loans can be made to towns, counties, GCDs, SWCDs, and other public agencies, as well as to private individuals and nonprofit organizations.

A water quality-based priority system is used to rank potential applicants and fund projects, including NPS projects. To be eligible, a project must be an identified practice within a WQMP, TMDL I-Plan, or WPP; a NPS management activity that has been identified in the *Texas Groundwater Protection Strategy*; or a BMP or plan identified in the *Texas NPS Management Program* or the National Estuary Program. Loans can be used for planning, designing, and constructing wastewater treatment facilities, wastewater recycling and reuse facilities, collection systems, and OSSFs. Other activities eligible for funding assistance include agricultural, rural, and urban runoff control; estuary improvement; NPS education; and wet weather flow control, including stormwater management activities that are not associated with a Texas Pollutant Discharge Elimination System (TPDES) MS4 permit.

The TWDB has increased its efforts to identify potential applicants for loan projects that would address NPS-related water quality problems in the state. Staff members from the TWDB, the TCEQ, and the TSSWCB meet regularly to coordinate efforts to identify water bodies that are impacted by NPS pollutants and to identify potential applicants for CWSRF assistance. They also seek to identify potential candidates for Green Project Reserve funding, which can offer some loan forgiveness in return for construction of LID practices.

A large number of leaking and inadequate OSSFs are replaced using CWSRF funding. During fiscal years 2011 and 2012, approximately 33,556 households received new OSSFs. In some instances, no designed OSSF was being used at all.

The TWDB received over $68 million in NPS project requests for fiscal year 2013. In fiscal year 2012, projects with eligible NPS components, received commitments for over $3.5 million. In fiscal year 2011, three NPS projects received over $18.6 million. Table 3-5 provides a few examples of CWSRF projects addressing NPS pollution, submitted for fiscal year 2013 funds.

Marschall Creek Riparian Corridor Restoration

Under the Landowner Incentive Program (LIP), the Texas Parks and Wildlife Department (TPWD) supported a private landowner's riparian restoration project on a tributary of the Llano River. Landowner goals included restoring native grass cover in severely degraded rangeland, reducing soil erosion, increasing rainwater infiltration, and improving habitat and water quality.

The property has a woodland corridor along the bank of Marschall Creek, which flows into the Llano River. However, due to overgrazing, fire suppression, neglect, heavy deer browsing, and feral hogs, the woodlands had become dominated by a dense understory of Mexican persimmon, tasajillo, and white brush. In the shadow of the crowded thickets, there were few seedlings to replace the aging trees. The landowner devoted considerable effort to remove the larger brush beneath the bigger trees closest to the creek. White brush and persimmon are difficult to eradicate because they are vigorous resprouters, and there is no effective chemical control that does not involve serious risks for nearby vegetation and waterways.

Table 3-5.
Examples of Clean Water State Revolving Fund Nonpoint Source Projects for Fiscal Year 2013

Organization	Project	Funding	Nearby Segments
City of Brady	Planning, design, and construction of a centralized collection system for residents currently being served by OSSFs around Lake Brady.	$2 million	Brady Creek (Segment 1416A)
Aqua Water Supply Corporation	Planning and design of a collection system for residents currently being served by OSSFs in the Stony Point Subdivision in Bastrop County.	$181,768	Colorado River above La Grange (Segment 1434)
San Antonio River Authority	Development of a Watershed Master Plan that includes a study of the nutrient levels in Martinez and Salatrillo Creeks.	$4.3 million	Upper Cibolo Creek (Segment 1902)
City of Buda	Planning, design, and construction of a centralized collection system for residents currently being served by OSSFs along Plum Creek.	$5.4 million	Plum Creek (Segment 1810)

The goals for the LIP project included reducing brush density, followed by planting native grasses not currently present or abundant. The landowner also hoped to locate and protect any tree seedlings encountered during the clearing. The landowner hired a contractor with a forestry mower and grappler to mechanically remove and shred the undesirable plants. A few months later, another crew excavated resprouting brush and broadcast seed into these disturbed areas. It will likely take two to five years to evaluate the success of these efforts. By bringing in more sunlight, opening up space for recovery of diverse forbs and grasses, and by caging tiny seedlings, positive changes have been set in motion that will ultimately benefit the habitat, improve water quality, and ultimately benefit wildlife and humans who reside in the area.

Household Hazardous Waste Collection Program

The TCEQ Household Hazardous Waste Collection Program gives local governments an opportunity to offer Texans an alternative disposal option for household waste that would otherwise be considered hazardous. Household Hazardous Waste Collections are most commonly funded and organized by municipalities and county governments, with assistance on program requirements provided by the TCEQ.

Results from Household Hazardous Waste Collections, including one-day events as well as permanent collection facilities, are reported annually to the TCEQ. In calendar year 2012, 253 household hazardous waste programs and events collected more than 6,630 tons of material, an increase of more than five percent from the previous reporting year. In continuing to provide assistance to communities and operators of Household Hazardous Waste Programs, the TCEQ has updated the Household Hazardous Waste webpages. These webpages (found here: <www.tceq.texas.gov/p2/hhw/hhw.html>) provide useful information to both residents and event organizers to help all Texans do their part as it relates to their household materials.

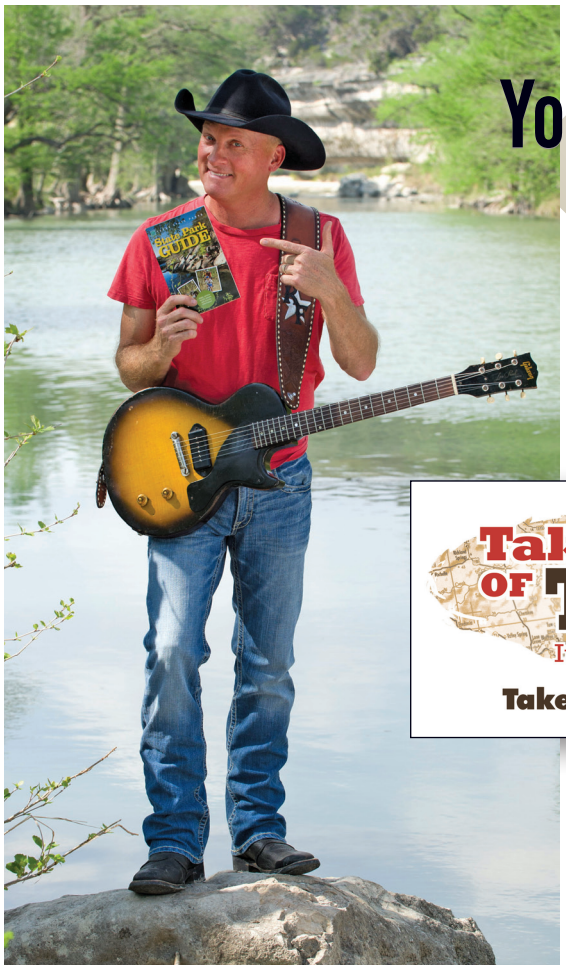
Take Care of Texas

Take Care of Texas is a statewide campaign that provides helpful information on Texas' successes in environmental protection, as well as tips to conserve water and energy, and keep our air and water clean. The TCEQ and the TPWD teamed up with country recording artist Kevin Fowler (who graciously donated his time and talents) to produce a new public service announcement (PSA) for the Take Care of Texas program. The PSA promotes outdoor recreation in Texas and encourages protection of the state's natural resources through the newly improved Take Care of Texas website.

The campaign urges everyone to get outdoors and enjoy Texas' clean air, rivers, lakes, and bays. It also asks those who hear or see the PSA to visit the website, <TakeCareOfTexas.org>, and pledge to conserve water and energy and keep the air clean. Since the campaign launched, there has been an 80 percent increase in online visits, a 91 percent increase in Facebook reach per post, and a total of 1,425 Texans taking the pledge to Take Care of Texas.

Don't Mess with Texas® Water

Don't Mess with Texas Water (DMWTW) is a program through the TCEQ and TxDOT designed to help prevent illegal dumping that affects surface water in Texas. The program was created by the passage of House Bill 451 during the 82nd Legislative Session and serves as a public awareness campaign. The TCEQ and TxDOT are required to cooperatively place road signs at major highway water crossings that let drivers know about a toll-free number to call and report illegal dumping. TCEQ staff



YouTube

View the PSA and the "making of" video on TCEQ News.

Take Care of Texas™
It's the only one we've got.
TakeCareOfTexas.org

Kevin Fowler filming a public service announcement at Guadalupe River State Park - *Photo by Chase A. Fountain, TPWD*

forward calls from the toll-free number to the appropriate enforcement agency that handles complaints of illegal dumping for a participating area.

In October of 2012, the first two DMWTW signs were unveiled in Harlingen on the US 77 frontage road overlooking the Arroyo Colorado. The program serves as another tool to alert stakeholders of illegal dumping and to raise awareness of the issue.

Other local governments are encouraged to join the program. For more information visit the program website: <www.tceq.texas.gov/p2/dont-mess-with-texas-water-a-way-to-report-illegal-dumping>. "Don't Mess with Texas®" is a registered trademark of TxDOT.

Richland Chambers Creek Watershed

Through the National Water Quality Initiative (NWQI), the NRCS in Texas targeted over 150,000 acres to enhance water quality in seven contiguous subwatersheds, collectively known as the Chambers Creek watershed, above the Richland Chambers Reservoir in the Trinity River Basin. The reservoir was built by Tarrant Regional Water District as part of their water system and provides household water for the 1.8 million people in Fort Worth.

Using funds from the Environmental Quality Incentives Program (EQIP), NRCS is providing financial assistance and technical advice to producers on the planning and implementation of conservation practices. The focus is on water quality protection in the watershed located in Ellis and Navarro counties. These producers invest in voluntary conservation practices to help improve water quality. The seven subwatersheds of Chambers Creek have water quality impairments from sediment and low DO, which qualifies them for the NWQI program. Partners in the NWQI project are the Tarrant Regional Water District, the TSSWCB, the TCEQ, and the EPA, as well as the Navarro and Ellis–Prairie SWCDs.

In fiscal year 2013, which is the second year of the project, 38 producers signed 41 NWQI contracts for over $1.7 million. Conservation practices included in these contracts are cover crop, residue and tillage management, no-till/strip till/direct seed, forage and biomass planting, pond, herbaceous weed control, grassed waterway, range planting, pipeline, filter strip, fence, terraces, and brush management. The conservation practices are being applied to over 8,100 acres. The cumulative efforts of this program, which began in fiscal year 2012, total 102 NWQI contracts with 78 producers for over $6.1 million on over 27,000 acres.

Lake O' the Pines Watershed

In fiscal year 2013, the NRCS added five additional subwatersheds to the NWQI. The subwatersheds are within the Lake O' the Pines watershed and contain over 148,000 acres in Camp, Morris, Tutus, and Upshur counties. Lake O' the Pines experiences periods of low DO and a TMDL I-Plan for DO was completed in 2008. The Lake O' the Pines is an important municipal, cultural, recreational, ecological, and aesthetic asset. Working to preserve and maintain water quality will ensure prosperity, productivity, and quality of life for the entire watershed.

Utilizing the NWQI in these subwatersheds will encourage implementation of agricultural BMPs to reduce the potential for NPS pollution from agricultural operations. Using funds from the EQIP, NRCS is providing financial assistance and technical advice to producers on the planning and implementation of conservation practices. These producers invest in voluntary conservation practices to help improve water quality. Partners in the NWQI project are the TSSWCB, Upshur–Gregg and Suphur–Cypress SWCDs, the TCEQ, and the EPA.

In fiscal year 2013, which is the first year of the Lake O' the Pines project, eight NWQI contracts were approved for over $423,000. Conservation practices included in these contracts are treatment of agriculture waste, animal mortality facilities, cover crop, forage and biomass planting, herbaceous weed control, roofs and covers, and waste treatment. The conservation practices are being applied to over 1,500 acres.

City of Lockhart Pet Waste Collection and Education

The City of Lockhart received a CWA Section 319(h) grant from the TCEQ to implement BMPs in the Plum Creek watershed, which is impaired for bacteria and has concerns for nutrients. The city's natural springs, fed by the shallow Leona Aquifer, supply Town Branch Creek which flows directly into Plum Creek.

The City of Lockhart educated local residents on the importance of eliminating pollution entering Plum Creek through billing inserts, PSAs on a local

Pet waste station at Lions Park in Lockhart - *Photo by Lee Weatherford, City of Lockhart*

television channel, environmental education classes at the elementary school, environmental fairs, and the city's website. Parks personnel installed additional pet waste stations in city parks with dry and active spring fed creeks to entice visitors to pick up their pet's waste when visiting the parks. Prior to the education programs, the pet waste stations were not being used for pet waste disposal, and were instead used as trash receptacles. Following the education program, parks personnel noted a dramatic increase in use of the pet stations for the intended use. Approximately 162 bags are now being used on a quarterly basis and an average of 8.86 pounds of pet waste are collected on a weekly basis.

The Lockhart City Council also enhanced its pet nuisance ordinance to require pet owners to pick up their pet waste. This improvement has given the code enforcement and police department the ability to cite violators when their pets leave unwanted deposits on public and private property. Education programs conducted within the elementary environmental classes also helped a great deal in bringing awareness to the parents by way of their children.

Goal Three–Education

The third goal of the *Texas NPS Management Program* is to conduct education and technology transfer activities to raise awareness of NPS pollution and activities that contribute to the degradation of water bodies, including aquifers, by NPS pollution.

Education is a critical aspect of managing NPS pollution. Public outreach and technology transfer are integral components of every WPP, TMDL, and I-Plan. This section highlights some of the NPS education and public outreach activities conducted in Texas in fiscal year 2013.

Texas Well Owner Network

The TWON is an educational training program developed by the Texas A&M AgriLife Extension Service in the departments of Soil & Crop Sciences and Biological & Agricultural Engineering in partnership with the TWRI. Funded by the TSSWCB under CWA Section 319(h), TWON trains well owners regarding water quality BMPs for protecting their wells and surface waters. One goal of the training is to avert off-site transport of contaminants such as bacteria and nitrates. These are two of the most common contaminants in private water wells in Texas, as well as the most frequent cause of stream impairment or concern. TWON works with other project partners to support current watershed protection planning and implementation efforts.

Texas Well Owner Network Training Event - *Photo by Diane Boellstorff, Texas A&M AgriLife Extension*

There are over 1 million private water wells in Texas that provide water to citizens in rural areas and increasingly, to those living on small acreages in the rural-urban interface. Public drinking water supplies are generally of good quality and are monitored through requirements of the federal Safe Drinking Water Act; however, private well owners are independently responsible for monitoring the quality of their wells and frequently at greater risk for exposure to compromised water quality.

TWON is delivered through two training programs, "Well Educated," which is a day-long course, and "Well Informed," which is an hour-long program. The "Well Educated" course covers aquifers, household wells, improving and protecting water resources, groundwater resources, septic system maintenance, well maintenance and construction, water quality, and water treatment. The "Well-Informed" training program focuses on wellhead protection and recommendations for remediating well contamination. For both types of programs, well owners can bring in water samples for screening for fecal coliform bacteria, nitrate-nitrogen, and salinity.

To date, eight "Well Educated" and 39 "Well Informed" training programs have been conducted. In all, more than 2,700 private water well owners have been trained and/or their samples have been screened. Results from pre- and post-test evaluations indicate that knowledge was increased 100 percent for the participants. On average, participants' test scores increased from 52 to 82 percent after participating in the program. When asked how much the program was worth to them personally, participants indicated an average of about $620 per participant, for a total of over $1.7 million across all participants.

Furthermore, results from six-month follow-up surveys indicated that 100 percent of well owners needing to remove hazardous material from their well house did so. In addition, almost 25 percent of the well owners pumped their septic system within 6 months of the training, while about 70 percent said pumping was not yet needed. The six-month follow-up survey also indicated that every well that needed to be plugged or capped had been plugged or capped within 6 months of the training. 100 percent of the participants said that they had applied the resources given to them at the training,

and nearly 80 percent said they had shared TWON educational materials with other well owners.

Texas Watershed Planning Training Project

Watershed planning remains a high priority to address the 568 water quality impairments in Texas. A well-trained workforce is necessary to effectively and consistently address these impairments in a timely and cost-effective manner. For a number of years, the TWRI has been utilizing CWA Section 319(h) funding to provide trainings for watershed professionals.

During fiscal year 2013, 17 watershed professionals attended the sixth-annual "Texas Watershed Planning Short Course," and 125 watershed professionals attended two "Texas Watershed Coordinator Roundtable" events. The TWRI has extended its efforts in watershed training programs by developing and conducting three additional courses. The course, "Introduction to Modeling," was offered in January and August of 2013 with more than 29 attendees. "Watershed Modeling using Load Duration Curves and the Spatially Explicit Load Enrichment Calculation Tool" was offered in November 2012 and May 2013 with 36 attendees. "Fundamentals of Developing a Water Quality Monitoring Plan" was offered in October 2012 with 25 attendees. In addition to the courses, the project funds the maintenance of the Watershed Coordinators Listserv with 406 subscribers. The listserv is used for providing updates and announcements of training opportunities and issues relevant to water quality and watershed planning. The listserv and the roundtables provide a forum for a dialogue between watershed coordinators, facilitate interactive solutions to common watershed issues, and instill fundamental knowledge conveyed at the Short Course. Information on these courses and guidance on watershed planning is available on the Texas Watershed Planning website: <watershedplanning.tamu.edu/>. This website had 1,405 unique visitors and 5,164 page views during fiscal year 2013.

Lone Star Healthy Streams: Feral Hog Component

The Lone Star Healthy Streams Feral Hog Component is a program that is focused on promoting healthy watersheds by increasing citizen awareness about feral hog biology, impacts, economics, removal methods, and laws and regulations concerning their management in Texas. Watershed-based educational trainings and landowner technical assistance are focused in water quality-impaired watersheds with significant feral hog activity. Texas A&M AgriLife Extension Service's Wildlife and Fisheries Sciences Extension Unit facilitates the program and has personnel located within priority watersheds.

During fiscal year 2013, 25 one-on-one technical guidance site visits and 51 face-to-face presentations with 2,792 attendees were conducted. 97.2 percent of 569 surveyed participants reported knowledge gained concerning feral hog biology, legal control options, efficient trap/bait techniques, and types/extent of feral hog damage. The statewide online feral hog reporting tool was utilized to report a total of 1,550 hog sightings and removal of 992 hogs based on 461 total reports. The feral hog Facebook page had 1,435 "Likes" and is currently reaching 11,182 users monthly. Some additional educational activities conducted include: two hard copy peer-edited articles, two web videos (566 views), 11 blog articles (8,384 views), 10 newspaper interviews, six AgriLife Communications news releases, two radio interviews, one magazine article, and one television interview.

In addition to these education and outreach efforts, the Wildlife and Fisheries Sciences Extension Unit personnel have built working relationships with watershed coordinators and related personnel through contact at "Texas Watershed Coordinator Roundtable" events, local watershed stakeholder meetings, and through telephone and e-mail conversations. Unit personnel also work alongside 35 Texas A&M AgriLife County Extension Agents to provide feral hog-related programming and technical assistance. Additionally, unit personnel cooperate with multiple federal, state, and public organizations including the NRCS, TPWD, Wildlife Management Associations, and Texas Master Naturalist's chapters.

Arroyo Colorado Bay Watershed Education and Training Workshops

The University of Texas Pan-American Coastal Studies Lab received a NOAA Bay Watershed Education and Training (B-WET) grant to provide environmental education to science teachers in Cameron County school districts concerning protecting water quality in the Arroyo Colorado watershed. The B-WET program aims to promote environmental literacy by encouraging individuals to understand, protect, and restore watersheds and related ocean, coastal, and bay environments. The Arroyo Colorado Conservancy assisted with the workshops by providing curriculum and their model of the Arroyo Colorado watershed. The teachers were educated on how to use the curriculum and trained on how to use the watershed model. They were instructed on how to discuss natural processes (e.g. the water cycle) with their students and apply them to Arroyo Colorado watershed.

Approximately 150 teachers attended eight workshops. The workshops were followed up with campus visits to introduce students to the Arroyo Colorado curriculum and the watershed model. The university staff went to four different elementary schools in Harlingen and gave presentations to approximately 260 students. The B-WET workshops were a success and the teachers gained invaluable knowledge that they will incorporate into their lesson plans and pass along to children living in the Arroyo Colorado watershed for years to come.

A physical model of the Arroyo Colorado watershed being used for education - *Photo by Jaime Flores, Texas A&M AgriLife Extension*

Lower Rio Grande Valley Low Impact Development Program

Founded in 1999 by A&M Kingsville, the LRGV Stormwater Task Force was formed to assist local governments in complying with the TPDES MS4 regulations. The Task Force is comprised of 18 local governments from the LRGV.

The Task Force has received multiple CWA Section 319(h) grants from the TCEQ to construct LID demonstration projects in strategic locations and monitor the water quality benefits. During fiscal year 2013, the Task Force's LID Program targeted outreach and education activities towards students, professionals, and regulators. Educational activities included classroom presentations at local schools; development of educational handouts; and presentation of LID topics such as rainwater harvesting, permable surfacing, and rain gardens in an annual stormwater professional training event. Construction was completed for a wetland at the Valley Nature Center in Weslaco and a pervious surface parking lot in La Feria. Additionally, the Task Force used CWA Section 319(h) funds to inventory and map current LID practices in the region and created a geospatial database of these BMPs. The BMPs along with other information can be viewed using an interactive map viewer at this website <http://lidprogram.tamuk.edu/>. The interactive map will be used as a tool to facilitate collaboration on water quality issues and LID for regional stormwater professionals.

Weslaco Library Rainwater Harvesting

The City of Weslaco is a member of the LRGV Task Force and the Weslaco Public Library is participating in the LID Program by constructing a rainwater harvesting system that will be used to water the library's landscape. A&M Kingsville, the City of Weslaco, and the TCEQ worked together to design the system. In fiscal year 2013, a 10,000 gallon cistern was installed at the library. During this next fiscal year, an irrigation system will be connected to the cistern to provide irrigation to the library's surrounding landscape. The project will also include an outreach and training program and a social media element.

Upper Trinity Watershed Low Impact Development

Urban NPS runoff from the Dallas–Fort Worth metropolitan area contributes to pollution in the Upper Trinity River (Segment 0805). Pollutants include nitrate, orthophosphate, total phosphorus, and chlordane. These pollutants enter the waterways mainly from impervious cover runoff. With the metropolitan area projected to almost double in population by 2060, from 6.6 million in 2010 to 13 million, the impervious surface is likely to increase, creating detrimental effects from increased runoff volume, and deteriorated water quality.

Texas A&M AgriLife Research received a CWA Section 319(h) grant from the TCEQ to design, construct, and evaluate LID practices at its Urban Center in Dallas, a site typical of commercial development in the Upper Trinity watershed. The following five BMPs were constructed:

- a three-foot deep bioretention area with curb openings and a flume that allows for runoff to drain to a collection point within the garden
- four kinds of permeable pavements – grass pavers, interlocking block pavers, porous concrete, and porous asphalt
- rainwater harvesting BMPs with both demonstration and controlled experiment components
- four types of green roof designs to allow for comparison of different growing media
- an innovative detention pond designed to resemble a meandering river with associated vegetation to reduce erosion and act as filter strips

During fiscal year 2013, rainfall runoff sampling was conducted and the samples analyzed in order to evaluate the pollutant removal effectiveness of the LID practices. The results of the sampling will assist local stormwater entities in selecting the most effective LID practices in their area.

Education and outreach has been an integral part of this project. Texas A&M AgriLife Research, in collaboration with North Carolina State University and commercial partner Belgard Hardscapes, conducted five intensive, hands-on workshops in fiscal year 2013 to educate stakeholders about different options that exist for stormwater control in the metropolitan area. Resulting in over 568 contact hours so far, these workshops provide continuing education credits for engineers, landscape architects, and other professionals, providing them with the necessary tools to adopt these techniques elsewhere in the state. At a time when so much infrastructure is in need of replacement or repair and so few communities can foot the bill, LID is an affordable solution that meets many objectives at once.

McKinney Falls State Park

CHAPTER 4

Progress in Developing and Implementing Watershed Protection Plans

Texas Watershed Protection Plan Highlights

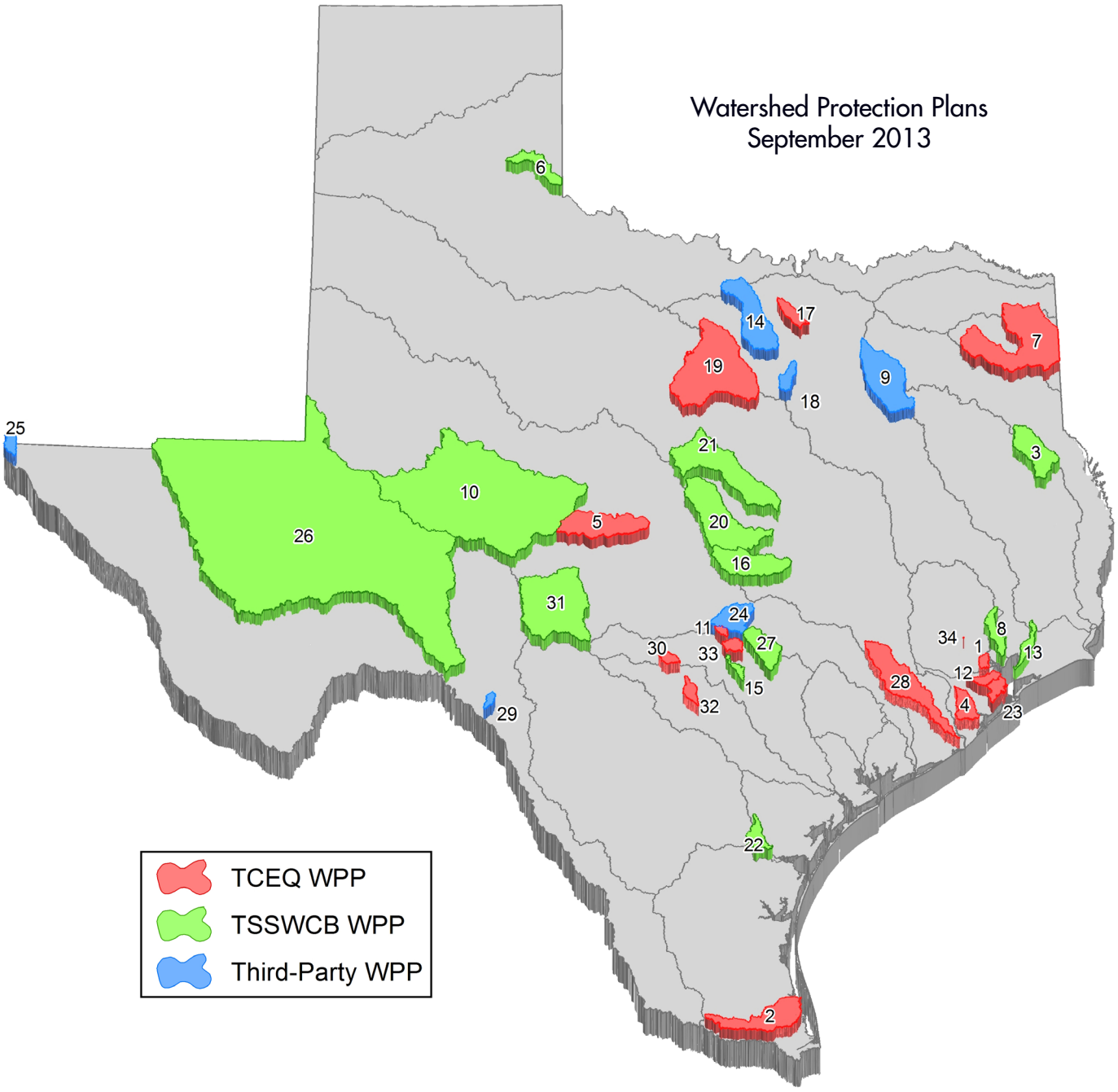
The TCEQ and the TSSWCB apply the Watershed Approach to managing NPS pollution by supporting the development and implementation of WPPs. These plans are developed through local stakeholder groups who coordinate activities and resources to manage water quality. In Texas, WPPs facilitate the restoration of impaired water bodies and/or the protection of threatened waters before they become impaired. These stakeholder-driven plans give the decision-making power to the local groups most vested in the goals specified in the plans. Bringing groups of people together through watershed planning efforts combines scientific and regulatory water quality factors with social and economic considerations. While WPPs can take many forms, the development of plans funded by CWA Section 319(h) grants must follow guidelines issued by the EPA. These guidelines can be found in the *Nonpoint Source Program and Grants Guidelines for States and Territories*.

In fiscal year 2013, the TCEQ and the TSSWCB facilitated the development and implementation of WPPs throughout Texas by providing technical assistance and/or funding through grants to regional and local planning agencies and, thereby, to local stakeholder groups. A significant portion of the funding for preventing NPS pollution under the federal CWA is dedicated to the development and implementation of WPPs where NPS pollution has contributed to the impairment of water quality. WPPs are also being developed, or have been developed by third parties independently of assistance from the TSSWCB and the TCEQ. Figure 4-1 is a map of all the WPPs being developed or implemented in Texas at the end of fiscal year 2013. Table 4-1 is a list of the same WPPs and links to more information. Neither the map nor table is intended to be a comprehensive list of all the WPP efforts currently underway in Texas.

Geronimo Creek - *Photo by Ward Ling, Texas A&M AgriLife Extension*

Figure 4-1.

Map of Watersheds with Watershed Protection Plans Being Developed or Implemented in Texas



01-Armand Bayou
02-Arroyo Colorado
03-Attoyac Bayou
04-Bastrop Bayou
05-Brady Creek
06-Buck Creek
07-Caddo Lake
08-Cedar Bayou
09-Cedar Creek Reservoir
10-Concho River
11-Cypress Creek
12-Dickinson Bayou
13-Double Bayou
14-Eagle Mountain Reservoir
15-Geronimo Creek
16-Granger Lake
17-Hickory Creek
18-Lake Arlington
19-Lake Granbury
20-Lampasas River
21-Leon River
22-Lower Nueces River
23-Moses-Karankawa Bayous
24-Onion & Barton Springs
25-Paso del Norte
26-Pecos River
27-Plum Creek
28-San Bernard
29-San Felipe Creek
30-Upper Cibolo Creek
31-Upper Llano River
32-Upper San Antonio River
33-Upper San Marcos
34-Westfield Estates

Table 4-1.

Texas Watershed Protection Plans

TSSWCB WPPs	LINKS
Attoyac Bayou	attoyac.tamu.edu/
Buck Creek	buckcreek.tamu.edu
Cedar Bayou	www.cedarbayouwatershed.com
Concho River	www.tsswcb.texas.gov/managementprogram/conchowpp
Double Bayou	doublebayou.harc.edu/
Geronimo Creek	www.geronimocreek.org/Plan.aspx
Granger Lake	www.tsswcb.texas.gov/managementprogram/granger
Lampasas River	www.lampasasriver.org
Leon River	www.brazos.org/LeonRiverWPP.asp
Lower Nueces River	www.nuecesriverpartnership.org/
Upper Llano River	southllano.org/
Pecos River	pecosbasin.tamu.edu
Plum Creek	plumcreek.tamu.edu/
TCEQ WPPs	**LINKS**
Armand Bayou	www.h-gac.com/community/water/watershed_protection/armand/default.aspx
Arroyo Colorado	arroyocolorado.org/
Bastrop Bayou	www.h-gac.com/community/water/watershed_protection/bastrop/default.aspx
Brady Creek	www.ucratx.org/NPSBrady.html
Caddo Lake	www.netmwd.com/Caddo%20Lake%20Protection%20Plan/Caddo_index.html
Cypress Creek	www.cypresscreekproject.org
Dickinson Bayou	dickinsonbayou.org/
Halls Bayou-Westfield Estates	www.h-gac.com/community/water/watershed_protection/westfield/default.aspx
Hickory Creek	www.cityofdenton.com/
Lake Granbury	www.brazos.org/gbWPP.asp
Moses-Karankawa Bayous	mokabayousalliance.org
San Bernard River	www.h-gac.com/community/water/watershed_protection/sanbernard/default.aspx
Upper Cibolo Creek	www.ci.boerne.tx.us/index.aspx?nid=147
Upper San Antonio River	www.bexarfloodfacts.org/watershed_protection_plan/
Upper San Marcos River	smwatershedinitiative.org/
Third-Party WPPs	**LINKS**
Cedar Creek Reservoir	nctx-water.tamu.edu/meetings
Eagle Mountain Reservoir	nctx-water.tamu.edu/meetings
Lake Arlington	www.arlingtontx.gov/water/lakearlingtonmasterplan.html
Onion Creek and Barton Springs	www.waterqualityplan.org
Paso del Norte	www.pdnwc.org/319h.html
San Felipe Creek	www.cityofdelrio.com/index.aspx?NID=574

Texas Watershed Protection Plan Highlights

Upper Cibolo Creek

Upper Cibolo Creek lies within the headwaters of the San Antonio River Basin in southern Kendall County. In 2009, the City of Boerne was awarded a CWA Section 319(h) grant from the TCEQ to coordinate the development of a WPP in order to address persistent bacteria impairments and nutrient concerns within the 77 square mile watershed. Early in the planning process, stakeholders developed a primary goal for the WPP that included, at a minimum, meeting the appropriate TSWQS established for bacteria to ensure safe contact recreation. Stakeholders were also encouraged to proactively address any pollutants that might threaten or impair the physical, chemical, biological or ecological integrity, and designated uses of the creek and its watershed.

By utilizing the watershed approach, stakeholders worked together in focus groups and stakeholder, steering committee, and technical advisory committee meetings to understand the nature of the local water quality problems. Through these meetings agricultural land management practices, OSSFs, feral hogs, axis deer, pet waste, cliff swallows, and waterfowl were identified as potential contributors to bacteria loads.

The Soil and Water Assessment Tool (SWAT) was used to model the impact pollutants and potential management strategies have on water quality throughout the watershed. In addition to the SWAT model, stakeholders utilized a Decision Support System coupled with a sensitivity analysis approach to determine the potential or maximum amount of bacteria reduction that could be achieved per management strategy. Using this information, stakeholders were able to more effectively set implementation levels for individual management strategies. It was possible to show that geographic targeting of management strategies would have a substantial benefit on water quality by reducing instream bacteria loads and produce a complementary beneficial reduction of nutrient loads within the watershed.

City of Boerne domestic waterfowl capture and relocation program at River Road Park on Cibolo Creek - *Courtesy of City of Boerne*

Two key management strategies quickly became apparent as most effective during the stakeholder input process:

- cliff swallow nest deterrents under IH 10 bridge crossings
- urban waterfowl management at River Road Park in Boerne

According to the model, these two strategies will have the largest impact on ambient water quality. This information allowed stakeholders to establish these strategies as a top priority for implementation. In addition, however, stakeholders wished to address all sources identified within the watershed and endorsed the simultaneous implementation of recommended management strategies according to an agreed upon project implementation schedule.

Upon learning that domestic waterfowl were a leading contributor to urban bacteria loads, the City of Boerne proactively developed and implemented a long-term waterfowl management plan. In fiscal year 2013, the city successfully captured and relocated 106 individual birds and initiated an egg oiling program at River Road Park and along the extended creekside trail system.

To assist with the implementation process, local, state, and federal technical and financial resources were identified to support individuals or organizations with their efforts. For example, approximately $3,500 per year from the City of Boerne is used to manage urban waterfowl in the city. The City of Boerne has hired a full-time Resource Conservation Coordinator who will be the primary point of contact and liaison for any entity seeking technical or financial assistance to implement strategies outlined in the WPP.

Education and outreach continues to be an important tool in improving water quality throughout the watershed. During the planning process many forms of outreach were used to enhance public understanding of this project and encourage local stakeholder participation in selecting, designing, and implementing management strategies. A variety of events, workshops, trainings, and literature resources have been developed to ensure methods used to reduce bacteria and nutrient loads within the watershed are realized by the public.

The WPP was accepted by the EPA on September 20, 2013, and the TCEQ has provided additional CWA Section 319(h) grant funding to the City of Boerne for implementation. The funding will be used to develop a sustainable program to support the Upper Cibolo Creek WPP. A sustainable WPP program for Upper Cibolo Creek will be accomplished through an outreach, education, and public

relations program promoting bacteria reduction strategies; a long-term water quality monitoring program to evaluate the effectiveness of management strategies; and the initiation of key management strategies identified in the WPP. These key management strategies will include cliff swallow nesting deterrents under bridges along the IH 10 corridor over the Upper Cibolo Creek, and a long-term waterfowl management program to reduce domesticated waterfowl populations on the Upper Cibolo Creek.

Geronimo and Alligator Creeks

In 2008, the GBRA and Texas A&M AgriLife Extension Service received a CWA Section 319(h) grant from the TSSWCB to develop a WPP for the Geronimo and Alligator Creeks watershed. The Geronimo and Alligator Creeks Watershed Partnership is a collaboration between local citizens, cities, counties, and state and federal agencies. After holding a successful Texas Watershed Steward training in the fall of 2009, the Partnership formed a local Steering Committee and workgroups to address wastewater, urban NPS, and agricultural NPS pollution.

The Partnership has met a total of 27 times since January 2009, actively participating in source identification and assessment, as well as providing recommendations on key BMPs to address potential agricultural, urban, and wastewater sources of the pollutants. The Partnership also made two tours of the upper watershed to observe retention structures that are in place in the rapidly urbanizing region, as well as touring the lower watershed to observe agricultural practices common to the area.

The final WPP was completed in June 2012 and approved by the Steering Committee. The plan was accepted by the EPA in September 2012.

The first annual Geronimo and Alligator Creeks Cleanup event was a success and made an impact by removing trash and debris from the streams, but more importantly it served to educate and inform area residents of the local water quality issues. The event was held in April 2013 and coordinated by the Partnership, Texas A&M AgriLife Extension, and GBRA, as part of implementation efforts for the WPP.

About 100 individuals from the watershed took part in the event. Volunteers collected 2,960 pounds of refuse which consisted of 110 bags of trash, 26 tires, and large items such as a stove, air conditioner, car batteries, a toilet, and piles of old lumber.

To address pollutant loads from OSSFs in the watershed, the TSSWCB provided CWA Section 319(h) funds for trainings targeted at homeowners with OSSFs and NPS education for municipal officials. The NPS education training will be provided by AgriLife Extension personnel to area municipal, county, and state officials. In 2013, the City of Seguin began implementation of a TCEQ CWA Section 319(h) grant to reduce bacteria and nitrogen loading from failing OSSFs in a neighborhood adjacent to Geronimo Creek. The grant will assist in decommissioning OSSFs in an area with documented high failure rates due to shallow groundwater, clay soils, and system age.

Stormwater from urban areas was a focus of the Urban NPS Workgroup during WPP development due to the rapidly urbanizing landscape in the watershed. Since that time, the City of New Braunfels, which covers a large portion of the Alligator Creek watershed, has moved forward with development of a Stormwater Management Plan in order to obtain coverage under the TCEQ TPDES MS4 permit.

Upgrading the wastewater infrastructure, as outlined in the WPP, is well underway in the watershed. The cities of Seguin and New Braunfels have signed Sanitary Sewer Overflow Initiative Agreements with the TCEQ. As part of their agreement, the City of Seguin recently completed upgrades to a lift station located adjacent to Geronimo Creek so that flood waters no longer impact its operation, thereby reducing potential bacteria and nitrate loading directly to the creek. New Braunfels Utilities, as part of their agreement, has developed an aggressive and active sanitary sewer line testing and replacement program to ensure the collection system is not contributing to bacteria and nitrate-nitrogen loading to the creeks.

Progress has already been made in implementing the education and outreach measures outlined in the WPP. The Geronimo and Alligator Creeks watershed was the location for the first TWON workshop in January 2013. A Texas Riparian and Stream Ecosystem Workshop was held in September 2013 to educate area landowners of the function and importance of healthy riparian zones and the impact they can have on water quality. Two farm production educational events were conducted for local agricultural producers in fiscal year 2013. In addition, field-applied research studies were conducted in a producer's field in Guadalupe County to show the use of precision agriculture technologies to reduce nutrient loading rates in row crops systems.

Implementation of the WPP in the next fiscal year will include the Comal–Guadalupe SWCD implementing components of the agriculture management measures by providing technical assistance and financial incentives to agricultural producers for the development and implementation of WQMPs in the Geronimo and Alligator Creeks watershed. Utilizing funding from a CWA Section 319(h) grant from the TSSWCB, the SWCD will employ a full-time technician with the goal of increased agricultural BMP implementation in the watershed. These efforts will help reduce potential loading of bacteria and nitrate-nitrogen.

Feral hogs were identified as a potential source of bacteria pollution by stakeholders early in the WPP development process, due to their abundance in the watershed. The first annual Lone Star Healthy Streams Feral Hog Component Workshop will be held in 2014.

Westcave Preserve waterfall and pool

Abbreviations

ACS	Agricultural Chemicals Subcommittee of the TGPC
B-WET	Bay Watershed Education and Training
BMP	Best Management Practice
CBBEP	TCEQ Coastal Bend Bays & Estuaries Program
CFU	colony-forming units
CRP	TCEQ Clean Rivers Program
CWA	Clean Water Act
CWSRF	TWDB Clean Water State Revolving Fund
CWQMN	TCEQ Continuous Water Quality Monitoring Network
DMWTW	Don't Mess with Texas Water
DO	Dissolved Oxygen
E. coli	*Escherichia coli*
EPA	U.S Environmental Protection Agency
EQIP	Environmental Quality Incentives Program
FAQ	Frequently Asked Questions
GBEP	TCEQ Galveston Bay Estuary Program
GBRA	Guadalupe–Blanco River Authority
GCD	Groundwater Conservation District
H-GAC	Houston–Galveston Area Council
IPD	*Interagency Pesticide Database*
I-Plan	Implementation Plan for a TMDL
Integrated Report	*Texas Integrated Report for Clean Water Act Sections 305(b) and 303(d)*
lbs	Pounds

LIP — Landowner Incentive Program

LCRA — Lower Colorado River Authority

LID — Low Impact Development

LRGV — Lower Rio Grande Valley

mg/L — Milligrams per Liter

MS4 — Municipal Separate Storm Sewer System

NOAA — National Oceanic and Atmospheric Administration

NPS — Nonpoint Source

NRCS — USDA—Natural Resources Conservation Service

NWQI — USDA National Water Quality Initiative

OSSF — On-Site Sewage Facility

PMP — *Texas State Management Plan for the Prevention of Pesticide Contamination of Groundwater*

PSA — Public Service Announcement

RRC — Texas Railroad Commission

SWAT — Soil and Water Assessment Tool

SWCD — TSSWCB Soil and Water Conservation District

SWQM — TCEQ Surface Water Quality Monitoring

SWQS — Surface Water Quality Standards

TCEQ — Texas Commission on Environmental Quality

TDS — Total Dissolved Solids

TGPC — Texas Groundwater Protection Committee

TMDL — Total Maximum Daily Load

TPDES — TCEQ Texas Pollutant Discharge Elimination System

TPWD — Texas Parks and Wildlife Department

TSSWCB — Texas State Soil and Water Conservation Board

TSWQS — TCEQ Texas Surface Water Quality Standards

TWDB — Texas Water Development Board

TWON — Texas Well Owner Network

TWRI — Texas Water Resources Institute

TxDOT — Texas Department of Transportation

UGRA — Upper Guadalupe River Authority

USDA — United States Department of Agriculture

WAP — Watershed Action Planning

WBP — Watershed-Based Plan

WPP — Watershed Protection Plan

WQMP — Water Quality Management Plan

Texas NPS Management Program Milestones

Goals / Objectives	Milestone	Milestone Description	Milestone Measurement	2013 Estimate[1]	2013 Actual	Comments
ST1/A	NPS Assessment Report	The state will produce the Integrated Report in accordance with applicable EPA guidance	Integrated Report	0	1	The EPA approved the *2012 Integrated Report* on May 9, 2013.
LT/2	NPS Management Program Updates	The state will update the Management Program in accordance with applicable EPA guidance	Management Program updates	0	0	
LT/7	NPS Annual Report	The state will produce the NPS Annual Report in accordance with applicable EPA guidance	NPS Annual Report	1	1	
LT/2-5	Section 319(h) Grant Program Solicitation	The state will conduct individual TCEQ and TSSWCB solicitations for Section 319(h) grant funding	Grant Solicitation documentation	2	2	
LT/2-5	Section 319(h) Grant Program Application	The state will prepare individual TCEQ and TSSWCB grant program applications and submit them to EPA for Section 319(h) grant funding	Grant Application documentation	2	2	
LT/2	Section 319(h) Grant Program Reporting	The state will report grant funded activities to the Grants Reporting and Tracking System in accordance with EPA guidance	GRTS updates	4	14	

Continued

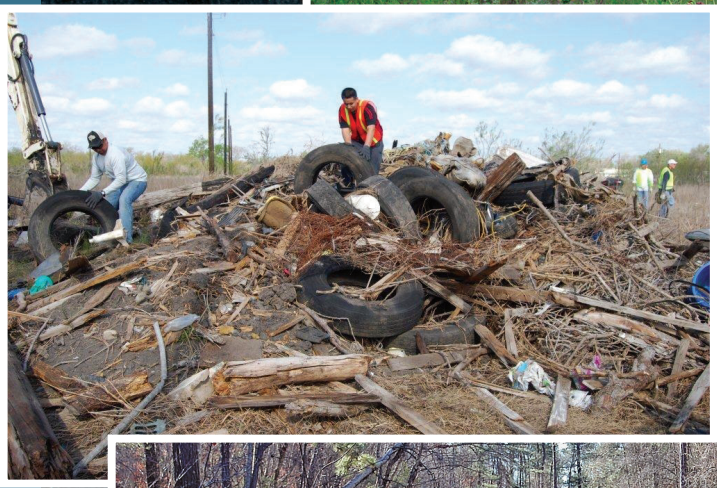
Goals / Objectives	Milestone	Milestone Description	Milestone Measurement	2013 Estimate[1]	2013 Actual	Comments
ST2/A	Priority Watersheds Report Updates	The state will update the Priority Watersheds Report based upon information and recommendations derived through the Watershed Action Planning process as described in the Management Program	Priority Watersheds Report Updates	1	0	The Priority Watershed Report will be updated, but it will be after the end of the fiscal year.
ST3/C,D	Watershed Training	The state will provide training to watershed professionals to ensure quality and consistency in the development and implementation of watershed protection efforts	Texas Watershed Planning Short Course	1	1	
ST3/A,B,F,G	Watershed Education	The state will provide watershed education to help citizens participate in programs designed to address water quality issues	Texas Watershed Steward Program (number of workshops)	10	9	
ST3/C,D	Watershed Training	The state will provide a forum to facilitate the transfer of information between watershed professionals in the state	Texas Watershed Coordinator Roundtable	2	2	
ST3/B,F,G	Volunteer Monitoring	The state will provide support for local volunteer monitoring groups. These groups provide water quality data to the state water quality planning program and gain insight into resolving water quality issues	Texas Stream Team Participation (numbers of stations monitored)	250	365	
ST3/C,F,G	Urban BMPs	The state will provide technical and financial assistance to local communities to support the implementation of urban BMPs	Coastal Urban BMP Guidance Manual	0	0	
ST1/B	Quality Assurance	The state will ensure that monitoring procedures are in compliance with EPA-approved TCEQ and TSSWCB Quality Management Plans	Annual Quality Management Plan updates	2	2	
ST1/C	Watershed Characterization	The state will support the implementation of projects designed to evaluate watershed characteristics and produce the information needed for watershed and water quality models	Watershed characterization projects	4	10	

Goals / Objectives	Milestone	Milestone Description	Milestone Measurement	2013 Estimate[1]	2013 Actual	Comments
ST2/A,C	Watershed Coordination	The state will support watershed coordination projects which facilitate the implementation of WPPs	Watershed coordination projects	12	30	Numbers reflect active projects.
ST1/D	Develop WPPs	The state will support projects which provide for the development of WPPs which satisfy applicable EPA guidance	WPP development projects	9	15	Numbers reflect active projects.
ST2/D	Implement WPPs	The state will support projects which provide for the implementation of management measures specified in WPPs which satisfy applicable EPA guidance	WPP implementation projects	19	25	Numbers reflect active projects.
ST1/D	Develop TMDLs and I-Plans	The state will support projects which provide for the development of TMDLs and I-Plans which satisfy applicable state, federal, and program regulations and guidance	TMDL and I-Plan development projects	0	0	
ST2/D	Implement TMDLs and I-Plans	The state will support projects which provide for the implementation of management measures specified in TMDLs and I-Plans which satisfy applicable state, federal, and program regulations and guidance	TMDL I-Plan implementation projects	8	15	Numbers reflect active projects.
ST2/B,C	Load Reductions	The state will support projects which provide for the reduction of loadings of NPS pollutants	NPS load reduction projects	22	27	Numbers reflect active projects.
ST2/B,C	Load Reductions (Nitrogen)	The state will ensure project reductions are reported utilizing GRTS	GRTS Report	RQ[2]	135,769 lbs/yr	
ST2/B,C	Load Reductions (Phosphorus)	The state will ensure project reductions are reported utilizing GRTS	GRTS Report	RQ	16,451 lbs/y	
ST2/B,C	Load Reductions (Sediment)	The state will ensure project reductions are reported utilizing GRTS	GRTS Report	RQ	660 tons/yr	
ST2/E	Effectiveness Monitoring	The state will support projects which provide for the collection and analysis of water quality and other watershed information for the purpose of evaluating the effectiveness of BMPs	Effectiveness monitoring projects	25	27	Numbers reflect active projects.

[1] *Milestone estimates were based upon existing grant commitments (up to and including fiscal year 2013 CWA Section 319(h) grant commitments between EPA, the State, and collaborating entities).*

[2] *RQ – Reportable Quantity*

Constructed wetland in a stormwater detention facility in McAllen



Trash cleanup event on the Lower Nueces River - *Courtesy of Nueces River Authority*

West Caney Creek in Trinity County - *Courtesy of the Texas Forest Service*

Smith Spring cascade, Guadalupe Mountains National Park

Town Branch Creek - *Photo by Lee Watherford, City of Lockhart*