Texas Nonpoint Source Management Program 2022

Texas Commission on
Environmental Quality

Texas State Soil and Water
Conservation Board

SFR-068/22

Governor’s letter

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Texas Nonpoint Source Management Program

2022

Texas Commission on Environmental Quality

Texas State Soil and Water Conservation Board

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Abbreviations

303(d) Vision	A Long-Term Vision for Assessment, Restoration, and Protection under the Clean Water Act Section 303(d)
AFO	Animal Feeding Operation
ARS	USDA Agricultural Research Service
BEACH Act	Beaches Environmental Assessment and Coastal Health Act of 2000
BMP	Best Management Practice
CAFO	Concentrated Animal Feeding Operation
CBBEP	Coastal Bend Bays and Estuaries Program
CCMP	Comprehensive Conservation and Management Plan
CFR	Code of Federal Regulations
CMP	Coastal Management Program
COG	Council of Governments
CRP	Clean Rivers Program
CWA	Clean Water Act
CWSRF	Clean Water State Revolving Fund
CZARA	Coastal Zone Act Reauthorization Amendments
CZMA	Coastal Zone Management Act
DFund	Texas Water Development Fund
DSHS	Texas Department of State Health Services
E. coli	*Escherichia coli*
EPA	Environmental Protection Agency
EQIP	Environmental Quality Incentives Program
GCD	Groundwater Conservation District
GBEP	Galveston Bay Estuary Program
GLO	Texas General Land Office
GPAT	Groundwater Planning and Assessment Team
GRTS	Grants Reporting and Tracking System
IBWC	International Boundary Water Commission, United States Section
I-Plan	Implementation Plan
Integrated Report	Texas Integrated Report of Surface Water Quality for Clean Water Act Sections 305(b) and 303(d)
Joint Report	Joint Groundwater Monitoring and Contamination Report
LID	Low Impact Development
Management Program	Texas Nonpoint Source Management Program
mgd	Million Gallons per Day
mg/L	Milligrams per Liter
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MS4	Municipal Separate Storm Sewer System
NADB	North American Development Bank
NGO	Non-Governmental Organization
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service

OSSF	On-Site Sewage Facility
OSPRA	Oil Spill Prevention and Response Act of 1991
PCB	Polychlorinated Biphenyls
POTW	Publicly Owned Treatment Works
PPG	Performance Partnership Grant
QAPP	Quality Assurance Project Plan
RFGA	Request for Grant Applications
RRC	Railroad Commission of Texas
RUAA	Recreational Use-Attainability Analysis
SPCS	Structural Pest Control Service
SWAP	Source Water Assessment and Protection
SWCD	Soil and Water Conservation District
SWQM	Surface Water Quality Monitoring
SWQMIS	Surface Water Quality Monitoring Information System
TAC	Texas Administrative Code
TAGD	Texas Alliance of Groundwater Districts
TCEQ	Texas Commission on Environmental Quality
TCRMP	Texas Coastal Resiliency Master Plan
TDA	Texas Department of Agriculture
TDLR	Texas Department of Licensing and Regulation
TDS	Total Dissolved Solids
TGPC	Texas Groundwater Protection Committee
TIAER	Texas Institute for Applied Environmental Research
TISCC	Texas Invasive Species Coordinating Committee
TLAP	Texas Land Application Permit
TMDL	Total Maximum Daily Load
TPDES	Texas Pollutant Discharge Elimination System
TPWD	Texas Parks and Wildlife Department
TSSWCB	Texas State Soil and Water Conservation Board
TSWQS	Texas Surface Water Quality Standards
TWC	Texas Water Code
TWDB	Texas Water Development Board
TWRI	Texas Water Resources Institute
TxDOT	Texas Department of Transportation
UAA	Use-Attainability Analysis
U.S.	United States of America
USDA	United States Department of Agriculture
USGS	United States Geological Survey
WAP	Watershed Action Planning
WPP	Watershed Protection Plan
WQMP	Water Quality Management Plan

Chapter 1 Introduction

The *Texas Nonpoint Source Management Program* (Management Program) is required under Clean Water Act (CWA) Section 319(b). The Texas Commission on Environmental Quality (TCEQ) and Texas State Soil and Water Conservation Board (TSSWCB) jointly administer the Management Program, which outlines Texas's comprehensive strategy to protect and restore water quality impacted by nonpoint sources of pollution. The Management Program describes the specific programs and processes the state uses to address nonpoint source pollution, and provides for the coordination of nonpoint source-related activities, establishment of statewide goals, prioritization of assessment and implementation activities, and tracking and reporting of program activities.

Nonpoint Source Pollution

Every river, stream, lake, reservoir, and estuary has a watershed. Each watershed encompasses many land uses and supports a variety of economic activities. To a large extent, water quality within a watershed is linked to the actions of the people who live, work, and play within its boundaries. Water quality problems can be a result of either point or nonpoint source pollution.

Point source pollution comes from single, identifiable sources, such as the discharges from municipal or industrial wastewater treatment systems and concentrated animal feeding operations (CAFOs). Point sources are regulated under the CWA and Texas law and are subject to permit requirements that focus on water quality protection. These permits specify effluent limits, monitoring requirements, and enforcement mechanisms.

Nonpoint source pollution comes from rainfall runoff, snowmelt, atmospheric deposition, and other means that carry pollutants to rivers, lakes, coastal waters, and groundwater. Due to the diffuse nature of nonpoint source pollution, it cannot be identified and characterized with the same level of specificity and accuracy as point source pollution. As a result, evaluating the impacts of nonpoint source pollution and the effectiveness of mitigation activities is difficult. Nonpoint source pollution can originate from many different locations. Common nonpoint source pollutants include:

- fertilizers, herbicides, and insecticides from residential areas and agricultural lands;
- oil, grease, toxic chemicals, chlorides, and total dissolved solids (TDS) from spills, roads, urban areas, and energy production;
- sediment from construction sites, crop and forest lands, and eroding stream banks; and
- bacteria and nutrients from livestock, pets, wildlife, and septic systems.

Evaluation of Nonpoint Source Pollution — Surface Waters

Nonpoint source pollution enters surface waters in a diffuse manner and at intermittent intervals during periods of precipitation. The amount, timing, and duration of these events are determined by meteorological conditions. Due to their widespread and variable nature, precise sources of nonpoint source pollution can be difficult to trace. However, it is known that contaminated runoff from urban and rural areas, whether or not the source can be pinpointed, may result in degradation of water quality and nonsupport of designated water uses.

Nonpoint source pollution is known or suspected to be responsible for water quality impairments in streams, rivers, reservoirs, and bays in Texas. According to data compiled by the United States (U.S.) Environmental Protection Agency (EPA) from information provided by the states, nonpoint source pollution contributes to approximately 72% of the water quality impairments to rivers and streams and 77% of the water quality impairments to reservoirs in Texas (Table 1.1). States also report the causes of water quality impairments. This information indicates elevated levels of bacteria and metals and depressed levels of dissolved oxygen are the causes of most impairments to water quality in streams, reservoirs, and bay segments in Texas.

Table 1.1 Texas Probable Sources Contributing to Impairments for Reporting Year 2020[1]

Probable Source Group	Rivers and Streams (miles)	Lakes and Reservoirs (acres)	Bays, Estuaries, and Ocean (acres)
Agriculture	1,783	37,191	
Aquaculture	18.6		
Atmospheric Deposition	326	300,984	
Commercial Harbor and Port Activities	24		
Construction	29		
Hydrologic Alteration	349		
Industrial	586	112,239	352,035
Land Application/Waste Sites/ Tanks	12		

Probable Source Group	Rivers and Streams (miles)	Lakes and Reservoirs (acres)	Bays, Estuaries, and Ocean (acres)
Legacy/Historical Pollutants			5,406
Military Bases	2		
Municipal Discharges/Sewage	1,445	26,549	102,614
Natural/Wildlife	2,330	136,867	4,493
Other[2]	1,879	44,460	194,245
Resource Extraction	87	7,144	
Spills/Dumping	6		5,406
Unknown	5,987	522,292	1,633,685
Unspecified nonpoint source pollution[3]	4,500	165,494	195,882
Urban-Related Runoff/ Stormwater	1,005	4,335	164,438

[1] Texas Integrated Report of Surface Water Quality for the CWA Sections 305(b) and 303(d), TCEQ, 2020.
[2] "Other" sources include ballast water releases, pesticide application, and unspecified unpaved roads or trails.
[3] "Unspecified nonpoint source pollution" sources include contaminated sediment, rural residential areas, and erosion from barren land.

Evaluation of Nonpoint Source Pollution — Groundwater

Nonpoint source contamination is present in many Texas aquifers. While there are a variety of pollutants of concern in groundwater (see Appendix D), the most widespread contaminant is nitrate. Sources of nitrate may include failing septic systems, infiltration of stormwater runoff, over-application of fertilizer on urban and agricultural land, or naturally occurring nitrate derived from the aquifer matrix.

TCEQ developed a Groundwater Assessment for the 2020 Texas Integrated Report of Surface Water Quality for the CWA Sections 305(b) and 303(d) (Integrated Report). Data from fiscal years 2010 through 2019 from the Texas Water Development Board's (TWDB's) groundwater database was used. The information demonstrated that ambient groundwater quality in Texas is

generally good, but varies somewhat among the state's aquifers. The ambient concentration in a small percentage of wells exceeded the drinking water maximum contaminant level for some parameters such as nitrate, arsenic, sulfate, and total dissolved solids. In addition, dissolved fluoride, which is naturally occurring in Texas, appears as a secondary contaminant of concern sporadically throughout the wells sampled during this period.

From fiscal years 2010 through 2019, the TWDB sampled 2,722 wells across the state for nitrate, with 661 presenting nitrate concentrations that exceeded the maximum contaminant level. An additional 1,143 wells showed the presence of nitrate, but did not exceed the maximum contaminant level.

Nonpoint Source Water Quality Challenges

Assessment

The size and number of water bodies in Texas presents a challenge to addressing nonpoint source pollution. Texas is separated into 23 river and coastal basins (Figure 1.1). For the 2020 Integrated Report, TCEQ assessed:

- 1,382 stream and river segments with a total combined length of 24,305 miles
    - 18,781 miles perennial (77%);
    - 4,496 miles intermittent or intermittent with pools (19%); and
    - 1,029 miles tidal (4%);
- 441 inland reservoirs and lakes that cover approximately 1,481,127 acres; and
- 85 bays, estuaries, and oceans that cover approximately 3,886 square miles.

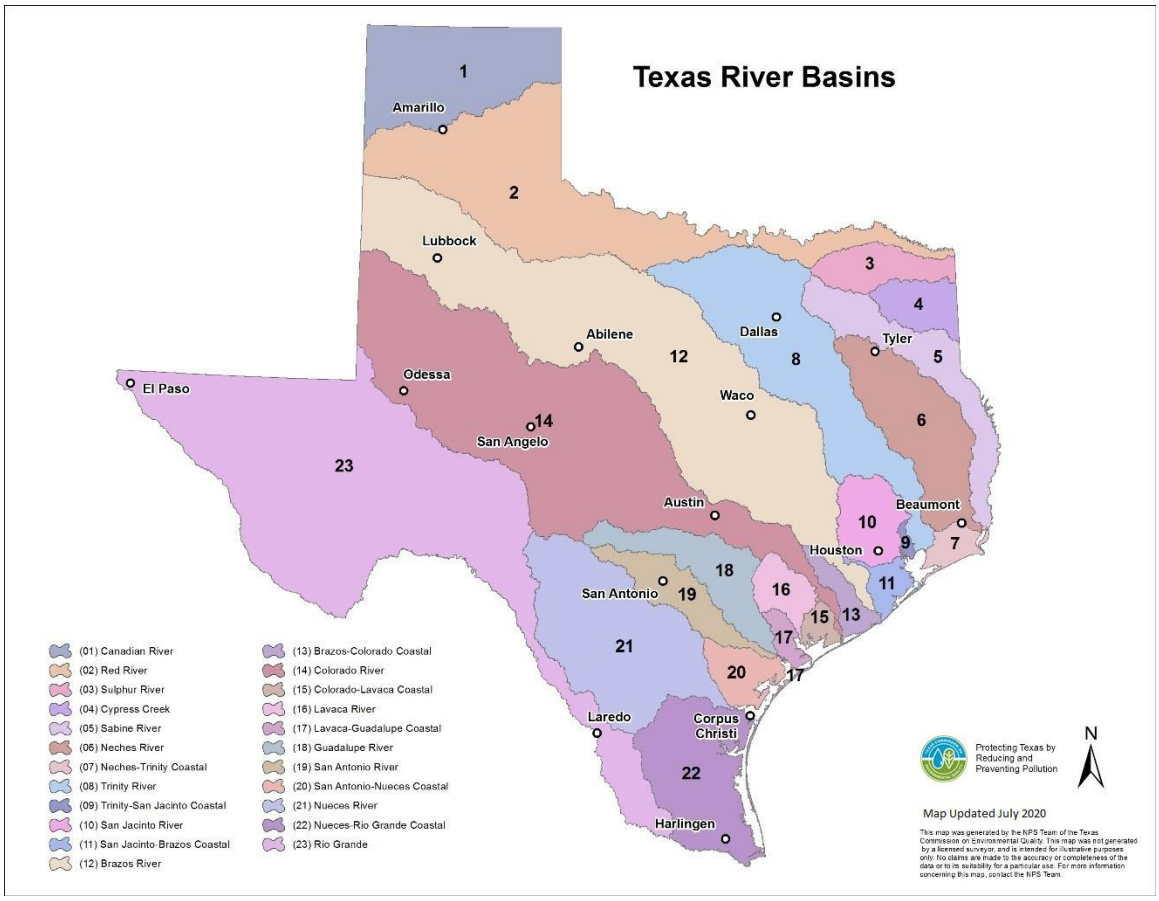

Figure 1.1 Texas River Basins

Coordinating Efforts

The future success of reducing nonpoint source pollution impacts will depend upon a coordinated effort of state and local officials, planners, developers, and citizens. Technical assistance and outreach to local and regional governments is an integral component of nonpoint source implementation efforts. Land use management decisions are best made in the local arena where buy-in by the affected parties is crucial to sustainability and success. Government planners and zoning authorities around Texas are integrating water conservation, nonpoint source pollution abatement, and water quality improvement strategies into urban planning.

Population Increases and Urban Development

TWDB estimates the population in Texas will more than double between the years 2010 and 2070 to over 51 million people. This population growth will cause urban growth, resulting in increases in impervious surfaces from buildings, roadways, and parking lots. These changes result in higher runoff volumes, increased pollutant loadings, a greater potential for downstream

flooding, the erosion of stream channels, reduced base flows, and reduced groundwater infiltration. Urban development also results in modifications to natural drainage systems. This urban growth pushes the urban-rural fringe further away from urban cores, resulting in the loss of wetlands, riparian areas, and stream buffers, thereby reducing the environment's natural ability to absorb storm flows and filter contaminants before they reach nearby water bodies.

Managing Rural Wastewater

It is crucial to correct and avoid nonpoint source problems in many developing areas where on-site sewage facilities (OSSFs), or septic tanks, may be the most cost-effective option available for managing domestic wastewater. These systems are primarily used in rural and suburban areas not connected to a city sewer system. Improved operation and maintenance of OSSFs is essential to nonpoint source management.

Agricultural Activities

Possible nonpoint source pollutants associated with agricultural and silvicultural (forestry-related) activities include sediment, nutrients, pesticides, organic matter, and bacteria. Sediment resulting from erosion from cropland, pastureland, rangeland, forestland, and stream banks fills up reservoirs, streams, and estuaries. Sediment can also carry fertilizers, pesticides, and excess nutrients into surface waters. These pollutants can seep into groundwater. Nutrients, pesticides, and other pollutants can come from a variety of sources, including over-fertilized fields, rainfall runoff from improperly managed animal operations and waste applications, and inaccurate pesticide sprayer settings.

Water Availability

According to TWDB, there is a relative abundance of water available in Texas; however, it is not uniformly distributed throughout the state. During recent periods of drought, surface water and groundwater supplies have been nearly depleted in some localized areas. Reductions in available surface and groundwater supplies have already limited urban growth and agricultural production in some areas of the state. As the Texas population continues to grow, the need to conserve, protect, and restore the quality and quantity of surface water and groundwater supplies remains a priority.

Characterizing and Identifying Nonpoint Source Pollution

Because of its diffuse nature, nonpoint source pollution can be more difficult and costly to characterize and control than point source pollution. Variations in precipitation, land use, and geography all drive the effects of nonpoint source pollution. The lack of a single identifiable source of pollution makes it difficult to establish specific cause-and-effect relationships.

Measuring Nonpoint Source Pollution

In addition, it is difficult, and in some cases impossible, to measure nonpoint source pollution or to quantify instream load reductions due to nonpoint source

implementation activities. Other challenges to nonpoint source pollution management in Texas are limited public awareness of the issues, the size and complexity of the problem, institutional barriers to directing multiple sources of funding to a diffuse problem, and the availability or lack of awareness of funding sources other than CWA Section 319(h) grants to address the problems.

Watershed Action Planning in Texas

Watershed Action Planning (WAP) is the coordination among the state's water quality planning programs and stakeholders to identify appropriate restoration strategies for impaired and special interest water bodies. The result of this process is a list of all water quality impairments and special interest water bodies in the state that identifies what will be done to address the impairment or issue, the party responsible for undertaking the action, and a means of tracking progress. WAP 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.

The objective of the WAP process is to identify, plan, document, and track water quality management strategies to protect and restore water quality in an efficient, effective, and appropriate manner (Figure 1.2). Updates to strategies are scheduled to occur every two years, following the TCEQ Commissioners' approval of a new Integrated Report. This is accomplished by gathering watershed-specific information, integrating this information into state water quality planning programs, and coordinating the resulting strategies with the appropriate federal, state, regional, and local stakeholders.

Strategies that protect and restore water bodies impacted by nonpoint source pollution, shown in the Nonpoint Source Priority Watersheds Report (Appendix C), are identified through the WAP process. This information is captured in the WAP Public Viewer, an interactive, web-based application. Participation in the WAP process is available at different stages to partners, stakeholders, and the public.

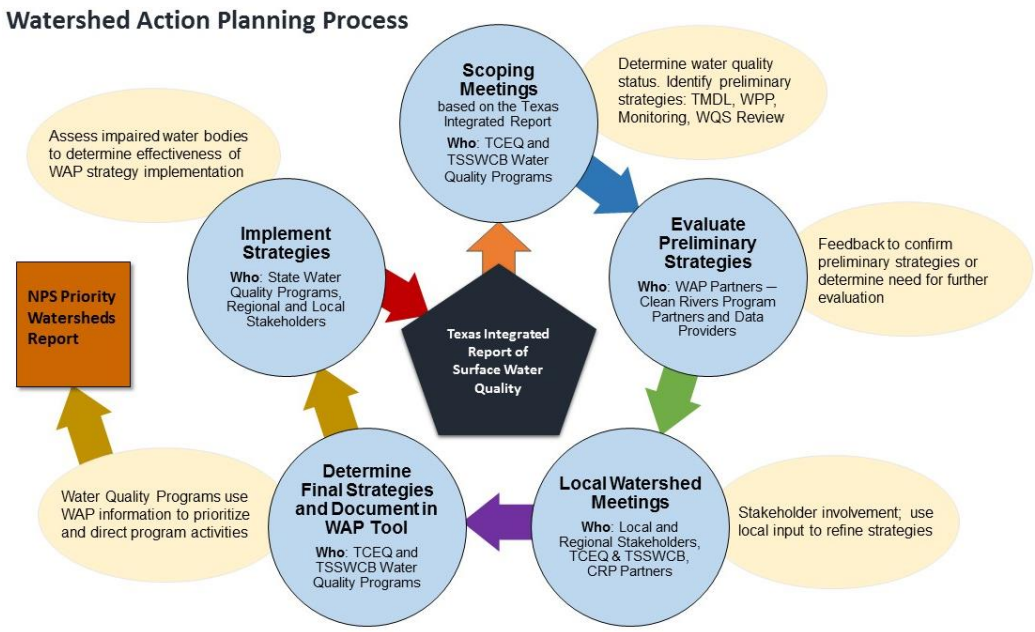

Figure 1.2 Watershed Action Planning Process

Solving Nonpoint Source Pollution Issues

It is critical to engage local stakeholders in the assessment and evaluation of a watershed's water quality impairments and concerns, as well as in the development and implementation of necessary management strategies to abate nonpoint source pollution. Watershed analyses are used to specify quantifiable targets for water quality improvement, and watershed-based plans outline actions necessary to attain and maintain applicable water quality standards and goals. TCEQ and TSSWCB are active in supporting each phase of the WAP process, from initial identification of impaired and threatened waters, to implementation and oversight of priority solutions.

The Eight Components of the Texas Nonpoint Source Management Program

As prescribed by EPA's *Nonpoint Source Program and Grants Guidelines for States and Territories* (April 2013), the Texas Nonpoint Source Management Program incorporates EPA's eight components of an effective program, which allows for maximum flexibility in managing nonpoint source pollution. These components are listed below, with a summary of how the state has addressed them in this Management Program. Many specific examples of the state's application of these eight components may be found throughout this document in the descriptions of various programs and management strategies.

Component 1

Explicit short- and long-term goals, objectives, and strategies to restore and protect surface water and groundwater, as appropriate.

The state has established long- and short-term goals and objectives for guiding and tracking the progress of nonpoint source management in Texas. The section "Goals for Nonpoint Source Management" in Chapter 2 details these goals and objectives and the milestones by which progress towards meeting them will be measured. Success in achieving the goals and objectives in Texas is reported annually in the *Nonpoint Source Management Annual Report*. Many individual programs from various agencies identified in this document have also established specific long- and short-term goals that are compatible with these overall Management Program goals.

Component 2

Working partnerships and linkages to appropriate state, interstate, tribal, regional, and local entities, private sector groups, and federal agencies.

Surface water and aquifers are not limited by political boundaries and, as a result, environmental solutions often cross federal, state, and local levels of responsibility. With the extent and variety of water quality issues across Texas, the need for cooperation at all levels is essential.

As described in Chapter 4, the state coordinates, develops, and implements the Management Program by using the existing infrastructure of the Clean Rivers Program (CRP), Soil and Water Conservation Districts (SWCDs), Texas Groundwater Protection Committee (TGPC), Coastal Coordination Advisory Committee, universities, and other organizations, creating an enhanced network that performs in conjunction with state, regional, and local entities. The WAP process described in Chapter 3 also provides a forum for engaging stakeholders more fully in determining strategies that protect and restore water quality. Through this infrastructure, the state establishes working partnerships for obtaining consensus and input on nonpoint source issues to:

- identify priority watersheds with nonpoint source water quality problems;
- formulate the steps necessary to address any known water quality problems within those watersheds; and
- secure and target resources in order to develop and implement nonpoint source water strategies that restore water quality.

A description of various agencies and programs that are used to address nonpoint source pollution in Texas are presented in Chapter 5.

Component 3

Combination of statewide nonpoint source programs and on-the-ground projects achieve water quality benefits; efforts are well-integrated with other relevant state and federal programs.

Activities in Texas that address nonpoint source pollution involve both statewide strategies and local initiatives. Nonpoint source activities are managed with a geographical focus where work can be directed to be most effective. For example, one of Texas's primary statewide efforts is public outreach and education. TCEQ has numerous programs throughout the agency that play significant roles in the area of statewide public education. TSSWCB educates agricultural stakeholders throughout the state on how their activities may contribute to nonpoint source pollution, the measures they can take to minimize their impacts, and financial incentives that are available to help them implement these measures. In addition to statewide public outreach and education efforts, CRP, local SWCDs, Texas AgriLife Extension Service, and groundwater conservation districts (GCDs) are some of the programs that provide the framework for public outreach on a local watershed level. Other state, regional, and local efforts to address nonpoint source pollution are described in detail throughout this document.

Texas's balanced approach of implementing both statewide and watershed programs is described in more detail in Chapter 4.

Component 4

Description of how resources will be allocated between abating known water quality impairments from nonpoint source pollution and protecting threatened and high quality waters from pollution caused by present and future nonpoint source activities.

As described in Chapter 3, TCEQ and TSSWCB use the WAP process to identify the most significant nonpoint source surface water quality problems. WAP provides a basis for prioritizing projects to address water quality issues. As described in Chapter 2, TCEQ and TSSWCB give the highest consideration to projects which address the most significant threats to water quality and have the best potential to prevent or reduce nonpoint source pollution and improve water quality.

Many TCEQ and TSSWCB programs are voluntary and preventive in nature or incorporate pollution prevention activities. Texas also uses regulatory approaches to prevent pollution as described later in this document. TCEQ, TSSWCB, and other state programs that carry out nonpoint source management activities are described in Chapter 5.

Component 5

Identify waters and watersheds impaired by nonpoint source pollution, as well as priority unimpaired waters, for protection. Establish a process to assign priorities and to progressively address identified watersheds by conducting more detailed watershed assessments, developing watershed plans (e.g., watershed protection plans (WPPs) or total maximum daily loads (TMDLs) and Implementation Plans), and then implementing the plans.

Texas routinely assesses and monitors water quality under programs administered by TCEQ. Data are collected by federal, state, regional, and local agencies and are compiled into the Integrated Report, which categorizes water bodies impaired by nonpoint source pollution according to their status. The WAP process sets forth the strategy by which the state will approach identified nonpoint source problems. CWA Section 303(d)-listed surface water bodies are further categorized to determine the priorities for conducting further water quality assessments or implementing protection and restoration activities. This strategy is described in the WAP process. The management strategies detailed through the WAP process lay out the procedures that TCEQ and TSSWCB will use to progressively address impaired or threatened surface water bodies.

The state assesses groundwater by compiling the groundwater portion of the Integrated Report specific to Texas's aquifers. The *Texas Groundwater Protection Strategy* serves as the statewide plan outlining responsibilities and goals for agencies and organizations with groundwater protection interests.

As described in Chapter 2, the state applies the Watershed Approach to managing nonpoint source pollution. Efforts to restore and protect water quality from nonpoint source pollution are achieved through the development and implementation of watershed-based plans, such as WPPs and TMDLs.

The state's water quality assessment and planning programs are described in more detail in Chapters 3, 4, and 5.

Component 6

Implement all nonpoint source program components required by CWA Section 319(b) and establish strategic approaches and adaptive management to achieve and maintain water quality standards as expeditiously as practicable. Upgrade program components as appropriate, and use a mix of regulatory, nonregulatory, financial, and technical assistance, as needed.

Management measures in TMDL reports and Implementation Plans (I-Plans) or WPPs identify best management practices (BMPs) that are designed to improve water quality. The successful implementation of TMDLs and TMDL I-Plans or WPPs is largely dependent on the early and sustained participation and involvement of stakeholders in the watershed. Early and sustained stakeholder participation and buy-in also provide the best possible setting for implementing subsequent management strategies called for in the action plans and future sustainability. This Management Program describes established regulatory, non-regulatory, financial, and technical assistance programs used by the state and regional agencies in the implementation of statewide and watershed programs.

The state's implementation programs are described in more detail in Chapters 3, 4, and 5.

Component 7

Manage and implement the nonpoint source program efficiently and effectively, including necessary financial management.

The state takes its fiduciary responsibilities related to the management of public funds very seriously. TCEQ and TSSWCB have established thorough operating procedures and tracking systems to ensure the effective use of CWA Section 319 grant funds for addressing identified water quality problems. Both agencies conduct a meeting at the beginning of all projects, with all contracted collaborating entities and internal agency programs, to discuss expectations and review what will be required throughout the course of the project. The respective agency staff maintain close contact with collaborating entities and provides oversight throughout the course of each project. Agency staff also stay in continuous contact with the EPA project officers regarding the status of the program. In order to enhance the efficiency and effectiveness of grant management as well as strengthen policies and procedures that govern the contracting process, both agencies continually review and update contractor performance criteria.

Component 8

Review and evaluate the nonpoint source management program using environmental and functional measures of success, and revise it at least every five years.

TCEQ and TSSWCB are committed to comprehensively updating the Management Program. They will review the Management Program and provide major programmatic revisions at least every five years, and priority activity updates at least biennially, to reflect activities planned through the WAP process.

This 2022 update to the Management Program was made available for stakeholder review and formal public comment. Most of the comments received provided clarification of general information used in this document, programmatic matters, and editorial changes. Public comments and the state's responses are presented in Appendix F, Table F.1.

This 2022 update to the Management Program provides an opportunity to recognize and document significant recent improvements in the state's efforts to improve water quality. These initiatives are as follows:

- The WAP process continues to provide an important perspective on deciding how to address water quality issues in the state and will allow planning activities to be implemented in a more open and coordinated manner.

- Texas has seen rapid growth in the development and implementation of WPPs for protection and restoration across the state.

- Coordination between the Nonpoint Source and TMDL programs in the state has been enhanced notably with the implementation of the 303(d) Vision, as discussed in Chapter 4.

- There has been increased coordination and project planning between state programs and partners, including the state's estuary programs, and an increased use of state revolving loan funds to address pollution sources in impaired watersheds through TWDB.

- There has been substantial progress between TCEQ, Texas General Land Office (GLO), EPA, and the National Oceanic and Atmospheric Administration (NOAA) in moving the state closer to full approval of the Texas Coastal Nonpoint Source Pollution Control Program.

- Communication and transparency between the Nonpoint Source Program and the public has been improved through the development of the Nonpoint Source Project Viewer. The Nonpoint Source Project Viewer includes WPPs, success stories, projects funded by CWA Section 319(h) funds through TCEQ, and links for additional information.

The state will rely on existing forums provided by the WAP process, Management Program updates, the *Nonpoint Source Management in Texas Annual Report*, CWA Sections 319(h), 320, and 604(b) annual grant cycles, and partner activities such as the CRP, SWCDs, and TGPC to continue the evaluation of the Management Program.

Chapter 2 Texas Nonpoint Source Management Program Overview

Nonpoint sources of pollution are largely unregulated, and a majority of the activities designed to reduce their impact on water quality falls on the states' Nonpoint Source Management Programs administered under CWA Section 319. Texas addresses the requirements of CWA Section 319, i.e., to manage nonpoint source pollution in surface water and groundwater, through the Management Program (Table 2.1). TSSWCB administers the Management Program for agricultural and silvicultural nonpoint source pollution, and TCEQ administers the Management Program for all other nonpoint sources. CWA Section 319 consists of three broad components as defined by CWA Sections 319(a), 319(b), and 319(h).

Table 2.1 CWA Section 319 Nonpoint Source Program Requirements

Assessment Report CWA Section 319(a)	Management Program CWA Section 319(b)	Grant Program CWA Section 319(h)
Identifies water bodies impacted by nonpoint sources that do not meet water quality standards[1]	Identifies BMPs and measures to reduce pollutant loadings from nonpoint sources	Outlines application requirements, including an identification and description of BMPs
Identifies categories of nonpoint sources which add significant pollution to impacted water bodies[1]	Identifies programs[3] to achieve implementation of BMPs	Identifies how grant funds will be allocated
Describes the process for identifying BMPs and measures to control nonpoint sources[2]	Includes a schedule with milestones for utilization of the program,[3] implementation methods, and implementation of BMPs	Identifies priorities for grant funds
Identifies and describes state and local programs for controlling pollution added from nonpoint sources[2]	Identifies sources of federal and other assistance and funding and purposes for which it will be used	States the requirement for annual reporting to EPA regarding progress towards milestones and as appropriate, reductions in loadings, and improvements in water quality

[1] Integrated Report

[2] Texas Nonpoint Source Management Program

[3] Programs may include nonregulatory or regulatory programs for enforcement, technical assistance, financial assistance, education, training, technology transfers, and demonstration projects.

Texas CWA Section 319(a) Assessment Report

The Texas Nonpoint Source Assessment Report is provided within the state's Integrated Report. TCEQ's Surface Water Quality Monitoring (SWQM) Program produces the state's CWA Section 305(b) Assessment and Section 303(d) List of Impaired Waters every two years in accordance with the requirements of the CWA. The Integrated Report identifies water bodies where observed water quality conditions do not support their designated uses and makes a preliminary determination as to whether or not nonpoint source pollution contributes to the impairment. The state's water quality assessment programs are described in more detail in Chapter 4. The list of impaired water bodies forms the basis for the WAP process to identify protection and restoration strategies.

Texas CWA Section 319(b) Management Program

The Management Program is the state's official plan for addressing nonpoint source pollution. The program publication is updated at least every five years. The last revision was submitted to EPA by the Governor in December 2017. TCEQ and TSSWCB jointly update and administer the Management Program.

TCEQ is charged with managing the quality of the state's water resources. Accordingly, TCEQ has general jurisdiction and primary responsibility over the state's water quality program, including water quality planning, issuance of permits for point source discharges, abatement of nonpoint source pollution from sources other than agriculture and silviculture, and enforcement of water quality rules, standards, orders, and permits.

TSSWCB is the lead state agency responsible for planning, implementing, and managing programs and practices for preventing and abating agricultural and silvicultural nonpoint source water pollution (Texas Agriculture Code Section 201.026).

TCEQ and TSSWCB have a Memorandum of Understanding (MOU), which sets forth the coordination of jurisdictional authority, program responsibility, and procedural mechanisms for point and nonpoint source pollution control programs (31 Texas Administrative Code (TAC) Section 523.5(b)). Additionally, TCEQ and TSSWCB have a Memorandum of Agreement (MOA), which sets forth the coordination of program responsibilities relating to the development and implementation of TMDLs, TMDL I-Plans, and WPPs by the two agencies.

The Management Program utilizes water quality management programs and regulatory, voluntary, financial, and technical assistance approaches to achieve a balanced program. Nonpoint source 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

nonpoint source management in Texas. Success in achieving the goals and objectives is reported annually in the *Nonpoint Source Management in Texas Annual Report* and appendix, which is submitted to EPA in accordance with the CWA.

In accordance with CWA Sections 205(j), 208, and 303 and 40 Code of Federal Regulations (CFR) Section 130.2(k), the *Texas Water Quality Management Plan* (WQMP) is required to address matters related to designated management agencies, effluent limitations for wastewater facilities, TMDLs, nonpoint source management, dredge and fill programs, and groundwater programs. The WQMP is used to direct planning for implementation measures that control and/or prevent water quality problems. This *Texas Nonpoint Source Management Program* is a required element of the state's WQMP.

Implementation of the Management Program involves partnerships among many organizations. With the extent and variety of nonpoint source issues across Texas, cooperation across political boundaries is essential. Many local, regional, state, and federal agencies play an integral part in managing nonpoint source pollution, especially at the watershed level. They provide information about local concerns and infrastructure and build support for the kind of pollution controls that are necessary to prevent and reduce nonpoint source pollution. By establishing coordinated frameworks to share information and resources, the state can more effectively focus its water quality protection efforts.

Texas CWA Section 319(h) Grant Program

Congress enacted CWA Section 319(h) in 1987, establishing a national program to control nonpoint source water pollution. Based on Congressional appropriations, EPA allocates CWA Section 319(h) funds by formula to the states annually for the implementation of Nonpoint Source Management Programs. The CWA Section 319(h) funding in Texas is divided equally between TCEQ and TSSWCB (Table 2.2). Each agency independently administers its portion of the grant and annually solicits project applications from eligible entities across the state. Each agency identifies priority areas and activities and ranking criteria for each funding cycle based on this Management Program, the most recent Integrated Report, the WAP process, and applicable state partnership grant codes.

State Priorities for CWA Section 319(h) Funding

Texas establishes priorities for its CWA Section 319(h) grant program, with highest priority given to funding those projects or activities which address water bodies not meeting water quality standards due to nonpoint source pollution, as identified in the most recent Integrated Report. TCEQ and TSSWCB use the Integrated Report and the Nonpoint Source Priority Watersheds Report to prioritize waters for CWA Section 319(h) grant funding. This helps to ensure fiscal responsibility by providing focus for the use of limited financial resources.

Generally, priorities for CWA Section 319(h) funding are as follows:

- Texas will develop watershed-based plans in impaired water bodies identified as impacted by nonpoint source pollution in the Integrated Report;
- Texas will implement watershed-based plans (e.g., TMDLs, TMDL I-Plans, and WPPs) to address nonpoint source water quality issues to the extent practicable;
- the state will continue to conduct activities to prevent the degradation of water quality, including, but not limited to, the development and implementation of watershed-based plans to protect water quality; and
- the state will facilitate the implementation of activities to restore and protect groundwater quality.

Table 2.2 Recent CWA Section 319(h) Nonpoint Source Grant Allocations to Texas

Federal FY	Texas Allocation
2017	$ 7,625,000
2018	$ 7,534,000
2019	$ 7,459,000
2020	$ 7,775,000
2021	TBD

Specific priorities and applicable criteria for CWA Section 319(h) funding are included in the TCEQ Request for Grant Applications (RFGA) and TSSWCB Request for Proposals which are released annually to solicit applications for projects. The balance of restoration and protection resources is determined through these competitive processes. Factors such as compatibility with Nonpoint Source Management Program priorities, the potential for project success, applicant qualifications/past performance, and budget issues are important considerations when balancing restoration and protection activities.

Resource Leveraging

The majority of the State of Texas's annual CWA Section 319(h) grant allocation is passed through to political subdivisions and non-governmental organizations (NGOs) by TCEQ and TSSWCB through the execution of interagency or inter-local contracts. CWA Section 319(h) contractors are considered sub-recipients and, as such, are subject to all applicable federal regulations and statutes.

For the Management Program to be effective on both a statewide and watershed level, TCEQ and TSSWCB must work closely with other state, regional, and local organizations to implement management measures and optimize the use of all available resources. The extent of monetary resources needed to effectively address nonpoint source pollution and restore beneficial uses is greater than the amount of funding available from the CWA Section319(h) grant program alone. Consequently, the Management Program encourages the use of leveraged resources when feasible. For example, the state has worked closely with the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) to leverage federal Farm Bill monies (i.e., the Environmental Quality Incentives Program (EQIP)) with CWA Section 319(h) grants to abate agricultural nonpoint source pollution and address water quality impairments on the CWA Section 303(d) List. Also, TCEQ and TSSWCB have worked with the state's estuary programs and GLO to leverage CWA Section 320 funding, Coastal Impact Assistance Program funding, and Coastal Management Program (CMP) Section 309 funding for projects that both reduce nonpoint source pollutant loadings to impaired water bodies and meet respective estuary program Comprehensive Conservation and Management Plan priorities and the requirements of the *Texas Coastal Nonpoint Source Pollution Control Program*.

Federal Match Requirement

The CWA Section 319(h) grant program requires federal funds to be matched with 40% non-federal funds. "Match" refers to funds or services used to conduct a project that are not sustained by federal funds. Any project match must: (1) relate directly to the project for which the match is being applied; (2) be reasonably valued; and (3) be supported by sufficient documentation. The match does not have to originate with the grant recipient but can come from eligible individuals, outside organizations, other local governments, or state agencies as long as the source of the matching funds is non-federal and is not being used to match another federal grant program. Eligibility requirements under CWA Section 319 apply equally to federal and matching funds.

Matching can be financed in multiple ways:

Cash

These are costs that relate directly to the project for which the match is being applied and which are paid by the grant recipient.

In-Kind Contributions

In-kind contributions are non-cash contributions, such as donated property or volunteered services, that benefit the grant project and are specifically identifiable with it. Additional information on in-kind contributions can be found in the Office of Management and Budget's Guidance for Grants and Agreements, 2 CFR Section 200.96 (definition) and 2 CFR Section 200.306 (regarding cost sharing and matching).

Federal Consistency Review of Other Assistance Programs

CWA Section 319(b)(2)(F) requires the Management Program to contain an identification of federal financial assistance programs and federal development projects for which the state will review individual assistance applications or development projects for their effect on water quality to determine whether such activities would be consistent with the Management Program. Grant applicants follow procedures outlined by the Office of Management and Budget. Consistency review of urban, non-agricultural, and non-silvicultural programs is the responsibility of TCEQ. Consistency review of agricultural and silvicultural programs is the responsibility of TSSWCB. Record keeping and public review of these documents are conducted in accordance with the requirements of the individual agency or program area responsible for the review.

Appropriate programs and projects from the Catalog of Federal Domestic Assistance will be reviewed by the state for consistency with the Management Program. The state is committed to reviewing and identifying federal land management programs and projects, development projects, and financial assistance programs that are or may be inconsistent with the Management Program. Potential inconsistencies are often resolved by the federal agency preparing a National Environmental Policy Act document, or by the U.S. Army Corps of Engineers in their decisions regarding the applicability of CWA Section 404 permitting requirements. When significant inconsistencies are not resolved, the state will seek EPA assistance to help resolve issues.

Texas Coastal Nonpoint Source Pollution Control Program

Section 6217 of the federal Coastal Zone Act Reauthorization Amendments (CZARA) of the Coastal Zone Management Act (CZMA) requires each state with a CMP to develop a federally approved program to enhance coastal nonpoint source pollution management. The Texas CMP was approved on January 10, 1997 and was created to improve the management of the state's coastal resources to ensure the long-term ecological and economic productivity of lands within the Coastal Zone Boundary (Figure 2.1). The CMP is administered by the GLO and is advised by members of the Coastal Coordination Advisory Committee.

At the federal level, NOAA and EPA jointly administer CZARA Section 6217. In Texas, GLO is designated as the lead agency responsible for the administration and management of the Coastal Management Program, which includes the *Texas Coastal Nonpoint Source Pollution Control Program*. TCEQ, TSSWCB, Railroad Commission of Texas (RRC), TPWD, TxDOT, and GLO are responsible for the development and implementation of the state's *Coastal Nonpoint Source Pollution Control Program*. EPA's *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters* under CZARA Section 6217(g)

(published in January 1993) calls for Coastal Nonpoint Source Pollution Control Programs to address five major categories of nonpoint source pollution that impair or threaten coastal waters nationally: (1) agricultural runoff; (2) urban runoff (including developing and developed areas); (3) silvicultural runoff; (4) marinas and recreational boating; and (5) hydromodification (channelization and channel modification, dams, and streambank and shoreline erosion). The guidance specifies management measures or strategies that reflect the greatest degree of pollutant reduction achievable through the application of pollution control practices, technologies, processes, siting criteria, and operating methods.

Texas submitted the *Texas Coastal Nonpoint Source Pollution Control Program* to NOAA and EPA in December 1998. In July of 2003, NOAA and EPA conditionally approved the *Texas Coastal Nonpoint Source Pollution Control Program*. The program discusses the coastal nonpoint source management area, provides an overview of program implementation and coordination, and presents specific nonpoint source categories, management measures, state rules and programs which address pollution sources and meet the federal requirements, and information on additional management measures, technical assistance, public participation, and program monitoring and evaluation. The *Texas Coastal Nonpoint Source Pollution Control Program* is incorporated by reference as part of this *Texas Nonpoint Source Management Program*. Texas continues to seek unconditional approval of its program.

Activities designed to meet the remaining condition for approval of the *Texas Coastal Nonpoint Source Pollution Control Program* include the creation of a technical manual, *Guidance for Sustainable Stormwater Drainage on the Texas Coast*, conducting outreach, maintaining an inventory of OSSFs, assessing the coastal management strategy, and continued planning. The state has identified and contacted officials in the coastal zone responsible for managing urban development, OSSFs, and roadways and has inventoried existing programs related to urban development, operating OSSFs, and roadways. The state continues to provide educational, technical, and financial assistance to support the implementation of the management measures, including workshops, constructing green infrastructure, and training. Green infrastructure is an approach to water management that uses vegetation, soils, and other elements and practices to restore elements of the natural water cycle. Types of practices include rain gardens, rainwater harvesting, permeable pavements, planter boxes, and bioswales, among others. The state received a set of interim decision documents in late 2020.

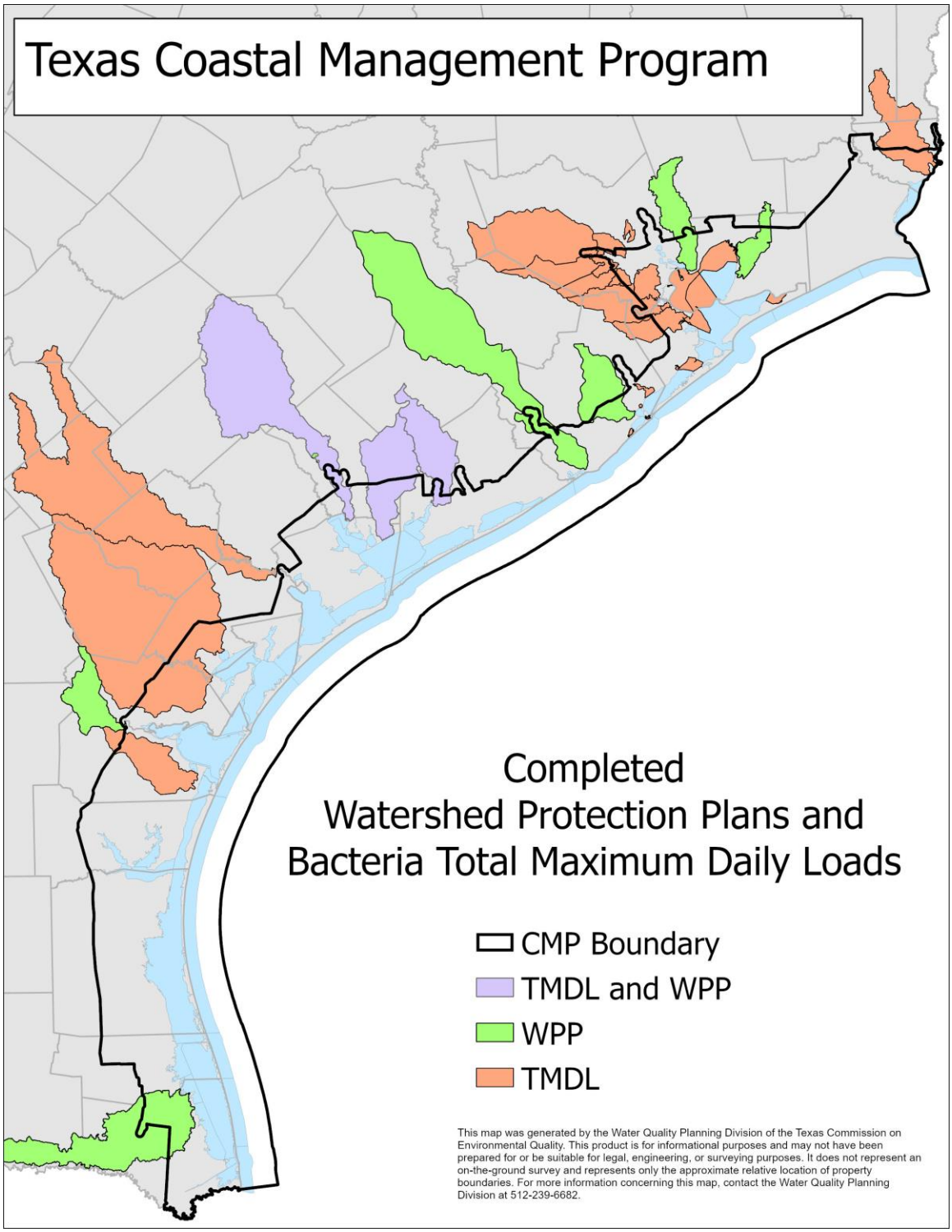

Figure 2.1 Coastal Zone Boundary for the CMP and CZARA Section 6217

Texas Groundwater Protection Strategy

The Texas Legislature charged the TGPC with developing a comprehensive groundwater protection strategy for the state that provides guidelines for the prevention of contamination, conservation, and coordination of the groundwater protection activities of the various agencies involved in groundwater issues (Texas Water Code (TWC) Section 26.405(2)).

The plan for preserving and conserving groundwater in the state starts with the existing regulatory and non-regulatory groundwater protection, remediation, and conservation programs listed in the annual *Joint Groundwater Monitoring and Contamination Report* (TCEQ publication SFR-056, "*Joint Report*"). In addition, the most recent edition of the *Texas Groundwater Protection Strategy* (TCEQ publication AS-188) introduced a summary of how information is exchanged and recommendations are made within and between the TGPC, its subcommittees, and the public to further protect groundwater resources in the state. The comprehensive strategy for protecting groundwater in Texas includes both the TGPC members' internal programs and the TGPC's internal processes outlined in the *Texas Groundwater Protection Strategy*. Various TGPC member internal programs address nonpoint source pollution, and the *Texas Groundwater Protection Strategy* is incorporated by reference as part of this Management Program.

The Role of Stakeholders

Stakeholder participation is an essential part of programs designed to address water quality issues. Stakeholder participation has become integrated into many state and local government programs. This section provides information to help define and identify stakeholders. It explains the importance of involving stakeholders early and sustaining their efforts through the process. It also touches briefly on the need to provide suitable forums for stakeholder involvement. The stakeholder participation process used in the Texas water quality planning programs are described below.

Who is a Stakeholder?

Stakeholders are individuals who have an interest in a particular water quality issue, or may be affected by a related decision. Stakeholders can include all individuals or organizations with an interest in a watershed and have one or more of the following attributes:

- they live in the watershed or use the water resource;
- they are affected by water quality problems;
- they impact water quality;
- they have statutory or regulatory responsibilities closely linked to water quality;
- they may be required to undertake water quality control measures;

- they can help develop or implement actions to remedy water quality problems;
- they are affected by project outcomes or decisions;
- they have a financial interest in how the resource is managed; and
- they have an interest in the decision-making process.

Simply knowing the types of stakeholders does not always help to identify specific stakeholders. For example, stakeholders might include water skiers at an area lake, workers at a port in the lower reaches of a watershed, or the millions of people who eat fish and seafood every day. Landowners, in particular, often have multiple interests in water quality issues because the water body may be on or near their property. The following list includes a description of various stakeholder types, and Table 2.3 depicts stakeholder categories in relation to their interests:

- wastewater dischargers: municipal and industrial;
- the public: individuals; civic and other groups representing environmental, consumer, recreational, and community interests; schools and universities; and private landowners;
- agriculture, silviculture, and aquaculture: corporate and individual farmers, ranchers, and producers; commercial harvesters of fish and shellfish; agricultural groups and organizations; and wildlife management associations;
- business: commercial and industrial firms, utilities, business groups, and trade associations; and
- government: people who represent citizens or are legally responsible for public resources, including federal, state, and local levels.

Table 2.3 Categories of Stakeholders

Stakeholder Category	Description	Examples
People who live, work, or play at or near a resource.	Those whose everyday lives and well-being are directly connected to a resource or issue. This group is essentially made up of the "neighbors" of the issue, and they should be invited to participate because their everyday lives may be impacted.	Residents, resource users, businesses, community/civic organizations, interest groups and NGOs, governmental entities, Native American tribes, and the media.

Stakeholder Category	Description	Examples
People interested in the resource, its users, its use, or its non-use.	Those who assign values to a resource and are concerned about the way the resource is used. This group includes those who extract value from the resource, as well as those more interested in conserving or protecting the resource. This group should be invited to participate because of the sheer interest in the resource or issue.	Businesses, resource users, interest groups and NGOs, community/civic organizations, governmental entities, and Native American tribes.
People interested in the processes used to make decisions.	Those deeply interested in the legal and procedural aspects of an issue. This group includes those who want to ensure that all relevant policies and procedures are observed in reaching a decision. They should be involved because of their attention to procedural details and their ability to derail a process or litigate final decisions.	Interest groups and NGOs, governmental entities, the media, residents, and Native American tribes.
People who pay the bills.	Those whose money is directly or indirectly used to fund resource management through taxes, fees, and other means. This group wants to ensure that money is spent wisely and should be invited to participate because the government is accountable for how it spends public dollars.	Residents, resource users, businesses, and governmental entities.
People who represent citizens or are legally responsible for public resources.	Those who have the legal authority and obligation to manage natural resources. Members of this group want to ensure the best final decision is reached and should be invited to participate because it is their duty.	Governmental entities.

Adapted from Source: Gary K. Meffe, Larry A. Nielsen, Richard L. Knight, and Dennis A. Schenborn. 2002. *Ecosystem Management: Adaptive, Community-Based Conservation*. Island Press. Washington, D.C.

Partnerships for Conducting Work

The state uses the infrastructure of the CRP, SWCDs, river authorities, TGPC, Coastal Coordination Advisory Committee, universities, and other mechanisms

to coordinate, develop, and implement the Management Program. These entities are each charged with certain water quality stewardship responsibilities and bring a variety of experience related to research, assessment, laboratory analysis, and implementation and education activities. In addition, these entities conduct meetings and coordinate activities with a variety of local, regional, and state stakeholders to pursue effective solutions to reduce or prevent nonpoint source pollution.

Goals for Nonpoint Source Management

TCEQ and TSSWCB have established long- and short-term goals and objectives for guiding and tracking the progress of nonpoint source management in Texas. The goals describe high-level guiding principles for all activities under the Management Program. The objectives specify the key methods that will be used to accomplish the goals. Success in achieving the goals and objectives will be tracked by a comprehensive suite of program performance measures, incorporated into the program to enhance accountability (Appendix E). Progress in meeting program performance measures is reported annually in the *Nonpoint Source Management in Texas Annual Report*, which is submitted to EPA in accordance with CWA Section 319(h)(11).

The long-term goal discussed below will remain as long as nonpoint source water pollution is an issue. Short-term goals will be reported annually.

The programs discussed throughout this document implement the Management Program and achieve its goals and objectives. To facilitate coordination among essential programs, the goals are over-arching for all nonpoint source programs implemented by federal, state, regional, and local governmental entities, NGOs, and citizens in Texas.

Long-Term Goal

Protect and restore water quality affected by nonpoint source pollution through assessment, implementation, and education.

Objectives

1. Focus nonpoint source abatement efforts, implementation strategies, and available resources in watersheds and aquifers identified as impacted by nonpoint source pollution.

2. Support the implementation of state, regional, and local programs to prevent nonpoint source pollution through assessment, implementation, and education.

3. Support the implementation of state, regional, and local programs to reduce nonpoint source pollution, such as the implementation of strategies defined in TMDL I-Plans, WPPs, and other water quality planning efforts in the state.

4. Support the implementation of state, regional, and local programs to reduce nonpoint source pollution to groundwater through the *Texas Groundwater Protection Strategy*, based on the potential for degradation with respect to use.

5. Support the implementation of state, regional, and local programs to reduce nonpoint source pollution in the coastal management zone through the *Texas Coastal Nonpoint Source Pollution Control Program*.

6. Develop partnerships, relationships, memoranda of agreement, and other instruments to facilitate collective, cooperative approaches to manage nonpoint source pollution.

7. Increase overall public awareness of nonpoint source issues and prevention activities.

8. Enhance public participation and outreach by providing forums for citizens and industry to contribute their ideas and concerns about the water quality management process.

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, nonpoint source-impacted watersheds, vulnerable and impacted aquifers, or areas where additional information is needed.

Objectives

Evaluate the condition of the state's waters on a biennial basis, and prepare a report containing this evaluation, as required by CWA Section 305(b), to determine: a) which waters are not meeting water quality standards due, at least in part, to nonpoint source pollution, and b) the potential cause of the impairment or degradation.

A. Identify surface water bodies and aquifers from the Integrated Report and *Joint Groundwater Monitoring and Contamination Report* that need additional information to characterize non-attainment of designated uses and water quality standards.

B. Ensure that monitoring procedures meet quality assurance requirements and are in compliance with EPA-approved TCEQ or TSSWCB Quality Management Plans.

C. Conduct special studies to determine sources of nonpoint source pollution and gain information to target water quality planning and BMP implementation.

D. Develop TMDLs, TMDL I-Plans, and WPPs to restore and maintain water quality in water bodies impacted by nonpoint source pollution.

E. Conduct monitoring to determine the effectiveness of TMDL I-Plans, WPPs, and BMP implementation.

Goal Two – Implementation

Implement TMDL I-Plans and/or WPPs and other state, regional, and local plans/programs to reduce nonpoint source pollution by targeting implementation activities to the areas identified as impacted by nonpoint source pollution with respect to use criteria.

Objectives

Prevent and reduce nonpoint source pollutant loadings in surface water bodies, groundwater aquifers, wetlands, and coastal areas, through the execution of TMDL I-Plans, WPPs, the *Texas Groundwater Protection Strategy*, the *Texas Coastal Nonpoint Source Pollution Control Program*, and other state, regional, and local plans.

A. Work with regional and local entities to determine priority areas and develop and implement strategies to address nonpoint source pollution in those areas.

B. Develop and implement BMPs to address constituents of concern or water bodies not meeting water quality standards in watersheds identified as impacted by nonpoint source pollution.

C. Develop and implement BMPs to address nonpoint source constituents of concern in aquifers identified as impacted by or vulnerable to nonpoint source pollution.

D. Implement TMDL I-Plans, WPPs, and other state, regional, and local plans developed to restore and maintain water quality in water bodies identified as impacted by nonpoint source pollution.

Goal Three – Education

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

Objectives

Through pollution prevention activities and education, reduce the amount of nonpoint source pollutant loading entering the water bodies of Texas.

A. Enhance existing outreach programs at the state, regional, and local levels to maximize the effectiveness of nonpoint source education.

B. Administer programs to educate citizens about water quality and their potential role in causing nonpoint source pollution.

C. Expedite the development of technology transfer activities to be conducted to increase BMP implementation.

D. Conduct outreach through the CRP, SWCDs, and other partners to enable stakeholders and the public to participate in decision-making and provide a more complete understanding of water quality issues and how they relate to each citizen.

E. Implement outreach and education activities identified in the *Texas Groundwater Protection Strategy* to prevent nonpoint source impacts to groundwater.

F. Implement outreach and education activities identified in the *Texas Coastal Nonpoint Source Pollution Control Program* to prevent and abate nonpoint source pollution impacts to coastal resources.

G. Implement public outreach and education activities to maintain and restore water quality in water bodies impacted by nonpoint source pollution.

Milestones

This Management Program identifies milestones at three levels to help track and report success in achieving the goals and objectives described above. These three planning levels include the statewide program level, priority watersheds level, and project level. At the statewide program level, milestones have been developed for program administration, the WAP process, the coastal nonpoint source management program, and statewide education programs. The state also reports to EPA as necessary to provide information on nonpoint source-related EPA Performance Assessment Measures referenced in the *EPA National Water Quality Program Guidance*. At the priority watersheds level, program initiatives may include stakeholder participation, monitoring, modeling, and the development and implementation of TMDLs and/or WPPs. At the project level, a schedule and deliverables are specified for individual project tasks in each approved scope-of-work. Milestones for the statewide program level, priority watersheds level, and project level are further defined below.

Statewide Program Level Milestones

CWA Section 319(b)(2)(C) requires state management programs to include a schedule of annual milestones for the implementation of programs and practices to control nonpoint source pollution. EPA's CWA Section 319 guidelines require that EPA annually issue a written determination that the state has made satisfactory progress during the previous fiscal year in implementing the Management Program. EPA requires schedules and milestones for the determination of satisfactory progress and continued funding of the program; however, other documents and factors are typically utilized to assist with a determination of satisfactory progress. In addition to the state's Management

Program and Annual Report, described in Chapter 1, EPA may consider other factors such as overall financial and grant progress, national program measures, and mid-year and end-of-year reports, as well as conduct interim meetings to discuss program issues across water programs, including CWA Section 319, in its determination of satisfactory progress of the Management Program.

Milestones have been defined for the Management Program that represent progress in implementing the nonpoint source program in Texas (Appendix E, Table E.1). Implementing the program and achieving the milestones support the achievement of the program goals and objectives. The milestones document program events, accomplishments, and project deliverables. An annual schedule of milestones provides a quantitative means to track progress in the program over time and to communicate this progress to stakeholders. The Nonpoint Source Program will report on the progress in meeting milestones annually in the *Nonpoint Source Management in Texas Annual Report*.

EPA recognizes that achievement of goals and milestones is subject to potential changes in national funding levels, environmental and weather related factors, the national economic climate, and other variables beyond the control of the state. EPA and the state also recognize that changes to the goals and milestones can be influenced by revisions to national EPA guidance. Subsequently, the state may choose to re-evaluate and update applicable goals and milestones to adjust for such changing factors. This adaptive management approach enables the state to make appropriate modifications to the Management Program to continue to attain satisfactory progress.

<u>Nonpoint Source Program Administration</u> - Milestones associated with the administration of the Management Program include the Grant Reporting and Tracking System (GRTS), the preparation of the *Nonpoint Source Management in Texas Annual Report* and semi-annual reports, filing financial reports required by federal grants, conducting an end-of-year meeting with EPA, and filing annual grant applications. These milestones are specified in individual grant conditions from EPA to TCEQ and TSSWCB and are reported according to appropriate grant procedures.

<u>Watershed Action Planning Process</u> - Milestones associated with the WAP process include interagency planning meetings to identify strategies, and updates to the Nonpoint Source Priority Watersheds Report (discussed in Chapter 3). In general, this process is ongoing, with updates to the WAP database occurring every two years following TCEQ's approval of a new Integrated Report.

<u>Coastal Nonpoint Source Pollution Control Program</u> - Milestones for coastal nonpoint source pollution control can be reported in the *Nonpoint Source Management in Texas Annual Report* and by the GLO on their public website.

<u>Education Program</u> - Milestones for the statewide educational program relate to the number of nonpoint source educational programs in the state. Activities are scheduled for these programs in consultation with collaborating entities.

Priority Watershed Level Milestones

Watershed programs are ongoing projects funded with CWA Section 319(h) grants. These projects have activities scheduled in accordance with approved grant work plans. Specific program commitments are specified in these work plans and are reported according to appropriate grant procedures. Milestones for watershed programs are specified in grant work plans for the major project activities, which are further described below.

Stakeholder Participation - Employ or develop a local watershed steering committee and work groups to encourage the participation of affected stakeholders in the decision-making process.

Water Quality Monitoring - Complete the assessment of pollutant problems by reviewing existing water quality data and conducting an inventory of point and nonpoint sources, land use data, and all known stressors influencing water quality. Complete water quality monitoring. Analyze data, assess loadings, and determine the origin and distribution of pollutants.

Modeling - Apply models to determine numerical load allocations. Recommend control strategies for implementation.

Plan Development - Develop a detailed action plan (TMDL and TMDL I-Plan, and/or WPP) which establishes overall goals and objectives, a strategy for load allocation, the load allocation, a timetable for implementation, and a list of expected results.

Implementation - Implement voluntary and regulatory action described in watershed plans and utilize adaptive management to adjust implementation based on effectiveness monitoring.

Project Level Milestones

Projects funded with 319(h) grants have activities scheduled in accordance with EPA-approved grant work plans. Specific project deliverables and a schedule are specified in these work plans and are reported according to appropriate grant procedures.

Chapter 3 Watershed Action Planning

Texas has an abundance of natural resources, a large and growing population, and a robust economy. Water quality planning programs in Texas recognize the need for keeping the state's water resources safe for drinking, swimming, fishing, aquatic life, and other beneficial uses. It is a complex effort that requires collaboration among numerous parties. The large geographic expanse of the state, increasing demands on the state's water resources, changing federal policies, new technical issues, and the high expectations of Texans require that state water quality planning programs evolve to meet new challenges.

Water quality planning programs in Texas respond to these challenges by developing new approaches to addressing water quality issues in the state. WAP is a process that emphasizes the role of partners and stakeholders, relies on sound technical information, and makes available multiple options to provide the flexibility needed to address varied conditions and circumstances.

Watershed Approach

The Watershed Approach provides the organizational framework for conducting scientific, engineering, and other technical work in the Management Program. Its goal is to focus efforts on the highest priority water quality issues for both surface water and groundwater. The Watershed Approach is a flexible framework for managing water quality and includes stakeholder involvement and management actions supported by sound science and appropriate technology. The approach also addresses water quality in a holistic manner (i.e., a manner that addresses all beneficial uses of the water body, the criteria needed to protect the uses, and the strategies to restore water quality). 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; and
- diverse, well-integrated partnerships.

For groundwater quality protection, the geographic focus is on aquifers rather than watersheds. Since aquifer boundaries do not follow watershed boundaries, a watershed may transect portions of several aquifers. Wherever interactions between surface water and groundwater are identified, management activities will support the quality of both resources. This approach is utilized with WPPs by integrating groundwater/surface water interactions into watershed characterizations and the selection of management measures. However, the management measures included in a WPP will generally not affect an entire aquifer.

The state applies the Watershed Approach to managing nonpoint source pollution by channeling its efforts to restore and protect water quality through

the development and implementation of WPPs and TMDLs in those watersheds where nonpoint source pollution is contributing to a water quality impairment or concern.

The Watershed Approach recognizes that to achieve the restoration of impaired water bodies, solutions to water quality issues must be socially equitable, economically viable, and environmentally bearable (Figure 3.1).

Figure 3.1 Social, Economic, and Environmental Considerations to Achieve Water Quality Restoration

The WAP Process

The WAP process is designed to coordinate and track the state's water quality programs' activities in addressing water quality issues. It includes an evaluation of watershed-specific circumstances and a deliberative and collective decision as to how to address water quality issues. The process emphasizes coordination by partners and stakeholders at both the watershed and state levels. An output of the WAP process is a list of impaired and special interest water bodies that identifies a recommended strategy to address water quality issues. Special interest waters are identified primarily in consultation with TCEQ and TSSWCB. These include water bodies which are not impaired that are targeted for protection activities.

Following the release of the Integrated Report, representatives from the state's water quality planning programs evaluate impaired water bodies and special interest water bodies and make recommendations on WAP strategies. These preliminary recommendations are reviewed and approved by CRP partners and related stakeholders. For those water bodies where a clear strategy is not apparent, a more intensive evaluation of local water quality conditions is initiated. In these evaluations, stakeholders and other participants in the WAP process discuss factors influencing water quality and other issues associated

with the water body from the local perspective. These watershed-oriented discussions may include the review of watershed maps, land uses, activities, and known point and nonpoint sources of pollution. This more intensive evaluation at the local level allows the state's water quality planning programs to determine appropriate strategies for restoration and protection.

The WAP process supports the integration of state water quality planning programs by providing a framework and a mechanism for an enhanced level of coordination to select strategies for addressing impaired waters. Participants in the WAP process consider water quality standards, monitoring data, remedial programs, and other water quality planning programs and how they relate to one another when developing an approach to addressing impaired waters. For example, it is essential to develop meaningful, yet attainable water quality standards. Remedial programs such as TMDLs cannot be successful if the water quality standards on which they are based are not attainable. Similarly, water quality monitoring plays a critical role in establishing a link between management measures on the landscape and resulting water quality instream. This is an important means by which progress toward meeting the state's water quality goals is demonstrated.

The intent of the WAP process is to identify strategies that optimize resources, have the support of stakeholders, and are accountable and transparent to the citizens of Texas. The ultimate goal of the WAP process is to facilitate the restoration of designated uses in impaired water bodies and protect unimpaired waters.

WAP and Stakeholder Participation

Stakeholder Participation in Water Quality Planning Programs

The water quality planning programs in Texas recognize the importance of stakeholder participation in the WAP process and are committed to working with stakeholders to devise mutually acceptable strategies for achieving the state's water quality goals. There are a number of opportunities for stakeholder participation in the state's water quality planning programs (Table 3.2).

Table 3.2 Examples of Stakeholder Participation in Water Quality Planning Programs

Water Quality Planning Program	Stakeholder Participation
Clean Rivers Program	Basin Steering Committees
Water Quality Standards	Surface Water Quality Standards Advisory Work Group and public comment on water quality standards revisions
Surface Water Quality Monitoring Program	Advisory Work Group for Surface Water Quality Assessment Guidance and public comment on the Integrated Report
Nonpoint Source Management Program	Public comment on Management Program revisions; Management Program implementation at statewide and watershed levels
Total Maximum Daily Load Program	Project-specific stakeholder committees and work groups
Estuary Programs	Councils and subcommittees

The WAP process provides a framework to bring these individual initiatives together (Figure 1.2). Stakeholder participation in the WAP process provides opportunities to contribute to strategy development with the objective of achieving state program goals more effectively and efficiently.

Watershed Action Planning Strategies

Strategies identified for addressing surface water quality issues in the WAP process (Table 3.3) are implemented at a watershed level utilizing the Watershed Approach explained earlier in Chapters 2 and 3. The Watershed Approach provides a coordination framework that focuses on the highest priority issues within a hydrologically defined geographic area.

Table 3.3 Watershed Action Planning Strategies

Strategy	Strategy Description
Monitoring	More data are needed in order to determine the severity and/or area of the impairment before determining the most appropriate restoration strategy.
Evaluation	A more comprehensive, site-specific analysis than the one conducted for the Integrated Report is required.
Water Quality Standards Review	Evaluate the appropriateness of the designated use or criterion.
TMDL/I-Plan	A TMDL and I-Plan determine the assimilative capacity, allocate loads, and identify the actions necessary to achieve water quality standards.
WPP	A WPP coordinates water quality protection programs and projects designed to meet water quality standards.
Other	The impairment cannot be addressed by one of the other identified strategies.

The WAP process will also be used to evaluate the effectiveness of water quality protection and restoration strategies. Progress in implementing strategies will be reviewed through the WAP process, and appropriate actions will be recommended.

The WAP Database/Public Viewer

The information developed through the WAP process is made available through the WAP Public Viewer, an interactive web-based database. The database documents and tracks strategies for impaired and special interest water bodies within the state. The WAP Public Viewer[1] is maintained by TCEQ. The following information is included in the database:

- the segment and assessment unit;
- the impairment or special interest parameter;
- the date the water body was first listed on the CWA Section 303(d) List;
- which strategy will be applied;
- the agency/program responsible for implementing the strategy; and
- the status of strategy implementation.

[1] https://www80.tceq.texas.gov/WapWeb/public/map.htm

The WAP Public Viewer also identifies any past or current special project associated with stream segments, its status, and a brief description of the project.

The WAP process increases the transparency of the state's water quality planning programs by presenting a list of restoration strategies for impaired waters in such a manner as to communicate activities and intentions collectively to affected stakeholders and the public at large.

Nonpoint Source Priority Watersheds Report

Priority surface waters for the Management Program are identified in the Nonpoint Source Priority Watersheds Report included as Appendix C. The report identifies water quality issues in the state which are caused by nonpoint source pollution and special interest water bodies. The report includes strategies, along with the lead entity responsible for implementation, identified through the WAP process. The Nonpoint Source Priority Watersheds Report is critical to the CWA Section 319(h) grant program. It provides the necessary foundation for project planning and development prior to annual requests for proposals or applications. The Nonpoint Source Priority Watersheds Report offers CWA Section 319(h) grant applicants the basis to plan, scope, and coordinate the development of projects that execute respective watershed strategies (Figure 3.2). Watersheds and water bodies that will be targeted/prioritized for funding under the Management Program for the upcoming planning period will include current projects and those which meet prioritization criteria set in annual grant solicitations.

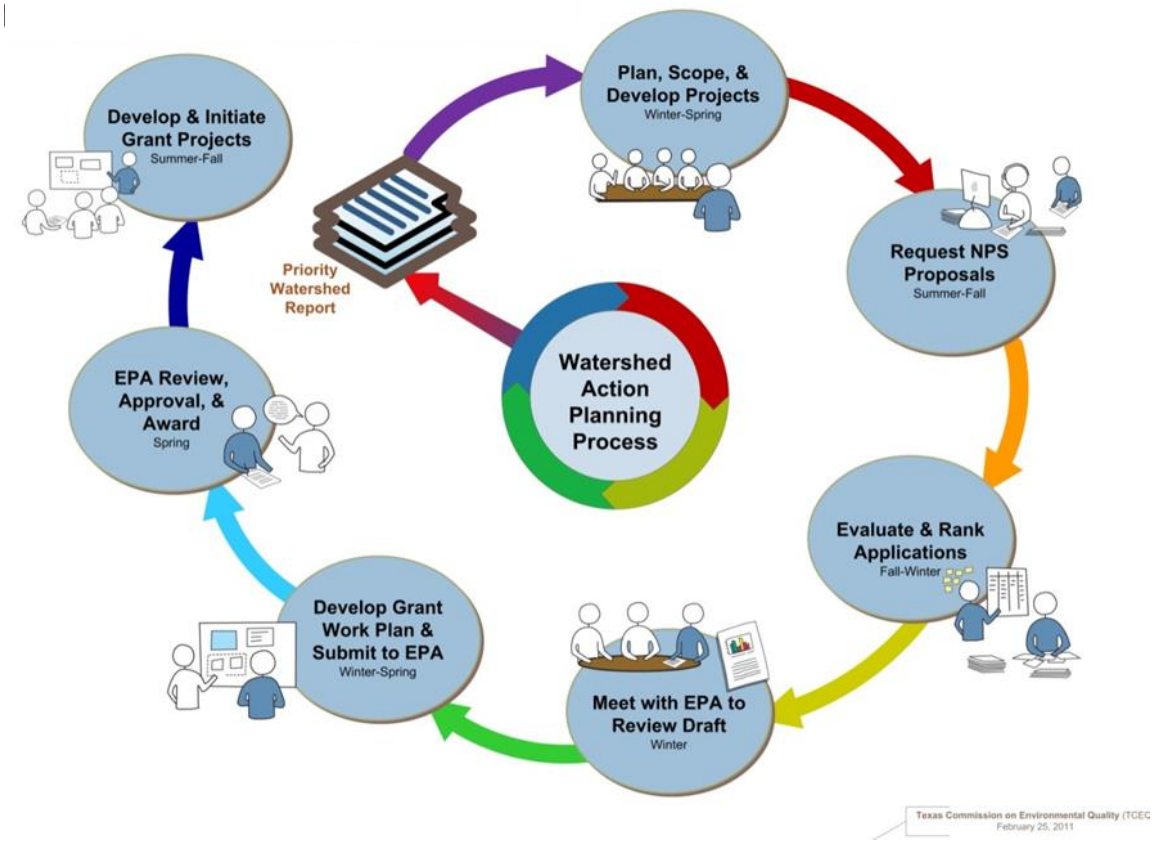

Figure 3.2 TCEQ Nonpoint Source Grant Development Process

*TSSWCB follows a similar grant development process on a different timeline.

In short, the WAP process and Nonpoint Source Priority Watersheds Report improve the coordination and resource leveraging necessary to achieve the long- and short-term goals of the Management Program. Updates to the Nonpoint Source Priority Watersheds Report occur biennially.

Chapter 4 Water Quality Management Cycle

In order to protect water quality, the state must define and measure it, identify the types and sources of pollution, and implement plans to protect, maintain, and restore it. The State of Texas uses a dynamic, flexible cycle of activities to manage water quality (Figure 4.1). Implementing this cycle of activities involves coordination between many different entities and programs around the state. The steps in the cycle include:

Planning: setting standards for surface water quality and revising or formulating monitoring plans;

Monitoring: collecting data to monitor the condition of surface waters and groundwaters;

Assessment: assessing data to determine water quality status and identify impairments and utilizing the WAP process to target resources;

Strategy Development: utilizing the Watershed Approach to protect, improve, or restore water quality with pollutant source controls and practices; and

Implementation: employing pollution controls for both point and nonpoint sources, conducting outreach/education programs, and evaluating progress. Evaluations may lead back to revising strategies or formulating new ones.

Planning

Water quality standards are the foundation for managing surface water quality under the CWA. Standards define the water quality-related goals for a water body.

A water quality standard is the combination of uses and water quality criteria:

Use - A use that can be reasonably achieved by a water body in accordance with its physical, biological, and chemical characteristics whether it is currently meeting that use or not. Typical uses that may be designated for specific water bodies include domestic water supply, categories of aquatic life use, recreational categories, and aquifer protection. Uses may be existing, designated, presumed and/or attainable.

Water Quality Criteria - Water quality conditions that must be met in order to support and protect uses. The Texas Surface Water Quality Standards (TSWQS) contain both numeric and narrative criteria for a variety of parameters. Specific parameters and criteria are associated with certain uses.

Figure 4.1 The Water Quality Management Cycle

The CWA and associated EPA rules require states to review, and, if appropriate, revise surface water quality standards at least every three years. The rulemaking process to revise the TSWQS requires public participation. State water quality standards must be approved by EPA in order for them to be used for federal permitting programs and other CWA purposes. The TSWQS are set forth in 30 TAC Chapter 307. They define desired uses for surface waters in the state, and appropriate instream numeric and narrative criteria to protect those uses. Water quality standards define the goals for water quality and provide the basis for permitting, assessment, and restoration targets for managing point and nonpoint source loadings in Texas surface waters. The TSWQS recognize the regional and geologic diversity of the state. The standards also define an antidegradation policy that protects existing uses and the state's highest quality waters.

TCEQ is the lead agency in the state responsible for establishing and revising standards to protect surface water quality in accordance with CWA Section 303(c). TWC Section 26.023 provides that TCEQ has the sole and exclusive authority to make rules setting water quality standards for all waters in the state. The TWC stipulates that the state may amend the standards from time to

time. The TCEQ Water Quality Standards Group is responsible for establishing and revising standards to protect surface water quality.

Water Quality Standards

Some water quality standards are applied generally to many different water bodies, while some are site-specific. Typical uses that may be designated for specific water bodies include domestic water supply, categories of aquatic life use, and recreational categories. Any one water body will usually have multiple uses designated. For example, a lake or stream may be designated for use as a source of drinking water, for recreation, and as a healthy environment for fish and other aquatic organisms.

The water quality standards assign site-specific uses for most medium to large water bodies, and general uses for all water bodies. Each use defined in the water quality standards has associated criteria that are used to evaluate whether water quality is sufficient to maintain those uses.

Aquatic Life Use

This use is designed to protect aquatic or aquatic-dependent animal species that live in and around the water. It establishes optimal conditions for the support of aquatic life and defines indicators used to measure whether these conditions are met. There are several tiers for the aquatic life use: exceptional, high, intermediate, limited, and minimal. Some pollutants or conditions that may jeopardize the aquatic life use include low levels of dissolved oxygen, toxic substances such as metals or pesticides, and excess turbidity.

Recreation

The recreation use is designed to ensure that water is safe for swimming and other water recreational activities that involve significant risk of ingestion of water. The recreation use consists of five categories - primary contact recreation 1, primary contact recreation 2, secondary contact recreation 1, secondary contact recreation 2, and noncontact recreation. Classified segments are designated for primary contact recreation unless a recreational use-attainability analysis (RUAA) study provides sufficient site-specific information to support changing the recreation use, or primary or secondary contact recreation is considered unsafe for other reasons, such as ship or barge traffic.

Domestic Water Supply

This use consists of three subcategories: public water supply, sole-source surface drinking water supply, and aquifer protection.

Public Water Supply

This use is intended to protect water from a lake or river that is suitable for use as a source for a public water supply system. Source water is treated before it is delivered to the tap and must meet standards established for treated drinking water through the federal Safe Drinking Water Act. Indicators used to measure the safety or usability of surface water bodies as a source for drinking water

include the presence or absence of substances such as metals or pesticides. Concentrations of salts, such as sulfate and chloride, are also measured.

Sole-Source Surface Drinking Water Supply

This use is intended to protect a body of surface water that is identified as a public water supply in rules adopted by TCEQ and is the sole source of supply of a public water supply system, exclusive of emergency water connections. Water bodies that are sole-source surface drinking water supplies are listed in Appendix B of the TSWQS. Sole-source surface drinking water supplies and their protection zones are addressed in 30 TAC Chapter 321, Subchapter B: Concentrated Animal Feeding Operations.

Aquifer Protection

The principal purpose of this use is to protect the quality of water infiltrating and recharging the Edwards Aquifer. It applies only to those designated portions of the segments that are on a recharge zone, transition zone, or contributing zone of the Edwards Aquifer. The use is discussed in more detail in 30 TAC Chapter 213. Segments designated for aquifer protection are capable of recharging the Edwards Aquifer.

Oyster Waters

This use assures that oysters or other shellfish in marine waters that may accumulate bacteria from the water are safe for commercial harvest, sale, and consumption by the public. More information on oyster waters can be found in 30 TAC Section 307.7(b)(3)(B) of the TSWQS.

Water Quality Indicators

Specific indicators of water quality, such as bacteria, dissolved solids, and organics, are also described in the TSWQS. Specific numeric and narrative criteria are assigned to these indicators, or parameters, for the various uses. Several different parameters may be measured to determine whether a water body meets its designated uses. Some of the most common are listed here, with an explanation of why they are important to the health of a water body.

Escherichia coli (E. coli) and Enterococci Bacteria

The presence of certain bacteria in surface waters is used as an indicator of the possible presence of other more harmful microbes that are pathogenic. This is determined by measuring the level of certain indicator bacteria in water. Indicator bacteria, although not generally pathogenic, are indicative of potential contamination by feces of warm-blooded animals. Their presence may indicate that other pathogens also in these wastes may be reaching a water body from sources such as inadequately treated sewage, improperly managed animal waste from livestock, pet waste, wildlife, or failing septic systems. Criteria associated with these indicators are used to assess the relative risk of swimming or other water recreational activities.

Dissolved Oxygen and Nutrients

The concentration of dissolved oxygen in surface water is a single, easy-to-measure characteristic that positively correlates with the abundance and diversity of aquatic life in a water body. A water body that can support diverse, abundant aquatic life is a good indication of high water quality. However, highly variable dissolved oxygen concentrations may indicate a related problem associated with an excess of nutrients (nitrogen and phosphorus) in water. High concentrations of nutrients in water may stimulate excessive growth of vegetation, which may result in very high dissolved oxygen concentrations during the day and very low dissolved oxygen concentrations at night. These conditions have a negative impact on aquatic life.

Dissolved Solids

Dissolved solids are different minerals dissolved in water. High levels of dissolved solids, such as chloride, sulfate, calcium, and potassium, can cause water to be unusable, or simply too costly to treat and use, for drinking water. Changes in dissolved solids concentrations also adversely affect the water quality for aquatic life. High concentrations may reduce water clarity, which contributes to a decrease in photosynthesis, which then increases water temperature. High dissolved salts can also dehydrate aquatic fauna.

Metals

Concentrations of metals can pose a threat to aquatic life, drinking water supplies, and human health. Eating fish contaminated with elevated metals can pose a risk to human health. Potentially dangerous levels of metals are identified through the chemical analysis of water, sediment, and fish tissue.

Organics

Certain components of pesticides and industrial chemicals, called organics, pose the same concerns as metals. Polychlorinated biphenyls (PCBs), for example, are industrial chemicals that are toxic and suspected to be carcinogens. Although banned in the United States in 1977, PCBs, like other organics, can remain in the environment, and accumulate in fish and human tissues when consumed. Potentially dangerous levels of organics are identified through the chemical analysis of water, sediment, and fish tissue.

Fish Consumption Advisories and Closures

The Texas Department of State Health Services (DSHS) conducts analyses of fish tissue to determine whether there is a risk to human health from consuming fish or shellfish caught in Texas streams, lakes, and bays. Fish seldom contain levels of contaminants high enough to cause an imminent threat to human health, even to someone who eats fish regularly. Risk increases for those persons who regularly consume larger fish and predatory fish from the same area of contaminated water over a long period of time. When a fish consumption advisory is issued by DSHS, a person may legally take fish or shellfish from the water body under the advisory but should limit how much

fish he or she eats, and how often. When a fish consumption closure is issued, it is illegal to take fish from the water body.

Classified Waters

Classified waters are designated in Appendix A of the TSWQS, and a map of stream segments is given below (Figure 4.2). Classified segments have designated uses (such as recreation, aquatic life, and water supply) and numeric criteria associated with those uses (such as dissolved solids, dissolved oxygen, pH, bacteria, and temperature). The designated uses and associated criteria for classified segments are also listed in Appendix A of the TSWQS. The segment descriptions that define the geographic extent of the classified segments are listed in Appendix C of the TSWQS.

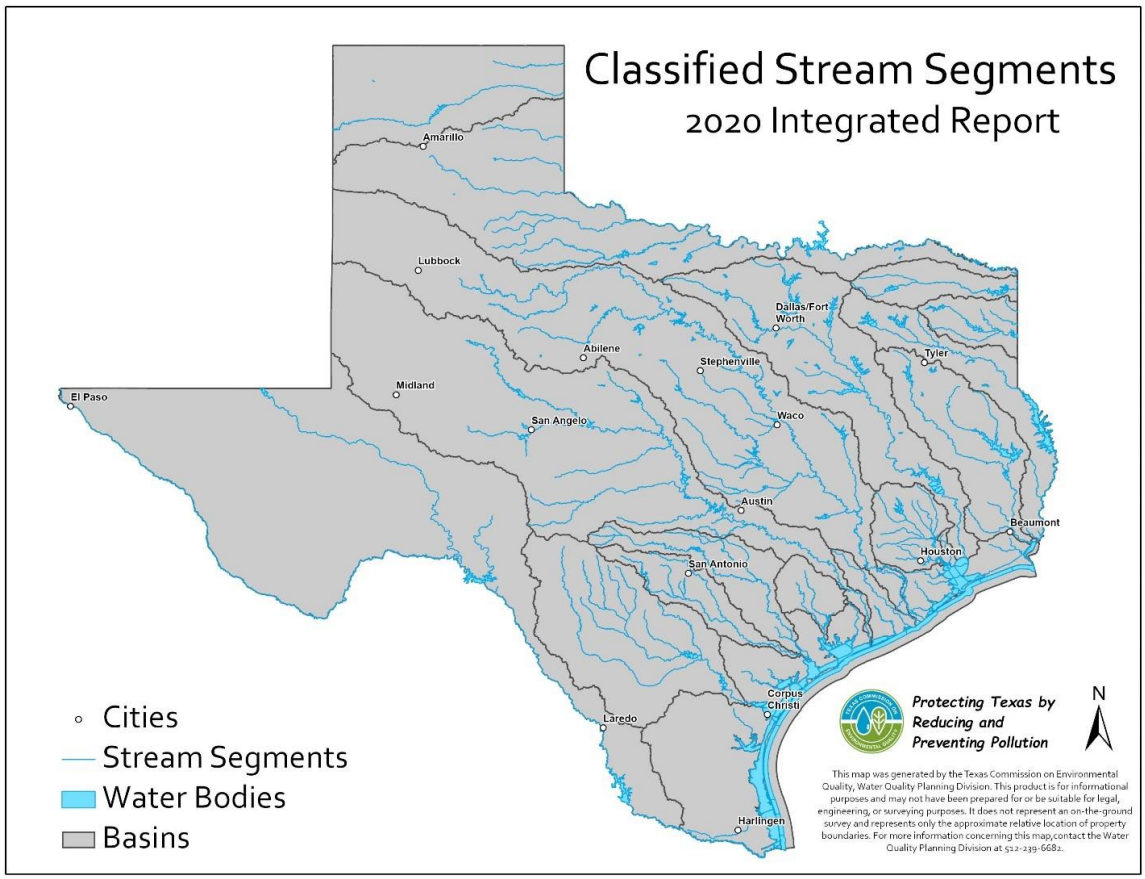

Figure 4.2 Classified Stream Segments

The major surface waters of Texas have been divided into classified water segments. Most of the larger perennial (always flowing) rivers in the state, major reservoirs, and estuaries with large areas, are classified. A single river may consist of several classified segments. The term segment refers to a defined, basic unit for assigning site-specific standards that has relatively homogenous

biological, chemical, hydrological, and physical characteristics. Segments will also normally exhibit common reactions to external stresses, such as discharges or pollutants. The establishment of segments facilitates planning activities, issuance of permits, and allocation of grant funds necessary to implement various sections of the CWA.

Unclassified Waters

Unclassified waters are those smaller water bodies that are not designated as segments in Appendix A of the TSWQS. Certain unclassified water bodies are listed in Appendix D of the TSWQS. These are water bodies where sufficient information has been gathered to assign an aquatic life use and associated dissolved oxygen criterion. Water bodies listed in Appendix D of the TSWQS are not designated as classified segments. Unclassified water bodies not included in Appendix D are typically assigned presumed uses, such as a presumed aquatic life use.

Water Quality Standards Review

The CWA provides a process for evaluating the water quality standards for a particular water body if there is reason to believe that one or more of the uses and/or criteria may be inappropriate because of local conditions that are not due to human impacts. Waters in this category (5b) are slated for a review of their standards, called a use-attainability analysis (UAA). As described in Chapter 3, the WAP process allows for stakeholder input on strategies such as water quality standard reviews.

Use-Attainability Analyses

TCEQ uses the Watershed Approach to address water quality. As part of this approach, it is essential to develop appropriate water quality standards that reflect a water body's ability to attain criteria due to natural water quality conditions. UAAs are one of the tools TCEQ uses to identify and assign appropriate standards. TCEQ has developed procedures for aquatic life UAAs and RUAAs.

An aquatic life UAA is conducted to establish or change an assigned aquatic life use or dissolved oxygen criteria by studying the physical, chemical, and biological characteristics of the water body. Aquatic life UAAs are often initiated on individual water bodies (classified or unclassified) when the existing standards appear to be inappropriate for water bodies that are identified on the CWA Section 303(d) List as impaired, or that are potentially affected by permitted wastewater discharges or other permitting actions. These studies often rely on the expertise of local water quality professionals from river authorities, TCEQ regions, and TPWD to collect the information necessary to assign appropriate aquatic life uses and dissolved oxygen criteria.

RUAAs are conducted to collect information needed by TCEQ to assign the most appropriate contact recreation use and indicator bacteria criterion. RUAA information includes the presence or absence of water recreation activities,

streamflow type, and stream depth. This information is used by TCEQ to verify a presumed use or provide detailed information to establish a site-specific recreational standard. Input from local stakeholders, including citizens who live near or adjacent to the water body, is considered heavily by TCEQ. Water quality professionals from river authorities, TCEQ regions, TPWD, and TSSWCB are solicited for feedback prior to the initiation of a study to determine if an RUAA is an appropriate water quality management strategy to address a water quality problem. Once an RUAA is initiated, local meetings are held in the watershed to notify stakeholders and incorporate their feedback to further develop the study design. Interviews with local citizens familiar with the water body are used by TCEQ to document past and present recreational activities occurring on the water body. Stakeholders also play an important role in providing comments on draft study reports.

An aquatic life or recreational UAA can result in the addition, removal, modification, or retainment of a use. Uses may be modified when it can be demonstrated, through a UAA, that attainment of the current uses and/or criteria is not possible due to local water quality conditions. Conversely, a UAA might demonstrate that the current uses and criteria are appropriate, or even that they should be more stringent. UAAs and use designations become part of the surface water quality standards and are available for public comment after they are proposed by TCEQ. Once formally adopted, they are reviewed by EPA and must be approved prior to use in TCEQ water quality management activities.

Monitoring

Water quality data are gathered regularly to monitor the condition of the state's surface waters. Chemical, physical, biological, and hydrological data are collected by TCEQ, the regional agencies of CRP, and other organizations, such as state and federal agencies, municipalities, educational institutions, volunteer monitoring groups, and private organizations under contract with the state. Data collectors follow methods and procedures outlined in TCEQ's *Surface Water Quality Monitoring Procedures* to perform sampling activities. Monitoring plans are guided by quality assurance project plans (QAPPs) that ensure that data are collected according to generally accepted practices and are of sufficient quality to be used in making defensible scientific assessments and management decisions.

TCEQ's SWQM Program is coordinated by the SWQM Team and by staff in TCEQ's 16 regional offices. Routine monitoring and special studies are conducted by SWQM personnel. This program is also responsible for the maintenance of the statewide Continuous Water Quality Monitoring Network, which is used to report water quality on a near real-time basis at specific locations.

Texas conducts four main types of data collection to monitor the status of water bodies:

- routine monitoring
- systematic monitoring
- permit support monitoring
- special-project monitoring

Routine Monitoring

Routine monitoring is designed to assess the status and trends of overall water quality for each river basin throughout the state. Data are collected on a regular basis using a network of key representative, ambient monitoring sites located on the major water bodies in each basin. Monitoring sites may also be located on smaller water bodies to support the characterization of ecoregions and/or basin-specific conditions.

Systematic Monitoring

Systematic monitoring focuses on evaluating subwatersheds and unclassified water bodies. The purpose of this monitoring is to investigate and detect areas of concern, and isolate issues that require further study. It also includes monitoring at sites to check the status of water bodies (identify improvements or concerns). This monitoring strategy distributes resources throughout the river basin to gather information on water bodies that would not normally be included in the routine monitoring program.

Permit Support Monitoring

Permit support monitoring is used to address specific areas where additional information is needed to support the development of permits that allow wastewater discharges. This may include studies to gather site-specific information used in drafting permits.

Special-Project Monitoring

Special-project monitoring involves data collection to better characterize nonattainment of water quality standards, the loading contributions of nonpoint sources of pollution in a watershed, and stakeholder concerns. Special projects are developed in consultation with other basin monitoring entities and TCEQ coordinators from the SWQM, Clean Rivers, Water Quality Standards, and TMDL programs.

Coordination

The Texas CRP and the SWQM Program play key roles in TCEQ's yearly integration of the various monitoring needs into a coordinated monitoring schedule for the entire state. The schedule shows all surface water monitoring being conducted by TCEQ or under its contracts or cooperative agreements for each planning year.

Planning and development of the coordinated monitoring schedule takes place from January through May preceding the state fiscal year for which the plan is

developed. To support coordinated monitoring, TCEQ has developed guidance for selecting sites and for sampling methods for routine, systematic, and targeted monitoring. The coordinated monitoring schedule is hosted by the Lower Colorado River Authority, a CRP Partner Agency, and can be found on their website.

Clean Rivers Program

CRP is a state sponsored program which relies on a collaborative partnership between regional water agencies in the state and TCEQ to accomplish its essential functions.

To support partnerships and TCEQ's overall water quality management program, CRP's long-term action plan includes six key elements:

- provide quality-assured data to TCEQ for use in water quality decision-making;
- identify and evaluate water quality issues;
- promote cooperative watershed planning;
- inform and engage stakeholders;
- maintain efficient use of public funds; and
- adapt the program to emerging water quality issues.

Coordinated Monitoring Meetings

An essential function of CRP is to facilitate coordination of water quality monitoring in each basin. Each basin has a CRP Partner, usually a river authority, which conducts surface water quality monitoring under a QAPP. Each year, the CRP Partner in each basin hosts at least one Coordinated Monitoring Meeting in which all entities who conduct surface water quality monitoring in that basin convene to discuss the monitoring schedule for the upcoming fiscal year. Each entity that participates in the coordinated monitoring process agrees to follow CRP guidance to ensure that data collected are of known quality. After the Coordinated Monitoring Meeting, each entity updates the coordinated monitoring schedule, which is hosted by the Lower Colorado River Authority and can be found on their website.

The key goals of the Coordinated Monitoring Meetings in each basin are to:

- ensure that there is adequate spatial and temporal coverage in monitoring surface water in the basin;
- eliminate duplications of effort by making sure entities are not monitoring the same site, at the same time, for the same parameters, which maximizes limited resources;
- set priorities for monitoring; and
- address areas of concern for water quality.

Steering Committee Meetings

Basin steering committees of CRP provide the primary forum for coordinating stakeholder involvement at the regional level. CRP Basin Steering Committees

generally meet at least annually in each of Texas's major river basins. The purpose of these meetings is for the CRP Partner Agency to present information on water quality issues in the basin and request input from the local citizens and stakeholders for identifying potential sources of pollution and setting local monitoring priorities. In turn, this process informs the monitoring decisions and discussions among the monitoring entities during the Coordinated Monitoring Meetings.

Basin Highlights and Summary Reports

A Basin Highlights Report is produced by each regional water quality authority, and provides an overview of water quality issues and the status of ongoing projects/tasks. A detailed and in-depth data analysis is provided for each basin in the Basin Summary Report once every third state fiscal biennium. This report provides trend analyses, spatial analyses (correlating environmental factors to water quality), an explanation for why certain water quality issues exist, and recommendations for addressing persistent water quality problems. The CRP partners strive to report water quality data in a user-friendly format to inform the public. The information contained in these reports is utilized by TCEQ in the development of the Integrated Report, subsequent statewide rankings, and prioritization of management strategies.

United States Geological Survey

The United States Geological Survey (USGS) also conducts a large amount of monitoring statewide, and much of the data are utilized by TCEQ. The primary purpose of USGS surface water collection network in Texas is to monitor streamflow continuously at many permanent sites. Field measurements, routine water chemistry, and metals in water are also collected at many of the fixed sites. Sites are chosen to represent a mix of natural and human factors that influence water quality. Chemical variables are then related by USGS to hydrologic conditions to interpret water resource conditions and meet water quality management needs. Estimations of point and nonpoint source loadings, stormwater management, and chemical-contaminant controls are some of those needs.

Groundwater Quality

Groundwater is produced from aquifers, which are underground layers of rock that store water and can transmit water though the pore spaces, cracks, or voids in the rock. Texas aquifers are composed of a variety of rock types, such as limestone, dolomite, sandstone gypsum, alluvial gravels, and igneous rocks. The TWDB has the responsibility for collecting and maintaining an inventory of ambient groundwater conditions throughout the state. The TGPC relies upon ambient monitoring data from the TWDB for state groundwater quality information. The TWDB performs ambient groundwater monitoring on water wells in a select number of Texas aquifers each year, so that all major and minor aquifers of the state are monitored approximately every four years. The TWDB maintains a database of ambient groundwater monitoring data for the state from over 51,000 water wells that is supplemented by data from USGS, the

Bureau of Economic Geology, and TCEQ. In addition, many GCDs throughout the state have well-developed monitoring programs. These programs are primarily intended to monitor the volume of water in an aquifer, but may also collect groundwater quality information in some cases. Data are maintained by the GCD, and generally reported to the TWDB for inclusion in their ambient groundwater database.

Major aquifers produce large quantities of water in a comparatively large area of the state (Figure 4.3). Minor aquifers produce significant quantities of water within smaller geographic areas or small quantities over large geographic areas (Figure 4.4). In some regions of the state, minor aquifers may constitute the only significant source of water supply.

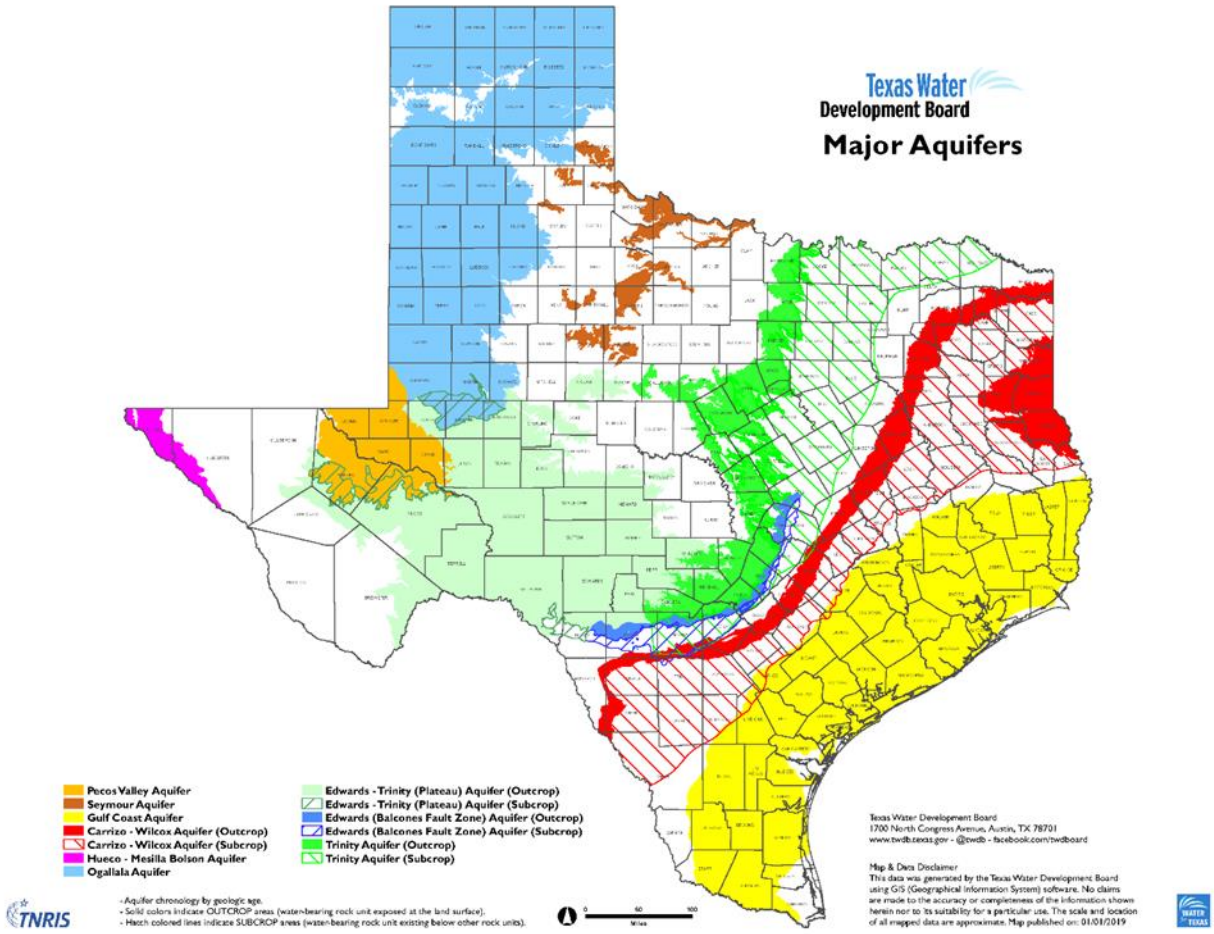

Figure 4.3 Major Aquifers of Texas

According to the *Texas Water Use Estimates, 2018 Summary* from TWDB, groundwater supplies about 54% of all water used by Texans for domestic,

municipal, industrial, and agricultural purposes. Of that, approximately 74% was used for irrigation and 19% was used for municipal supplies.

Nine major aquifers and 22 minor aquifers have been delineated within the state. This includes the Cross Timbers minor aquifer, which was named by TWDB as a new minor aquifer at the end of 2017. In addition to the major and minor aquifers, smaller, local aquifers may provide groundwater for an area.

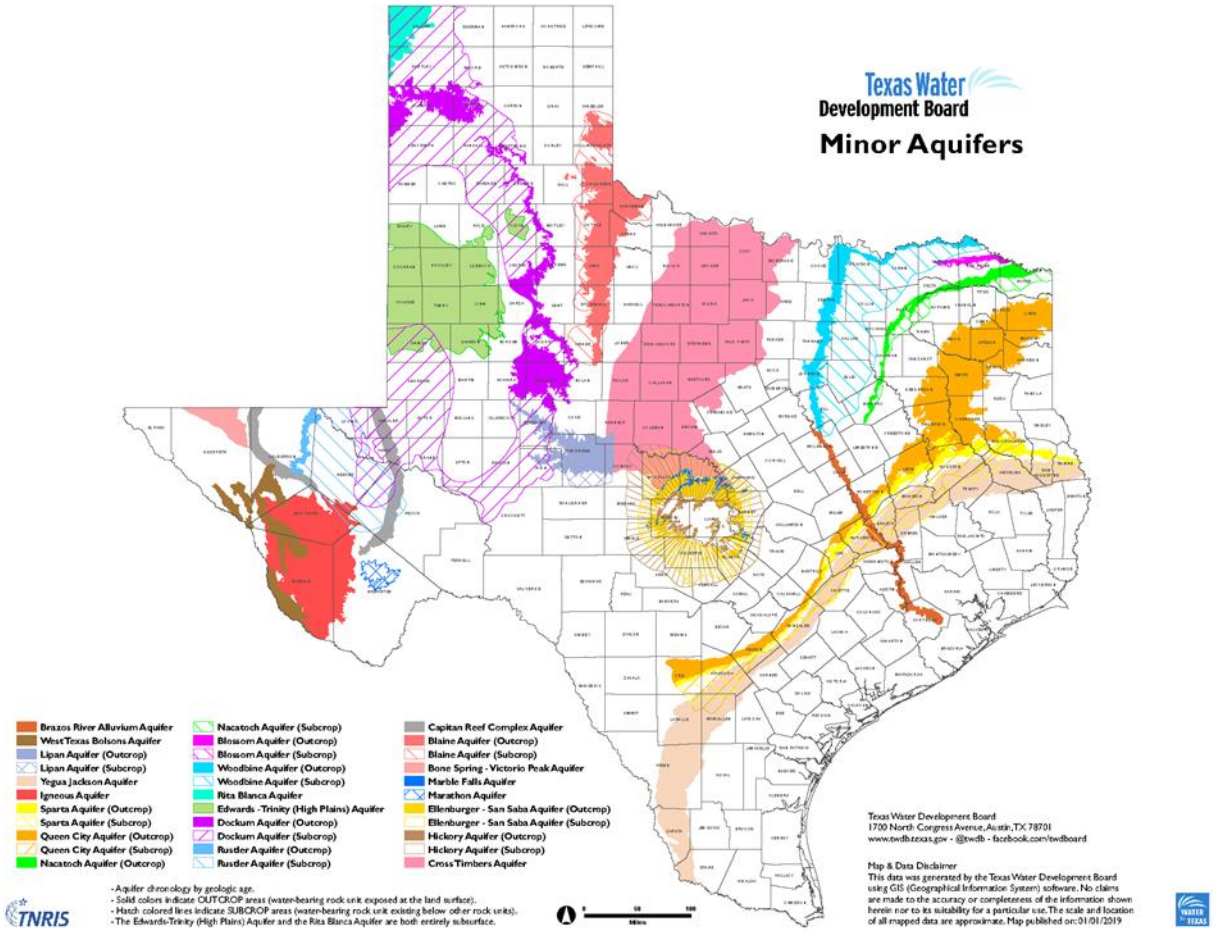

Figure 4.4 Minor Aquifers of Texas

Measuring Groundwater Quality

TWDB is authorized by the TWC to conduct studies and map the state's water resources. TWDB has identified the boundaries and various characteristics for the state's major and minor aquifers based on yields and significance of aquifer production. The aquifer maps (Figures 4.3 and 4.4) depict the extent of each aquifer, including the portion that is exposed at the surface, commonly where recharge occurs, as well as the underground portion of the aquifer. For most aquifers, a TDS concentration of 3,000 milligrams per liter (mg/L) is used to mark the boundary of usable-quality water when mapping aquifers, as this level

meets most agricultural and industrial needs. A notable exception is the Edwards Aquifer (Balcones Fault Zone), which has a boundary for mapping purposes of 1,000 mg/L TDS for public water supply use.

TGPC and its member agencies recognize that groundwater classification is an important tool in the implementation of the state's groundwater protection policy. Through classification, the groundwater in the state can be categorized and protection or restoration measures can be specified by member agencies according to the quality and present or potential use of the groundwater. The TGPC developed a Groundwater Classification System (Table 4.1) for use by state agencies. Four groundwater classes are defined based on quality as determined by TDS content.

Table 4.1 TGPC Groundwater Classification System

Class	Quality*	Examples of Use
Fresh	Zero to 1,000	Drinking and all other uses
Slightly Saline	More than 1,000 to 3,000	Drinking (if freshwater is unavailable), livestock watering, irrigation, industrial, mineral extraction, oil and gas production
Moderately Saline	More than 3,000 to 10,000	Potential/future drinking and limited livestock watering and irrigation (if fresh or slightly saline water is unavailable), industrial, mineral extraction, oil and gas production
Very Saline to Brine	More than 10,000	Mineral extraction, oil and gas production

*Concentration range of TDS in mg/L.

Other Sources of Data

TWDB's ambient groundwater monitoring data also includes other pollutants, such as nitrates, metals, and radionuclides, which may pose a risk to human health. Additional water quality data from other state and federal agencies, local governments, and monitoring groups can be assessed in the evaluation if the data meet clearly defined acceptance and timeline criteria established by TCEQ. GCDs are the main contributors of this type of data.

Assessment

Texas Integrated Report for CWA Sections 305(b) and 303(d)

TCEQ evaluates the condition of the state's water bodies every two years as required by CWA Section 305(b). The results of this evaluation are contained within the state's Integrated Report which is prepared by TCEQ's SWQM team and submitted to EPA for approval. The *Guidance for Assessing and Reporting Surface Water Quality in Texas* is based on a set of methods that apply the surface water quality standards to ambient surface water quality monitoring data collected as part of routine monitoring events. These methods are developed by TCEQ with the advice of a diverse group of stakeholders, and are made available to partner organizations and stakeholders every two years, prior to the biennial assessment in which they will be used.

The Integrated Report describes the status of all surface water bodies of the state that were evaluated for the defined assessment period. TCEQ uses data collected during a recent seven- to ten-year period in making its assessment. The data are gathered by many different organizations that operate according to approved quality control guidelines and sample collection procedures. The quality of waters described in the Integrated Report represents a snapshot of conditions during the defined time period.

One of five categories is assigned to each parameter and assessment unit, described as an area of water which is hydrologically uniform, to provide more information to the public, EPA, and agency staff about water quality status, management plans, and management activities (Table 4.2). The categories indicate the status of the water body and measures the state will employ to address identified water quality problems. Higher category numbers correspond to higher levels of effort required to manage or restore water quality.

Category 5 represents the list of impaired water bodies as required by CWA Section 303(d). Since a water body has multiple uses, it may fall into different categories if impaired for different uses. In that case, the overall category for the water body is the one with the highest category number.

For example, a hypothetical water body does not support the contact recreation use (Category 5c - additional data collection) or the aquatic life use (Category 5b - water quality standards evaluation). It supports the public water supply and general uses (Category 1), and the fish consumption use has not been assessed (Category 3). The designation for the entire water body is Category 5, since that is the highest category associated with any one of its uses.

Table 4.2 Categories of the Texas Integrated Report

Category 1	All designated uses are supported, no use is threatened.
Category 2	Available data and/or information indicate that some, but not all of the designated uses are supported.
Category 3	There is insufficient or unreliable available data and/or information to make a use support determination.
Category 4	Available data and/or information indicate that at least one designated use is not being supported or is threatened, but a TMDL is not needed.
Category 4a	A state-developed TMDL has been approved by EPA or a TMDL has been established by EPA for any water-pollutant combination.
Category 4b	Other required control measures are expected to result in the attainment of an applicable water quality standard in a reasonable period of time.
Category 4c	The impairment or threat is not caused by a pollutant.
Category 5	Available data and/or information indicate that at least one designated use is not being supported or is threatened, and a TMDL is needed.
Category 5a	A TMDL is underway, scheduled, or will be scheduled.
Category 5b	A review of the standards for the water body will be conducted before a management strategy is selected.
Category 5c	Additional data and information will be collected or evaluated before a management strategy is selected.

CWA Section 303(d) List

The CWA Section 303(d) List (Category 5) is an important management tool produced as part of the assessment. It identifies waters which do not meet uses defined in the TSWQS. Before the CWA Section 303(d) List can be implemented, it must be approved by EPA. A map of impaired stream segments based on the 2020 Integrated Report is illustrated in Figure 4.5.

When a water body is identified on the CWA Section 303(d) List, certain new requirements may apply for facilities that discharge wastewater into the listed water body. Importantly, TCEQ may not allow any new or expanded discharges of a listed pollutant into a Category 5 water body if it will contribute to the impairment. Other possible effects on permits that may result from a restoration plan (e.g., TMDL) for the water body include the following:

- TCEQ may initiate amendments to impose new limits, or may impose new limits with routine renewals or amendments;

- permitted loadings from existing facilities may be reduced;
- new facilities may be required to meet more stringent effluent limits than expected;
- stormwater permits may receive new or more stringent limits;
- dischargers may no longer be eligible for general permits; and
- additional monitoring and reporting requirements may be added.

The CWA Section 303(d) List also helps to determine how technical and financial assistance programs are implemented to address nonpoint source pollution. These resources are used to help implement additional nonpoint source management practices, such as:

- management of runoff by such means as detention basins, filter strips, infiltration basins, porous pavement, retention ponds, and swales; and
- management of operations to decrease or eliminate pollutants in runoff, such as spill prevention and control, source controls, and education.

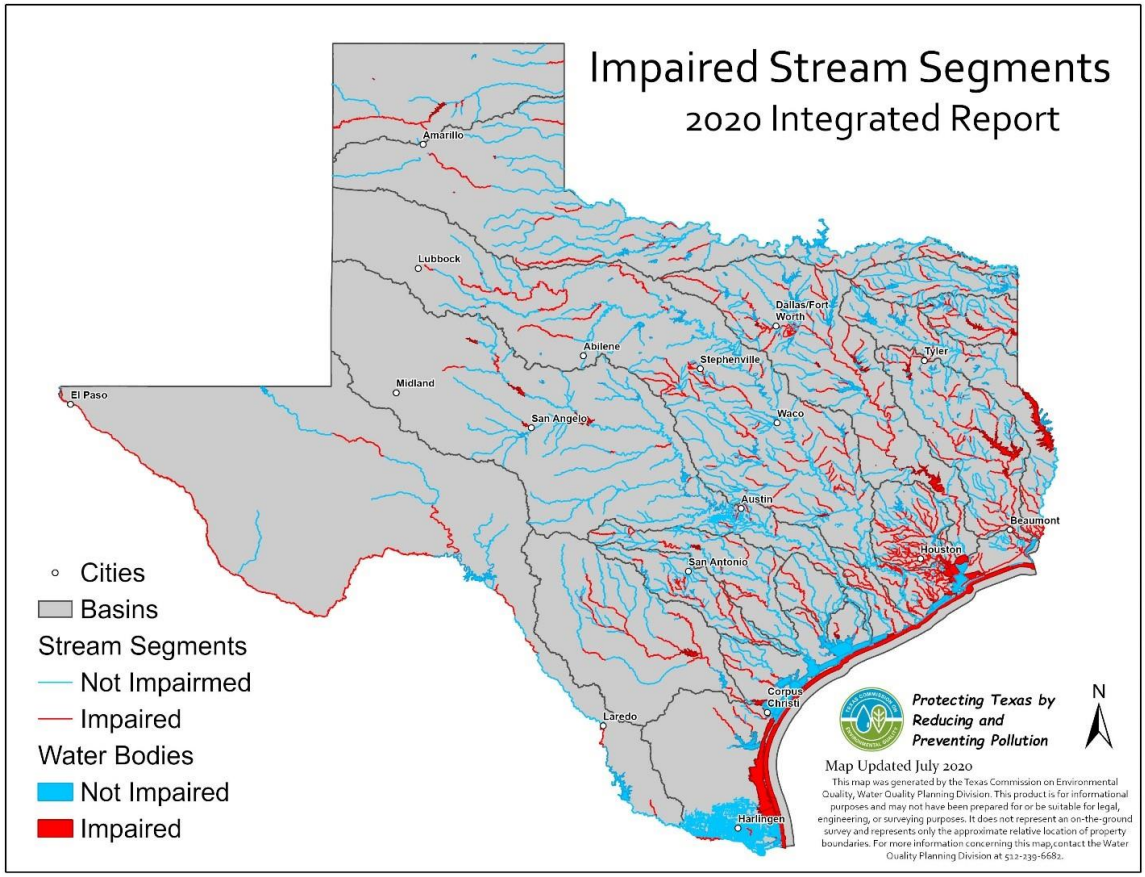

Figure 4.5 Impaired Stream Segments

Groundwater Assessment

Member agencies of the TGPC provide data for groundwater quality inventory efforts. In 1996, the TGPC began conducting an inventory of groundwater quality of the state's aquifers through a partnership between TCEQ and TWDB, two of its member agencies. This assessment is now conducted as a part of the biennial Integrated Report. Tables included in the Integrated Report show the parameters assessed against EPA drinking water standards, developed under the Safe Drinking Water Act, as well as summaries of the sources and types of groundwater contamination at regulated facilities. Groundwater contamination case information in the Integrated Report is compiled from data contained in the annual *Joint Report*.

For the Groundwater Assessment portion in the Integrated Report, TCEQ evaluates ambient groundwater quality data from TWDB's groundwater database. The constituents that are typically evaluated are chosen because they are listed in state rules related to drinking water standards (including arsenic, barium, cadmium, chromium, copper, iron, manganese, selenium, zinc, sulfate, chloride, nitrate-nitrogen, TDS, and gross Alpha radiation, total). For each constituent, results were evaluated for the most recent ten-year period to determine how many wells in each sampled aquifer were above an accepted regulatory value, typically the maximum contaminant level for drinking water established by EPA.

The groundwater quality data are augmented by the information presented in the annual *Joint Report* which lists groundwater contamination cases resulting from activities regulated by programs of the TGPC member agencies, including TCEQ, RRC, and GCDs. The contamination cases in the *Joint Report* are primarily those where contaminants were discharged to the surface, to the shallow subsurface, or directly to groundwater from activities such as storage, processing, transport, or disposal of products or waste materials. For TCEQ, the majority of groundwater contamination cases are related to the agency's remediation programs, including leaking petroleum storage tanks, industrial and hazardous waste sites, voluntary cleanup sites, and superfund sites. Other programs that typically report contamination cases include municipal solid waste facilities, wastewater disposal facilities, public water supplies, and other occurrences of contamination that may not be directly linked to a specific source or program. For RRC, groundwater contamination cases may be related to oil and gas well drilling and production activities, spills from oil or gas pipelines, or surface mining operations. GCDs typically monitor only those groundwater contamination cases that are of specific interest to the individual district, or those that do not fall under the regulatory umbrella of other agencies.

Because there are no specific water quality standards for groundwater, TCEQ utilizes the state's goal of non-degradation with respect to use as an appropriate standard to assess groundwater quality. For the purposes of the nonpoint source assessment, any measurements of groundwater quality taken from the aquifers listed in the Integrated Report that exceed the maximum contaminant

levels for drinking water are considered to be impaired with respect to existing or potential use. Constituents of concern that are above the minimum detection level, but below the maximum contaminant level, should also be watched, as an increase in the number of detections of a constituent could signal a developing concern even if the maximum contaminant level has not been exceeded. Groundwater that indicates degradation with respect to existing or potential use could be considered for targeted monitoring and restoration activities.

The vulnerability of major and minor aquifers is fully ranked in Appendix D (Table D.2). Some highlights are as follows:

- Major aquifers with “high” vulnerability rankings include the Seymour Aquifer and the Edwards (Balcones Fault Zone) Aquifer.
    - Note that for the Edwards (Balcones Fault Zone) Aquifer, the karstic features at the outcrop mean the aquifer is vulnerable to contamination, making nonpoint source pollution from runoff in urbanized areas a particular concern (Texas Aquifers Study, TWDB, December 31, 2016).
- Minor aquifers with “high” vulnerability rankings include the Brazos River Alluvium Aquifer, the Ellenburger-San Saba Aquifer, and the Marble Falls Aquifer.

Nonpoint Source Assessment

The CWA Section 319(a) assessment focuses only on those waters which have been identified as being degraded, at least in part, by nonpoint source pollution. Texas's CWA Section 319(a) assessment of impaired waters is based on the Integrated Report. In order to address the most current priorities for Texas and have a Management Program based on the most current information, the latest state-approved Integrated Report serves as the state's CWA Section 319(a) assessment. Nonpoint source-degraded surface waters appearing in the report will be targeted by the state for additional nonpoint source monitoring and restoration activities.

With regard to CWA Section 319(h) grant funding, priority for assessment dollars is given to those water bodies that fall within categories 5b and 5c of the Integrated Report. Funds may also be used for TMDL I-Plans and WPPs.

Strategy Development

WAP Process

The WAP process, described in Chapter 3, is utilized to develop strategies to address water quality issues. The strategies identified for addressing surface water quality issues in the WAP process are monitoring, evaluation, water quality standards review, TMDL/I-Plan, WPP, and other. A range of circumstances influence the decision regarding the strategy selected to address

impaired water bodies on the CWA Section 303(d) List. Strategies such as water quality standard reviews and watershed evaluation studies may result in delisting due to the increased understanding of water quality and conditions in the watershed. WPPs are primarily developed to address issues caused by nonpoint sources. Federal regulations cite TMDLs as the basis for permitting decisions and may thus be more appropriate for issues caused by point sources.

The CWA Section 303(d) Vision

In 2013, EPA published a new vision for implementing the CWA in relation to the CWA Section 303(d) List, titled *A Long-Term Vision for Assessment, Restoration, and Protection under the Clean Water Act Section 303(d) Program* (303(d) Vision). Together with the states, EPA outlined how implementation of the new vision would be organized and defined. The 303(d) Vision includes a performance measure (WQ27) that is based on the percentage of area covered by an EPA-approved or accepted watershed-based plan. Performance measures are in place so the program's progress and accomplishments can be monitored.

EPA's new vision sets a strategy for the current period of 2016 through 2022. States are currently in discussion with EPA to develop the strategy for the next period beginning in 2022. There are six key goals in the current approach:

Engagement – States actively engage the public and other stakeholders to improve and protect water quality, as demonstrated by documented, inclusive, transparent, and consistent communication; requesting and sharing feedback on proposed approaches; and enhanced understanding of program objectives.

Prioritization – States review, systematically prioritize, and report priority watersheds or waters for restoration and protection in their biennial integrated reports to facilitate state strategic planning for achieving water quality goals.

Protection – In addition to the traditional TMDL development priorities and schedules for waters in need of restoration, states identify protection planning priorities and approaches along with schedules to help prevent impairment in healthy waters, in a manner consistent with each state's systematic prioritization.

Integration – States identify and coordinate implementation of key point source and nonpoint source control actions that foster effective integration across CWA programs, other statutory programs, and the water quality efforts of other federal departments and agencies to achieve the water quality goals of each state.

Alternative Approaches – States use alternative approaches, in addition to TMDLs, that incorporate adaptive management and are tailored to specific circumstances where such approaches are better suited to implement priority watershed or water actions that achieve the water quality goals of each state, including identifying and reducing nonpoint sources of pollution.

Assessment – States identify the extent of healthy and CWA Section 303(d) impaired waters in each state's priority watersheds or waters through site-specific assessments.

The *Prioritization Framework for Protecting and Restoring Surface Water Quality* (2016) describes how Texas will implement the 303(d) Vision. This document describes how the state will meet the goals of the vision to develop and track plans necessary for WQ27 reporting. Plans in Texas currently include TMDLs, TMDL I-Plans, and WPPs.

Engagement with stakeholders is implemented by the TMDL and Nonpoint Source Programs and their partners. This is accomplished by conducting outreach at the watershed and basin level. Stakeholder engagement is a critical component of the vision and is explained in greater detail in Chapter 3.

Prioritization takes place at two levels – the overall priority for the state to establish the long-term Vision Priority Watersheds and the short-term priority for individual river basins or watersheds to achieve the targets. Long-term and short-term priorities are integrated with the WAP process, which coordinates, documents, and tracks strategies. In addition, prioritization relies on the WAP process to better ensure that resources are efficiently directed toward educating stakeholders on water quality issues. Currently, the long-term priority is to address contact recreation impairments, which represent the majority of water bodies on the CWA Section 303(d) List in Texas. The TCEQ TMDL and Nonpoint Source Programs, along with TSSWCB, coordinate to set short-term priorities for specific waters. These priorities, known as Vision Priority Watersheds, are communicated to EPA annually by the TMDL Program and are updated when priorities change.

Protection of healthy waters is also a goal for Texas. The TCEQ and TSSWCB Nonpoint Source Programs oversee multiple WPPs in the state which are designed to prevent impairments. Protection is important both in terms of preserving environments as well as anticipating the impacts of growth in communities across the state.

Integration occurs through the cooperative agreements between various agencies and an integrated agency structure at TCEQ. Cooperative agreements between the various state agencies are summarized in Chapter 5. The SWQM Program, CRP, Water Data Management and Analysis Team, Nonpoint Source Program, TMDL Program, and Galveston Bay Estuary Program are all organized within one division at TCEQ. This improves integration and creates opportunities for coordination, discussions, planning, and implementation.

Alternative approaches in addition to TMDLs incorporate adaptive management and are developed by river authorities, cities, or other local governmental entities to determine how to best solve the water quality problems that often cross multiple jurisdictions and to define implementation activities needed to attain or maintain water quality standards. WPPs are considered alternative watershed-based plans in the vision strategy. These plans, as well as TMDLs and TMDL I-Plans, are prioritized, developed, tracked, and reported.

Assessment occurs with focused monitoring and the utilization of partnerships between TCEQ and regional water authorities. The TCEQ's SWQM Program coordinates the collection of physical, chemical, and biological samples. This

data may be used by TCEQ to characterize existing conditions or identify emerging problems, evaluate the effectiveness of water quality control programs, or identify trends. In addition, CRP coordinates and conducts water quality monitoring and assessment in order to improve surface water quality within each river basin in Texas.

Implementation

The implementation of pollution control measures for point and/or nonpoint sources of pollution may be required to address water quality impairments. These pollution control measures can employ both regulatory and non-regulatory mechanisms to limit pollution as needed to meet water quality standards. Regulatory mechanisms (such as wastewater and stormwater discharge permits) establish legally enforceable pollution control requirements and consist of permitting, inspection, and compliance programs. Non-regulatory mechanisms are applicable to nonpoint sources of pollution. These measures encourage pollution control practices through educational, technical, and financial assistance provided by state and federal programs. Pollution control measures needed to achieve and maintain water quality standards are identified in plans developed by the TMDL and WPP processes. The development of these measures and some of the programs and strategies involved in their development are further described below.

Statewide Educational Program

The state's overall outreach and education programming is fundamental to the Management Program and the development of TMDLs and WPPs. The following are some examples of education outreach and training that help ensure watershed planning and implementation is a success.

Texas Watershed Planning Short Course

The Texas Watershed Planning Short Course provides training and promotes sustainable proactive approaches to managing water quality throughout the state. This course provides participants with guidance on stakeholder coordination, education, and outreach; meeting EPA's nine essential elements of a WPP; data collection and analysis; and the tools available for plan development. This information is presented through lectures and case studies. Proper training of watershed coordinators and water professionals is needed to ensure that watershed protection efforts are adequately planned, coordinated, implemented, and sustained. To provide this training, the Texas Watershed Planning Short Course is developed through a coordinated effort led by the Texas Water Resources Institute (TWRI) and funded by EPA through TCEQ and TSSWCB.

TWRI partners with state and federal agencies, other universities, and public and private entities to develop and conduct this short course. The Texas Watershed Planning Short Course has evolved into a fundamental tool used by

parties interested in developing a WPP to achieve the goals of an EPA nine-element watershed-based plan.

Texas Watershed Steward Program

To support the need for stakeholder involvement, the Texas Watershed Steward Program was initiated to provide science-based, watershed education to help citizens identify and take action to address local water quality impairments. Texas Watershed Stewards learn about the nature and function of watersheds, potential impairments, and strategies for watershed protection.

The Texas Watershed Steward Program is a one-day training program designed to increase citizen understanding of watershed processes and foster increased local participation in watershed management and WPP activities across the state. The program is tailored to and delivered in target watersheds undergoing TMDL, TMDL I-Plan, or WPP development or implementation.

The program curriculum is comprised of five units: a program introduction, an overview of watershed systems, identification of watershed impairments, watershed management and regulation, and community-driven watershed protection strategies. The curriculum is compiled into a handbook that includes a comprehensive glossary of terms, and appendices providing detailed information on federal, state, and local water quality agencies and organizations, important websites pertaining to water quality projects, management, and regulation, and a list of important activities for communities to engage in to help protect their local water resources. The program is delivered through interactive training events conducted by a team of professionals using high quality visual aids and hands-on teaching stations.

Texas Watershed Coordinator Roundtable

The Texas Watershed Coordinator Roundtable is held bi-annually, to provide a forum for establishing and maintaining dialogue between watershed coordinators/professionals, facilitate interactive solutions to common watershed issues faced throughout the state, and add to the fundamental knowledge conveyed at the Watershed Planning Short Course. The program has developed a listserv for watershed coordinators/professionals to receive information about the roundtables and training events, and other useful information. Interested coordinators/professionals may contact TWRI at *twri@tamu.edu* to subscribe to the listserv.

Texas Stream Team

The Texas Stream Team is a statewide organization committed to improving water quality through citizen-generated water quality data, stakeholder engagement, and watershed education. It is a network of trained volunteers and supportive partners working together to gather information about the natural resources of Texas and to ensure the information is available to all Texans.

The Texas Stream Team was established in 1991 and is administered through a cooperative partnership between the Meadows Center for Water and the

Environment at Texas State University, TCEQ, and EPA. Currently, over 500 Texas Stream Team volunteers collect water quality data on lakes, rivers, streams, wetlands, bays, bayous, and estuaries in Texas.

The Texas Stream Team volunteers sample streams, reservoirs, and tidal areas for bacteria, dissolved oxygen, specific conductivity, pH, Secchi depth, temperature, and various field observations, including flow severity. Data are collected utilizing a QAPP and a three-phase certification process. Intended data uses include watershed characterization, problem identification, understanding background conditions, watershed-based plan development, education, research, local decisions, and other uses deemed appropriate by the end user. Data summary reports and a data forum are available for viewing and download at the program website. There are over 43 data summary reports available for water resource managers, stakeholders, and others to access. The data forum provides water quality data from the last ten years from every major river basin in Texas.

The watershed outreach program of the Texas Stream Team focuses on teaching students, citizens, and landowners about watershed functions and how nonpoint source pollution impacts water quality. Watershed outreach services are delivered in a myriad of ways, including curriculum distribution, nonpoint source watershed model demonstrations, hands-on student scenario investigations, creek-side lessons, bacteria snapshots, water quality monitoring trainings, and hosting booths at special events. The Texas Stream Team provides outreach to thousands of students, teachers, citizens, and landowners each year. By providing customized watershed information and new ways to engage teachers and students, participants learn about local issues, factors influencing water quality, and ways to improve watershed health. Texas Stream Team staff and partners lead educational workshops at universities, community education centers, partner offices, and local creeks and reservoirs.

In addition to statewide programmatic activities, the Texas Stream Team also focuses efforts in targeted watersheds. A suite of watershed services, such as nonpoint source pollution outreach, citizen scientist trainings, outreach internships, community clean-up coordination assistance, data summary reports, and collaborative grant writing, are provided to assist in the development and implementation of watershed-based plans.

Urban BMP Initiative

The Urban BMP Initiative is an effort by the TCEQ Nonpoint Source Program to provide financial, technical, and educational assistance to municipalities in the state to support the implementation of urban BMPs, including Low Impact Development (LID) stormwater management practices. It is anticipated that this process of documenting the benefits of urban BMPs and communicating these benefits to municipal governments will lead to broader implementation of the urban BMPs.

Certain urban stormwater management practices are required under Municipal Separate Storm Sewer System (MS4) permits and are therefore considered to be

point source controls. These types of practices are not eligible for financial assistance under CWA Section 319 guidelines. However, those practices that are not required by permits may be eligible for assistance under the TCEQ Nonpoint Source Program. More information about the eligibility of TCEQ Nonpoint Source Program projects within MS4 jurisdictions is available on the TCEQ Nonpoint Source Program's website. These determinations are made on a case-by-case basis in consultation with EPA.

New developments in urban BMPs include a rapid expansion in the development and use of LID stormwater management practices and the integration of these practices into an overall green infrastructure strategy in municipal areas. EPA reports that municipalities around the country are going green as they strive to achieve healthier and more sustainable communities. EPA literature cites the benefits of green infrastructure and LID practices to include reducing the volume of stormwater runoff, reducing pollutant loadings, preserving areas that provide important water quality benefits, and reducing the costs of urban development. EPA states that LID practices can be used in both new development and re-development projects.

The TCEQ Nonpoint Source Program is taking advantage of the interest in and benefits of LID practices to help meet Management Program goals and objectives in specific priority watersheds and in the coastal zone. The TCEQ Nonpoint Source Program is implementing outreach efforts to priority municipalities (including coastal communities) to inform them of the technical and financial assistance resources available from TCEQ to support the implementation of LID management practices. The goal of this initiative is to leverage limited state and federal resources to achieve broader and sustainable environmental benefits by helping communities incorporate LID practices into their local programs. The initiative is based on the EPA publication *Incorporating Low Impact Development into Municipal Stormwater Programs* (EPA 901-F-09-005). This publication identifies several steps municipalities can take to institutionalize the use of LID practices in their community. The TCEQ Nonpoint Source Program seeks to assist these municipalities by providing financial assistance, supporting the implementation of demonstration projects, developing technical guidance, educating developers and designers, and quantifying the costs and benefits of LID practices.

The TCEQ Nonpoint Source Program provides financial assistance through the administration of the CWA Section 319 federal grant program. The TCEQ Nonpoint Source Program will continue to solicit and provide financial assistance for LID implementation projects in future years depending upon the quality of the projects and the availability of funding. Among other criteria, LID implementation projects will be evaluated based on the degree to which they: (1) reduce pollutant loads contributing to a water quality impairment, and (2) serve to institutionalize LID practices at the state, regional, or community level.

Watershed Protection Plans

WPPs are locally driven mechanisms for voluntarily addressing complex water quality problems that cross multiple jurisdictions. WPPs are coordinated frameworks for implementing prioritized and integrated water quality protection and restoration strategies driven by environmental objectives. Through the WPP process, TCEQ and TSSWCB encourage stakeholders to holistically address all the sources and causes of impairments and threats to both surface water and groundwater resources within a watershed.

TCEQ and TSSWCB apply the Watershed Approach to managing nonpoint source pollution by supporting the development and implementation of WPPs (Figure 4.6). CWA Section 319(h) funds are utilized to develop and implement WPPs. In some cases, third-party WPPs are funded and sponsored by entities and agencies other than TCEQ or TSSWCB. WPPs are voluntary plans developed at the local level to address water quality issues and attainment of water quality standards.

WPPs are developed to determine how to best solve the water quality problems of that area and to define the implementation activities needed to attain or maintain water quality standards. Priority for CWA Section 319(h) funding is provided to develop and implement these plans.

The Management Program encourages the use of available training and guidance in the development of WPPs. WPP development projects funded by CWA Section 319(h) federal grant funds in Texas are required to develop these plans in accordance with the *Nonpoint Source Program and Grants Guidelines for States and Territories* promulgated by EPA (April 2013). EPA has also published the *Handbook for Developing Watershed Plans to Restore and Protect Our Waters* (March 2008), which provides in-depth guidance and technical tools for use in developing WPPs along with examples to illustrate how to apply these concepts to a specific watershed. EPA Region 6 has released a *Review Guide for Watershed-Based Plans* (January 2010), which helps the state and local watershed stakeholders better understand EPA expectations for satisfying the nine essential elements fundamental to a successful WPP.

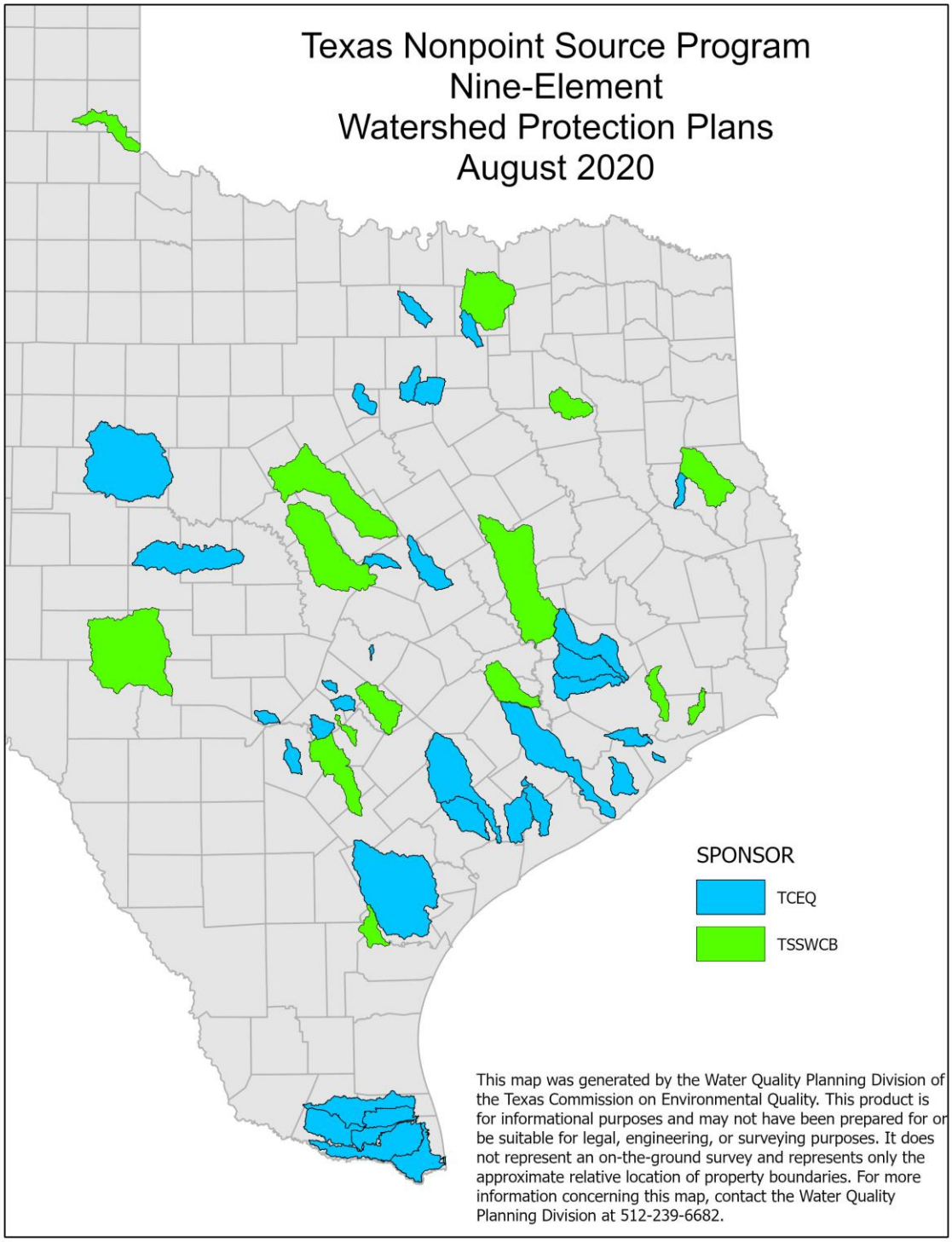

Figure 4.6 Texas WPPs

WPPs are reviewed by the state (either TCEQ or TSSWCB) and then EPA to assess a plan's consistency with the nine essential elements of a WPP and to ensure a plan is eligible for CWA Section 319(h) implementation funding. The state and EPA utilize the EPA Region 6 *Review Guide for Watershed-Based Plans* to conduct this consistency review. For WPPs developed utilizing CWA Section 319(h) grants from either TCEQ or TSSWCB, the funding agency will review the WPP and then seek EPA acceptance of the plan. Third-party WPPs must be submitted to TCEQ or TSSWCB for a consistency review to ensure that the plan includes the nine essential elements of a WPP and is integrated into the state's water quality management programs. Entities interested in developing third-party WPPs should consult with both agencies to determine how best to proceed.

The State of Texas believes that in some watersheds, the development and implementation of a WPP may be a more viable approach to restoring water quality than through the establishment of a TMDL. Essentially, this perspective recognizes that certain alternative approaches, such as a WPP, may obviate the need for a TMDL and that the most effective method for achieving water quality standards for some water bodies may be through management measures developed and implemented without TMDLs. EPA Region 6 has outlined a process by which the state may submit a WPP as an alternative approach. The *EPA Region 6 Process for Review of Watershed-Based Plans in Lieu of TMDLs* (May 2007) discusses the national guidance and regulatory mechanisms governing the process of utilizing WPPs, as well as providing details on how Integrated Report Category 4b relates to the nine essential elements of WPPs. Category 4b is for impairments where "other pollution control requirements" will result in the attainment of water quality standards (Table 4.2). The significance and complexity of whether a WPP or alternative approach may be more immediately beneficial or practicable in achieving water quality standards than pursuing the TMDL approach in the near term necessitates close coordination between watershed stakeholders, the state, and EPA.

Another viable approach in Texas is completing TMDLs, TMDL I-Plans, and WPPs concurrently. This results in water bodies being placed in Integrated Report Category 4a and ensures that a plan is developed in accordance with the EPA's *Nonpoint Source Program and Grants Guidelines for States and Territories (April 2013)*. There is a great deal of overlap between what is required in TMDLs, TMDL I-Plans, and WPPs, and this approach often provides for the leveraging of state and federal resources, the completion of permitting actions for point sources, and the use of CWA Section 319(h) for some implementation activities.

EPA's nine essential elements, listed below, will be addressed in WPPs developed and implemented through the CWA Section 319(h) Grant Program as required by EPA's *Nonpoint Source Program and Grants Guidelines for States and Territories (April 2013).*

a. An identification of the causes and sources or groups of similar sources that will need to be controlled to achieve the estimated load reductions.

b. An estimate of the load reductions expected for the management measures described in the plan.

c. A description of the management measures that will need to be implemented to achieve the load reductions estimated in the plan, and an identification of the critical areas in which those measures will be needed to implement the plan.

d. An estimate of the amounts of technical and financial assistance needed, associated costs, and/or sources and authorities that will be relied upon to implement the plan.

e. An information/education component that will be used to enhance public understanding of the plan and encourage early and continued participation in selecting, designing, and implementing the management measures that will be implemented.

f. A schedule for implementing the management measures identified in the plan.

g. A description of interim, measurable milestones for determining whether management measures or other control actions are being implemented.

h. A set of criteria that can be used to determine whether load reductions are being achieved over time and substantial progress is being made towards attaining water quality goals and, if not, the criteria for determining whether the plan needs to be revised.

i. A monitoring component to evaluate the effectiveness of the implementation efforts over time, measured against the criteria established in the plan.

The development of WPPs is supported by CWA Section 319(h) funding to varying extents; however, a WPP that meets EPA's nine essential elements is required to be completed in order to utilize CWA Section 319(h) funding to implement the management measures of the WPP. The state has identified five general areas of activity associated with WPPs which are implemented to meet the specific watershed-based goals of the program. These areas of activity are identified and generally described below.

Outreach and Partnership Development

The diverse nature of nonpoint sources requires a varied response, including the establishment of a diverse partnership of stakeholders to plan, guide, and implement WPPs that are developed for the unique conditions found within each watershed. Effective partnerships strengthen support for watershed-based environmental protection by increasing the quantity and improving the quality of available information. These partnerships foster local ownership of water quality, helping local stakeholders to gain insight into the nature of water quality problems, which leads to voluntary actions and the reduction of pollution.

Science-based watershed education to help citizens identify and take action to address local water quality concerns and impairments is supported by the development and implementation of multiple education and outreach strategies included in the Management Program. Citizens learn about the nature and function of watersheds, threats to water quality, and strategies for watershed protection. Active public participation in local watershed management efforts is critical in addressing local water quality problems and concerns. Educational programs are provided to watershed residents, including homeowners, business owners, agricultural producers, decision-makers, community leaders, and other citizens.

The development and implementation of watershed management strategies with federal, state, and local stakeholders is supported by the Management Program. Information derived from the state's water quality inventory identifies priority water quality issues in the state. These issues are discussed and evaluated every two years with stakeholders at the watershed and state levels to identify appropriate watershed management strategies and track their implementation. The outcomes of these discussions and evaluations are incorporated into the WAP process and serve as the basis for planning, budgeting, and implementing program activities.

Watershed Assessment

Watershed assessments provide the foundation for watershed planning and implementation and present a basic understanding of the impairments of concern, the degree of difference between current and desired water quality, and the likely sources contributing to the impairment. Characterizing the watershed and the water body segments for their associated impairments and causal sources provides necessary background information to support decisions regarding the approach used in managing water quality within the watershed. The methods for completing a source assessment may vary but typically rely on information from state and national databases, literature reviews, and local knowledge from state, regional, or local citizens.

An effective knowledge of the cause-and-effect relationship between pollutant sources and the water body response is necessary in order to guide the management of nonpoint sources. Selecting the most appropriate approach to use for the analysis of cause-and-effect relationships requires a number of technical and practical factors. This analysis may be determined through either complex or simplified approaches using modeling and non-modeling methods.

Watershed Planning

The primary mechanism for addressing nonpoint source pollutant load reductions in Texas is through watershed planning. A WPP is one strategy and work plan used for achieving water quality goals. WPPs include information related to the watershed, watershed problems, water quality goals, solutions, partnerships, and measuring progress. A WPP is developed through a series of cooperative, iterative steps to characterize existing conditions, identify and prioritize problems, define management objectives, and develop and implement

protection or remediation strategies as necessary. Effective watershed management processes require active participation from stakeholders as well as the analysis and quantification of the specific causes and sources of water quality problems. This, in turn, facilitates the identification of measurable water quality goals and the implementation of specific actions needed to solve those problems.

Determining a pollutant load reduction that will allow a water body to support its designated uses involves applying anticipated load reductions from BMPs that will identify preferred strategies in meeting water quality standards. Factors affecting the selection of load reduction strategies include the location and relative magnitude of sources, the pollutants of concern, the feasibility of load reduction strategies, the equitability among sources, ongoing control practices, and stakeholder priorities. Reasonable efforts to obtain and analyze relevant data may result in only limited information at the planning stage. Additional monitoring may be gathered during WPP development or along with implementation efforts. Preliminary information and estimates may need to be confirmed and/or modified over time, accompanied by mid-course corrections in the watershed plan, and a project will often require a number of years of effective implementation for it to achieve its goals. The watershed planning process is dynamic and iterative.

Implementation

The implementation of management measures needed to protect and restore water quality conditions is supported by the Management Program. Financial assistance is provided through the CWA Section319(h) grant program and other funding sources. CWA Section 319(h) grants are made available on an annual basis to projects and programs set forth in the Management Program. Priorities for funding under the CWA Section 319 grant program are given to projects which produce measurable reductions in pollutant loadings from nonpoint sources in accordance with goals established in accepted WPPs and projects which leverage other funding sources. Determining a pollutant load reduction that will allow a water body to support its designated uses involves applying anticipated load reductions from BMPs that will identify preferred strategies in meeting water quality standards. Factors affecting the selection of load reduction strategies include the location and relative magnitude of sources, the pollutants of concern, the feasibility of load reduction strategies, the equitability among sources, ongoing control practices, and stakeholder priorities.

TSSWCB provides financial incentives to agricultural producers through state and other federal financial assistance programs. Technical assistance is provided through TSSWCB to assist agricultural producers in developing plans to limit water quality impacts from farming and ranching operations. Municipal planners in Texas receive technical assistance for urban runoff management measures through a series of technical workshops provided by TCEQ. Educational opportunities for public officials, business owners, and the public are provided through TCEQ.

Tracking, Evaluation, and Reporting

The state reports annually on its progress in meeting the schedule of milestones contained in the Management Program. Information on reductions in nonpoint source pollutant loadings and improvements in water quality resulting from program implementation is also reported. The *Nonpoint Source Management in Texas Annual Report* provides a summary of progress in meeting approved milestones and the short- and long-term goals and objectives identified in the Management Program. The report includes information on program milestones associated with the applicable project or program, the scheduled project completion date, and the percent completed. The report also summarizes available information on the extent of reductions in nonpoint source loadings achieved and improvements in water quality as a result of Management Program implementation. Surrogate measures of environmental progress are used where appropriate.

Post-implementation monitoring is critical to determine the success of watershed implementation efforts. Pre- and post-implementation monitoring needs are included as a regular part of the state's monitoring strategy. By comparing monitoring results at key locations against specific metrics obtained with model results, stakeholders have a real measuring stick to guide them in assessing the success of their reduction efforts.

Total Maximum Daily Loads

CWA Section 303(d) and its implementing regulations (40 CFR Section 130.7) require states to identify waters that do not or will not meet applicable water quality standards after the application of technology-based or other required controls, and to establish TMDLs for pollutants that are causing non-attainment of water quality standards. For listed waters, states must develop TMDLs allowing for seasonal variations and an appropriate margin of safety (Figure 4.7). A TMDL is a quantitative assessment of water quality problems, contributing sources, and load reductions or control actions needed to restore and protect individual water bodies.

Numerous factors are considered in determining when a TMDL will be developed for an impairment, including whether the impairment affects human health, local and regional support for TMDL development, data availability for immediate TMDL development, the proximity of one impaired segment to others that have similar or related pollutants, the similarity of the strategies and actions needed to address impairments, and the availability of funding and resources.

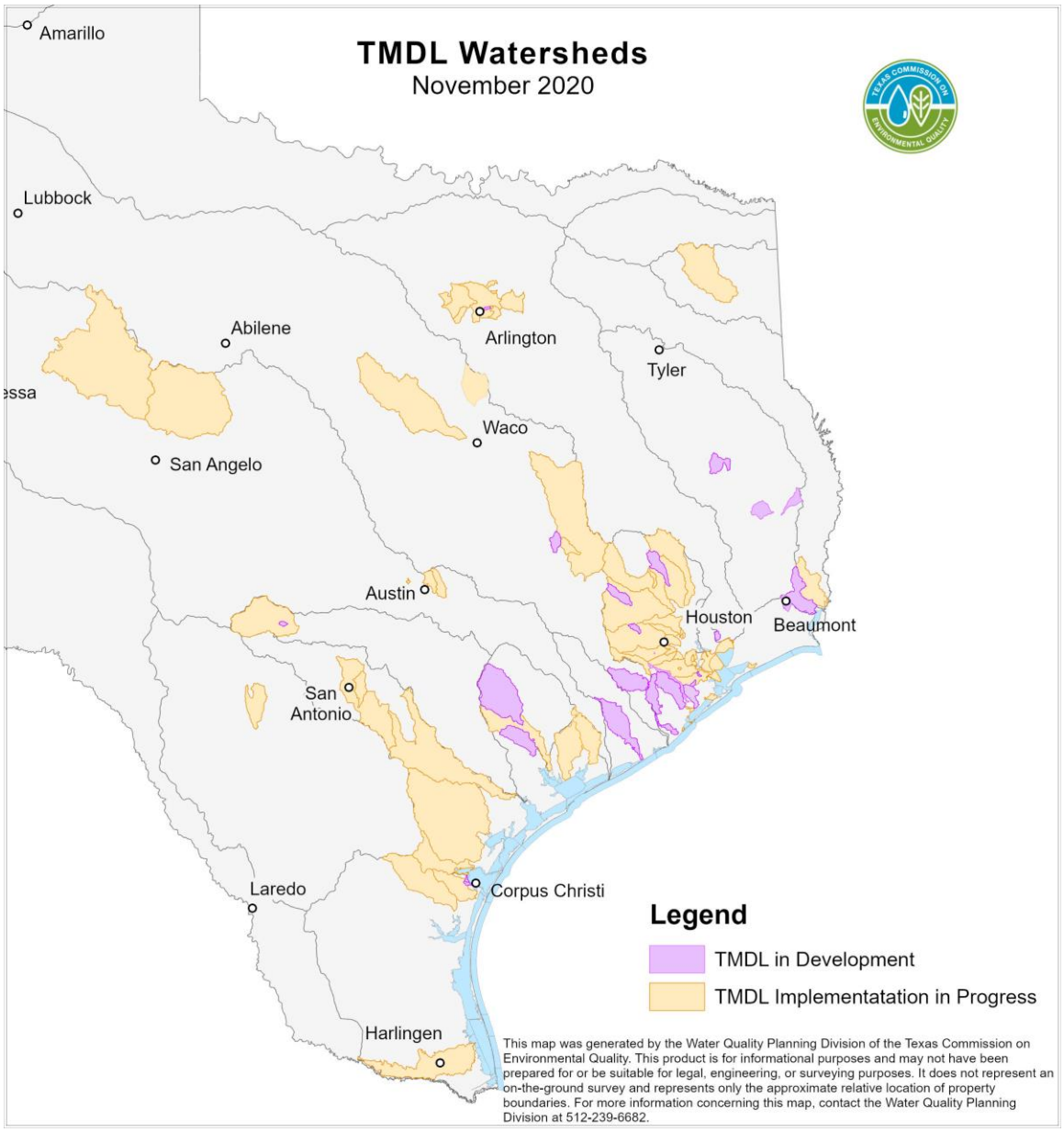

Figure 4.7 Texas TMDL and I-Plan Watersheds

A TMDL is a tool for achieving water quality standards that is based on the relationship between pollution sources and instream water quality conditions. TMDLs are developed to provide a basis for planning and implementing pollution controls, land management practices, and restoration projects needed to improve and protect water quality.

TMDLs address stressors that cause an impairment to a use, including point sources, such as wastewater treatment plant discharges; nonpoint sources, such as runoff from fields, streets, construction sites, or forest land; and naturally

occurring sources, such as runoff from undisturbed lands. TMDLs may address individual pollutants or groups of pollutants, as long as they clearly identify the links between the use impairment, the causes of the impairment, and the load reductions needed to remedy the impairment.

At the most basic level, a TMDL is the sum of the individual wasteload allocations for point sources, load allocations for nonpoint and natural background sources, and an appropriate margin of safety. This equation expresses the total amount (or load) of a single pollutant that a receiving water body can receive within a 24-hour period and maintain water quality standards.

Public Participation and Engagement

Public participation is an integral part of the TMDL process, and many opportunities for the public to participate are provided. A few of the ways the public can participate in the TMDL process include:

- Watershed committees established to provide local input on a TMDL and to develop an I-Plan for the TMDL project. The public is encouraged to work on these committees or attend their meetings.
- All TMDL meetings are open to the public, regardless of whether or not formal committees are established. Notices are provided for meetings in local media outlets, through e-mail, and on TCEQ's website. These meetings provide an opportunity for residents to make comments and get answers to their questions.
- The public is given the opportunity to review and provide comments on the development of the current CWA Section 303(d) List for the state.
- Before the state adopts a TMDL, TCEQ publishes the document and has a formal public comment period. In addition, TCEQ conducts a public comment hearing to listen to stakeholder concerns. Responses to all comments are published.

TCEQ's TMDL Program uses three primary avenues for informing the general public of its activities:

- its website, which includes project fact pages and program descriptions,
- an e-mail news list, and
- coordination with existing statewide and regional forums.

Statewide, the TMDL Program coordinates with the forums and work groups of the CRP and the Nonpoint Source Program. Regionally, the program coordinates its projects with the CRP Basin Steering Committees, and SWCDs if agricultural or silvicultural operations may be affected by the TMDL. In addition, the state may conduct public meetings within the watershed at key points in project development.

The amount of time it takes to address a listed segment varies greatly. In some cases, a segment may be addressed within one to three years of its listing; in other cases, a longer time is needed. Several factors influence the scheduling of management activities for all three categories (5a, 5b, and 5c) of the list, such as the number of successive years a segment has been on the list, scheduled permit renewals, or administrative demands. Available funding ultimately determines how many new restoration or management projects will be initiated annually.

Key Components of a TMDL

The development of TMDLs begins with the review of existing data and/or the collection of additional data related to water quality, point source discharge, precipitation, streamflow, soils, geology, topography, and land use (construction, agriculture, mining, etc.). Next, analytical methods are used to calculate pollutant loads and the response of the receiving water. The appropriate method is selected based on the pollutants of concern, the amount of data available, the type of water body, and watershed conditions. If a computer model is selected, data from the watershed may be used to calibrate the model and verify that the computed values match known conditions. The model can then be used to develop alternate scenarios by first determining the amount of specific pollutants each source contributes, then calculating the amount each pollutant needs to be reduced, and finally specifying how the reduced pollutant load would be allocated among the different sources. In some cases, TMDLs can be based on readily available information and studies using simple analytical efforts. In other cases, more complex, data-intensive computer simulations are required.

Upon completion of the data collection and analyses, a TMDL report is developed, and adopted by the state after a thorough public review and comment period. The state-adopted TMDL is submitted to EPA for review and approval. The TMDL report consists of nine components:

- Problem Statement,
- Endpoint Identification,
- Source Analysis,
- Linkage Between Pollutant Sources and Water Quality in the Receiving Water,
- Margin of Safety,
- Pollutant Load Allocation,
- Seasonal Variation,
- Public Participation, and
- Implementation and Reasonable Assurances.

TMDL I-Plan

The TMDL I-Plan document provides an overview of the activities that will be used to implement the TMDL and improve water quality. It is used as a basis for the implementation planning process. Management activities may be non-

regulatory, regulatory, or incentive-based. Nonregulatory nonpoint source management activities are eligible for CWA Section 319(h) funding.

For example, the plan may show that point source dischargers will be required to reduce discharges of the pollutant of concern through enhanced treatment technology, and that such enhancements are reasonable and achievable. If new or amended rules are necessary to implement the TMDL, the plan may cite the laws and regulations that give it the authority to enact such rules. The plan may also identify funding sources available for implementing the TMDL, and indicate that the selected implementation activities are eligible for funding under the identified state, federal, or private grants or incentives.

Compliance with load allocations may also be assured by setting numeric targets for pollutant concentrations at individual sampling sites and regularly monitoring conditions at those sites. A commitment to periodic and repeated evaluations of the effectiveness of the chosen implementation methods is another way of providing reasonable assurance. Continuing evaluation allows for the adaptation of implementation activities based on the environmental progress observed, giving further assurance that compliance with water quality standards is attained.

Monitoring for Results

In addition to WPPs and TMDLs, there are many other programs in place throughout the state that are responsible for conducting implementation activities. Upon implementing a BMP or other implementation activity, it is necessary to determine the effectiveness of the activity. Data collected after implementation must be compared to data collected prior to implementation to determine effectiveness. These data may be historical, like that collected for a special study, or collected as part of the project tasks prior to implementation. In some cases, routine monitoring can be used to evaluate effectiveness. In other cases, it will be necessary to collect data in a specific project area to evaluate the effectiveness of the implementation activities. Certain types of BMPs or implementation activities will not show immediate results; effectiveness and water quality improvements will be determined over time.

Groundwater Strategy

The TGPC serves as the main mechanism for coordinating the protection of groundwater quality in the state. The TGPC strives to improve or identify areas where new or existing programs could be enhanced to provide additional protection for groundwater resources. The committee actively seeks to improve existing groundwater programs and promotes coordination among agencies and GCDs.

Though the membership of the TGPC is limited by statute, the primary work of the TGPC is carried out through subcommittees and task forces, which are comprised of staff from member agencies, as well as any interested party. The subcommittees include the Groundwater Issues Subcommittee and the Public Outreach and Education Subcommittee. Nonpoint source issues are addressed in

the Groundwater Issues Subcommittee meetings, which TCEQ and TSSWCB attend.

Groundwater Protection Strategy

Users of privately-owned water wells used for domestic drinking purposes are a major segment of the population likely to be impacted by nonpoint source pollution. There are some statewide resources and programs that include testing of domestic well water. Up to 20% of the wells from which TWDB has collected groundwater samples are private domestic wells. TWDB analyzes samples for naturally occurring inorganic constituents, nutrients, trace metals, and radionuclides; however, they typically do not test for organics that might be present due to nonpoint source pollution. In addition, the Texas Well Owner Network is an educational program offered through the Texas A&M AgriLife Extension Service in cooperation with TSSWCB and other partners.

Studies conducted by various agencies have indicated that both man-made and naturally occurring contaminants (e.g., fecal coliform, nitrate, radionuclides, pesticides and pesticide degradation byproducts, arsenic, and other heavy metals) have been found in some domestic wells at levels that exceed health-based maximum contaminant levels (based upon a lifetime exposure to the contaminant).

The TGPC is responsible for developing and updating the *Texas Groundwater Protection Strategy*, which includes the TGPC members' internal programs regarding groundwater protection, remediation, and observation. Various aspects of these programs address nonpoint source pollution and its impacts to sources of drinking water (for both private and public wells).

Additional strategies for addressing nonpoint source pollution in groundwater are provided in the Groundwater Constituents of Concern Report section and Appendix D.

Joint Groundwater Monitoring and Contamination Report

Each year, the TGPC publishes the *Joint Report*, which describes the documented cases of groundwater contamination in the state that are under the jurisdiction of state regulatory agencies and GCDs, including the enforcement status of those cases. Once groundwater contamination has been confirmed, either the regulated entity or the appropriate agency will address the groundwater contamination case. Confirmed cases of contamination are generally addressed by following a prescribed sequence of actions until it is concluded that no further action is necessary or required. The sequence of actions generally consists of confirming the contamination; investigating the extent, composition, and circumstances of the contamination; developing corrective action measures based on the investigation; implementing those measures; and monitoring actions prior to considering the site closed or complete. While the *Joint Report* focuses on contamination from point sources, information from the report is used in nonpoint source assessments to ascertain the potential for contaminants from nonpoint sources to impact an aquifer.

Groundwater Constituents of Concern

The Management Program utilizes multiple methods for identifying and addressing nonpoint source groundwater issues. The methods utilized in Texas include:

- Texas Integrated Report, Groundwater Assessment;
- aquifer vulnerability ranking (Appendix D, Table D.2);
- TGPC recommendations and reports, including:
    - Joint Groundwater Monitoring and Contamination Report,
    - Texas Groundwater Protection Strategy,
    - *State Management Plan for the Prevention of Pesticide Contamination in Groundwater*, and
    - subcommittee recommendations; and
- special programs and priorities identified by GCDs.

The list of groundwater constituents of concern presented in Appendix D (Table D.1) is based on the Groundwater Assessment from the 2020 Integrated Report. The list includes constituents for which groundwater analyses exceed the maximum contaminant level for drinking water requirements for one or more wells in an aquifer for the ten-year period from fiscal year 2010 through 2019.

Additionally, the vulnerability ranking for major and minor aquifers in Texas, as determined through the DRASTIC methodology, is provided in Appendix D (Table D.2). DRASTIC consists of several components, the first of which is the designation of mappable hydrogeologic parameters. The seven variables from which the name of the model is derived include Depth to water, Recharge, Aquifer media, Soil media, Topography, Impact of the vadose zone, and Conductivity (hydraulic). The aquifer vulnerability rating is a mechanism used to identify aquifers that may be susceptible to impacts from surface activities. Texas has used this DRASTIC methodology for many years, and DRASTIC values have been incorporated into TCEQ's regulatory programs to establish the relative vulnerability of aquifers to contamination. The tables in Appendix D provide general water quality concern information for aquifers in the state, but do not identify localized issues. The CWA Section 319(h) grant funds are often targeted to address localized nonpoint source pollution issues and prevention. These areas are identified through the TGPC and other stakeholders, in addition to statewide and regional efforts.

A particular focus for targeting efforts is water quality protection practices in outcrop portions of aquifers where nonpoint source pollution is a greater risk due to recharge, or surface water infiltration of the aquifers. The focus of groundwater/surface water interactions may also be addressed in other activities as stakeholders and project leaders identify these hydrology features and areas as significant concerns. Since groundwater contamination can remain latent for a lengthy period of time, and since groundwater can be difficult to remediate once it has become impacted, the majority of Texas groundwater programs focus on prevention of contamination, rather than remediation. This is true of point source regulatory and permitting programs, as well as nonpoint

source-related programs like the Pesticides in Groundwater Program conducted under the Federal Insecticide, Fungicide, and Rodenticide Act by TCEQ. Therefore, the Management Program emphasizes the prevention of nonpoint source pollution in groundwater.

Chapter 5 Agency Program Descriptions Supporting Nonpoint Source Management

The Management Program utilizes a partnership among many organizations to protect and restore water quality. With the extent and variety of water quality issues across Texas, the need for cooperation at all levels is essential. Surface water bodies and aquifers are not limited by political boundaries, and, therefore, environmental solutions often cross federal, state, and local levels of responsibility. By establishing a coordinated framework to share information and resources, while minimizing unnecessary duplication, the state can more effectively focus its water quality protection efforts. This chapter provides a description of the agencies and their respective programs that are used to address nonpoint source pollution in Texas.

Interagency Agreements

Maximizing the utilization of local, state, and federal resources is essential if limited resources are to be effective. Texas has implemented a variety of mechanisms to ensure and improve coordination among and between federal, state, and local officials for addressing water quality. A list of some of the agreements and strategic partnerships is provided below in Table 5.1.

Table 5.1 Federal, State, and Local Agreements

Cooperative Entities	Type of Agreement	Purpose of Agreement
TCEQ and TSSWCB	MOU	Facilitates cooperation between the two primary Texas nonpoint source control agencies by setting forth the coordination of jurisdictional authority, program responsibility, and procedural mechanisms for point and nonpoint source pollution programs.
TCEQ and TSSWCB	MOA	Sets forth the cooperating responsibility and authority regarding the development of TMDLs, TMDL I-Plans, and WPPs.

Cooperative Entities	Type of Agreement	Purpose of Agreement
TSSWCB and The Texas A&M University System	MOU	Establishes commitments to work together to accomplish statewide nonpoint source pollution reduction goals with the state's agricultural and silvicultural producers. The AgriLife Extension will conduct soil and water conservation and nonpoint source management demonstrations and related educational activities, and cooperate with TSSWCB and SWCDs to identify research needs relative to soil and water conservation and nonpoint source management.
TCEQ and RRC	MOU	Clarifies the division of jurisdiction between TCEQ and RRC with regard to wastes generated in connection with oil and gas exploration, development, and production activities.
USDA-NRCS with local SWCDs	MOA	Sets forth the cooperation for SWCDs to furnish technical assistance to farmers and ranchers in the preparation of soil and water conservation plans.
TCEQ and TWDB	MOA	Sets forth the cooperation, responsibility, and authority regarding the development of TMDLs.
TCEQ and Texas Department of Agriculture (TDA)	MOA	Sets forth the cooperation, responsibility, and authority regarding the development of TMDLs.
TCEQ and Texas Agricultural Experiment Station, Texas Cooperative Extension and Texas A&M Forest Service	MOA	Sets forth the cooperation, responsibility, and authority regarding the development of TMDLs.
TSSWCB and USDA-Forest Service	MOU	Sets forth the responsibilities and activities to be performed by each agency in carrying out the Management Program as related to activities on National Forest System Lands.
TPWD and TxDOT	MOU	Provides a formal mechanism by which the TPWD may review TxDOT transportation projects, including those that have the potential to affect natural resources and promote the mutually beneficial sharing of information which will assist TxDOT in making environmentally sound decisions.

Cooperative Entities	Type of Agreement	Purpose of Agreement
TCEQ and U.S. Coast Guard	MOA	Outlines the responsibilities for the notification of and recovery of abandoned sealed containers on Texas beaches for pollution prevention and response.
GLO and U.S. Coast Guard	MOA	Provides for agreement to cooperate and coordinate efforts in implementing and exercising their respective statutory and regulatory duties related to pollution prevention and response in the navigable waters of the U.S. which are also within or may impact the coastal waters of the State of Texas.

State Agencies

The following sections describe the various state agencies and the programs they administer which contribute to managing nonpoint source pollution in Texas.

Texas State Soil and Water Conservation Board

TSSWCB, established in 1939, works in partnership with the state's 216 local SWCDs to encourage the wise and productive use of the state's natural resources in a manner that promotes a clean, healthy environment and strong economic growth. TSSWCB is the lead agency in Texas responsible for:

- administering Texas's soil and water conservation law;
- delivering coordinated natural resource conservation programs to agricultural producers through local SWCDs;
- administering grant programs to SWCDs to ensure the State's network of 2,000 flood control dams are protecting lives, private property, and public infrastructure from flood damage;
- planning, implementing, and managing programs for preventing and abating agricultural and silvicultural (forestry related) nonpoint source pollution, including assisting the Texas poultry industry with water quality management plans;
- working to improve border security along the Rio Grande through control of Carrizo cane; and
- facilitating the Texas Invasive Species Coordinating Committee.

TSSWCB is governed by a seven-member State Board composed of two Governor-appointed members and five members elected from across Texas by the directors of the state's 216 SWCDs. All members of the State Board must be landowners actively engaged in farming or ranching. Specific agency programs, functions, and initiatives which are implemented to fulfill statutory responsibilities and that collectively represent the agency's efforts in supporting

the goals and objectives of this Management Program are described below. More information is available on the TSSWCB Management Program website.

Water Quality Management Plan Program

With the passage of Senate Bill 503 in 1993, the 73rd Texas Legislature directed TSSWCB to establish a WQMP Program to abate agricultural nonpoint source water pollution. The WQMP Program is administered by TSSWCB through local SWCDs and provides a voluntary, incentive-based, natural resource conservation planning mechanism to agricultural producers and other rural landowners who choose to implement BMPs that prevent and abate nonpoint source pollution. The WQMP Program includes technical assistance to participants for the development of WQMPs, as well as financial incentives to participants to assist with the installation of specific BMPs prescribed in WQMPs. The WQMP Program is the state's primary BMP implementation program for agricultural and silvicultural lands.

Through the WQMP Program, agricultural and silvicultural producers develop and implement site-specific WQMPs in cooperation with local SWCDs. WQMPs include appropriate and essential land treatment practices, production practices, management measures, or technologies applicable to each planned land use (e.g., cropland, rangeland, pastureland). Specific BMPs included in WQMPs are based on the best available management and technology as described in the USDA-NRCS Field Office Technical Guide. Local SWCDs provide technical assistance to program participants to develop WQMPs through agreements with USDA-NRCS and TSSWCB. After being approved by the local SWCD, the developed WQMP requires TSSWCB certification. Certified WQMPs ensure farming or ranching operations are carried out in a manner consistent with state water quality standards. While participation in the WQMP Program by agricultural producers is generally voluntary, the 77th Texas Legislature, in 2001, amended the TWC to require all persons who own or operate a poultry facility to implement and maintain a WQMP certified by TSSWCB.

The Texas Legislature provides funding (state general revenue) through TSSWCB for the implementation of WQMPs. In accordance with statute, TSSWCB identifies priority areas across the state where water quality is being impacted, or has the potential to be impacted, by agricultural and silvicultural nonpoint source water pollution. TSSWCB then allocates state funding to specific SWCDs in those priority areas to serve as financial incentives for implementing WQMPs. In establishing and periodically changing these priority areas, TSSWCB considers water bodies identified as impaired on the CWA Section 303(d) List, threatened areas in which action is necessary to prevent nonpoint source pollution, and other concerns such as impacts to groundwater. In addition to state funds directed to these priority areas, TSSWCB utilizes CWA Section 319(h) grant funds to assist landowners and SWCDs in developing and implementing WQMPs in watersheds with TMDLs or WPPs.

Nonpoint Source Grant Program

The Nonpoint Source Grant Program is administered by TSSWCB for the purpose of providing funding as grants to cooperating entities for activities that address the goals and objectives in this Management Program. The Texas Legislature and the U.S. Congress (through EPA) provide funding to TSSWCB to implement the agricultural and silvicultural components of this Management Program through the TSSWCB Nonpoint Source Grant Program.

Agricultural and silvicultural nonpoint source pollution prevention and abatement activities that can be funded through the Nonpoint Source Grant Program include implementation of WPPs and the nonpoint source portion of TMDL I-Plans, SWQM, demonstration of innovative BMPs, technical assistance and financial incentives for the development and implementation of TSSWCB-certified WQMPs, public outreach and education, development of WPPs, and monitoring activities to determine the effectiveness of specific pollution prevention methods.

Since 1990, Congress has annually appropriated grant funds to states through EPA under CWA Section 319(h) for the implementation of each state's Nonpoint Source Management Program. The CWA Section 319(h) funding allocated to the State of Texas is split evenly between TCEQ and TSSWCB. TSSWCB directs its share of CWA Section 319(h) funds through the agency's Nonpoint Source Grant Program. Additional detail on CWA Section 319(h) funding is provided in Chapter 2.

The 80th Texas Legislature, in 2007, appropriated state general revenue funds to TSSWCB for the purpose of planning, implementing, and managing programs and practices for preventing and abating agricultural and silvicultural nonpoint source water pollution in impaired watersheds; subsequent Legislatures have continued this appropriation. These state funds are used for activities consistent with the goals and objectives of this Management Program, including, but not limited to, watershed planning and assessment, BMP implementation, and research on the efficacy of BMPs.

Flood Control Program

Nearly 2,000 floodwater retarding structures, or dams, have been built over the last 60 years within Texas. The primary purpose of the structures is to protect lives and property by reducing the velocity of floodwaters, and thereby releasing flows at a safer rate. These earthen dams that exist on private property were designed and constructed by the USDA-NRCS and have local governmental sponsors responsible for their operation and maintenance. SWCDs are one of the local governmental sponsors of these flood control dams across the state; other local sponsors include counties, cities, and water control and improvement districts. In order for these aging dams to continue to serve as critical protection for lives, private property, and the state's infrastructure, the Texas Legislature has appropriated state funds to TSSWCB for grants to SWCDs and other local sponsors for operation and maintenance, structural repair, and rehabilitation.

A secondary benefit of properly maintained and functioning flood control dams is the reduction of nonpoint source pollutants (e.g., sediment) in floodwater downstream, helping to accomplish the state's CWA goals. By trapping sediment and other pollutants, these dams contribute to the protection of water quality in downstream water bodies, such as major water supply reservoirs. Studies have examined the rate at which sediment is trapped by these dams and the various pollutants (e.g., nutrients, heavy metals, pesticides) buried in sediment cores from the impoundments behind these dams. While TSSWCB flood control grant funds are targeted to dams based on priorities associated with protecting lives and property, this agency program supports the state's water quality goals and contributes to achieving the goals and objectives of this Management Program.

Rio Grande Carrizo Cane Eradication Program

Large dense stands of non-native carrizo cane (*Arundo donax*) now occupy the banks and floodplains of the Rio Grande, thwarting law enforcement efforts along the international border, impeding and concealing the detection of criminal activity, restricting law enforcement officers' access to riverbanks, and impairing the ecological function and biodiversity of the Rio Grande. These stands of invasive riparian weeds present considerable obstacles for the protection of the international border by law enforcement and agricultural inspectors by both significantly reducing visibility within enforcement areas and by providing favorable habitat for agriculturally damaging cattle ticks. Carrizo cane is a noxious brush species that consumes precious water resources to a degree that is detrimental to water conservation. As a result of this weed's high evapotranspiration capacity, infestations threaten water supplies for agricultural and municipal drinking water uses in south Texas.

In order to help meet the Governor's border security priorities, the 84th Texas Legislature, in 2015, directed TSSWCB, through Senate Bill 1734, to develop and implement a program to eradicate carrizo cane along the Rio Grande. The goal of the program is to improve border security and restore function of the Rio Grande through invasive species control.

TSSWCB has developed a program that establishes long-term management of invasive carrizo cane at a landscape level along the entire Rio Grande, an international border with great ecological and cultural significance. Comprehensively addressing the impacts of carrizo cane on border security are paramount to the program, while also accruing benefits to the ecosystem health of the Rio Grande and water user groups in south Texas.

The Carrizo Cane Eradication Program:

- reduces carrizo cane canopy, density, and biomass;
- improves border access for law enforcement officers;
- improves visibility to allow better detection of illegal activities;
- restores ecological function, degraded riparian habitats, and the biodiversity of the Rio Grande; and
- enhances water savings by conserving water lost to evapotranspiration by carrizo cane.

Due to the diversity of biological, legal, and cultural issues associated with the control of carrizo cane along the 1,255-mile Rio Grande international border, the TSSWCB's ecosystem-based approach integrates the use of biological, chemical, mechanical, and cultural controls, as appropriate, to manage carrizo cane along the Rio Grande. Such an approach promotes the re-establishment of beneficial native plants but necessitates a long-term maintenance program to ensure control is successful. Participation in the program is voluntary for landowners.

Outreach and Education

TSSWCB implements a robust outreach and education program targeted to the general public, youth, and agricultural producers. TSSWCB prepares and disseminates public information relative to the agency and SWCD functions, programs, events, and accomplishments. TSSWCB staffers annually participate in a variety of seminars, conferences, workshops, and agricultural trade shows. TSSWCB staffers provide guidance to SWCDs on their individual education programs. TSSWCB conducts training for newly elected SWCD directors on SWCD operations and programs to help them better serve landowners and agricultural producers. TSSWCB collaborates with the Texas Future Farmers of America organization and others to sponsor the Wildlife Alliance for Youth, which affords youth the opportunity to experience soil, water, and related resource conservation management techniques in the outdoors. In collaboration with the Association of Texas SWCDs, TSSWCB has a Conservation Video Library that gives teachers access to over 200 conservation-related videos with no rental fees. TSSWCB staffers utilize physical watershed models in classrooms to help students understand how water supplies can be impacted by nonpoint source pollution. In partnership with SWCDs, TSSWCB carries out an annual Texas Conservation Awards Program, which includes a soil and water stewardship public speaking contest and a poster and essay contest for students. TSSWCB regularly disseminates Conservation News, a compilation of readily available current news and information regarding natural resource issues, and agency press releases to an e-mail subscriber list. As required by statute, TSSWCB hosts the Annual Meeting of Texas SWCD Directors, bringing SWCDs from across the state together to discuss common challenges and solutions to natural resource conservation issues. TSSWCB's comprehensive outreach and education program supports the state's water quality goals and contributes to achieving the goals and objectives of this Management Program.

Texas Commission on Environmental Quality

TCEQ strives to protect the state's human and natural resources consistent with sustainable economic development. TCEQ implements many sections of the TWC, CWA, and Safe Drinking Water Act. TCEQ develops water quality requirements designed to protect attainable uses and maintain the quality of waters in the state. TCEQ has a number of programs that address various aspects of nonpoint source pollution management through planning, setting standards, data collection, assessment, prioritization, and implementation.

TCEQ Nonpoint Source Program

The goal of the Nonpoint Source Program is to protect water bodies from nonpoint source pollution and restore water quality. This goal is achieved through assessment, implementation, and educational activities. The strategy utilized by the Nonpoint Source Program is to work with stakeholders to develop and implement programs and practices which minimize nonpoint source pollution at the source and manage nonpoint source pollution, which complements other state water resource goals. The objectives of the Nonpoint Source Program are to establish public/private partnerships, develop watershed plans, assess water quality and watershed conditions, implement cost effective management measures, and evaluate and report progress. Success of the TCEQ Nonpoint Source Program is measured through water quality improvements, nonpoint source pollutant load reductions, and the implementation of nonpoint source controls and educational programs. Agency activities for addressing nonpoint source pollution are described below.

Nonpoint Source Management Program

The Nonpoint Source Program coordinates with partners in the state to produce the Texas Nonpoint Source Management Program as required under CWA Section 319(b). The Management Program is a five-year document that outlines the comprehensive and integrated strategy used in Texas to restore waters impacted by nonpoint source pollution. The Management Program identifies the practices and programs that will be undertaken to reduce loadings of nonpoint source pollution and contains a schedule of annual milestones for the use of these programs and practices.

CWA Section 319(h) Grant

The Nonpoint Source Program administers the provisions of CWA Section 319 to control urban and non-agricultural nonpoint source pollution. CWA Section 319 authorizes grant funding for states to develop projects and implement nonpoint source management strategies. The TCEQ Nonpoint Source Program manages nonpoint source categorical grants to implement the goals identified in the Texas Nonpoint Source Management Program. The CWA Section 319(h) grant provides 60% federal funds and requires a 40% non-federal match. TCEQ solicits applications through an RFGA to develop projects that make up a Work Plan. After applications are received, projects are reviewed and scored. The number of projects funded depends on the amount of each contract. Fifty percent of the money awarded from the federal government must be used to fund the implementation of watershed-based plans (e.g., WPPs).

Nonpoint Source Annual Report

Both TCEQ's and TSSWCB's Nonpoint Source Programs prepare the Nonpoint Source Annual Report, which identifies the progress in meeting the schedule of milestones contained in this Management Program.

Watershed Protection Plans

The Nonpoint Source Program utilizes CWA Section 319(h) funds to develop and implement WPPs. WPPs are developed at the local level to address water quality issues. A WPP is a coordinated framework for implementing prioritized and integrated water quality protection and restoration strategies driven by environmental objectives.

CWA Section 604(b) Grants

TCEQ's Nonpoint Source Program also administers the provisions of CWA Section 604(b). These funds are derived from state revolving fund appropriations under Title VI of the CWA. Using a legislatively mandated formula, funds are passed through to Councils of Governments for planning purposes, as well as educating the public on nonpoint source pollution.

TCEQ Water Quality Standards Program

TCEQ is the lead agency in the state responsible for establishing and revising standards to protect surface water quality in accordance with CWA Section 303(c). TWC Section 26.023 identifies the Commission as the sole and exclusive authority to make rules setting water quality standards for all waters in the state.

The TCEQ Water Quality Standards Group is responsible for establishing and revising standards to protect surface water quality. The TSWQS recognize the regional and geologic diversity of the state. Appropriate uses are established in the TSWQS for surface waters in the state, and the associated numerical and narrative criteria provide a basis for permitting, assessing water quality, and establishing restoration targets for managing point and nonpoint source loadings in Texas surface waters.

TCEQ Surface Water Quality Monitoring Program

The TCEQ's SWQM Program is coordinated by the SWQM staff in TCEQ's central office and 16 regional offices. Texas routinely monitors and assesses water quality under programs administered by TCEQ. Routine monitoring and special study data collection efforts are conducted by SWQM personnel. Data are collected by federal, state, regional, and local agencies and are compiled and assessed to develop the Texas Integrated Report for CWA Sections 305(b) and 303(d).

TCEQ Clean Rivers Program

TCEQ administers the Texas CRP. The CRP is a collaboration of 15 regional water agencies and TCEQ. It is a unique, water quality monitoring, assessment, and public outreach program that is funded by state fees assessed on permittees based on the number and size of their wastewater treatment plants and surface water right permittees that reside within each river basin. The CRP provides the opportunity to approach water quality issues at the local level through coordinated efforts among diverse agencies, various programs, and the public.

TCEQ Data Management and Analysis Program

Water quality assessments, including assessments for nonpoint source pollution, depend upon having accurate and available water quality data. TCEQ's Data Management and Analysis Team provides assurances of the quality and availability of water quality data in the state. It is responsible for the management of surface water quality data and metadata in cooperation with other TCEQ water programs and the TCEQ Information Resources Division. This responsibility includes documentation and maintenance of records relating to the processes described in the Data Management Reference Guide. Relationships between the Data Management and Analysis Team and other water program areas are documented in project-specific QAPPs. Data not meeting quality requirements set forth in these QAPPs may be stored in the Surface Water Quality Monitoring Information System (SWQMIS) database with appropriate qualifiers.

The purpose of the Data Management Reference Guide is to assist TCEQ CRP partner agencies, TMDL Program contractors, SWQM Program staff, Standards Group staff and contractors, Nonpoint Source Program contractors, and any other TCEQ programs or external entities submitting data to the TCEQ SWQMIS database. The guide outlines the processes for requesting parameter codes and station identification numbers, submitting and collecting entity codes, using tag prefixes, correcting data in SWQMIS, and submitting data reports. It also explains data review and data reporting (including data reporting formats) and contains reference maps, tables, and descriptions for use when submitting data to TCEQ. Guidance is also provided for using tools to extract and interact with data in the SWQMIS database. Links are provided to internet resources that are dynamic in nature and change too frequently for TCEQ to publish in this document.

The original SWQM Program was established in 1967 with the purpose of collecting and analyzing the data necessary to describe the water quality of Texas streams, reservoirs, and estuaries. Today, SWQMIS contains more than 42 years of physicochemical and biological data from up to 8,500 monitoring stations throughout Texas. These data are collected by TCEQ, contributing river authorities, cities, and other local, state, and federal agencies.

The SWQMIS database is maintained by TCEQ and serves as a repository for TCEQ surface water quality data. SWQMIS also provides validation and reporting tools, a mapping interface, modules for tracking information about analytical laboratories, and quality assurance documents.

The statewide water quality database has received data since 1967, allowing for the assessment of short- and long-term trends. These data may be used by TCEQ to characterize existing conditions, evaluate spatial and temporal trends, develop water quality standards, determine water quality standards compliance, identify emerging problems, and evaluate the effectiveness of water quality control programs.

TCEQ Total Maximum Daily Load Program

The TCEQ TMDL Program is responsible for developing TMDLs in accordance with CWA Section 303(d) and its implementing regulations (40 CFR Section 130.7). These regulations require states to identify waters that do not or will not meet applicable water quality standards after the application of technology-based or other required controls, and to establish TMDLs for pollutants that are causing non-attainment of water quality standards. For listed waters, states must develop TMDLs allowing for seasonal variations and an appropriate margin of safety. A TMDL is a quantitative assessment of water quality problems and contributing sources that need to be addressed to restore and protect individual water bodies. If a WPP is being developed where a TMDL has already been developed and approved, or is being developed, the WPP must be designed to achieve the nonpoint source pollutant load reductions called for in the TMDL. The integration of TMDLs and WPPs increases the efficiency of efforts and accelerates restoring water quality in targeted water bodies.

TCEQ Estuary Programs

The National Estuary Program was established under CWA Section 320 to identify nationally significant estuaries which are threatened by pollution, development, or overuse; promote comprehensive planning and conservation and management plans for estuaries of national significance; and enhance the coordination of estuarine research. There are two active estuary programs in Texas. The first was established for the Galveston Bay system, and the second was established for the bays and estuaries along the Coastal Bend of South Texas. The Galveston Bay Estuary Program (GBEP) is a program of TCEQ, and the Coastal Bend Bays and Estuaries Program (CBBEP) is a non-profit organization. Each of these estuary programs developed a Comprehensive Conservation and Management Plan (CCMP) which recommends priority actions and implementation schedules to address impacts observed in the estuary. The CCMP development is a consensus-based process involving a partnership across federal, state, and local levels. With the completion of the CCMP, each national estuary program formed a nonprofit, academic, or local government-based nonregulatory management structure to implement its plan.

Galveston Bay Estuary Program

GBEP is a continuation of the National Estuary Program established for Galveston Bay in 1989. GBEP is a partnership of stakeholders currently working to implement the CCMP, *The Galveston Bay Plan*. The plan guides future decisions and addresses a wide range of environmental protection issues. In 2018, after several public engagement opportunities through workshops, stakeholder meetings, and approval by the Galveston Bay Council, the 41-member advisory council that helps guide implementation of the plan, the second edition of *The Galveston Bay Plan* was approved by the TCEQ Commissioners and EPA.

Nonpoint source pollution is an identified water quality problem in Galveston Bay. Implementation of *The Galveston Bay Plan, 2nd Edition* includes numerous actions to address this problem.

GBEP works with local partners and numerous state and federal agencies to address nonpoint source pollution. Actions include convening a forum for information sharing among Galveston Bay stakeholders involved in nonpoint source pollution prevention/control activities, providing technical assistance to local governments, and providing education and outreach to local residents.

Coastal Bend Bays and Estuaries Program

TCEQ and EPA helped establish CBBEP to develop and implement a plan to protect and restore the bays and estuaries of the Texas Coastal Bend. CBBEP has developed a CCMP to deal with a wide array of problems ranging from public health and education, freshwater flow, and loss of natural habitats. Through implementation of the plan, CBBEP has completed the following actions that serve to protect bays and estuaries from nonpoint source pollution:

- created a handbook of urban nonpoint source pollution BMPs for voluntary use by local communities and provided assistance training regarding appropriate BMP use to the community leadership;
- provided compliance assistance to small businesses and industries in the region which are subject to the stormwater National Pollutant Discharge Elimination System (NPDES) permit program or have nonpoint source controls needs;
- provided assistance to local governments to implement OSSF programs;
- provided upgrades and/or replacements of failing OSSFs in targeted colonias; and
- coordinated and facilitated the development of agricultural water quality management programs necessary to meet water quality standards.

TCEQ Wastewater Permitting Program

A fundamental consideration for achieving CWA goals is the ability to control sources of pollutants that may be impairing or threatening the quality of navigable waters. In many jurisdictions, the discharge of pollutants from point sources is a significant factor to address when managing the condition of water bodies. Point source permitting programs are integral to the state's Nonpoint Source Program because in many cases, the goals of the Nonpoint Source Program cannot be fully realized without considering impacts from permitted sources.

Pollutant discharges from point sources are controlled through the Texas Pollutant Discharge Elimination System (TPDES) Permit Program administered by TCEQ. Through the TPDES Permit Program, Texas prohibits the discharge of pollutants from a point source into a water in the state unless the operation has been granted authorization through a permit by rule or a TPDES individual or general permit that explicitly allows discharges by establishing:

- limits on the type and amount of pollutants that can be discharged into a receiving water,
- monitoring and reporting requirements for discharges, and

- other conditions necessary to carry out the intent of the CWA and applicable state laws.

The State of Texas assumed the authority to administer the NPDES Program in Texas on September 14, 1998. NPDES is a federal regulatory program to control discharges of pollutants to surface waters of the United States. The TCEQ's TPDES Permit Program has federal regulatory authority over discharges of pollutants to Texas surface water.

House Bill 2771 (86th Legislature, 2019) amended Texas Water Code, Section 26.131, to transfer to TCEQ the RRC's responsibilities relating to regulation of discharges into surface water in the state of produced water, hydrostatic test water, and gas plant effluent resulting from the exploration, production and development of oil, natural gas, or geothermal resources. House Bill 2771 authorizes the transfer of responsibilities from the RRC to TCEQ after TCEQ receives approval from EPA to supplement or amend TCEQ's TPDES program to include authority over these discharges.

A TPDES permit may be written to address discharges either from an individual point source or from a number of similar dischargers.

TPDES Individual Permit

TCEQ may issue an individual permit to a point source that includes site-specific conditions, such as effluent limitations, management practices, and monitoring and reporting requirements.

TPDES General Permit

TCEQ may issue a general permit to authorize the discharge of waste into or adjacent to water in the state by category if TCEQ finds the discharges in the category or the dischargers:

- engage in the same or substantially similar types of operations,
- discharge the same types of waste,
- are subject to the same requirements regarding effluent limitations or operating conditions,
- are subject to the same or similar monitoring requirements, and
- are more appropriately regulated under a general permit than under individual permits.

TCEQ may also issue a general permit to authorize the discharge of waste by categories of dischargers within the entire state or within a discrete geographical area identified by an appropriate division or combination of geographic or political boundaries. A facility that does not or cannot meet the requirements of the general permit must obtain authorization under an individual permit. The general permit also includes limitations for coverage for certain facilities. After a general permit is issued, dischargers that meet the eligibility criteria in the permit can request coverage under the permit by submitting a Notice of Intent (if required by the permit) to TCEQ.

Classification of Wastewater Permits

TPDES permits are grouped into two categories based broadly on the type of wastewater the permitted facilities treat and discharge. They are further classified based on ownership and the volume of flow permitted.

Facilities that treat wastewater that has the characteristics of domestic wastewater are classified as municipal wastewater treatment facilities. Municipal wastewater treatment facilities can be classified as publicly owned, i.e., owned by a state, tribe, or municipality, or privately owned.

Facilities that treat wastewater from industrial sources are classified as industrial wastewater treatment facilities. Industrial wastewater sources include manufacturing, food processing, chemical production, oil refining, and many varied commercial and industrial processes. Industrial wastewater may also contain some domestic wastewater. In addition, certain publicly owned treatment works (POTWs) are required to implement an approved TPDES pretreatment program to regulate the discharges from industrial users discharging into their sanitary collection systems.

TCEQ divides these categories further between major and minor facilities. A major facility is one with a permitted flow equal to or greater than one million gallons per day (mgd) or one that has been determined to be a major facility by EPA based on industry type. A minor facility is all other facilities.

TCEQ establishes the effluent limits of a TPDES permit based on two separate and unique approaches established in the CWA. The limits based on these approaches are described in the next section.

Technology-Based Effluent Limits

Technology-based effluent limits are the minimum level of control that must be imposed in an NPDES permit. EPA establishes national technology-based standards for municipal dischargers and for various categories of industrial facilities. The standards and guidelines are based on the performance of actual treatment systems or other pollutant control technologies, such as process controls. By not being site specific, the standards and guidelines place all facilities within an identified category on an equal footing. In the absence of established national technology-based standards for industrial facilities, TCEQ utilizes best professional judgment to set minimum technology-based effluent limits in permits.

Water Quality-Based Effluent Limits

Further limits on discharges of pollutants may be necessary if the technology-based effluent limits are not sufficient to prevent impacts from discharges into the receiving waters in regard to compliance with the state's water quality standards. EPA has identified the following steps to assess the need for water quality-based effluent limits. TCEQ must then establish the limits as necessary based on the assessment of the following:

Step 1. Identification of applicable water quality standards.
Step 2. Characterization of the effluent and receiving water.
Step 3. Determination of the need for parameter-specific water quality-based effluent limits.
Step 4. Calculation of parameter-specific water quality-based effluent limits.

No-Discharge Permits

Texas Land Application Permits (TLAPs) are no-discharge permits that authorize individual facilities to dispose of wastewater without discharging into water in the state. TLAPs may authorize septic systems over 5,000 gallons per day or may authorize industrial or domestic wastewater to be evaporated or land applied via a surface or subsurface irrigation system. Discharges to surface waters from these no-discharge systems are prohibited. Land application rates are limited to the agronomic and hydrologic (evapotranspiration rates) needs of the cover crop and the soil infiltration rates. The permittee may be required to monitor soils in the land application areas for nutrients, metals, and salts to determine and monitor the appropriate application rates. The permittee is prohibited from land applying effluent in sensitive areas that may result in the contamination of surface water or groundwater, or additional restrictions are placed in permits to protect these sensitive areas.

Stormwater Management

TCEQ issues TPDES permits to regulate stormwater discharges from industrial activities, construction activities, and MS4s to Texas surface waters.

The MS4 Stormwater Program administered through the TPDES Program regulates stormwater discharges from medium and large municipalities under the federal stormwater Phase I rules through individual permits, and small municipalities under the Phase II rules through a general permit. Growing urban fringe areas and other urban development are regulated under the Phase II rules if they are located within an urbanized area, as defined by the U.S. Census Bureau, or if they are designated by TCEQ as needing coverage. If an MS4 falls within the scope of the stormwater program, a TPDES permit is required under which a management plan for the reduction of the pollutants in stormwater runoff must be implemented locally, permit compliance must be evaluated, and maintenance or improvement of surface water quality must occur, consistent with the water quality standards. In designating MS4s that are outside of census-defined urbanized areas for permit coverage, EPA requires states to consider the following factors: discharges to sensitive waters, high growth areas or growth potential, contiguity to an existing regulated MS4, significant contribution of pollutants to surface water, and ineffective protection of water quality by other state programs.

The application of TPDES permits to the discharge of stormwater from industrial activities is based on the type of industrial activities that occur at a facility and are specifically defined in EPA regulations under 40 CFR 122.26. Construction activities that disturb greater than one acre of soil are regulated

under the TPDES program, and activities that disturb greater than five acres of soil are required to obtain general permit authorization to discharge construction stormwater runoff. Industrial and construction permittees are required to develop and implement a stormwater pollution prevention plan and best management practices.

TCEQ has issued statewide general permits for discharges of stormwater from industrial activities (Multi Sector General Permit), construction activities (Construction General Permit), and small (Phase II) MS4s.

TCEQ Beneficial Use Sludge Permitting Program

Sewage sludge, also known as biosolids, must be properly processed, transported, and used or disposed of in order to prevent adverse environmental and public health impacts. Sewage sludge is a solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a treatment works. Sewage sludge includes, but is not limited to, domestic septage, scum, or solids removed in primary, secondary, or advanced wastewater treatment processes; and material derived from sewage sludge.

Sewage sludge can also be combined with water treatment sludge, which is the material generated during the treatment of either surface water or groundwater for potable use. Water treatment sludge is not considered an industrial waste.

Because of the nutrient and soil-conditioning characteristics of most biosolids, local governments are encouraged to consider beneficial land application or composting of sludge following treatment in accordance with TCEQ established criteria. Land application of certain biosolids for a beneficial use must be authorized by TCEQ. TCEQ requires authorization to process, market, and distribute exceptional quality sludge (commonly known as Class A or Class AB sludge in Texas). Beneficial use is defined as the land application of treated municipal sludge at or below the agronomic needs of a cover crop or the use of water treatment sludge as a soil amendment.

Because some municipal wastewater treatment facilities also receive industrial wastewater, sewage sludge may contain pesticides and chemicals (at or below acceptable levels for suitable land application) along with human waste. A permit is required for most activities that involve the processing, transportation, beneficial use, or disposal of sewage sludge. If sludge is not of domestic origin, it is regulated as either a municipal solid waste or an industrial solid waste.

TCEQ CAFO Permitting Program

Animal Feeding Operations (AFOs), such as feedlots, dairies, and poultry operations, can be a source of pollutant discharges following rainfall events. An AFO is required to apply for a wastewater permit if it confines more than a given number of animals. CAFOs are prohibited from directly discharging into surface water under wastewater permits, except under chronic or catastrophic rainfall events or catastrophic conditions.

AFOs that are not classified as CAFOs and dry litter poultry facilities are not required to obtain written authorization. These facilities are regulated by rule. AFOs may choose to obtain a WQMP from TSSWCB. The WQMP must meet the same technical requirements as the TCEQ rule. All dry litter poultry operations must obtain a TSSWCB-certified WQMP. AFOs and CAFOs may receive technical assistance from TSSWCB and the USDA-NRCS.

The TCEQ CAFO Permitting Program reviews technical designs of CAFOs for new facilities and facilities being modified or enlarged. The designs are reviewed to ensure that the retention control structures are adequately sized and that sufficient land is available for land application. Waste and wastewater application rates are reviewed to ensure that land application does not exceed agronomic rates. Applications are also reviewed to ensure that BMPs will be implemented to prevent the pollution of waters in the state.

A Pollution Prevention Plan must be prepared for every permitted CAFO facility in the state. The plan must be prepared in accordance with good engineering practices and include measures necessary to limit the discharge of pollutants to waters in the state. The Pollution Prevention Plan must include:

- practices to ensure compliance with the CAFO rules;
- a site plan indicating all animal confinement areas, waste treatment and retention facilities, and waste and wastewater application areas;
- a nutrient management plan;
- design calculations for retention facilities;
- the identification of potential pollutant sources used, stored, or disposed of at the facility;
- BMPs used to control potential pollutant sources;
- the identification of recharge features with BMPs used to protect them; and
- required monitoring and inspection records, including procedures for monitoring discharges and sampling land application areas.

TCEQ Dairy Outreach Program

Some areas of the state have been identified as having a higher potential for water quality problems and concerns from AFOs. The areas involved in TCEQ's Dairy Outreach Program Area include Erath, Bosque, Hamilton, Comanche, Johnson, Hopkins, Wood, and Raines counties. The number of animals requiring written authorization is lower for AFOs located in the Dairy Outreach Program Area. For example, the threshold for dairies is reduced from 700 to 200 head.

Owners and operators of dairy CAFOs located in the Dairy Outreach Program Area must complete an initial eight-hour course of continuing education in animal waste management and a subsequent eight hours every two years. Similarly, owners and operators of a CAFO are required to train all employees responsible for work activities relating to compliance regarding the proper operation and maintenance of the facility. Employees at all levels of responsibility must be informed of the general components and goals of the Pollution Prevention Plan. Training topics include land application of waste, proper operation and maintenance, good housekeeping and material

management practices, recordkeeping requirements, and spill response and cleanup.

TCEQ Standards Implementation Team

The Standards Implementation Team of the Water Quality Division is responsible for the implementation of the TSWQS, 30 TAC Chapter 307, through wastewater permits. Team functions include:

- evaluating TPDES permit applications to determine the statewide and site-specific designated uses and criteria for the protection of human health and aquatic life in the receiving streams;
- evaluating CAFO permit applications to identify waterways down gradient of land application fields and identify any impairments to those waterways;
- conducting receiving water assessments;
- administering the whole effluent toxicity program to ensure the protection of surface water from instream toxicity due to wastewater discharges;
- conducting 401 State Water Quality Certifications of CWA Section 404 Dredge and Fill permits and other federally permitted or licensed projects;
- performing severity determinations for certain TCEQ TSWQS violation enforcement cases; and
- performing site reviews and criteria development for the following agency programs: Leaking Petroleum Storage Tanks, Voluntary Cleanup Program, Corrective Action Program, and the Superfund Program.

TCEQ Water Quality Assessment Team

The Water Quality Assessment Team performs several functions related to water quality. The primary functions of the team are dissolved oxygen modeling and determining critical low flow conditions and mixing zone sizes for TPDES permits and groundwater protection for TLAP facilities through geology and soil reviews.

The dissolved oxygen modelers provide support for the development of wastewater discharge permit limits for dissolved oxygen-demanding constituents to ensure that dissolved oxygen criteria are maintained in the receiving stream. The critical conditions staff provide information on flow conditions that the permit writers use to develop limits for other wastewater constituents that are placed in the permits to protect human health and aquatic life consistent with 30 TAC Chapter 307. The team also coordinates quarterly updates to the state's WQMP, which contains updates of permitted effluent information for amended and new permits. The state's WQMP provides an avenue for updates of approved TMDLs. The group assists the wastewater permitting section with these updates by coordinating with the TMDL Team.

The groundwater protection component of the team assesses geology, groundwater, and soils information at a facility and provides specific technical recommendations to the wastewater permitting program to develop TLAP permits that are protective of groundwater and surface water qualities.

Groundwater Protection (Water Quality Division)

The Water Quality Division's Water Quality Assessment Team is responsible for the coordination of the Water Quality Division's groundwater protection responsibilities. The Water Quality Assessment Team groundwater staff duties include:

- conducting groundwater impact evaluations of TLAP individual and CAFO general permits to ensure that the permits are protective of groundwater quality and comply with applicable rules;
- providing technical support to the Wastewater Permitting Section for all permit-related activities for soil science, soil chemistry, agronomy, geology, groundwater quality, groundwater recharge potential, vadose zone geology, and groundwater migration;
- providing geology, agronomy, and groundwater protection expertise for rule writing and bill analysis;
- responding to groundwater-related inquiries from the public, other government agencies, the regulated community, and internal customers;
- reviewing permit-required groundwater and agronomic data to assess effectiveness of site management. If groundwater problems are detected, staff may modify permits with corrective action measures and coordinate with staff of the Enforcement or Remediation Divisions to mitigate the release;
- reviewing nutrient management plans and nutrient utilization plans required by 30 TAC Chapter 321, Subchapter B and 30 TAC Chapter 312;
- assisting the regulated CAFO community and the Field Operations Division in resolving issues related to misidentified, abandoned, or damaged water wells; and
- providing a public service by reporting groundwater contamination issues to the TGPC via the annual *Joint Report* and participating as a member of TCEQ's Impact Evaluation Team, which implements the requirements of TWC Section 26.408.

TCEQ Water Supply Program

Public Drinking Water

Many Texans get their drinking water from large-scale municipal water systems that rely on surface water resources, such as rivers, lakes, and reservoirs. Others depend on private sources, such as wells and aquifers. Contamination can occur in surface water or groundwater supplies from wastewater discharges, urban and agricultural runoff, leaking underground storage tanks, improperly maintained OSSFs, waste sites, abandoned wells, and the deposition of airborne pollutants. The state pays special attention to protecting surface water and

groundwater supplies that serve as a source of drinking water. Protecting drinking water at the source makes good public health, economic, and environmental sense. The aquifers, lakes, and rivers that are designated by law for use as sources of drinking water are called source waters. TCEQ protects source waters by assessing their susceptibility to pollution and assisting local communities to develop source water protection programs.

The following is a discussion of the state programs that focus on the protection of drinking water sources.

TCEQ Source Water Assessment and Protection Program

The TCEQ Source Water Assessment and Protection (SWAP) Program was created in 1996 by the Safe Drinking Water Act. The SWAP Program combines source water assessment and source water protection.

Source Water Assessments

A source water assessment determines a Public Water Supply system's susceptibility to 227 potential drinking water contaminants. Specific elements scrutinized include location, intrinsic characteristics, contaminant occurrence, point and nonpoint source pollution, and construction. These elements are compared with several hundred thousand database records to produce a technically defensible assessment product. The goal of the assessment component leads to local source water protection. A source water assessment report has been provided to 6,000 public water systems and is intended to lead to the implementation of source water protection projects and BMPs. The source water assessment reports are used by TCEQ's SWAP Program to drive the activities and recommended BMPs aimed at minimizing or eliminating the effects of nonpoint source contaminants.

Under the program, all surface waters and groundwaters that contribute to public drinking water supplies are investigated for potential contamination. Investigations proceed in the following stages:

- identification of areas that supply public drinking water,
- delineation of the boundaries of the assessment areas needed to protect the water supplies,
- inventorying of potential sources of contamination within the assessment areas,
- informing the public of the results, and
- implementation of a source water protection program.

A report assessing the vulnerability of each source water is provided to the operators of systems that supply public drinking water. The assessments consider the location of pollutant sources, intrinsic characteristics, contaminant occurrence, well construction, geology, known point sources, and land uses that occur within the capture zone of groundwater wells and within the watersheds of surface water intakes.

The assessments provide the scientific basis for the implementation of source water protection projects. Water systems are encouraged to take an active role in verifying the completeness and accuracy of the data used in the assessment report. Additionally, information developed for the Nonpoint Source Program serves as valuable information and data about land-based contamination sources, which provide valuable input into the source water assessment process. The protection and assessment of source waters is required and authorized under the federal Safe Drinking Water Act Section 1453.

Source Water Protection

Source Water Protection is a voluntary pollution prevention program implemented at the local level to prevent the contamination of waters that are a source for public drinking water. All public water supply systems are eligible to participate in the program. TCEQ provides technical assistance and guidance to local Public Water Supply systems that implement recommended BMPs. TCEQ coordinates BMP recommendations or implementation with other agencies/organizations with expertise and/or jurisdiction. These BMPs include signs to increase public awareness, educational programs, site-specific protection plans, and local ordinances. TCEQ recommends that communities participating in the program voluntarily implement BMPs based on the results of potential contaminant source inventories. Most source water protection participants have implemented programs by working cooperatively with community members and through public education programs. Costs associated with implementing a source water protection program are much lower than cleaning up a contaminated water source. Implementation costs are eligible for funding through the TWDB's Drinking Water State Revolving Fund Loan Program.

For over eighteen years, TCEQ has used funds from the Nonpoint Source Program to fund source water protection activities. For example, BMPs funded with CWA Section 319 grants for the protection of water quality in the Edwards Aquifer may also have applicability in source water protection areas.

Finalized drinking water data are collected by the TCEQ's Drinking Water Quality Program. Additional supporting information is provided by the SWAP Program.

Groundwater Planning and Assessment

The Groundwater Planning and Assessment Team (GPAT) is responsible for implementing the Texas Groundwater Protection Strategy, administering the interagency TGPC, maintaining groundwater viewers, providing technical support, and developing and implementing the state's Generic State Pesticide Management Plan and Pesticide-Specific Management Plans.

Activities of the TGPC that GPAT supports include arranging meetings, compiling and maintaining meeting records, providing leadership on subcommittees, compiling and preparing data for the *Joint Report,* and preparing the Groundwater Assessment portion of the Integrated Report.

GPAT administers the state's Priority Groundwater Management Area Program. The program also provides limited oversight of GCDs relating to the adoption and implementation of management plans, reviews stakeholder petitions for inquiry, processes and reviews landowner petitions for GCD creation, and provides reports and legislative support for the TGPC, groundwater management, and GCD activities.

GPAT maintains an online map-based application that helps assess groundwater conditions. The Groundwater Contamination Viewer, which was developed in 2017, allows users to query and obtain spatial relationship information about groundwater contamination cases from recent *Joint Reports*. GPAT also maintains the Water Well Report Viewer, which allows users to geographically locate and view scanned copies of over one million water well reports submitted by drillers since about 1960 until about 2003. The Groundwater Contamination Viewer and the Water Well Report Viewer can be found on TCEQ's Geographic Web Apps website. Additional viewers outside of GPAT are available for groundwater information as well: TWDB maintains the Groundwater Data Viewer of approximately 140,000 water well reports in its Groundwater Database, and TCEQ's Source Water Assessment Viewer displays water well information for public drinking water sources.

GPAT facilitates TCEQ's Impact Evaluation Team, which was implemented to address the requirements of TWC Section 26.408. This statute requires the agency to notify owners of private drinking water wells of potential groundwater contamination that may impact their wells. The Impact Evaluation Team meets bi-weekly as needed to review cases of potential groundwater contamination documented by various program areas within TCEQ and by other state agencies, such as RRC.

Additionally, GPAT provides technical support for all TCEQ groundwater-related programs, such as the Edwards Aquifer Protection Program, and provides oversight and technical support when needed for a variety of special initiatives and studies.

GPAT compiles and maintains the Interagency Pesticide Database, which is part of an interagency effort of the TGPC to assess groundwater impacts from pesticides. The database contains the results of groundwater monitoring for pesticides collected by various agencies and other entities that sample groundwater. The database enables quick responses to public and agency inquiries, and when applied within Graphic Information System (digital mapping) software, it provides maps that enhance and clarify pesticide monitoring coverage, and acts as an annual planning and assessment resource.

Pesticide Management

TCEQ is the state's lead agency for developing pesticide contaminated water regulations. The state legislature and federal government have granted TCEQ:

- the responsibility of developing management plans to prevent water pollution by pesticides. TCEQ must solicit advice from the TGPC in developing such plans;
- the authority to regulate chemical wastes discharged to waters in the state (including groundwater) from tailwater or runoff from agricultural lands; and
- the authority to issue a TPDES permit.

GPAT has been responsible for groundwater protection activities related to pesticides since 1989, including conducting the agricultural chemical monitoring programs as outlined in the *Texas State Management Plan for Prevention of Pesticide Contamination of Groundwater*. The monitoring represents ambient screening for atrazine and other constituents depending on location, funding, and specific immediate concerns.

Additional pesticide-related activities include:

- delineating areas vulnerable to pesticide contamination,
- conducting cooperative ambient monitoring of groundwater,
- investigating elevated detections of atrazine and other constituents to determine the source and extent,
- ongoing monitoring of known high occurrences of atrazine or other constituents for long-term trend analysis and determining BMP effectiveness, and
- assessing pesticides of interest or concern in the online Pesticides of Interest Tracking System.

TCEQ Environmental Assistance Program

Pollution Prevention

The key to controlling nonpoint source pollution is often prevention. Preventing contaminants from reaching water in the first place mitigates environmental risks from pollution and eliminates the need for expensive clean-up programs. Community, business, and citizen involvement are integral to successful pollution prevention. There are simple day-to-day activities Texans can do to prevent pollution. Educating individuals about those activities and implementing prevention programs can be accomplished on a larger scale by federal, state, or local government programs. The following sections describe several programs that work with citizens, businesses, and industries to encourage voluntary use of pollution prevention activities.

Household Hazardous Waste Program

The TCEQ's Household Hazardous Waste Management Program offers assistance to municipalities and individuals who are interested in the proper collection and disposal of household hazardous waste. Resources include educational and regulatory information; technical assistance in setting up a collection program; contact information for existing programs; and general information on relevant issues.

Small Business and Local Government Assistance

TCEQ offers assistance through its Small Business and Local Government Assistance Program to help small businesses and local governments comply with environmental rules. The program is designed to give confidential technical assistance on air, water, waste, and pollution prevention issues without the threat of enforcement.

TCEQ offers several compliance assistance tools, regulatory guidance documents, and easy-to-follow checklists for various industries. Example industries include auto body shops, automotive repair facilities, auto salvage yards, dry cleaners, fleet maintenance facilities, foundries, metal finishers, printers, reinforced plastics facilities, sawmill operations, small airports and tenant operations, surface coaters, and the wood products industry.

TCEQ Take Care of Texas Program

The Take Care of Texas Program is a statewide campaign designed to improve water quality and prevent nonpoint source pollution. The Take Care of Texas campaign includes the initiatives identified below.

Resources for Students and Teachers - The Take Care of Texas website offers an expanded page with educational information for students, including activity books and posters. The website also offers teaching resources, which include lesson plans, to help educators promote awareness of environmental sciences.

Publications - TCEQ has many publications available to provide assistance and educational information. The Take Care of Texas Program offers free materials to help citizens and communities learn how all Texans can improve the environment, including publications on how to practice environmentally responsible lawn care to improve water quality and reduce water use.

TCEQ also offers subscribers a free, online newsletter called Take Care of Texas News You Can Use. This monthly newsletter offers current information to educate customers, suppliers, employees, or students about why and how they can improve the environment. More information on the Take Care of Texas campaign can be found at the program's website.

TCEQ On-Site Sewage Facilities Program

Texas Guidelines for Management of On-site Sewage Facilities

In Texas, an OSSF is defined as a wastewater system with a daily flow of less than 5,000 gallons where the wastewater is treated and disposed of on the property where it is generated. In 1989, the 71st Texas Legislature passed legislation to regulate OSSF systems statewide. The law required the state to establish a minimum construction code for all newly installed OSSFs. The law also encouraged the state to delegate its regulatory power to local governments who may adopt more stringent regulations than the state minimum. Texas presently has 4-5 million residents relying upon OSSFs for wastewater disposal,

with 37,000 permits issued on average per year. Approximately 98% of the permits issued in the state are issued by local governments.

In order to properly manage OSSFs to protect public health and the environment, Texas employs the following guidelines:

- Permits are required for lots less than 10 acres - In order to construct or operate a new OSSF, a property owner is required to obtain a permit. The permitting process encompasses site evaluation, approval of planning materials, and final inspection of OSSF construction.
- Statewide Construction Code - The statewide construction code establishes a minimum standard for OSSF construction. The minimum code protects the public health and environment by matching the size and type of the OSSF to the soil and site characteristics.
- Inspections/Monitoring - All new construction is inspected and approved by a trained inspector. Additionally, the performance of more complex commercial OSSFs is periodically monitored by trained professionals and reported to the regulatory authority.
- Enforcement - TCEQ and local governments primarily pursue enforcement for failing OSSFs through local courts. Revocation and suspension of licenses is performed through TCEQ.

Training and Licensing of OSSF Professionals

Texas has a formal licensing program for the OSSF professionals identified below.

- Designated Representative - Trained to review OSSFs, inspect OSSF construction, and initiate corrective actions for failing systems;
- Site Evaluator - Trained to evaluate soils and site characteristics;
- Installer I - Trained to install basic septic tank and drainfield systems;
- Installer II - Trained to install complex OSSFs; and
- Maintenance Provider - Trained to maintain individual wastewater treatment plants used in OSSFs.

All of the training for licensed individuals is conducted by third parties, with TCEQ review and approval of the trainers and course materials.

TCEQ Edwards Aquifer Protection Program

The State of Texas contains only one designated sole-source aquifer, the Edwards Aquifer found in the central and south central portion of the state. The Edwards Aquifer is an arcuate band of limestone and associated formations that stretch from Bell County through Williamson, Travis, Hays, Comal, Bexar, Medina, and Uvalde counties, finally terminating in Kinney County. All of these counties, except Bell, are subject to TCEQ rules promulgated to protect the quality of groundwater within the aquifer.

The rules in 30 TAC Chapter 213 are the basis of the Edwards Aquifer Protection Program, administered by TCEQ's staff in the Austin and San Antonio

Regional Offices. The program requires anyone who plans to conduct regulated activity on the recharge, transition, or contributing zone of the Edwards Aquifer to first have an application, including construction plans, approved by TCEQ. After a plan is reviewed and approved by TCEQ, the regional office staff monitor the site for compliance.

The Edwards Aquifer rules are intended to mitigate nonpoint source and point source impacts from regulated development over the recharge zone, transition zone, and contributing zone of the aquifer and, depending on the location and type of development, may require any or all of the following:

- A water pollution abatement plan for any regulated activity proposed on the Edwards Aquifer recharge zone. This includes any construction-related activity on the recharge zone, such as, but not limited to, the construction of buildings, utility stations, roads, highways, and railroads; clearing, excavation, or any other activities that alter or disturb the topographic, geologic, or existing recharge characteristics of a site; or any other activities which may pose a potential for contaminating the Edwards Aquifer and hydrologically connected surface streams.

- A contributing zone plan for regulated activities on the contributing zone that disturb five or more acres or regulated activities disturbing less than five acres which are part of a larger common plan of development or sale with the potential to disturb five or more acres.

- An organized sewage collection system plan for any public or private sewage system for the collection and conveyance of sewage to a treatment and disposal system that is regulated pursuant to rules of the TCEQ and provisions of TWC Chapter 26. A system includes lift stations, force mains, gravity lines, and all accessories necessary for conveying wastewater from a generating facility to a treatment plant.

- An underground storage tank facility plan for the installation or replacement of underground storage tanks or piping on either the recharge or transition zone of the Edwards Aquifer. In particular, storage tank (aboveground or underground) facilities that will store 500 gallons or more of static hydrocarbons or hazardous substances are regulated.

- An aboveground storage tank facility plan for the installation of permanent aboveground storage tanks at a facility that will have a total capacity of 500 gallons or more on either the recharge or transition zone of the Edwards Aquifer. In particular, aboveground storage tanks that will store static hydrocarbons or hazardous substances are regulated.

TCEQ Border Affairs Program

Border Programs

Urban populations are growing more rapidly in the border region compared to the rest of the state. On the Mexican side of the border, the population has grown by almost 50% in some areas over the past ten years. The boom in population and industrial growth both create an increased demand for water and strain communities' drinking water, wastewater, and waste management infrastructure.

The border region's economy depends on agriculture, ranching, oil and gas production, trade and commerce, industry, and tourism. Per capita income is lower in the border region than other parts of Texas, and lower income means fewer tax dollars for local governments to meet existing needs, keep up with rapid growth, or plan for the future. One of the greatest threats to water quality is the lack of sufficient drinking water, wastewater, and stormwater infrastructure to keep pace with growth. Poor and inadequate wastewater treatment can elevate bacteria levels and the risk of contracting water-borne diseases.

In addition to the need for adequate infrastructure, water quantity problems also affect water quality in the Rio Grande. As water quantity decreases, salinity levels can increase and may make the water less suitable for municipal and agricultural use. Agriculture is particularly important in the Lower Rio Grande Valley of South Texas, where elevated levels of salinity in surface water from the Rio Grande, as well as water supply delivered from binational dams on the Rio Grande, are a daily concern for farmers.

Border growth also impedes communities' ability to manage the disposal of solid and hazardous wastes. Limited disposal options lead to an increase in illegal dumping. Hazardous waste transportation remains a concern in border port-of-entry cities, where chemical spills pose a potential threat to public health and water supplies. Improper disposal of used and scrap tires is a major concern in the region where scrap tires can block storm drains and canals, exacerbating flooding and interrupting water deliveries for irrigation. TCEQ provides several programs to address the unique water quality and quantity needs in the border region.

The TCEQ Border Initiative

In 2008, TCEQ began a comprehensive border initiative, integrating all of the agency's work in the border region, including those undertaken cooperatively with local, state, and federal partners. The Border Initiative encompasses various water and wastewater programs, including a binational watershed protection pilot program for the Rio Grande (known as Rio Bravo in Mexico) downstream of Falcon Dam. TCEQ worked with U.S. and Mexican stakeholders on the plan, which was completed in August 2016. Regional TCEQ staff based in El Paso, Harlingen, and Laredo respond to complaints and provide confidential

assistance to small businesses and local governments on water and waste regulations face to face and through the toll-free hotline at 800-447-2827.

Part of TCEQ's Border Initiative is supporting the Texas Water Infrastructure Coordinating Committee, which according to its website is a "one-stop shop for information on funding eligibility or technical assistance for water systems facing infrastructure or compliance issues." Since maintaining water quality is a shared responsibility of many agencies and jurisdictions, the Border Initiative helps provide information to customers in the border region about the various resources that are available to bring water systems and utilities into compliance, follow best management practices, and ensure cost-effective operations. More information on the Texas Water Infrastructure Coordinating Committee can be found at the program's website.

TCEQ Commissioners play a key role in ensuring that the 1944 Water Treaty between the U.S. and Mexico results in timely deliveries of water from dams in Mexico to the Rio Grande and its reservoirs, to provide water for Texas farmers and communities. The Border Initiative supports the Commissioners' many efforts to represent Texans on the border and the border environment.

State-to-State Agreements

TCEQ has signed Memoranda of Cooperation with neighboring states in Mexico to help communicate and work together with sister agencies when needed during emergencies and to resolve shared environmental challenges. As part of these memoranda or state-to-state agreements, TCEQ has developed strategic environmental plans with Texas's four neighboring Mexican states: Chihuahua, Coahuila, Nuevo León, and Tamaulipas.

Border 2020: U.S.-Mexico Environmental Program

Since the signing of the 1983 La Paz Agreement, EPA and Mexico's Secretariat of the Environment and Natural Resources have engaged in a joint environmental program, to be renewed as "Border 2025." Improving water quality through binational collaboration is a top priority of the program. According to the draft Border 2025 framework, Goal 2, Objective 5d, a stated objective is to "[c]ontinue the work of the binational water quality improvement plan as part of the Lower Rio Grande Water Quality Initiative in the Lower Rio Grande below Falcon International Dam." TCEQ is a proud partner in the Lower Rio Grande Water Quality Initiative, along with Mexican state and federal agencies, EPA, and the IBWC. The objectives of the initiative are to characterize the state of the river, develop a strategic plan to improve environmental conditions, and implement a monitoring plan to document progress. More information on Border 2020 can be found at EPA's U.S. Mexico Border 2020 Program website.

The North American Development Bank

The North American Development Bank (NADB) was created through a side agreement to the North American Free Trade Act, and recapitalized under the United States – Mexico – Canada Agreement to certify and finance water, wastewater, and solid waste projects along the entire U.S.-Mexico border. As of

March 2020, the NADB has certified 264 environmental infrastructure projects with more than $3.26 billion in loans and grants in the border area of Texas, defined as within 100 kilometers of the border. Most NADB investments are water and sewer projects. In addition, various completed wastewater projects in Mexico along the Rio Grande are aimed to improve Rio Grande water quality. TCEQ coordinates with the NADB to ensure that funded projects meet state priorities.

TCEQ Clean Water Certification Program

TCEQ implements the requirements of 30 TAC Chapter 321, Subchapter A relating to boat sewage disposal. These rules identify which boats must have marine sanitation devices installed, specification and certification requirements (including fees and renewals) for marine sanitation devices and boat pump-out stations, and disposal methods for the contents of marine sanitation devices and boat pump-out stations. The rules also identify which waterways in Texas are designated as no discharge zones, which are bodies of water into which the disposal of sewage (treated or untreated) is completely prohibited.

TCEQ CWA Section 401 Certification Program

CWA Section 401 ensures that federal discharge permits are consistent with the TSWQS. Under CWA Section 401, states are given the authority to review federally permitted or licensed activities that may result in a discharge of pollutants to waters of the U.S., such as the discharge of dredge or fill material.

Any federally authorized activity that may result in a discharge is subject to CWA Section 401 certification. The most common type of permit subject to CWA Section 401 certification is the U.S. Army Corps of Engineers' CWA Section 404 permit for discharges into jurisdictional waters of the U.S. Applicants for CWA Section 404 permits are asked to avoid impacts to waters of the U.S. where possible; minimize impacts where avoidance is not possible; and provide compensatory mitigation for unavoidable impacts. Wetland and stream mitigation can take place at mitigation banks, through in-lieu fee programs, or through permittee-responsible mitigation. State and federal regulations have set a goal of *no net loss* of wetland functions and values.

Before issuing a federal permit in Texas, the permitting agency must receive from TCEQ or the RRC a certification, conditional certification, or waiver stating that the discharge will not violate the TSWQS. If the state denies certification, the federal permit is also denied. TCEQ is responsible for certifying federal permits in Texas, except for those related to oil and gas exploration, development, and production, which are certified by the RRC. The RRC certified permit activities include dredging an access channel to conduct drilling or production operations in a critical area; construction of a drilling pad or installation of a production platform in a critical area; and construction, operation, or maintenance of a crude oil or natural gas pipeline facility in waters in the state. Examples of TCEQ 401 certification projects include roads, reservoirs, shoreline stabilization, and commercial and residential developments. Short-term and long-term BMPs for soil stabilization, erosion

control, and sedimentation control are typically recommended for projects during the CWA Section 401 review.

The CWA Section 401 certification program also plays a role in protecting coastal resources under the Texas CMP. The CMP is designed to accomplish the goals set by the state legislature for coastal resource protection and to meet specific requirements for an approved plan under the CZMA. Certain activities, such as discharges authorized by CWA Section 404 permits, must be consistent with the state CMP when they occur within the coastal zone boundary and the CMP delegates some coastal consistency reviews to the two CWA Section 401 agencies.

TCEQ Industrial and Hazardous Waste Permits Program

TCEQ permits for industrial and hazardous waste management units contain provisions to protect groundwater and surface water from the effects of small releases. These provisions include requirements for pond and landfill liner systems, groundwater monitoring sampling and analysis, leak detection, and other protective measures. In addition, new facilities must meet siting requirements that consider the suitability of local geology to isolate wastes, thereby protecting groundwater and surface water.

Remediation of Contaminated Sites

Environmental contamination can occur in many ways. Some examples include unreported spills of hazardous materials, undetected leaks from pipes or other malfunctioning industrial equipment, improper disposal of byproducts of industrial processes, abandoned municipal solid waste landfills, and abandoned, inactive industrial sites. If not remedied, groundwater and surface water contamination may occur, which can pose environmental and human health problems.

TCEQ Superfund Program

The state Superfund Program remediates abandoned or inactive sites within the state that pose an unacceptable risk to public health and safety or the environment, but which do not qualify for action under the federal Superfund Program. The state Superfund Program is administered by TCEQ.

TCEQ manages or provides management assistance to EPA with regard to the Superfund remediation process after the site is identified as being eligible for listing on either the state Superfund registry or the federal National Priorities List. TCEQ ensures that all Superfund activities are completed in a timely and efficient manner, and in accordance with all applicable state and federal laws and rules.

TCEQ Brownfields Program

In Texas, many former industrial properties lie dormant or underutilized due to liability associated with real or perceived contamination. These properties are broadly referred to as brownfields. TCEQ, in close partnership with EPA and other federal, state, and local agencies, facilitates cleanup, transferability, and

revitalization of brownfields. This is accomplished through the development of regulatory, tax, and technical assistance tools. In addition, TCEQ is available to provide local governments technical advice, education, and project partnering for brownfields redevelopment projects free of charge.

TCEQ Voluntary Cleanup Program

The Texas Voluntary Cleanup Program provides administrative, technical, and legal incentives to encourage the cleanup of contaminated sites in Texas. Non-responsible parties, including future lenders and landowners, receive protection from liability from the State of Texas for cleaning up sites under the Voluntary Cleanup Program. Therefore, constraints for completing real estate transactions at those sites are eliminated. Also under the program, site cleanups follow a streamlined approach to reduce future human and environmental risks to safe levels. As a result, many unused or under-used properties may be restored and become economically productive and beneficial to the community.

TCEQ Corrective Action Program

The mission of TCEQ's Industrial and Hazardous Waste Corrective Action Program is to oversee the cleanup of sites with soil and groundwater contamination from industrial and municipal hazardous and industrial non-hazardous wastes. The goal of this program is to ensure that the public is not exposed to hazardous levels of chemicals by requiring mitigation and/or the removal of contamination to levels protective of human health and the environment.

TCEQ Leaking Petroleum Storage Tank Program

TCEQ is responsible for administering the Leaking Petroleum Storage Tank Program. The program mission is to oversee the cleanup of spills from regulated storage tanks by recording and evaluating all reported incidents of releases of petroleum and other hazardous substances from underground and aboveground storage tanks. The goal of the program is to ensure that the public is not exposed to hazardous levels of contamination by requiring the removal of contamination from petroleum storage tanks to levels protective of human health and the environment.

TCEQ Dry Cleaner Remediation Program

TCEQ established the Dry Cleaner Remediation Program for state-led clean-ups of dry cleaner-related contaminated sites. The program assists with remediation of contamination caused by dry cleaning solvents. The goal of the program is to ensure that the public is not exposed to the hazardous levels of chemicals by mitigating and/or remediating the contaminated soil and groundwater to levels protective of human health and environment.

TCEQ Underground Injection Control Program

Chapter 27 of the TWC (the Injection Well Act) defines an "injection well" as "an artificial excavation or opening in the ground made by digging, boring, drilling, jetting, driving, or some other method, and used to inject, transmit, or dispose

of industrial and municipal waste or oil and gas waste into a subsurface stratum; or a well initially drilled to produce oil and gas which is used to transmit, inject, or dispose of industrial and municipal waste or oil and gas waste into a subsurface stratum; or a well used for the injection of any other fluid; but the term does not include any surface pit, surface excavation, or natural depression used to dispose of industrial and municipal waste or oil and gas waste."All injection wells in Texas are regulated by either TCEQ or RRC. Injection wells are classified into six different types:

- Class I wells, which are used for deep injection, are regulated by TCEQ. (RRC reviews and comments on these applications.)
- Class II wells, which are related to oil and gas injection wells, are regulated by RRC. (TCEQ reviews and comments on these applications.)
- Class III wells, which are used to extract minerals other than oil and gas, are regulated by TCEQ or RRC, depending on the type of well.
- Class IV wells are generally banned, but may be authorized by TCEQ or EPA in certain environmental cleanup operations.
- Class V wells, which are used for many different activities, are regulated by either TCEQ or RRC, depending on the type of well.
- Class VI wells, which are used to inject carbon dioxide into deep rock formations, are regulated by either TCEQ or RRC depending on the location of the well.

A few examples of injection wells regulated by TCEQ are:

- wells that inject municipal, industrial, or hazardous wastes into a layer that is below the lowermost underground source of drinking water;
- wells that inject fluids to extract uranium or sulfur and to dispose of waste byproducts from the mining operation;
- any well or similar apparatus that releases a liquid or liquids into or above an underground source of drinking water;
- wells that are used for aquifer storage and recovery;
- wells that are used as remediation wells and stormwater drainage wells; and
- non-hazardous waste disposal wells that inject into or above underground sources of drinking water.

TCEQ Emergency Response Program

TCEQ provides monitoring, oversight, and technical and regulatory help through its emergency-response team. According to the State of Texas Emergency Management Plan, Annex Q, TCEQ is the state's primary agency for hazardous materials and oil spill response. TCEQ personnel provide technical and regulatory assistance in the management of wastes and other residual materials that result from spills within the agency's jurisdiction, which also includes management of industrial and municipal solid wastes and hazardous wastes. Technical assistance is provided in other related areas, such as spill notifications, contingency-plan issues, cleanup levels, in-state funded cleanups, and remediation of hazardous materials spills. TCEQ and GLO jointly serve as the state's primary members of the federal Regional Response Team for EPA's

Region 6, and TCEQ represents the state in matters related to inland spills or releases of oil and inland or coastal releases of hazardous substances or other pollutants. The agency also responds to pollution events and the needs of local government, the regulated community, and the public associated with natural disasters. Assistance in emergencies includes:

- assisting water-supply officials in supplying drinking water and the return of systems to operation, evaluating water quality, assisting individuals in maintaining private water or sewer systems, and assessing damages to public drinking water systems;
- informing and aiding the State Emergency Management Council on matters of flood-hazard areas, floodplain management, flood hydrology, engineering, dam safety, reservoir operation, water rights and uses, water quality, and management of hazardous waste;
- obtaining, analyzing, and interpreting meteorological and climatological data, and making forecasts in emergency situations when weather is a factor;
- making available the services of specialists (floodplain management, hydrology, meteorology, groundwater geology, water quality, dam safety, wastewater treatment, water rights and uses, management of solid waste—including hazardous and radioactive waste, and emergency response) that may be of assistance during a disaster;
- supplying spill-response maps as well as maps relating to flood-hazard areas;
- supplying TCEQ data, including data from neighboring states and Mexico, needed for dealing with a disaster that transcends the boundaries of Texas;
- offering technical assistance to local governments in the physical siting of disposal facilities for debris, including municipal wastes, whenever a disaster generates or causes excessive amounts of such wastes;
- making available equipment from TCEQ regional offices, such as boats, generators, and vehicles with radio and cellular phone support;
- helping pay for cleanups as appropriate from funds under TCEQ's statutory authority; and
- making available contracting resources for cleanups when a responsible party cannot be found.

TCEQ Used Oil Recycling Program

Texas law prohibits the dumping of used oil into storm drains, sewers, and waterways, or on land, including for use as a dust suppressant. Instead, used oil is recycled to make fuel oil, lubricants, re-refined oil, or other petroleum products. Owners and operators of used oil transporters, handlers, and collection centers are required to register with TCEQ and report the amount of used oil handled on an annual basis. Additionally, Texas has banned used oil filters from being placed in or accepted for disposal in a landfill. Instead, used oil filters can be drained, shredded, crushed, and/or heated to remove the oil. The removed oil is sent to a recycler who can then utilize the oil. The remaining material must be further recycled. A transporter, storage facility, or processor may not store, process, recycle, or dispose of used oil filters unless the person is registered with the agency.

TCEQ Municipal Solid Waste Permitting, Planning, and Reporting Program

Municipal solid waste is solid waste resulting from municipal, community, commercial, institutional, and recreational activities, including garbage, rubbish, ashes, street cleanings, dead animals, and abandoned automobiles. TCEQ requires municipal solid waste facilities to obtain permits in Texas. These permits address aspects of the facilities, including:

- location restrictions
- lining requirements
- leachate collection and removal systems
- operating practices
- groundwater monitoring requirements
- closure and post-closure care requirements
- corrective action provisions
- financial assurance

TCEQ is responsible for data assessment and planning for the management of solid wastes in Texas. To support these activities, TCEQ collects and compiles data on the generation and disposal of municipal solid waste in Texas.

As part of its waste planning efforts, TCEQ administers a Regional Solid Waste Grants Program. The grants program supports regional solid waste management planning by the state's 24 regional Councils of Governments (COGs), as well as a pass-through grant program administered by the COGs to fund regional and local solid waste management projects. The COGs also use these funds to develop an inventory of closed municipal solid waste landfills; conduct regional coordination and planning activities; provide technical assistance and informational programs pertaining to solid waste management; serve as central points of contact for solid waste management outreach, education, and training programs; and maintain a regional solid waste management plan.

Owners and operators of municipal solid waste landfills and other waste management facilities submit an annual report to TCEQ, detailing the amount and types of solid waste managed and the remaining capacity of each facility. The data are compiled and published in an annual summary report titled *Municipal Solid Waste in Texas: A Year in Review* (TCEQ publication AS-187).

TCEQ Illegal Disposal Abatement Program

To successfully address illegal dumping, communities must develop long-term comprehensive solutions. TCEQ has developed a model approach for use in developing solutions for illegal dumping and other municipal solid waste problems. This model approach focuses on developing and maintaining a program that includes the following four components:

- Garbage collection services - Provide residents with convenient and affordable ways to dispose of their garbage, such as citizen collection stations for rural communities.

- Public awareness campaigns - Increase public awareness on the health and safety hazards of illegal dumping and available legal options for garbage disposal.

- Cleanup of existing dumps - Clean up illegal dump sites to discourage other dumpers, who are attracted to these existing sites, and to improve the community's awareness of the problem.

- Enforcement - Increase the cost of illegal dumping through increased enforcement and more severe punishments for offenders.

TCEQ Scrap Tire Management Program

Scrap tires must be managed to prevent fires and control disease vectors (mosquitoes and rats). The toxic air pollutants from tire fires can become nonpoint source water pollutants through atmospheric deposition. Prior to TCEQ's Scrap Tire Management Program, large illegal tire dumps often appeared on the beds and banks of streams, damaging riparian habitat. TCEQ regulates the collection, processing, and recycling/disposal of over 44 million tires discarded each year in Texas. Anyone who stores more than 500 scrap tires must register with TCEQ as a scrap tire storage site. Scrap tires must be hauled by a registered transporter to either a permitted landfill or an authorized scrap tire facility. All facilities must keep manifest records showing the disposition of scrap tires.

Annual Enforcement Report

The Annual Enforcement Report provides the TCEQ Commissioners, the legislature, and the public with key statistics and performance indicators about agency enforcement activities. State law requires TCEQ to prepare an electronic enforcement report by December 1 each year that reports on the enforcement actions for each type of regulatory program in the agency. The enforcement report contains statistical indicators and a comparative analysis for many enforcement-related activities, including, but not limited to:

- number of investigations and complaints by program and region;
- number of notices of violation issued by program and region;
- number of administrative orders, civil judicial orders, and criminal convictions, including the regulated entity name and location by county;
- amount of penalties assessed, deferred, and required to be paid;
- supplemental environmental project costs, offsets, and descriptions;
- number of notices of intent to audit and disclosures of violation submitted under the Texas Environmental Health and Safety Audit Privilege Act;
- percentage of industry types with previous enforcement orders;
- most frequently cited rules/statutes in enforcement actions;
- emissions events;
- aggregate production operations; and
- other information which the Commission deems relevant, including information on the results of enforcement actions (i.e., environmental benefit, pollutant reductions, etc.).

Stakeholders developing a WPP can refer to the Annual Enforcement Report as information during watershed characterization, planning, and implementation.

Citizen Complaints

Responding to complaints from the general public about alleged environmental, health, or regulatory violations is an important part of TCEQ's regional offices. Complaints received in regional offices are prioritized based on the relative threat that is posed to public health, safety, or the environment in which the most serious complaints are addressed first. An investigation may take the form of an on-site inspection, which may result in sampling.

Complaints are categorized as follows:

- conditions relating to air quality, such as odor, dust, and smoke,
- conditions that create a potential to pollute the water or land,
- alleged violations of TCEQ permits or rules,
- smoking vehicles,
- spills, and
- other environmental concerns.

Stakeholders developing a WPP can use past citizen complaints as information during watershed characterization, planning, and implementation. Matters not within TCEQ’s jurisdiction will be referred to the appropriate state agency. TCEQ does not have the authority to regulate, enforce, or mediate private actions between citizens.

Citizen-Collected Evidence

When a citizen believes someone is causing an environmental problem and possibly violating the law, the citizen can either file a complaint with TCEQ or submit information documenting the problem. TCEQ is authorized by statute to initiate an enforcement action based on information provided by a private individual if that information, in the TCEQ's judgment, is of sufficient value and credibility to warrant the initiation of an enforcement action (TWC Section 7.0025; 30 TAC Section 70.4).

It is important to note that a citizen who wants TCEQ to use the information provided as evidence in an enforcement case cannot remain anonymous. Furthermore, TCEQ rules do not authorize citizens to enter the property of another person for purposes of gathering information to document a violation. Finally, a citizen collecting evidence must use TCEQ protocols, procedures, or guidelines when collecting and submitting information or evidence. Protocols vary depending on the nature of the problem; for example, water quality sampling procedures are very different from a nuisance odor evaluation. A sample without the proper chain of custody documentation will not be acceptable to TCEQ.

Supplemental Environmental Projects

Supplemental Environmental Projects prevent or reduce pollution, enhance the quality of the environment, and increase environmental public awareness. The Supplemental Environmental Projects Program, administered by TCEQ, provides the opportunity for the respondent in an enforcement action to negotiate an agreement to perform a supplemental environmental project in return for a reduction in administrative penalties. Potential projects include cleanup of abandoned illegal dump sites; community household hazardous waste collections; purchase of Water Wise kits for local schools; and on-site pollution prevention projects that exceed regulatory requirements.

TCEQ Occupational Licensing Program

The TCEQ Occupational Licensing Program is dedicated to the protection of the environment and human health through the responsible licensing of individuals whose occupations may have an environmental impact. The program's duties include issuing new licenses, renewing licenses, training approval, and exam development. The following is a listing of licenses that TCEQ issues:

- Backflow Prevention Assembly Tester;
- Customer Service Inspector;
- Landscape Irrigator, Technician, and Inspector;
- Leaking Petroleum Storage Tank Corrective Action Specialist and Project Manager;
- Municipal Solid Waste Operator;
- OSSF, including septic tanks, Inspector and Installer;
- Underground Storage Tank Contractor and On-Site Supervisor;
- Wastewater Operator;
- Wastewater Collection Operator;
- Water Operator; and
- Water Treatment Specialist.

Texas Water Development Board

TWDB is the state's water planning and water project financing agency. It is responsible for collecting and disseminating water-related data, assisting with regional water planning, preparing the State Water Plan, and financing water and wastewater projects located throughout the state. Under the Clean Water State Revolving Fund (CWSRF), TWDB provides loans that can be used for the planning, design, and construction of wastewater treatment facilities, wastewater recycling and reuse facilities, collection systems, stormwater pollution controls, nonpoint source pollution controls, and estuary management projects.

TWDB conducts an active groundwater resource assessment program. TWDB personnel have identified boundaries and various characteristics for all of the state's major and minor aquifers, including geologic information, water availability, and recharge. In addition, TWDB has identified the major entities using groundwater within each river basin, the aquifer(s) from which they

pump, the quality of water being developed, and the quantity of water needed for a 50-year planning period. To accomplish this, TWDB has been collecting data on the occurrence, availability, quality, and quantity of groundwater present and the current and projected demands on groundwater resources. The statewide groundwater level measurement program, groundwater quality sampling program, and groundwater studies are vital to the state's regional water planning efforts.

The purpose of the ambient groundwater quality sampling program is to collect data to: 1) monitor changes, if any, in the quality of groundwater over time and 2) establish, as accurately as possible, the baseline quality of groundwater occurring naturally in the state's aquifers. TWDB conducts the groundwater quality monitoring program in accordance with procedures established in its Field Manual for Groundwater Sampling. It also obtains data collected by other entities that follow these and similar procedures, such as GCDs, USGS, and other state and federal agencies.

The Clean Water State Revolving Fund

Another funding tool available in Texas to address nonpoint source pollution is the CWSRF, which is administered by the TWDB. The CWSRF is a loan program authorized under the CWA and is capitalized by an annual grant from EPA. This program provides funding assistance in the form of 20- to 30-year loans at below market interest rates. The money from the loan payments is returned to the CWSRF to supplement the annual EPA capitalization grant for new loans. Although the majority of the loans are made to publicly owned wastewater treatment and collection systems, the TWDB can also provide loans for nonpoint source pollution abatement projects through the CWSRF. Loans can be made to towns, counties, GCDs, SWCDs, and other political subdivisions, as well as to private individuals and non-profit organizations. A water quality-based priority system is used to rank potential applicants and fund projects with the greatest environmental benefits. Some of the activities that are eligible for funding include agricultural, rural, and urban runoff control; estuary improvement; nonpoint source education; and wet weather flow control, including stormwater and sewer overflows that are not associated with a TPDES permit.

TWDB has increased its efforts to identify potential applicants for loan projects that would address nonpoint source-related water quality problems in the state. Staff from TWDB, TCEQ, and TSSWCB meet on a regular basis to coordinate efforts to identify water bodies which are impacted by nonpoint source pollutants and identify potential applicants for CWSRF assistance. TCEQ and TSSWCB provide input on funding needs from information gathered during the development of the Integrated Report, TMDLs, TMDL I-Plans, and WPPs. The TWDB uses this information during the development of its annual CWSRF Intended Use Plan and to focus its efforts to identify potential applicants for CWSRF funding assistance. More information on the CWSRF can be found at the TWDB website.

The Texas Water Development Fund

The Texas Water Development Fund (DFund) is the original TWDB Financial Assistance Program created by the Texas Legislature in response to the drought of the 1950s. The DFund makes loans available for planning, acquisition, design, and construction of both wastewater and water projects. Eligible sewer projects include sewer treatment plants, collection systems, system acquisitions, nonpoint source pollution abatement, and development of new municipal solid waste disposal facilities. In addition to standard water treatment and supply projects, the DFund can also provide loans for structural and nonstructural flood protection improvements. The DFund provides loans only and is available to state political subdivisions and nonprofit water supply corporations.

The Rural Water Assistance Fund

The Rural Water Assistance Fund is designed to assist small rural utilities to obtain low-cost financing for water and wastewater projects. The assistance fund offers tax-exempt equivalent interest rates with long-term finance options. Eligible borrowers are defined as rural political subdivisions, which include water supply corporations, serving populations of 10,000 or less, and counties in which no urban area has a population exceeding 50,000. Financial assistance is provided for a wide range of both water and wastewater projects, including nonpoint source pollution abatement.

The Agricultural Loan Program

The TWDB provides grants and loans for agricultural water conservation equipment and practices which promote, demonstrate, or evaluate more efficient uses of irrigation in agriculture. Grants are available to political subdivisions and state agencies. Loans are also available to political subdivisions and individuals through political subdivisions or a linked deposit program. The use of more efficient irrigation practices can reduce agricultural nonpoint source loadings in surface water and groundwater.

Flood Infrastructure Fund

The Flood Infrastructure Fund provides grants and loans for flood mitigation, flood control, and drainage projects that may also mitigate nonpoint source pollution. For most projects, eligible applicants are political subdivisions created under Article III, Section 52 or Article XVI, Section 59 of the Texas Constitution. For large-scale watershed planning studies, eligibility is expanded to also include any other political subdivision of the state, any interstate compact commission to which the state is a party, and any nonprofit water supply corporation created and operating under Chapter 67. Details for each funding cycle, including the schedule, prioritization criteria, and available financing, are specified in an Intended Use Plan posted to the program website.

Texas Groundwater Protection Committee

TGPC was created by the 71st Texas Legislature in 1989 to bridge gaps between existing state groundwater programs and to optimize water-quality protection

by coordinating the state's groundwater protection efforts. State law codified in TWC Sections 26.401 through 26.408 establishes the TGPC; outlines the Committee's powers, duties, and responsibilities; and establishes the state's policy to protect groundwater as a vital resource.

The TGPC includes representatives from ten agencies. The executive director of TCEQ serves as the TGPC's chairman, and the executive administrator of TWDB serves as the vice chairman. TCEQ is designated as the lead agency for TGPC and administers the activities of TGPC. Additional members of the committee are RRC, DSHS, TDA, TSSWCB, Texas Alliance of Groundwater Districts, Texas A&M AgriLife Research, Bureau of Economic Geology of the University of Texas at Austin, and Texas Department of Licensing and Registration (TDLR).

The TGPC implements the state's groundwater protection policy, which includes a goal of no degradation of groundwater resources for all state programs. This policy recognizes the variability of the state's aquifers, the importance of maintaining water quality for existing and potential uses, the protection of the environment and public health and welfare, and the maintenance and enhancement of the long-term economic health of the state. Further, the policy recognizes that groundwater contamination may result from many sources, including current and past oil and gas production and related practices, agricultural activities, industrial and manufacturing processes, commercial and business endeavors, domestic activities, and natural sources that may be influenced by, or may result from, human activities. The use of best professional judgment by the responsible state agencies in attaining the goal and policy is also recognized. The policy states that discharges of pollutants, disposal of wastes, and other regulated activities should be conducted in a manner that will maintain present uses and not impair potential uses of groundwater or pose a public health hazard. The programs of the various state agencies are generally coordinated to attain this goal.

Public Outreach and Education Subcommittee

The primary goals of the Public Outreach and Education Subcommittee are to develop and distribute educational outreach materials for those concerned with groundwater protection and environmental health issues and to facilitate interagency communication and coordination to provide support for water well owner and user educational outreach projects. Activities include developing educational materials, coordinating outreach programs and special projects with a focus on the nonpoint source-related issues of abandoned well closure, OSSF maintenance, domestic drinking well sampling, and the Texas Well Owner Network, which is a groundwater quality protection program.

Groundwater Issues Subcommittee

The primary goals of the Groundwater Issues Subcommittee are to facilitate interagency communication for assessment programs addressing groundwater contamination; coordinate and assist member agencies with monitoring programs for ambient groundwater conditions, pesticides, and emerging contaminants or constituents of concern; and support the intent of the Texas

Groundwater Protection Strategy. Activities include the review of data and reports to assist in the determination of the effectiveness of existing regulatory programs and to identify potential groundwater contaminants not addressed by existing regulatory programs, and the development of white papers with recommendations or policy options for consideration by the TGPC regarding various groundwater-related issues.

Texas Parks and Wildlife Department

TPWD's primary functions are to manage and conserve the natural and cultural resources of Texas and to provide hunting, fishing, and outdoor recreation opportunities. Many natural resources depend on clean water in the state's rivers, lakes, and coastal waters. TPWD participates in the state's Nonpoint Source Program and implements many programs that support the Nonpoint Source Program goals.

To this end, TPWD does the following:

- operates and maintains a system of public lands, including state parks, historic sites, fish hatcheries, and wildlife management areas;
- monitors, conserves, protects, and enhances the state's fish and wildlife resources;
- regulates and enforces commercial and recreational fishing, hunting, boating, and nongame laws in the state;
- monitors, conserves, and enhances the quality and quantity of rivers, streams, lakes, coastal marshes, bays, beaches, gulf waters, and other aquatic and wildlife habitat;
- informs and educates the public regarding laws and rules regulating fish, game/nongame wildlife and environmental habitats, boating safety, firearm safety for hunters, fish and wildlife conservation, and outdoor recreation in general; and
- provides direct matching grants to local political subdivisions and non-profit entities for planning, acquiring, or developing local parks and recreational facilities, and for recreation, conservation, and education programs for underserved populations.

The 2015 Land and Water Resources Conservation and Recreation Plan guides the agency in conserving the state's natural and historic heritage and in providing public access to the outdoors. It serves as a tactical document that guides planning, operational, and budget decisions.

Kills and Spills Team

TPWD has assembled a multi-divisional response team, the Kills and Spills Team, comprised of biologists assigned to four regions across Texas. The Kills and Spills Team assumes four key responsibilities: 1) respond to fish and wildlife kills and pollution incidents, including oil and hazardous material spills; 2) minimize environmental degradation resulting from pollution incidents and fish and wildlife kills; 3) obtain compensation, repairs, and restoration for

environmental damage; and, 4) act as a technical resource with respect to relationships between water quality, habitat, and living organisms.

Approximately 84% of the incidents the Kills and Spills Team responds to are fish or wildlife kills. Natural causes responsible for fish kills include extreme weather temperatures, bacteria and disease, and toxic algal blooms. The actions of humans can result in fish and wildlife kills through the introduction of toxic chemicals, pesticides, fertilizers, and contaminated stormwater runoff. Low dissolved oxygen concentration is another cause of fish kills. Low dissolved oxygen can result from plant respiration depleting oxygen levels during the night. Other causes of low dissolved oxygen include excessive decay during hot, still days, dams, and dead-end canals.

A fish or wildlife kill is physical evidence that something is wrong. The sooner it is reported, the sooner it can be investigated and remedied. Immediately after a kill or spill is reported, an investigation is begun to determine the source of a spill or the cause(s) of a kill. Though differences exist between investigating fish and wildlife kills and spills, the need for prompt response and accurate analysis applies in either case. Crucial details can be lost in a short amount of time. In addition, factors that may seem insignificant such as weather, vegetation, algal blooms, water chemistry, water flow, and pollution can have serious impacts to an ecosystem when they change rapidly. Therefore, TPWD biologists must pay close attention to details, follow proper sampling procedures, and keep valid records. For large pollution events, TPWD biologists often work together with other state and local authorities.

A responsible party may be identified as having caused the incident. The responsible party may be asked to make restitution for the ecological damages. Restitution may consist of a monetary reimbursement for the value of fish or wildlife killed, or may be a project that restores value to the ecosystem.

The Private Lands and Habitat Program

The goal of the Private Lands and Habitat Program is to provide advice and information to land managers interested in managing natural resources on their property. This program seeks to answer landowner questions regarding the conservation and development of wildlife habitat and the proper management of the various wildlife populations which utilize that habitat, from producing quality whitetail deer to increasing songbird diversity. The goal is to slow or reverse the decline in quantity of the state's wildlife habitat and improve the quality of remaining habitat. TPWD biologists promote management practices which will maximize wildlife potential, prevent waste or depletion of the resource, provide aesthetic and economic benefits to the landowner, and offer increased opportunity for public use and enjoyment of renewable natural resources.

The Texas Farm and Ranch Lands Conservation Program

The Texas Farm and Ranch Lands Conservation Program was created in 2005 by the 79th Texas Legislature and received state funding when it was moved to

TPWD in 2016 with a biennial appropriation of $2 million. The program provides funds to qualified easement holders, such as government entities and land trusts, to acquire and hold conservation easements on privately owned working lands that have a high conservation value. Working lands include farms and ranches, fiber and timber production, or wildlife management. An emphasis is placed on protecting lands that are at risk of subdivision and fragmentation. Since the program transferred to TPWD, the Texas Farm and Ranch Lands Conservation Council has awarded over $4 million to thirteen projects, protecting more than 24,000 acres across the state. The conservation of these properties is directly related to improving water quality by providing permanent protection to springs, creeks, and watersheds. In addition, the properties selected have demonstrated a long-term commitment to utilizing best management practices designed to improve water quality.

The Texas Wildscapes Program

The Texas Wildscapes Program emphasizes providing the basics for good habitat: food, water, and cover. With approximately 95% of the state's land use practices in the hands of private landowners, the importance of education toward a common bond is evident. The Texas Wildscapes Program provides educational materials for the Texas urban residential landowner to promote a better-educated population which is more supportive of wildlife and conservation issues. The Texas Wildscapes Program can also be applied to community, rural, and corporate properties. The program introduces the concept of habitat and provides information to the public regarding wildlife needs and the importance of landscaping with native plants. The program also promotes minimizing the use of pesticides and fertilizers, xeriscaping, mulching, composting, and watering practices to conserve water.

Freshwater Habitat Protection and Restoration

TPWD has recently initiated a program to restore and maintain freshwater aquatic habitats to support healthy, sustainable ecosystems throughout Texas. Aquatic habitat degradation and loss have profound detrimental effects on ecosystem health and resiliency. Currently, more than 40% of fish and mussel taxa in Texas are listed as imperiled, and several species have already been lost to extirpation or extinction. These losses can be mitigated by ensuring natural physical processes and habitat quality throughout watersheds.

TPWD helps to protect these habitats by providing technical support and review of projects associated with water development, water planning, and water quality issues. Partnerships have been developed to conserve aquatic, riparian, and upland habitats essential to environmentally and economically healthy watersheds that benefit the natural resources of the state. This is achieved through: 1) promoting awareness and stewardship of fish and freshwater aquatic habitats; 2) establishing and nurturing local partnerships to identify conservation priorities and leverage available resources; 3) providing technical guidance and planning assistance; and 4) organizing community involvement in local fish habitat conservation projects. Proper watershed management helps to

raise public awareness of the value of our state's natural resources and provides quality recreational opportunities to citizens of Texas.

Conserving Texas Rivers Initiative

The TPWD Habitat Conservation Branch staff work with TPWD's Wildlife Division staff to engage private landowners and promote the implementation of watershed-based BMPs for the conservation of riparian and aquatic species. Technical guidance is provided to facilitate land stewardship that results in benefits to aquatic species. Additionally, staff work with landowners to develop riparian and upland restoration projects that are ultimately funded by the TPWD Landowner Incentive Program, National Fish and Wildlife Foundation, Southeast Aquatic Resources Partnership, and U.S. Fish and Wildlife Partners. To date, technical guidance has been provided on over 100,000 acres, and active restoration projects have been implemented on over 8,000 acres in the Edwards Plateau.

TPWD Watershed Conservation staff also run the River Access and Conservation Area program, which leases and maintains public river access areas on private lands, expanding boater access to more than 200 miles of Texas rivers. Watershed Conservation staff are also a part of the multi-divisional Texas Paddling Trails Team, which partners with communities across the state to develop and maintain river access sites for paddling trails. Currently, 78 paddling trails encompassing approximately 650 miles of Texas rivers have been developed. By promoting access to and responsible use of Texas Rivers through these programs, TPWD seeks to develop a conservation ethic for river conservation among current and future generations of Texans.

Riparian Workshops

The TPWD Watershed Conservation staff has been instrumental in the presentation of a series of riparian workshops for landowners, particularly in presenting sessions on stream geomorphology and riparian functions. Over 68 workshops have been completed, resulting in reaching over 2,500 participants who are now implementing riparian management principles on over 800,000 acres.

Coastal Habitat Restoration and Protection

TPWD has an active program to restore and protect habitats along the Texas Coast. These marsh restoration projects reestablish intertidal marsh, high marsh, seagrasses, and sand flats along bay shorelines that have subsided and are suffering from severe erosion. These restored habitats can provide many ecosystem services in addition to enhancing the habitat value. For example, restored marshes buffer shorelines from erosion and remove both sediments flowing into the bays and sediments that have been re-suspended by dredging, boating activities, and storms. These wetlands also help remove nutrients from stormwater runoff. Oyster habitat restoration provides both water quality, fisheries habitat, and economic value for harvest. Protection occurs along with restoration projects and through acquisition. For example, TPWD Wildlife Management Areas and State Parks preserve many thousands of acres of

lagoons, emergent salt marshes, estuarine and intermediate marshes, and tidal flats from Cameron County to Jefferson County. In turn, these TPWD-owned properties, with dozens of miles of Gulf and bay frontage, offer protection for adjacent aquatic habitats from detrimental land uses, fragmentation, and development. TPWD also helps to protect these habitats by providing technical support and review of projects associated with water development, water quality issues, or regulated activities in wetlands. Partnerships with multiple local, state, and federal agencies have been developed to leverage state and local funds to conserve aquatic, riparian, and upland habitats essential to environmentally and economically healthy watersheds that benefit the natural resources of the state.

Seagrass Conservation Plan

The Seagrass Conservation Plan was originally developed in 1999 to address seagrass problems in Texas. TCEQ, GLO, and TPWD endorsed conservation goals for the Seagrass Plan, which include defining seagrass research needs, addressing management concerns, and expanding environmental awareness in citizens through education. In 2012, TPWD convened a conference of seagrass experts and stakeholders to conduct a ten-year review and update of the plan. TPWD also leads and coordinates the Seagrass Monitoring Workgroup, which meets twice a year to improve communication and coordination between the various entities and individuals working to conserve and protect seagrasses in Texas, aiding in implementation of the Seagrass Conservation Plan.

Conservation Plan for State-Owned Coastal Wetlands

The State Wetlands Conservation Plan for State-Owned Coastal Wetlands provides protection through specific actions for state-owned coastal wetlands. TPWD and GLO, with assistance from other agencies, are jointly developing this legislatively required plan. Eighteen specific items/actions must be included in the plan. Some of these actions include a goal of no overall net loss of state-owned wetlands, wetland mitigation policies, a requirement for freshwater inflows to estuaries, a navigational dredging and disposal plan, education and research regarding boating in wetlands, the reduction of nonpoint source pollution, improved coordination among federal and state agencies, and a plan to acquire coastal wetlands.

Texas Department of Agriculture

TDA is the state's lead regulatory agency for agricultural, structural, and vector pesticide regulation. Texas statutes grant TDA the authority to enforce provisions relating to the registration, distribution, and use of all agricultural, structural, and health-related vector pesticides. TDA is responsible for licensing all pesticide applicators and the labeling, storage, sales, usage, and disposal of all pesticides. TDA also cooperates with other state agencies that have statutory pesticide responsibilities, such as TCEQ and the DSHS. TDA is also responsible for the enforcement of federal pesticide laws under a cooperative agreement with EPA. TDA continues to proactively engage state and federal agencies to review and keep current with issues involving the protection of water quality

from pesticides. TDA is also working on issues involving risks from other contaminants as well as state water conservation and planning efforts.

Texas Pesticide Laws define a pesticide as a substance or mixture of substances intended to prevent, destroy, repel, or mitigate any pest, or any substance or mixture of substances intended for use as a plant regulator, defoliant, or desiccant. Pesticide contamination occurs as a result of improper use, overuse, spills, improper storage, and disposal. Pesticides may enter surface water bodies and aquifers through wastewater treatment plants; runoff from sites such as farms, golf courses, parks, highway rights-of-way, lawns, and gardens; and atmospheric deposition. EPA has identified pesticide contamination as a nationwide problem in surface water and groundwater. In response, there has been a coordinated state effort to monitor pesticides and define roles and responsibilities in responding to the water quality effects of possible pesticide contamination. In addressing pesticide contamination, several major principles are considered. Agricultural pesticides are beneficial and important to the production of food and fiber, and are of significance to the state economy. However, the use of pesticides should not impair any use of waters of the state or cause a public health hazard. Drinking water supplies, both groundwater and surface water, should especially be protected. State and local government should be the first line of protection, with their efforts being complemented by federal expertise and information. Efforts in Texas in addressing these issues include, for groundwater, the adoption of the *Groundwater Pesticide Management Plan* and, for surface water, the incorporation of similar sets of protective management measures by various state agencies.

The goal of surface water pesticide management is to provide a mechanism for the protection of surface water from pesticide contamination. This goal subscribes to the unimpaired use of surface water, allowing for the normal use of pesticides without impairing surface water quality or posing a public health hazard. All used and potentially usable surface waters are subject to the same protection afforded by the antidegradation policy goal. This level of surface water protection complements the protection of groundwater influenced by surface water. Pesticide contamination of surface water is detected through the state's assessment process. Public water supplies are regularly monitored by the Public Drinking Water Section of TCEQ. Nonpoint source pollution resulting from pesticides is managed through prevention and response to contamination. The NPDES Permit Program addresses water pollution by regulating point sources that discharge pollutants to waters of the U.S. CWA permits are required for all biological pesticide and chemical pesticide applications that leave a residue in water when such applications are made into or over, including near, waters of the U.S.

EPA reviews and registers pesticides to ensure they meet current scientific and regulatory standards. Through this process, consideration is made for human health and ecological effects of pesticides. EPA issues risk management decisions based on the reviews that may result in registration eligibility, risk reduction measures, or elimination of uses. Risk factors that are analyzed include risks to workers, risks associated with residential uses, and risks

affecting drinking water. Measures used to address risks include requiring intensive monitoring programs, prohibition of use in specified geographic areas or watersheds, education programs to promote and ensure proper pesticide use, and mitigation requirements. The state has developed programs to enforce and ensure compliance with this EPA program at the state level.

Prevention and Mitigation

TDA recommends and coordinates a five-tiered approach for the prevention of pesticide contamination.

- General Education - Current and updated information is shared statewide to raise and maintain awareness of the potential for pesticide contamination. Presentations, brochures, displays, and slide presentations are the tools used to raise awareness. These materials are created and distributed throughout the state by the cooperating agencies.

- Education Focused on Affected Water Bodies - Educational efforts will be expanded in areas where a surface drinking water source is identified as affected by specific pesticides. This effort will be applied even though monitoring has not shown contamination beyond the maximum contaminant level. Dissemination of information will be through public presentations, articles in newsletters, and advertisement of available educational literature.

- Education and Application of BMPs in Areas with Lower Levels of Pesticides - Where monitoring has revealed contamination of surface water used as a drinking water source, but at concentrations lower than the pesticide maximum contaminant level or health advisory level, a voluntary BMP program will be encouraged. Furthermore, cooperating agencies may take additional action through their standard education programs.

- Education and Application of BMPs in Areas with Higher Levels of Pesticides - In a surface water body used as a drinking water source, where monitoring has revealed a nonpoint source contamination by a pesticide at levels greater than the maximum contaminant level or health advisory level, a voluntary education and BMP program will be initiated. If there is no evidence of sufficient improvement, use restrictions will be implemented.

- Pesticide Use Restrictions - If all previous levels of preventive measures fail, the final recourse will be use restriction of the pesticide in the water body which is contaminated. Such actions will be implemented by the TDA after consultation with the other involved agencies through the Texas Watershed Protection Committee. Users will be notified of the restricted use status of the pesticide in their area.

The response to contamination of surface water by pesticides falls under the jurisdiction of several agencies. Pesticide runoff is typically treated as agricultural nonpoint source pollution; therefore, TSSWCB and TDA play a key role in response. TCEQ provides response assistance when the water body is a drinking water supply. TDA provides expertise on pesticide regulation and

education. When pesticide contamination results in a surface water body not meeting TSWQS, the response is addressed through the TMDL process. When the pesticide contamination does not result in a standards violation, response occurs through the actions described above.

Agricultural Pesticide Regulation

TDA cooperates with all agricultural producers and other users of pesticides to make certain that all pesticides are used safely and according to instructions. The Texas Pesticide Control Act requires that pesticides be stored in a manner that will reasonably ensure that human food, domestic and public water, pet foods, drugs, animal feeds, commercial fertilizers, seeds, and clothing will not be contaminated. The law also directs that pesticide containers be disposed of as directed on the label or by any other methods approved by TDA. Any use of pesticides inconsistent with label directions is a violation of the law and may subject the user to penalties under federal and state law.

TDA is also responsible for developing and implementing the State of Texas Plan for Certification of Pesticide Applicators. All application equipment used by pesticide applicators is subject to inspection at any reasonable time. The Texas A&M AgriLife Extension Service is responsible for training in relation to the state pesticide applicator certification program.

The Structural Pest Control Service (SPCS), within the Agriculture and Consumer Protection Division of TDA, licenses and regulates pest management professionals, specifically those engaged in the business of structural pest control. The SPCS enhances the educational and professional standards of license holders and ensures the health, safety, and welfare of the public.

The SPCS is authorized by Texas Occupations Code Chapter 1951 to promulgate rules and regulations governing the methods and practices pertaining to structural pest control to prevent adverse effects on human health and the environment. The SPCS has established regulations under which it enforces label instructions approved by EPA and TDA regarding application, storage, and disposal of pesticides in the urban environment. Many label instructions contain information relating to proper application and disposal of pesticides to prevent surface water contamination.

In addition, the SPCS licenses businesses, certified commercial applicators, technicians, technician apprentices, certified noncommercial applicators, noncommercial technicians, and noncommercial technician apprentices in the structural pest control industry. The SPCS also has the authority to take action against any licensee for engaging in practices that could be detrimental to public health or safety or the environment. The SPCS has the authority to perform inspections to monitor pesticide use and investigate complaints regarding label violations.

Texas Institute for Applied Environmental Research

The Texas Institute of Applied Environmental Research (TIAER) was created by the 72nd Texas Legislature in 1991 and established at Tarleton State University in Stephenville, Texas in 1992. Under its enabling legislation, TIAER conducts applied research on environmental issues with public policy implications focusing on the interface between government and the private sector. A goal of TIAER is to establish interdisciplinary programs and partnerships that develop and implement new policies, technologies, and strategies addressing state- and national-level environmental issues.

Because problems associated with nonpoint source pollution are essentially an outgrowth of land-use decisions, TIAER's research dealing with nonpoint source pollution focuses largely on the interactions of streams, lakes, and reservoirs with their terrestrial environments. As most watersheds are combinations of rural and urban land uses, TIAER seeks to involve all affected parties in developing practical, equitable, and economically feasible solutions in addressing water quality issues, realizing that these outcomes impact the quality of lives. TIAER provides technical and outreach services in the assessment and management of nonpoint source pollution throughout Texas, as well as playing a role nationally, specifically in dealing with nutrient tracking tools for nutrient trading.

Texas Water Resources Institute

TWRI, part of Texas AgriLife Research, the Texas AgriLife Extension Service, and the College of Agriculture and Life Sciences at Texas A&M University, provides science-based, community-supported solutions for the state's pressing water quantity and quality challenges through internal expertise and external collaborations. TWRI serves as a gateway to a national network of water institutes as well as to interdisciplinary partnerships with Texas A&M University departments, other universities, and various water resources organizations. TWRI was designated as the water resources research institute for the state by the Texas Legislature in 1964. TWRI is one of 54 National Institutes for Water Resources. The following paragraphs summarize TWRI programs related to managing nonpoint source pollution.

Monitoring and Assessing Water Quality

Many of the TWRI's projects address agricultural and urban BMPs to reduce or prevent nonpoint source pollution. The TWRI assists communities with water quality and quantity monitoring and assessment, bacterial source tracking of pollution sources in watersheds, and evaluation of innovative BMPs. Its water team collects water quality data, conducts watershed surveys to identify pollutant sources, and analyzes and interprets the information to provide sound science to support restoration work. TWRI's demonstration projects evaluate management practice efficiency and provide hands-on teaching to stakeholders.

Watershed Planning and Implementation

Through its watershed planning and implementation projects, TWRI works with stakeholders to identify, develop, and implement effective watershed-based management strategies to address local water quality concerns. These projects use science-based and stakeholder-supported approaches to develop strategies to reduce nonpoint source pollution and improve water quality.

Water Resources Outreach and Training

The TWRI Water Resources Outreach and Training Program serves interested citizens, students, and water professionals. Its programs convey BMPs essential to managing and conserving water, riparian and stream restoration, and water well protection and maintenance. The program administers courses that offer intensive hands-on instruction on the latest technologies, computer modeling, and water management strategies to water resource professionals. For the public, it raises awareness about water resources and the importance of practicing good water stewardship through publications, social media channels, and websites.

Texas A&M Forest Service

The Texas A&M Forest Service provides statewide leadership to assure that the state's trees, forests, and related natural resources are protected and sustained for the benefit of all.

Silvicultural Management

Texas has over 60 million acres of forested land, more than any other state in the continental U.S. Most streams that originate or flow through these forest lands are sources of water supply, prime recreation, and other high quality uses. As a result, forest and woodland management programs have been developed to implement adequate measures to protect water quality. Below are some of the programs in place to address the potential nonpoint source problems resulting from improperly conducted silvicultural and land management operations.

Forest Resource Development Division

The Forest Resource Development Division provides professional assistance to family forest owners, including services such as development of forest management plans, assistance in the implementation of reforestation and forest stand improvement practices, native forest restoration, and control of forest insect and disease problems. The division also administers several state and federal cost share programs which promote reforestation, healthy forests, and land stewardship. Emphasis is placed on developing the state's forest resources in an environmentally sound manner to meet present and future needs.

The Forest Stewardship Program

The Forest Stewardship Program, a USDA Forest Service Program, provides technical assistance, through state forestry agency partners, to non-industrial private forest owners. The program encourages and enables active long-term

forest and woodland management. A primary focus of the program is the development of comprehensive, multi-resource management plans that provide landowners with the information they need to manage their forests.

The Water Resources Program

The Water Resources Program works to protect, conserve, and enhance water resources through the sustainable use of trees and forests. This program accomplishes this objective through the development of science-based, non-regulatory BMPs, an aggressive education/technical assistance/outreach campaign, and a monitoring program designed to measure the implementation and effectiveness of these practices. Additionally, program staff work to advance forest watershed initiatives, source water protection, riparian restoration, green infrastructure, wildfire remediation, and land stewardship.

The Ecosystem Services Program

The Ecosystem Services Program seeks to create a marketable value for the numerous benefits forests provide, generating additional revenue for landowners that will allow them to keep their forests in forests. Conserving these working forest landscapes can enhance water resources, as well as many other environmental benefits.

The Urban and Community Forestry Program

The Urban and Community Forestry Program works with communities to develop sustainable programs that provide Texans with healthy trees and forests. Trees intercept rainfall, slow and filter runoff, and reduce flooding, making them a critical component in green infrastructure and stormwater management plans.

Texas Forest Information Portal

The Texas Forest Information Portal is a website that provides landowners, managers, government officials, local community groups, and the public state-of-the-art access to information about trees and forest lands across the state. This web portal provides access to custom web mapping applications with capabilities to discover and explore an array of maps depicting forest conditions, query data, and download reports on a variety of forest interests. The *Plan My Land Operation* application enables users to map custom areas, identify sensitive features, and generate BMP recommendations based on the site conditions of the mapped property. The *Texas Forestry BMPs* native smartphone application provides users with in-the-field digital access to the Texas Forestry Best Management Practices handbook and critical planning tools, such as soil survey data, a slope calculator, and a culvert sizing tool. More information can be found at the Texas A&M Forest Service’s Texas Forest Information Portal website.

Texas A&M AgriLife Research

Texas A&M AgriLife Research is the state's premier research agency in agriculture, natural resources, and the life sciences. An agency of The Texas

A&M University System, AgriLife Research collaborates with the Texas A&M University College of Agriculture and Life Sciences, the Texas A&M AgriLife Extension Service, and others to help fulfill The Texas A&M University System's land-grant mission of teaching, research, extension, and service. Texas AgriLife Research provides technical services in the assessment and management of nonpoint source pollution in Texas.

Texas A&M AgriLife Extension Service

The Texas A&M AgriLife Extension Service, an agency of The Texas A&M University System, is an outreach education agency with a statewide network of professional educators, trained volunteers, and county offices. It provides high-quality, relevant education to improve the lives of people, businesses, and communities across Texas. Extension education encompasses the broad areas of agriculture and natural resources, community economic development, family and consumer sciences, and youth development programs, such as 4-H.

Among other goals and priority objectives pursued by AgriLife Extension, the following relate to agriculture and natural resources:

- consumers, homeowners, agricultural producers, communities, and irrigation districts understand and adopt BMPs to protect water quality and enhance conservation so water supplies will meet future water needs in Texas that are essential for expanding agricultural growth, jobs, and the economy in both rural and urban areas;

- landowners, professional ecosystem managers, community planners, and other interest groups become more knowledgeable, make informed decisions, and adopt BMPs that insure the proper management of rural and urban natural ecosystem resources through stewardship education in order to support the biological, sociological, and economic sustainability of those resources; and

- advance the planning and management of natural resource-based recreation opportunities in Texas.

Lone Star Healthy Streams Program

The goal of the Lone Star Healthy Streams Program is to protect Texas waterways from bacterial contamination originating from livestock operations and feral hogs. To achieve this goal, the program’s objective is the education of Texas farmers, ranchers, and landowners about proper grazing, feral hog management, and riparian area protection to reduce the levels of bacterial contamination in streams, rivers, and other water bodies. The Lone Star Healthy Streams Program is implemented through a partnership between the Texas AgriLife Extension Service and TSSWCB with CWA Section 319(h) grants from EPA.

The framework for the program is provided by five resource manuals that focus on bacterial runoff management for beef cattle, dairy cattle, horses, poultry, and

feral hogs. As part of this education program, current and novel BMPs are being evaluated to provide important information regarding BMP effectiveness relative to implementation costs and pollutant load reduction. Through enhanced education regarding riparian protection and vegetation management on grazing lands, Lone Star Healthy Streams will further protect Texas waterways from sediment, nutrient, and pesticide runoff with the concomitant loss of water and topsoil. Lone Star Healthy Streams is the state's primary coordinated and comprehensive educational program to address nonpoint source pollution and water quality impacts from livestock operations and feral hogs.

Texas Well Owner Network

Over one million private water wells in Texas provide water to citizens in rural areas and increasingly to those living in small acreages at the growing rural-urban interface. Private well owners are independently responsible for monitoring the quality of their wells and are at a greater risk for exposure to compromised water quality.

Texas Well Owner Network is a science-based, community-responsive education curriculum focused on educating private well owners about potential pollutant sources and what steps can be taken to protect groundwater quality and aquifer integrity. Texas Well Owner Network offers training workshops and water well screening events that can stand alone or be delivered in conjunction with other water education programs. Participants will have a better understanding of the relationship between actions on the land and the quality of groundwater available for drinking and irrigation.

Texas Well Owner Network is implemented through a partnership between the Texas A&M AgriLife Extension, TWRI, and TSSWCB with CWA Section 319(h) grants from EPA. The program's major goal is the protection of private water wells by averting the transport of contaminants to surface waters, preventing the contamination of underlying aquifers, and safeguarding the health of landowners and their families.

Texas Department of Licensing and Registration

TDLR is charged with protecting groundwater quality through the licensing of well drillers and assuring well construction standards are enforced. A water well driller is defined as any individual who drills, bores, cores, or constructs a water well. A driller may include an owner, or drilling supervisor. The program has mandatory requirements that all applicants have at least two years of drilling experience before taking the licensing exam. TDLR has the power to suspend or revoke licenses and set administrative penalties for incompetence or violations of Texas Occupations Code Chapters 1901 and 1902 or any related rule.

The Texas Legislature expanded the water well driller functions to include pump installers that repair wells after they have been drilled. Pump installers install and repair well pumps and equipment, locate and survey abandoned wells, and repair existing wells. Regulation of this function provides a mechanism to ensure that surface casing is completed on wells that were drilled before the

rules on surface casing existed to prevent the contamination of drinking water sources by improperly sealed wells.

Numerous state and local programs have identified abandoned water wells as having a significant, or potentially significant, negative impact on groundwater quality in the state. Abandoned water wells exist in every county and impact all of the state's aquifers. It is conservatively estimated that 150,000 of the wells drilled since 1965 are abandoned or deteriorated. Abandoned water wells not only serve as conduits or channels for contamination to reach groundwater, but larger diameter wells can also be a hazard to human and animal life. In addition, uncapped, non-cemented, deteriorated, or uncased wells completed in more than one water-bearing zone or aquifer may allow poorer-quality water from one zone to commingle and impact the other(s). Abandoned municipal, industrial, and irrigation wells; abandoned rig-supply, domestic, and livestock wells; and unplugged test-holes also pose threats to groundwater quality.

State law requires landowners who possess an abandoned or deteriorated well to have the well plugged or capped under TDLR standards. The landowner is liable for any water contamination or injury due to such wells. The Abandoned Well Notification and Referral Program, administered by TDLR, compiles, identifies, and processes abandoned water well notification and enforcement cases in cooperation with local groundwater conservation districts and TCEQ. TDLR can assess administrative and civil penalties against persons who do not comply with the provisions. Some GCDs are implementing well-capping and plugging programs of their own.

Additionally, the Water Well Driller/Pump Installer Program provides advisories to water well drillers for areas with contaminant plumes or undesirable water quality. These advisories help water well drillers avoid impacting usable groundwater by unknowingly drilling through contaminated zones in the areas specified. Drillers are advised to case off and pressure grout those zones to prevent contaminant migration - another form of nonpoint source pollution.

Texas General Land Office

GLO is the state agency responsible for the management of state-owned public lands not specifically purchased by or deeded to other agencies. GLO is a proprietary state agency. GLO is also the state's lead agency for coordinating the CMP designed to help preserve public beach access, protect coastal wetlands and other coastal natural resources, and respond to beach erosion along the Texas coast.

GLO is responsible for managing over 3,300 miles of bays and estuaries and approximately 367 miles of Texas coastline, which includes the area from mean high tide to 10.3 miles into the Gulf of Mexico. Through its Coastal Resources Division, GLO seeks to encourage, promote, and engage in sound stewardship practices that preserve and enhance the use and enjoyment of the state’s natural resources, while fostering economic growth along the Texas coast. The Coastal Resources Division oversees and participates in many coastal programs, working to mitigate the impact of the issues of concern affecting the Texas

coast and, ultimately, safeguard the coastal ecosystem and communities from future vulnerabilities.

Coastal Oil Spill Prevention and Response

The Oil Spill Prevention and Response Act of 1991 (OSPRA) designated GLO as the lead state agency for the prevention of and response to oil spills in coastal waters. The program is funded by a 1 1/3-cent-per-barrel fee on crude oil loaded or off-loaded in Texas ports by vessel. Revenue is deposited in the Coastal Protection Fund, which is capped at $20 million.

Mounting an efficient and effective response is a primary objective of the Oil Spill Prevention and Response program area. Five regional offices respond to about 700 spill notifications reported to GLO annually. Located in Nederland, LaPorte, Port Lavaca, Corpus Christi, and Brownsville, personnel at these offices respond to spills 24 hours a day, 7 days a week, 365 days a year. Notification requirements are met by calling a toll-free number. In addition to their rapid response capability, regional staff conduct audits, inspections, and harbor patrols by boat and vehicle; maintain response equipment; participate in oil spill response exercises with marine and shore-based industries; and provide public education services about oil spill prevention and response.

OSPRA also authorizes GLO to procure spill response equipment—booms, skimmers, boats, trucks, pumps, wildlife rehabilitation equipment, communications equipment, mobile command posts, and associated support equipment. All equipment is maintained by field personnel in a ready condition and is available to supplement spill contractor and industry-owned equipment, as well as for emergency response in the event of a natural disaster.

OSPRA requires all facilities that handle oil and pose a threat to coastal waters to submit contingency plan information to GLO for review and certification. Approximately 555 facilities currently require this certification. Their plans, which are routinely audited by field personnel, detail spill response strategies, identify sensitive natural resources, list trained personnel, and provide inventories of spill response equipment. The law also requires that certain classes of vessels that sail in state waters submit contingency plans. The program maintains a database containing over 3,600 company accounts representing over 27,500 vessels.

The Texas Coastal Management Program

The Texas CMP is a networked program comprised of eight member agencies that was created to coordinate state, local, and federal programs for the management of Texas coastal resources. The program brings in CZMA funds to state and local entities to implement projects and programs to improve the management of the state's coastal resources and ensure the long-term ecological and economic productivity of the coast.

The Coastal Nonpoint Source Program

The Texas CMP was created to improve the management of the state's coastal resources to ensure the long-term ecological and economic productivity of the coast. GLO administers the CMP and the Texas Coastal Nonpoint Source Program. On October 16, 2003, NOAA and EPA approved the Texas Coastal Nonpoint Source Pollution Control Program, subject to certain conditions. The document discusses the coastal nonpoint source management area; an overview of program implementation and coordination; specific nonpoint source categories, the CZMA Section 6217 management measures, and the state rules and programs which address pollution sources and meet the federal requirements; information on additional management measures, technical assistance, and public participation; and program monitoring and evaluation.

The Texas Beach Watch Program

In October 2000, the U.S. Congress passed the Beaches Environmental Assessment and Coastal Health Act (BEACH Act) to protect the public health at our nation's beaches. The BEACH Act requires that states, in cooperation with the EPA, develop and implement a program to monitor coastal recreation waters that are used by the public and to notify the public if Beach Action Value standards for pathogens and pathogen indicators are exceeded.

The BEACH Act requires the state to identify all factors used to evaluate and rank beaches; identify coastal recreation waters in the state; identify bathing beaches adjacent to coastal recreational waters; develop a sampling, monitoring, and notification program; develop a method for issuing beach advisories; and develop a method to notify the public. In July 2001, the Governor's office appointed GLO as the lead state agency to implement the BEACH Act based upon the ongoing Beach Watch Program at that time.

The Texas Beach Watch Program gives Texans baseline data on the health of high-use Gulf and bay sites, helping to ensure that patrons have timely access to contact recreation conditions. The Texas Beach Watch Program coordinates with county and city governments, universities, and organizations representing beach goers. Contractors test specified sites for Enterococci bacteria and issue public advisories if water samples exceed the Beach Action Value criteria recommended by EPA. Additionally, data collected through the Texas Beach Watch Program is used by local government decision-makers, researchers, and TCEQ in developing the Integrated Report.

The Texas Coastal Resiliency Master Plan

The Texas Coastal Resiliency Master Plan (TCRMP) is an ongoing, state-led coastal planning effort coordinated by GLO that provides a vision to boost long-term resiliency of the state’s coastal communities, infrastructure, and ecological assets to hazards resulting from both natural processes and human activities. The process behind TCRMP is heavily informed from input from a Technical Advisory Committee consisting of coastal experts and local decision-makers. TCRMP recommends specific statewide and regional actions while ultimately prioritizing 123 Tier 1 projects for funding and implementation. TCRMP has

been published in 2017 and 2019, with the next iteration scheduled for release in 2023. This planning process will continue in four-year cycles, assessing coastal vulnerabilities and evaluating solutions through close partnerships with local municipalities, ports, non-profits, universities, and other federal and state agencies.

The Adopt-A-Beach Program

The Texas Adopt-A-Beach Program, sponsored by GLO, is dedicated to preserving and protecting Texas beaches by raising public awareness; educating citizens about the source of marine debris; and generating public support for state, national, and international action to clean up coastal waters. Since the first Adopt-A-Beach Cleanup in 1986, more than 540,000 volunteers have removed nearly 10,000 tons of trash from Texas beaches. At each cleanup site, volunteers record data about the trash to learn more about the cause of marine debris. These data have been instrumental in the passage of international treaties and laws aimed at reducing the amount of offshore dumping. The program's success is due to the generous efforts of dedicated volunteer county coordinators, coastal community leaders, sponsors, and citizens. Strong support from the private sector helps carry the anti-litter message to Texans all across the state.

The Small Spill Prevention Program

GLO's Small Spill Prevention Program works with marinas and other interested parties to educate the public on ways to properly dispose of oil and reduce small spills. Small amounts of petroleum products may not kill fish and other marine organisms, but they can affect the vision, sense of smell, growth, and reproductive ability of marine wildlife. While small petroleum spills may impact marine wildlife, multiple small spills have the potential to impact entire water bodies. The Small Spill Prevention Program is an effective way to educate the public about ways to reduce spills and protect our marine resources.

Railroad Commission of Texas

RRC is the state agency with primary regulatory jurisdiction over the exploration and production activities of the oil and natural gas industry, pipeline transporters, natural gas utilities, and surface mining operations. The main functions of RRC are to protect the environment, protect public safety, protect the correlative rights of mineral interest owners, prevent the waste of natural resources, and ensure fair and equitable utility rates in those industries over which it has been granted authority.

Texas Natural Resources Code Section 91.113(a) authorizes RRC or its employees or agents to spend oil field cleanup funds to investigate, assess, control, or cleanup oil and gas wastes or other substances or materials regulated by RRC that are causing or are likely to cause the pollution of surface or subsurface waters of the state. RRC is responsible for plugging and cleaning up abandoned wells and sites using state managed funds. Funding for RRC's program comes from regulatory fees, permit fees, and bond fees paid by the oil

and gas industry. Cleanup and prioritization of sites is based on protecting public health, public safety, and the environment. RRC also oversees cleanup by responsible parties of pollution associated with oil and gas activities under RRC jurisdiction.

Oil and Gas Waste Management

RRC regulates activities and the wastes generated as a result of activities associated with the exploration, development, or production of oil, gas, or geothermal resources, including the transportation of crude oil or natural gas by pipeline. These wastes are termed "oil and gas wastes," and include both hazardous and non-hazardous oil and gas wastes.

RRC has responsibility for the prevention of pollution that might result from activities associated with the exploration, development, and production of oil, gas, or geothermal resources of the state to prevent operations dangerous to life or property. RRC uses authorizations by rule and permitting to regulate the storage, transportation, processing, and disposal of oil and gas wastes in Texas to prevent releases to the environment. RRC rules require that oil and gas wastes be processed and disposed of only in an authorized or permitted manner.

RRC establishes oil and gas well construction and plugging standards. RRC’s Groundwater Advisory Unit establishes the location of the base of usable quality groundwater. Wells must be constructed and plugged in such a manner that the usable quality groundwater is protected from contaminants that may migrate during the life of the well. In addition, RRC authorizations by rule and permits for the storage, management, and disposal of oil and gas waste include requirements for pit liners, sampling and monitoring, and runoff control.

House Bill 2771 (86th Legislature, 2019) amended Texas Water Code Section 26.131 to transfer to TCEQ the RRC's responsibilities relating to the regulation of discharges into surface water in the state, as defined in 30 TAC Section 307.3(70), of produced water, hydrostatic test water, and gas plant effluent resulting from the exploration, production, and development of oil, natural gas, or geothermal resources. House Bill 2771 authorizes the transfer of responsibilities from the RRC to TCEQ after TCEQ receives approval from EPA to supplement or amend TCEQ's TPDES program to include authority over these discharges. The delegation of authority to TCEQ was approved by EPA in January 2021.

RRC's environmental and safety programs cover the drilling, operation, and plugging of wells; separation and treatment of produced fluids in the field or at natural gas processing plants; storage of crude oil before it enters the refinery; underground storage of hydrocarbons in salt caverns or natural gas depleted reservoirs; transportation of crude oil or natural gas by pipeline; drilling, operation, and plugging of brine wells; and storage, hauling, reclamation, or disposal of wastes generated by these activities.

RRC's environmental and safety regulations for oil and gas wastes are administered through the agency's Technical Permitting, Site Remediation, and Field Operations programs.

The Technical Permitting Program

The Technical Permitting Program oversees the management and disposal of oil and gas waste, at and near the surface, and is responsible for regulating the construction, operation, permitting, and closure of injection wells that place fluids underground for storage and disposal. The Technical Permitting Program also coordinates with other state and federal agencies on environmental and safety matters.

The Field Operations Program and the Site Remediation Program

The Field Operations Program coordinates the activities of nine district offices in inspecting oil and gas operations and enforcing the RRC's environmental and safety rules. The Field Operations and Site Remediation programs utilize the Oil and Gas Regulation and Cleanup Fund to clean up abandoned facilities. This fund is supported by the agency's existing fees. The Site Remediation Program also reviews operator cleanup activities and coordinates RRC's response to large spills and other major events.

The Oil and Gas Well Plugging Program

RRC has long been active in regulating the exploration, development, and production of oil and gas in Texas, which includes protecting the environment and maintaining public safety. RRC began regulating oil and gas exploration and production operations in 1919 and over time has adopted increasingly stringent plugging standards and procedures. Statutes to prevent pollution from unplugged wells have also been modified over the years to increase RRC authority in this area.

RRC has utilized the Oil and Gas Regulation and Cleanup Fund to plug over 32,000 wells; however, thousands of additional abandoned wells remain. To ensure effective and efficient use of the fund, RRC has implemented a well plugging priority system to plug the wells that pose the greatest risk to the environment. The fund is supported entirely by existing agency fees. RRC has worked with TCEQ to utilize CWA Section 319(h) grant funding to reduce chloride and TDS resulting from improperly plugged wells in watersheds across the state.

Site Remediation Section

RRC’s Site Remediation Section has four programs to clean up oilfield pollution sites: Operator Cleanup Program; Voluntary Cleanup Program; State Managed Cleanup Program; and Grants Cleanup Program.

The Operator Cleanup Program is tasked with the oversight of complex pollution cleanups performed by the oil and gas industry. The Voluntary Cleanup Program provides an incentive to participants to remediate oil and gas-

related pollution, with RRC oversight, if the party did not cause or contribute to the contamination.

The State Managed Cleanup Program utilizes funds from regulatory fees, permit fees, and bond fees paid by the oil and gas industry to clean up pollution at abandoned oil and gas sites. An abandoned site becomes a candidate for state cleanup when the responsible party fails or refuses to take action or is unknown, deceased, or bankrupt.

The Grants Cleanup Program includes the Brownfields Response Program, Nonpoint Source Program, and Coastal Impact Assessment Program. The Brownfields Response Program utilizes an EPA grant and state managed funds as necessary to restore brownfield properties in communities across Texas by increasing the redevelopment potential of abandoned oil and gas sites.

Texas Department of Transportation

TxDOT is the lead state agency for the construction and maintenance of state roads, which includes responsibility for the management of potential pollution from road and highway operations. TxDOT has a comprehensive statewide stormwater management effort to protect water quality throughout the state.

TxDOT maintains compliance with a number of TPDES programs at a statewide and district level. These programs, including Phase I and Phase II MS4 permits as well as TPDES Construction Permits, identify TxDOT activities as pollutant point sources. TxDOT's non-permitted areas are controlled by stringent work practices, programs, and policies implemented at a statewide and district level, as described below.

Litter Pick Up

TxDOT hires private contractors to walk along rights of way and pick up litter for disposal. These comprehensive activities minimize the amount of floatable materials which may block storm drain systems and discharge pollutants to surface water. Each roadway segment in the urbanized area is treated multiple times a year. Mobile, stop-and-go spot litter pickup operations are also performed on an as-needed basis to collect litter between comprehensive litter pickup events. Picnic and safety rest areas are also treated on a routine basis.

Street Sweeping

TxDOT hires private contractors to perform street sweeping on TxDOT roadways throughout the permit area. Most of the street sweeping is vacuum-assisted, which provides the greatest level of particulate recovery. Roadways with an urban profile are generally treated at least once per month. Elevated section treatments include as-needed vacuuming of inlets, sediment pans and drain pipes, and expansion joints between bridge deck sections.

Permeable Friction Course

The use of permeable friction course by TxDOT is a BMP that aides in pollutant removal. Permeable friction course is a layer of porous asphalt up to two inches

thick overlaid on existing conventional concrete or asphalt surfaces. Stormwater that falls on the friction course drains through the porous layer to the original impervious road surface, at which point the water drains along the boundary between the pavement types until the runoff emerges at the edge of the pavement. Historically, the main use of this BMP in Texas has been to increase safety through improved visibility and better traction. However, when used on high speed roadways with no curbs, research has documented total suspended solids removal of 90% compared with conventional concrete or asphalt pavements. The use of this pavement is categorized as a BMP within the Edwards Aquifer Program because of its capability to remove total suspended solids from stormwater runoff in this sensitive aquifer region.

Structural Controls - Construction and Post-construction

TxDOT designs stormwater structural controls in a manner to reduce the discharge of pollutants to the maximum extent practicable. TxDOT's manual entitled *Storm Water Management Guidelines for Construction Activities* provides guidelines to prevent erosion and pollutants from projects from flowing into waters of the U.S. The manual provides guidelines for each structural control device, including height, width, depth, and drainage area design requirements. In addition to the construction guidelines manual, TxDOT maintains stringent design specifications, ensuring structural goals meet water quality requirements.

TxDOT's policy is to implement activity-appropriate BMPs for any soil disturbing activity where a potential for stormwater discharges exists, regardless of the type of activity or acreage disturbed.

Public Education and Participation

TxDOT has developed a multifaceted, comprehensive program designed to ensure public participation in stormwater management throughout the state. These programs target the public, including TxDOT employees, to understand and implement practices to improve water quality. Elements of TxDOT's statewide public education and outreach program include training, public education campaigns, and research projects, along with other efforts. TxDOT programs such as "Don't Mess with Texas" and Adopt-a-Highway programs are included in these efforts and are successful contributors to litter abatement.

The Adopt-a-Highway Program is implemented statewide to teach Texans about litter prevention by allowing citizens to pick up litter along Texas highways. The program encourages litter pick-up by establishing sections of the highway to be adopted by individuals or groups for clean-up. Upon adopting a section of the highway, a sign will be posted along the highway naming the individual or group who has adopted that section of the highway. The program concept has been adopted by 47 other states and several foreign countries.

Pesticide, Herbicide, and Fertilizer Application

TxDOT implements controls to reduce the discharge of pollutants by minimizing the quantities of pesticides, herbicides, and fertilizers applied by

TxDOT's employees or contractors to public rights of way, parks, or other TxDOT property. TxDOT has created the *Roadside Vegetation Management Manual*, which includes vegetation management guidelines, as well as other vegetation management considerations and recommended practices. TxDOT requires all in-house personnel handling and applying herbicides, pesticides, and fertilizers to take a 12-hour training course and become licensed ground applicators. Licensing is achieved by passing an examination administered by TDA. An annual eight-hour refresher course is required for licensed applicators.

Texas Department of State Health Services

The Texas DSHS is the lead agency to protect, promote, and improve the health of the people of Texas. DSHS administers several programs that support public health and environmental programs.

The Environmental Surveillance and Toxicology Branch in the Environmental Epidemiology and Disease Registries Section at DSHS uses the principles of epidemiology, toxicology, and surveillance to identify populations at risk, to develop evidence-based actions, and to protect and promote the health of the people of Texas.

The Environmental Sciences Branch of DSHS Laboratory Services provides analytical chemistry laboratory support to the EPA Safe Drinking Water Program.

The Seafood and Aquatic Life Group in the Division of Consumer Protection at DSHS protects consumers of fish and shellfish from disease or other health hazards transmissible by these products produced in or imported into Texas. The Seafood and Aquatic Life Group also protects the recreational fishers from disease or contaminants found in fish and other aquatic species caught in Texas's lakes, rivers, bays, or nearshore state waters. Consumption advisories, possession bans, and shellfish harvesting area restrictions issued by DSHS are evaluated by TCEQ when developing the Integrated Report.

The Meadows Center for Water and the Environment

The Meadows Center for Water and the Environment at Texas State University supports research, education, stewardship, and service programs that ensure sustainable water resources for human needs, ecosystem health, and economic development. The Meadows Center develops and promotes holistic approaches to the management of river systems, with those systems including the springs, streams, groundwater aquifers, and watersheds that feed them, as well as the lakes, bays, and estuaries into which they flow.

This broad approach supports the Management Program goals of data collection and assessment, implementation, and education. The Meadows Center is uniquely positioned in working toward goals that reduce nonpoint source pollution and preserve a watershed's natural ability to sustain clean and abundant water supplies. The Meadows Center continues to apply cutting edge technologies specifically aimed at systematic watershed characterization that

inform and refine water quality and quantity management strategies. The Meadows Center continues to support its transboundary and binational watershed work, and continues its work within the San Marcos watershed, in particular, the Spring Lake area where the Meadows Center is located, to achieve its goal to develop this area into a nationally recognized watershed educational and research center.

Data Collection and Assessment

The Meadows Center's monitoring programs support watershed research, management, and policy decisions and are conducted in collaboration with institutional partners, water resource professionals, faculty, students, and volunteers. These monitoring programs fill information gaps that have historically impeded critical components of watershed management, such as assessment and modeling.

As active partners in the Edwards Aquifer Habitat Conservation Plan, the Meadows Center rehabilitates aquatic habitats and conducts research in support of conservation efforts in Spring Lake and the San Marcos River. In addition to Texas Stream Team citizen scientists, the Meadows Center trains divers as citizen scientists to help manage Spring Lake. It has directed or assisted projects, including monitoring and assessing vegetation, invertebrate, and fish communities within the upper San Marcos River and developing instream-flow recommendations for fountain darters and Texas Wild Rice utilizing hydraulic modeling data. Since the Meadows Center's involvement, the endangered Texas Wild Rice species has expanded by 53%. The Meadows Center also supports real-time, fixed station, ambient, and stormwater monitoring programs that produce physical and chemical data, including key nonpoint source variables such as bacteria and nutrients.

Assessment and Characterization

The Meadows Center recognizes that effective watershed management establishes linkages between land use and the integrity of ecosystem processes and services. It supports water resource managers in establishing these linkages in several ways by:

- assessing the prevalence and severity of pollutant loadings;
- relating fluvial biodiversity with watershed function;
- collecting temporal and predictive data on urban growth and historical land use patterns to be used as inputs for hydrologic and water quality impact simulation models; and
- addressing gaps in understanding the relationships between key ecological dynamics, ecosystem processes, and watershed land-use patterns.

The Meadows Center develops and deploys assessment and prioritization tools, such as decision support systems that incorporate hydrologic and land use models that support management priorities and facilitate stakeholder participation in planning and implementation. These modeling efforts incorporate the effects of land use changes, streamflow, water quality, and

nonpoint source pollution, and provide temporal and predictive information on urban growth or historical land use patterns. These modeling efforts also support a wide range of assessment and management tasks, such as helping stakeholders identify natural areas that have high water quality values that should be targeted for protection. The combined efforts lay the groundwork for improved watershed management, including working with local governments to improve existing ordinances or practices.

Watershed Planning and Implementation

The Meadows Center helps communities develop WPPs and large-scale regional planning frameworks that support sustainable uses of the region's water resources. The intended outcomes of these plans include maintenance of water quality standards, alignment of water availability with demand, agricultural irrigation efficiency, improved watershed hydrologic function, sustainable growth, and incorporation of natural areas into water quality management strategies.

Watershed-based plans are implemented in collaboration with stakeholders as well as directly through the Meadows Center. The Meadows Center has led watershed protection planning efforts to develop EPA-accepted WPPs for Cypress Creek and the Upper San Marcos River and has provided technical support to many others, including the Arroyo Colorado and Plum Creek WPPs.

Education and Outreach

The Meadows Center engages more than 125,000 people each year in environmental education and outdoor learning activities at Spring Lake. The Meadows Center creates customizable field trips from pre-kindergarten to high school, with more than 30 Texas Essential Knowledge and Skills-aligned curricula, that allow educators to design an interactive experience with conservation at its core. The Spring Lake site includes a wide variety of educational activities that emphasize the importance of environmental conservation and the impacts of nonpoint source pollution on the environment. Among these are demonstration gardens, nature walks, the Discovery Hall Aquaria, the Wetlands Boardwalk, interpretive exhibits, paddling tours, and glass-bottom boat tours.

The Meadows Center also assists educators in developing water monitoring groups that become valuable teaching tools to support students in the fields of math, science, and social studies. The Meadows Center provides hands-on techniques for students to effectively grasp abstract concepts by teaching them how to measure and report pH, temperature, dissolved oxygen, and other indicators of water quality. With a broader understanding of water quality issues, students are better prepared to comprehend and participate in water conservation. The Meadows Center also participates in statewide water education events that teach elementary students about watersheds, their role in preventing water pollution, and how they can help protect and conserve their watershed.

Texas Stream Team

The Texas Stream Team serves as a valuable resource for educating the public about water quality issues and fostering citizen participation in monitoring and protecting water quality. Data collected through the citizen monitoring program can be used at the local level for targeted monitoring and decision making. The Texas Stream Team is administered through a cooperative partnership between the Meadows Center, TCEQ, and EPA. The Texas Stream Team supports nonpoint source and other environmental education and volunteer monitoring activities throughout the state. The Texas Stream Team, through its varied outreach activities, encourages individuals to adopt activities and behaviors which contribute to the improvement of water quality and prevention of nonpoint source pollution.

Clean Marina Initiative

The Clean Marina Initiative is a voluntary, incentive-based program that encourages marina operators and recreational boaters to protect coastal water quality by engaging in environmentally sound operating and maintenance procedures.

The Clean Texas Marina Program

The Clean Texas Marina Program was developed through a partnership of the Marina Association of Texas, Texas Sea Grant College Program, TCEQ, and TPWD and is administered by the Marina Association of Texas. This program enables marinas to be recognized for their efforts in environmental responsibility. It also lets boaters identify those marinas that promote clean activities and follow BMPs. Participation is voluntary and shows a marina's commitment to keeping Texas boating areas safe and clean.

The Clean Texas Marina Program recognizes operators of public and private marinas who voluntarily meet high standards that help keep Texas waterways clean. To be certified as a Clean Texas Marina, the operator must submit a pledge form, complete a self-assessment using a checklist, be sure the marina is complying with all applicable laws and regulations, and when ready, schedule an on-site confirmation visit with the Marina Association of Texas.

The Clean Texas Boater Program

As part of the Clean Texas Marina Program, the Clean Texas Boater Program recognizes individual boaters who pledge to help keep Texas waterways clean by working with certified Clean Marinas. The Clean Texas Boater Program is an important part of the Clean Texas Marina Program, which is designed to assist marina, boat yard, and yacht club operators in protecting the resources that provide their livelihood: clean water and fresh air. By adopting pollution prevention measures, boaters receive a Clean Texas Boater sticker to display on their vessels and can take satisfaction in knowing they are doing their part by keeping Texas waterways and shores clean, preserving our waterways for the future, and learning and teaching clean boating habits.

To be certified as a Clean Texas Boater, the boater must read the Clean Boating Tips card, agree to follow the tips by signing the pledge card, return the pledge card to the Marina Association of Texas office, and display the Clean Texas Boater sticker on their vessel.

Texas Invasive Species Coordinating Committee

The Texas Invasive Species Coordinating Committee (TISCC) was established by the 81st Texas Legislature in 2009. Statutorily-authorized members of TISCC include TDA, TPWD, TSSWCB, the Texas AgriLife Extension Service, the Texas A&M Forest Service, and TWDB. On the request of a state agency that has an interest in controlling invasive species, these member agencies may add the requesting agency to TISCC by unanimous agreement. TISCC is administratively attached to TSSWCB, whose staff serves as the committee coordinator.

TISCC serves as a catalyst for cooperation between state agencies on invasive species control. TISCC provides a forum for developing effective and timely interagency strategies and policies for invasive species control. TISCC facilitates governmental efforts, including efforts of local governments and special districts, to manage and prevent the spread of invasive species. TISCC makes recommendations to the leadership of state agencies regarding research, technology transfer, and management actions related to invasive species control.

A myriad of invasive plant and animal species, both aquatic and terrestrial, can affect water quality, water quantity, and aquatic ecosystems. For example:

- Rapidly expanding infestations of giant salvinia can overgrow and replace native aquatic plants, creating dense surface cover preventing light and oxygen from entering the water. Additionally, decomposing material from mats of giant salvinia drops to the bottom of lakes and ponds, greatly consuming dissolved oxygen needed by fish and other aquatic life.
- Feral hogs are significant contributors of pollutants to creeks and rivers across the state. As feral hogs congregate around water sources to drink and wallow, this concentration of high numbers in small riparian areas poses a threat to water quality. Fecal matter deposited directly in streams by feral hogs contributes bacteria and nutrients. In addition, extensive rooting activities of groups of feral hogs can cause extreme erosion and soil loss.
- Riparian areas infested by saltcedar impact salinity levels in water bodies. Water quality concerns arise from saltcedar's ability to effectively transport salt from the soil profile or water table to the surface, where it remains until it leaches back into the soil or is transported downstream during high flows. Saltcedar can also intensify water quality problems due to its ability to reduce groundwater supplies and streamflow through evapotranspiration.

TISCC works to prevent, monitor, and control or eradicate invasive species and to reduce environmental, economic, and human health threats from invasive species. Efforts of TISCC contribute to the implementation of the National Invasive Species Management Plan developed under the auspices of federal

Executive Order 13112. Work by TISCC supports the state's water quality goals and contributes to achieving the goals and objectives of this Management Program.

Regional and Local Agencies

The following sections describe various regional and local agencies and the programs they administer which contribute to managing nonpoint source pollution in Texas.

Cities

Cities in Texas have numerous environmental responsibilities, including water and wastewater services, solid waste management, and stormwater management. Cities have many programs to address stormwater pollution, including educational materials, inspections, and land development guidelines.

Counties

Counties in Texas have numerous environmental responsibilities, including OSSF management, solid waste management, and stormwater management. OSSF management programs are implemented in accordance with rules established by TCEQ and include site plan approval, construction inspection, and complaint response.

River Authorities

Twenty-four River Authorities were created by the Texas Legislature as water conservation and reclamation districts. Their primary function is to distribute and conserve the state’s surface water. River Authorities provide stewardship for the water resources in their basins. Planning and resource development efforts are carefully coordinated within the broader consideration of regional and statewide water needs in order to fulfill responsibilities of developing, conserving, and protecting the water resources. Many river authorities are CRP partners.

Councils of Governments

Texas has 24 COGs that represent all 254 counties. COGs are voluntary associations of local governments formed under Texas law. These associations address the problems and planning needs that cross the boundaries of individual local governments or that require regional attention. Regional services offered by COGs are varied. Services are undertaken in cooperation with member governments, the private sector, and state and federal partners, and include promoting regional municipal solid waste and environmental quality planning. In addition, Texas's regional COGs are responsible for regional planning activities that may differ from region to region, but typically include planning for economic growth, water supply and water quality, air quality, transportation, emergency preparedness, and the coordinated delivery of various social services. Many COGs establish and host region-wide geographical

information systems as well as databases on regional population, economic, and land-use patterns.

Soil and Water Conservation Districts

SWCDs are independent political subdivisions of state government, like a county or school district. The first SWCDs in Texas were organized in 1940 in response to the widespread agricultural and ecological devastation of the Dust Bowl of the 1930s. There are currently 216 SWCDs organized across the state. Each SWCD is governed by five directors elected by landowners within the district.

SWCDs serve as the state's primary delivery system through which technical assistance and financial incentives for natural resource conservation programs are channeled to agricultural producers and rural landowners. SWCDs work to bring about the widespread understanding of the needs for soil and water conservation. SWCDs work to combat soil and water erosion and enhance water quality and quantity across the state by giving farmers and ranchers the opportunity to solve local conservation challenges. SWCDs instill in landowners and citizens a stewardship ethic and individual responsibility for soil and water conservation.

Many of TSSWCB's statewide programs, such as the WQMP Program, Water Supply Enhancement Program, and Flood Control Program, are administratively coordinated through the efforts of local SWCDs. Additionally, SWCDs assist federal agencies in establishing resource conservation priorities for federal Farm Bill and CWA programs based on locally specific knowledge of natural resource concerns. SWCDs work with the USDA NRCS, USDA Farm Service Agency, EPA, Texas AgriLife Extension Service, Texas A&M Forest Service, and others when necessary to assist landowners and agricultural producers in meeting natural resource conservation needs. SWCDs are actively involved in promoting outreach and education programs, such as sponsoring pesticide applicator workshops, agricultural producer field days, land and range judging contests for students, scholarships, and securing funds for the construction of outdoor classrooms.

SWCDs in Texas do not have taxing authority; therefore, various federal and state agencies and other local governmental entities provide assistance to SWCDs. As TSSWCB is charged with the responsibility of coordinating the programs and activities of the state's 216 local SWCDs, the assistance programs provided by TSSWCB make up the majority of SWCDs' operating budgets. Additionally, many SWCDs have received CWA Section 319(h) grants from TSSWCB to implement specific objectives in WPPs and TMDLs. The delivery system that SWCDs present for the state is one of the most efficient and effective mechanisms for conducting natural resource conservation programs.

Groundwater Conservation Districts

GCDs are the state’s preferred method of groundwater management and may be created under Chapter 36 of the TWC to provide for the conservation, preservation, protection, recharging, and prevention of waste of groundwater

and to control subsidence. Chapter 36 authorizes GCDs to make and enforce rules to carry out those responsibilities.

GCDs are guided by comprehensive management plans that address various management goals aimed at the efficient use, conservation, and protection of groundwater resources. Wastewater reuse, well spacing, brush control, drought contingency with water conservation, and other strategies are featured in the plans. While water quantity is the primary focus of these plans, strategies to protect water quality may also be addressed. GCDs are also encouraged by their enabling legislation to coordinate groundwater quality assessment and protection activities with the appropriate state regulatory agencies.

Texas Alliance of Groundwater Districts

The Texas Alliance of Groundwater Districts (TAGD) is a membership organization whose membership is open to GCDs within the state. Currently, 89 of the GCDs in Texas are members of TAGD. Its voting membership is restricted to GCDs which have the powers and duties to manage groundwater as defined in TWC Chapter 36. Associate, non-voting membership can be applied for by groundwater-related parties, agencies, and businesses.

TAGD was formed to support the sound management of groundwater resources, including groundwater conservation and protection activities. Nonpoint source pollution can impact the water quality of groundwater resources. Therefore, TAGD has an active interest in this Management Program. TAGD provides a means of communication and exchange of information between individual GCDs on issues ranging from the day-to-day operation of local groundwater management to statewide groundwater resource policy issues. Members of TAGD are part of a network in which valuable technical and operational experience is available to its members and the interested public. TAGD staff and its members also serve on various local, state, and federal agency committees and subcommittees and maintain contact with members of the private sector and various elected officials.

Federal Agencies

The following sections describe the various federal agencies and the programs they administer which contribute to managing nonpoint source pollution in Texas.

United States Environmental Protection Agency

EPA works to develop and enforce regulations that implement environmental laws enacted by Congress. EPA is responsible for researching and setting national standards for a variety of environmental programs, and delegates to states and tribes the responsibility for issuing permits and monitoring and enforcing compliance. While EPA protects the nation's natural resources primarily through regulation, EPA has also developed a wide variety of funding,

planning, and education programs that are effective at protecting environmental quality.

Watershed Planning and the CWA Section 319 Program

EPA offers numerous free tools and resources that simplify the watershed planning process and provide access to needed resources, including:

- Technical Guidance and Tools – EPA offers free online guidance on national management measures and tools to calculate pollutant load reductions and social indicators. These resources can be found on EPA's Nonpoint Source Pollution website.
- Handbook for Developing Watershed Plans to Restore and Protect Our Waters – This guidance document discusses the watershed management process and can be found on EPA's Nonpoint Source Pollution website.
- Training – EPA offers free online seminars and courses about watershed protection and planning on their Watershed Academy website.
- Funding – EPA offers a series of documents, databases, and other tools to help identify potential funding sources on the EPA Grants website.

Water Quality Standards

Water quality standards are the foundation of the water quality-based pollution control program mandated by the CWA. Water quality standards define the goals for a water body by designating its uses, setting criteria to protect those uses, and establishing provisions such as antidegradation policies to protect water bodies from pollutants. More information about EPA's Water Quality Standards Program, as well as the EPA-approved standards for each state and territory, can be found at the Standards for Water Body Health website.

Monitoring and Assessment

The nation's waters are monitored by state, federal, and local agencies, universities, dischargers, and volunteers. Water quality data are used to characterize waters, identify trends over time, identify emerging problems, determine whether pollution control programs are working, help direct pollution control efforts to where they are most needed, and respond to emergencies such as floods and spills. Reports and additional information on EPA's Monitoring and Assessment Program can be found at the program's website.

Drinking Water

The Office of Groundwater and Drinking Water, together with states, tribes, and its many partners, protects public health by ensuring drinking water is safe and protecting groundwater. The office, along with EPA's ten regional drinking water programs, oversees implementation of the Safe Drinking Water Act, which is the national law safeguarding tap water in America. A WPP can be developed for

source water protection using CWA Section 319(h) grant funds. More information can be found at the program's website.

Groundwater

Many communities obtain their drinking water from aquifers. Water suppliers drill wells through soil and rock into aquifers to reach groundwater and supply the public with drinking water. Many homes also have their own private wells drilled on their property to tap this supply. Unfortunately, the groundwater can become contaminated by human activity. Constituents from such activity can enter the soil and rock, polluting the aquifer and eventually the well. Information on the Office of Groundwater activities to protect groundwater can be found at the program's website.

Wetlands

EPA has several programs for wetland conservation, restoration, and monitoring. EPA, along with the U.S. Army Corps of Engineers, establishes environmental standards for reviewing permits for discharges that affect wetlands, such as residential development, roads, and levees. Under CWA Section 404, the U.S. Army Corps of Engineers issues permits that meet environmental standards (after allowing the public to comment). More information on EPA's wetland program and activities can be found on the program's website.

United States Geological Survey

USGS has the principal responsibility within the federal government to provide hydrologic information and exhibit the understanding needed by others to achieve the best use and management of the nation's water resources. Through research and the Integrated Water Availability Assessments, Next Generation Observing Systems, National Hydrologic Monitoring Networks, Hazards, and Integrated Water Prediction programs, USGS scientists collect and interpret data about water chemistry, hydrology, land use, stream habitat, and aquatic life. These programs are a primary source for long-term, nationwide, and regional information on the quality of streams, groundwater, and aquatic ecosystems. This information supports national, regional, state, and local decision making and policy formation for water-quality management. Activities of these programs include:

- enhancing current USGS Water Mission Area observing networks with new sensor and satellite-based monitoring of selected water-quality properties and constituents initially in selected basins but then across the rest of its national networks;
- building wall-to-wall, short- to long-term water forecasts for water quality;
- evaluating long-term trends in water quality and the related impacts on water availability; and
- conducting integrated water-availability assessments inclusive of water quality, quantity, and use, both at regional and national levels.

USGS also conducts a large amount of monitoring statewide, and much of the data are utilized by TCEQ. USGS's surface water collection network in Texas is primarily established to monitor streamflow continuously at many permanent sites. Field measurements and samples for routine water chemistry and metals in water are also collected at many of the fixed sites. Sites are chosen to represent a mix of natural and human factors that influence water quality. Chemical variables are then related by USGS to hydrologic conditions to interpret water-resource conditions and meet water quality management needs. Estimation of point and nonpoint source loadings, stormwater management, and chemical-contaminant controls are some of those needs.

National Oceanic and Atmospheric Administration

NOAA is a scientific agency within the U.S. Department of Commerce focused on the conditions of the oceans and the atmosphere. NOAA warns of dangerous weather, charts seas and skies, guides the use and protection of ocean and coastal resources, and conducts research to improve understanding and stewardship of the environment. Among many other responsibilities, NOAA administers the CZMA of 1972, which provides for management of the nation's coastal resources and balances economic development with environmental conservation.

The CZMA created the National Coastal Zone Management Program, a voluntary partnership between NOAA and 34 coastal and Great Lakes states, territories, and commonwealths. The partnership works to preserve, protect, develop, and where possible, restore and enhance the nation's coastal zone resources. The National Coastal Zone Management Program takes a comprehensive approach to coastal resource management, balancing the often competing and occasionally conflicting demands of coastal resource use, economic development, and conservation. Some of the key elements of the National Coastal Zone Management Program include protecting natural resources; managing development in high hazard areas; giving development priority to coastal-dependent uses; providing public access for recreation; and coordinating state and federal actions.

The Coastal Nonpoint Pollution Control Program was established by Congress in 1990 under CZARA Section 6217 and is jointly administered by NOAA and EPA. The Coastal Nonpoint Pollution Control Program represents a comprehensive approach to polluted runoff, recognizing that all land-use activities in coastal watersheds can have impacts on estuaries, beaches, marine resources, and the ocean. The program is fundamentally about improved coordination and pollution prevention, seeking to build partnerships and networks that facilitate the implementation of appropriate methods to limit polluted runoff before problems occur.

The Coastal Nonpoint Pollution Control Program builds upon existing state coastal zone management and water quality programs by applying a consistent set of economically achievable management measures to prevent and mitigate polluted runoff. These measures are designed to control runoff from six main

sources: forestry, agriculture, urban areas, marinas, hydromodification, and loss of wetlands and riparian areas.

Gulf of Mexico Community-Based Restoration Program

The Gulf of Mexico Community-Based Restoration Program invites proposals for citizen-driven habitat restoration projects. The Program supports restoration projects that use a habitat-based approach to rebuild productive and sustainable fisheries, contribute to the recovery and conservation of protected resources, promote healthy ecosystems, and yield community and economic benefits. Projects are required to result in habitat restoration, not simply planning and engineering.

The Gulf of Mexico Community-Based Restoration Program is a multi-year, regional partnership between the Gulf Ecological Management Sites Program and the NOAA Community-Based Restoration Program. This partnership was designed to strengthen the conservation efforts of the Gulf Ecological Management Sites Program by supporting on-the-ground habitat restoration benefitting living marine resources and fostering local stewardship of ecologically significant areas across the Gulf of Mexico.

United States Army Corps of Engineers

The U.S. Army Corps of Engineers is a worldwide organization that provides engineering services, environmental restoration, and construction support for a wide variety of civil and military projects. The primary civil mission is developing and managing the nation's water resources. The U.S. Army Corps of Engineers develops projects to reduce flood damage; improves navigation channels and harbors; protects wetlands; and preserves, safeguards, and enhances the environment.

United States Coast Guard

The U.S. Coast Guard is a military, multi-mission, maritime service and one of the nation's five Armed Services. Its mission is to protect the public, the environment, and U.S. economic interests in the nation's ports and waterways, along the coast, on international waters, or in any maritime region as required to support national security. The Coast Guard addresses the wide-ranging problems associated with preventing, responding to, and paying for pollution associated with oil spills and leaks. It does so by creating a comprehensive program that addresses prevention, response, liability, and compensation related to spills from vessels and facilities in our navigable waters.

United States Department of Agriculture

USDA provides federal leadership on food, agriculture, natural resources, and related issues based on sound public policy, the best available science, and efficient management. USDA agencies described below include the Agricultural Research Service (ARS), the Farm Service Agency, the Forest Service, and the NRCS.

Natural Resources Conservation Service

The NRCS is a federal agency that works in partnership with the people of Texas to improve and protect soil, water, and other natural resources. For over 80 years, private landowners have voluntarily worked with NRCS specialists to prevent erosion, improve water quality, and promote sustainable agriculture.

NRCS offers technical services to provide science-based solutions to address America's ever-changing environmental concerns. While farmers, ranchers, and forest landowners remain the primary customers of NRCS, the agency also provides technical assistance to other landowners, city planners, watershed groups, state and local governments, and civic organizations.

NRCS has a unique partnership with SWCDs. All 217 SWCDs in Texas have working mutual agreements with the USDA to provide grassroots input to USDA through NRCS.

Environmental Quality Incentives Program

EQIP, which was authorized in the Conservation Title of the 2018 Farm Bill, is a voluntary conservation program established to provide financial and technical assistance to agricultural producers in order to address natural resource concerns and deliver environmental benefits, such as improved water and air quality, improved water conservation, reduced soil erosion, and improved wildlife habitat. Through EQIP, farmers and ranchers may receive financial and technical assistance to install or implement structural, vegetative, and management conservation practices on eligible agricultural land. EQIP is administered by the USDA-NRCS, but the priorities for allocation and distribution of financial assistance funds are established with input from a State Technical Advisory Committee, composed of representatives from federal and state resource agencies, organizations that are associated with agriculture, and individual agriculture operators. TCEQ and TSSWCB are represented on this committee. In Texas, financial assistance funds are used to address both the local priority resource concerns identified by the local work groups that are chaired by SWCDs and the statewide resource concerns identified by the committee. The committee and local work groups also make recommendations for conservation practices eligible for incentive payments. Eligible persons may apply for EQIP assistance by contacting their local NRCS office. Landowners and operators will work with a local conservationist to plan the practice or system of practices to address resource concerns present on their operations. In addition to state and local priority resource concerns, EQIP has several national priorities and landscape initiatives, such as the National Water Quality Initiative, in place to address high priority natural resource concerns.

The availability of EQIP, active participation in the State Technical Advisory Committee, local work groups, and the accommodation of recommendations from the committee by the state conservationist has provided opportunities to focus resources on problem areas that were previously difficult or impossible to address. The voluntary nature of the program has enabled the committee and the USDA-NRCS to establish state-level resource concerns. Through the

committee, the USDA-NRCS has actively pursued information on areas of the state where changes or adjustments in practices by individual landowners would be needed to contribute to the alleviation of identified environmental problems. This has enhanced the opportunities for regulatory agencies to use a combination of regulatory and voluntary practices to address specific problem areas impacted by nonpoint sources or a combination of point sources and nonpoint sources.

Watershed Program

The purpose of the Watershed Program, administered by the USDA-NRCS, is to assist state and local agencies, local units of government, and tribal governments (watershed sponsors) to protect and restore watersheds from damage caused by erosion, floodwater, and sediment; conserve and develop water and land resources; and solve natural resource and related economic problems on a watershed basis. The program provides technical and financial assistance to project sponsors, builds partnerships, and requires local and/or state funding contributions.

The Watershed and Flood Prevention Operations Program provides technical and financial assistance to entities of state and local governments and tribes (project sponsors) for planning and installing watershed projects. Resource concerns addressed by the program include flood prevention (flood damage reduction/flood protection), watershed protection, public recreation, public fish and wildlife, agricultural water management, municipal and industrial water supply, and water quality management.

The Watershed Rehabilitation Program offers financial and technical assistance to rehabilitate dams constructed through NRCS Watershed Programs. This program extends the service life of dams to meet applicable safety and performance standards or decommissions the dams so they no longer pose a threat to life and property.

The Emergency Watershed Protection Program safeguards lives and property from floods, drought, and the products of erosion in any watershed where fire, flood, or any other natural occurrence is causing or has caused a sudden impairment of the watershed.

The Watershed Surveys and Planning program enables NRCS to cooperate with federal, state, and local agencies and tribal governments to protect watersheds from damage caused by erosion, floodwater, and sediment and to conserve and develop water and land resources. If approved, technical and financial assistance is provided for the installation of improvement measures specified in proposed watershed plans.

Conservation Technical Assistance Program

The Conservation Technical Assistance Program, administered by the USDA-NRCS, provides voluntary conservation technical assistance to any group or individual interested in conserving our natural resources and sustaining agricultural production in this country. Through this program, NRCS assists

land users, communities, units of state and local government, and other federal agencies in planning and implementing conservation practices that address natural resource issues. The program encourages and assists citizens to voluntarily conserve, improve, and sustain natural resources.

Soil Survey Program

The National Cooperative Soil Survey is a partnership, led by NRCS, of federal land management agencies, state agricultural experiment stations, and state and local units of government that provide soil survey information necessary for understanding, managing, conserving, and sustaining the nation's limited soil resources.

Soil surveys provide an orderly, on-the-ground, scientific inventory of soil resources that meet all reasonable needs for farmers, agricultural technicians, community planners, engineers, and scientists in planning and transferring the findings of research and experience to specific land areas. Soil surveys include maps showing the locations and extent of soils, data about the physical and chemical properties of those soils, and information derived from that data about potentialities and problems of use on each kind of soil. Soil surveys provide the basic information needed to manage soil sustainably. They also provide information needed to protect water quality, wetlands, and wildlife habitat. Soil surveys are the basis for predicting the behavior of a soil under alternative uses, its potential erosion hazard, potential for groundwater contamination, suitability, and productivity for cultivated crops, trees, and grasses. Soil surveys are important to planners, engineers, zoning commissions, tax commissioners, homeowners, developers, and agricultural producers. Soil surveys also help predict the effect of global climate change on worldwide agricultural production and other land-dependent processes.

Farm Service Agency

The principal mission of the Farm Service Agency includes stabilizing farm income, helping farmers conserve land and water resources, providing credit to new or disadvantaged farmers and ranchers, and helping farm operations recover from the effects of a disaster. Many of the Farm Service Agency-operated programs are funded through the Commodity Credit Corporation, a government-owned and operated corporation established in 1933.

Conservation Reserve Program

The Conservation Reserve Program is a voluntary program administered by the Farm Service Agency that offers annual rental payments, incentive payments, annual maintenance payments for certain activities, and cost-share assistance to establish approved cover on eligible cropland. The program encourages farmers to plant long-term resource-conserving cover to improve soil, water, and wildlife resources. These practices can reduce nonpoint source pollution from agricultural lands. The Commodity Credit Corporation makes available cost-share assistance in an amount equal to not more than 50% of the participant's costs in establishing approved practices. Contract duration is between 10 and

15 years. The NRCS, National Institute of Food and Agriculture, state forestry agencies, and local SWCDs provide technical support for this program.

Agricultural Research Service

ARS is the principal in-house research agency of the USDA. ARS conducts research to develop and transfer solutions to agricultural problems of high national priority. Two of the 22 ARS National Programs, *Water Availability and Watershed Management* and *Sustainable Agricultural Systems*, are strongly committed to applied nonpoint source pollution research as part of their mission to increase understanding and develop solutions to protect the nation's soil and water resources. In Texas, ARS is conducting ongoing research on nonpoint source-related issues, such as land application of municipal and agricultural wastes; improved management of soil, water, nutrients, and chemicals in agricultural production systems; and enhanced simulation tools for water quality, hydrology, and crop growth. ARS research, conducted by laboratories throughout the state, is often carried out in cooperation with universities, state research and extension centers, and private organizations.

United States Forest Service

Congress established the U.S. Forest Service in 1905 to provide quality water and timber for the nation's benefit. Its main activities include protection and management of natural resources on National Forest System lands; research on all aspects of forestry, rangeland management, and forest resource utilization; and community assistance and cooperation with state and local governments, forest industries, and private landowners to help protect and manage non-federal forest and associated range and watershed lands to improve conditions in rural areas. The Forest Service is also the largest forestry research organization in the world and provides technical and financial assistance to state and private forestry agencies.

International Boundary and Water Commission, U.S. Section

IBWC encourages and coordinates the establishment of cooperative relationships with federal, state, and local agencies, both in the U.S. and in Mexico, in carrying out activities along the border. IBWC may undertake cooperative projects to implement existing treaties and other agreements between the two governments. Projects may originate with the emergence of an environmental problem requiring the agreement and cooperation of the two governments to develop and implement a solution. Because of the international nature of the Rio Grande, the State of Texas has contracted with the U.S. Section of IBWC to implement the CRP in its 1,254-mile international boundary section.

United States Fish and Wildlife Service

The U.S. Fish and Wildlife Service is a federal government agency within the U.S. Department of the Interior dedicated to the management of fish, wildlife, and habitats. The mission of the agency is to work with others to conserve, protect,

and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people. The agency assists in the development and application of an environmental stewardship ethic based on ecological principles, scientific knowledge of fish and wildlife, and a sense of moral responsibility. The agency guides the conservation, development, and management of the nation's fish and wildlife resources and administers a national program to provide the public opportunities to understand, appreciate, and wisely use fish and wildlife resources. The U.S. Fish and Wildlife Service is responsible for implementing all aspects of the Endangered Species Act, such as coordination with the states on wildlife conservation, listing new species in need of protection, recovering species that are federally listed as threatened or endangered, and de-listing recovered species.

Chapter 6 Best Management Practices

Nonpoint source management programs in Texas make use of a wide variety of BMPs. This section provides an overview of the primary BMPs in use or identified for use in Texas. This is not a complete listing of all acceptable BMPs for nonpoint source pollution control programs and projects in Texas. Whether or not projects receive funding under CWA Section 319(h), the use and demonstration of innovative practices not listed here are acceptable and valuable, particularly where their effectiveness can be evaluated and monitored.

Definition of Best Management Practices

Nonpoint source BMPs are activities, practices, and procedures undertaken to prevent or reduce water pollution. They are sometimes categorized as preventative measures, which are actions taken or techniques used to eliminate or reduce concentrations of pollutants from runoff. Programs that implement these BMPs are addressed in Chapter 5.

There are many nonpoint source BMPs utilized in Texas. A separate document, the BMP Finder, provides a more comprehensive description and discussion of important Texas nonpoint source BMPs and guidance on their use. The BMP Finder is extensively cross-referenced to help in identifying and comparing BMPs which are closely related and to sort out the many different names and variations in BMPs which are currently in use. The best BMP to use depends on the particular needs or purposes to be addressed and the specific site characteristics. The BMP Finder can be found on the TCEQ Nonpoint Source Program's website.

TSSWCB has determined that the implementation of a whole-farm WQMP based on the USDA-NRCS Field Office Technical Guide, including all practices required to minimally meet the resource quality criteria for water quality at the resource management system level, represents the best available technology for preventing and abating agricultural and silvicultural nonpoint source pollution in order to comply with the TSWQS (31 TAC Section 523.3(g)(2)). This means that the specific BMPs included in the USDA-NRCS technical guide are incorporated by reference as part of this Management Program.

Since most BMPs address specific management needs and site characteristics, it is helpful to identify and classify BMPs according to where they are most effective. The next section categorizes BMPs according to their use in managing the various parts of the nonpoint source pollution pathway. The final section addresses which BMPs best address different activities and disturbances which are sources of nonpoint source pollution.

Categories of Nonpoint Source Pollution Management

The management of nonpoint source pollution involves a strategic combination of practices designed to prevent and intercept the entry of nonpoint source pollutants into waters along the entire stormwater pathway. Most BMPs address one specific stage of this pathway, although they may be applied in different situations and to different sources (Table 6.1). General categories of BMPs include:

- preventive practices: conceptual management or design practices which eliminate or reduce pollutants at the sources;
- cleanup practices: recapturing pollutants that have spilled onto or contaminated a location;
- runoff control practices: reducing the volume, velocity, and/or erosive force of stormwater runoff flow;
- erosion control practices: protecting material at the soil surface from entering stormwater runoff;
- sediment control practices: preventing materials already suspended in water from leaving a site;
- channel protection practices: preventing the erosion of channels, stream banks, and streambeds;
- habitat restoration practices: restoring natural communities that minimize erosion and remove water pollutants, especially along a waterway and its riparian zone;
- instream remediation practices: removing nonpoint source pollutants or restoring water quality characteristics in a waterway;
- abatement of contaminated groundwater seepage to reduce the flow into surface waters; and
- other BMPs, such as public education, may address two or more of these stages in the water pathway simultaneously.

For optimum effectiveness, nonpoint source programs should attempt to coordinate BMPs with other governmental agencies, private sector interests, and stakeholder groups at the state and watershed level. BMPs can complement each other when planned efficiently. For example, erosion control on a site typically increases the effectiveness and reduces the size and maintenance requirements of the site's sediment controls. If the planning and installation of BMPs is not coordinated, they may undermine each other. For example, armoring a straight stretch of channel or stream bank may increase flow velocity and channel erosion downstream. In general, controlling nonpoint source pollutants through prevention where possible is most cost effective. Additional monitoring to characterize nonpoint source pollution in a watershed may be necessary to ensure BMPs are being installed in the most effective locations. Control of these pollutants generally becomes more difficult and expensive the farther they travel down the stormwater pathway.

Table 6.1 Best Management Practices by Category

Management Category and Description	Typical BMP Examples
Preventive BMPs Preventive BMPs, sometimes called source controls, are management techniques or designs that prevent or reduce the exposure of substances to precipitation, stormwater, or surface waters. All policies and practices that prevent the release of materials to the open air, soil, or water are preventive BMPs. Such practices and safeguards comprise a large part of the rules, guidelines, and permit requirements for facility management and for the storage, transport, processing, and disposal of wastes and hazardous materials administered by TCEQ and other regulatory agencies.	• Planning, policy, and regulatory activities • Using alternate, less polluting materials • Housekeeping to contain and cover materials and wastes, or keep them indoors • Minimize the extent and duration of land disturbance activities • Well plugging • Groundwater seepage abatement and control • Recycling and composting, including rainwater harvesting • Household Hazardous Waste and similar collections
Cleanup BMPs Cleanup BMPs remove or remediate nonpoint source pollutants which have contaminated a specific area. In most cases of significant contamination, the selection and implementation of these BMPs is governed specifically under agency rules. Other cleanup BMPs, such as the cleanup of litter or illegally disposed materials, are more discretionary.	• Spill response • Contaminated site cleanup • Trash-litter cleanup • Increased-efficiency street sweeping • Plugging oil and gas wells • Source removal
Runoff and Run-on Control/LID BMPs Runoff and run-on control BMPs reduce the volume, velocity, and erosive force of stormwater through the diversion, infiltration, or absorption of stormwater into the surface or through physical impediments which slow the flow of stormwater.	• Level spreaders • Permeable Pavement • Bio-retention and bio-swales • Rainwater harvesting • Rainwater detention/irrigation • Vegetated filter strips • Rain gardens • Trash interceptors/separators • Tree boxes • Riparian buffers
Erosion Control BMPs Erosion control BMPs maintain the integrity of the land surface to prevent material at the surface from entering stormwater or surface water.	• Mulches and blankets • Vegetation preservation and establishment • Riprap on temporary traffic areas

Management Category and Description	Typical BMP Examples
Sediment Control BMPs For material that escapes erosion control BMPs and enters stormwater runoff, the next line of defense is sediment control. Sediment control BMPs detain runoff before it leaves a site to filter out and/or precipitate suspended particles, including soluble pollutants which may be attached to solid particles.	• Inlet protection • Extended detention basins • Vegetated filter strips • Sediment trap/stone outlet • Filter berms and silt fences • Sand filter systems • Constructed or restored wetlands
Channel, Stream Bank, and Streambed Protection BMPs These BMPs protect the integrity of stream beds and stream banks to prevent erosion and loss. Stream banks can be protected or restored either by increasing the resistance of the bank to erosion or by decreasing the energy of the water at the point of contact with the bank, such as deflecting or interrupting flows.	• Prevention of disturbance by exclusion of livestock, off-road vehicles, etc. • Channel shaping to reduce velocity and erosive force • Gabions or riprap lining of channels • Reinforcing or armoring exposed surfaces • Stream bank vegetation
Habitat Restoration BMPs These are a special subset of biological erosion control and stream protection BMPs. They establish or protect the natural communities which most effectively protect waterways and riparian areas from erosion.	• Reestablish the hydrology of wetlands and riparian areas • Restoration of wetland native plant communities • Riparian buffer connecting streams or channels to floodplains
Instream and Lake Remediation BMPs Once nonpoint source pollutants have affected a water body, another set of BMPs may reduce or reverse these effects.	• Mechanical aeration to restore dissolved oxygen • Chemical treatments - e.g., pH adjustment
Other BMPs	• Public education

Categories of Nonpoint Sources and Associated Pollutants

BMPs can be classified not only by management category but also by the primary nonpoint sources of pollution and the types of pollutant loadings and other impacts that each of these sources tends to cause (Table 6.2). Many BMPs are used to address a broad range of nonpoint sources, particularly the erosion and sediment control BMPs.

Major Sources

- agriculture
- silviculture
- urban stormwater
- construction

Special Sources

- atmospheric deposition
- boats and marinas
- septic and other on-site wastewater systems
- mining and petroleum production
- industrial sites
- roads
- spill containment and contaminant remediation
- hydromodification and stream bank protection
- habitat degradation
- wildlife
- instream remediation
- underground storage tanks

Table 6.2 Best Management Practices by Source

Sources and Activities	Pollutants and Other Impacts	BMP Examples
Agriculture Tilling, cultivation, harvesting, and other soil surface exposure and disturbances; chemical applications; livestock	• Sediment from exposed soil • Nutrients from fertilizers, chemicals, and pesticides • Streamflow and temperature increases caused by vegetation removal	Animal Mortality Facility, Alley Cropping, Brush Management, Closure of Waste, Impoundments, Composting Facility, Conservation Crop Rotation, Constructed Wetland, Contour Buffer Strips, Cover Crop, Cross Wind Strip cropping, Diversion Dam, Dike, Filter Strip, Firebreak, Grade Stabilization Structure, Grassed Waterway, Irrigation Land Leveling, Manure Transfer, Nutrient Management, Pest Management, Pond Sealing or Lining - Bentonite Treatment, Prescribed Grazing, Residue Management - No Till/Strip Till, Riparian Forest Buffer, Sediment Basin, Surface Roughening, Terrace, Use Exclusion, Waste Utilization, Water and Sediment Control Basin, Well Decommissioning
Silviculture/Forestry Timber road construction and use, timber harvesting, mechanical equipment operation, prescribed burning, site preparation, fertilizer and pesticide application	• Sediment • Nutrients from forest fertilizer application • Chemicals from pesticide application • Temperature changes resulting from riparian vegetation removal and sediment additions • Streamflow increases caused by vegetation removal	Broad-Based Dips, Cross-Road Drainage Culverts, Haul Roads, Log Sets, Field Chipping Sets, Portable Mill Locations, Revegetation of Disturbed Areas, Rolling Dips, Skid Trails, Stream Crossings, Streamside Management Zones, Salvage and Sanitation in Streamside Management Zones, Water Bars, Wing Ditch

Sources and Activities	Pollutants and Other Impacts	BMP Examples
Urban and Industrial/Post-construction Industrial, commercial, and residential activities; lawn and landscape management; pets and wildlife; pavement and other impervious covering of the soil; vehicular traffic; production and use of synthetic chemicals; improper disposal of wastes	• Sediment from disturbed land • Accelerated runoff from impervious surfaces • Nutrients and pesticides from lawn and landscape management • Pathogens and nutrients from pet and wildlife waste • Oil and grease • Petroleum hydrocarbons	Cleanup, Composting, Animal Waste Collection, Curb Elimination, Debris Removal, Exposure Reduction, Landscaping and Lawn Maintenance Controls, Minimization of Pollutants, Parking Lot/Street Cleaning Operations, Road Salt Controls, Streambank Stabilization, Bio-retention and Bio-swales, Buffers, Easements, Solid Waste Collection Facilities, Extended Detention Basin, Infiltration Trench, Oil and Grease Trap Device, Porous Pavement, Sand Filter, Rain Garden, Rainwater Harvesting/Reuse, Vegetative Practices, Filter Strip, Grassed Swale, Wetland, Wet Retention Pond

Sources and Activities	Pollutants and Other Impacts	BMP Examples
Construction Removal of the soil's protective cover, unpaved traffic surfaces, earthmoving, open stockpiling of erodible materials	• Sediment from bare soil and stockpiles • Nutrients from temporary and permanent vegetation establishment • Streamflow increases caused by vegetation removal and impervious ground coverings • Waste chemicals and debris from painting and other construction wastes	**Minimize extent and duration of disturbance surface stabilization**: Mulching, Preserving Natural Vegetation, Recontouring, Permanent Seeding, Riprap, Sodding, Surface Roughening, Temporary Gravel Construction Access, Temporary Seeding, Topsoiling, Erosion Control Compost, Erosion Control Blanket, Runoff Diversion **Runoff conveyance measures:** Grass-Lined Channel or Swale, Hardened Channel, Interceptor Swale, Temporary Slope Drain, Paved Flume, Runoff Diversion Dike **Outlet protection:** Level Spreader, Outlet Stabilization Structure **Sediment traps and barriers:** Block and Gravel Drop Inlet Protection, Excavated Drop Inlet Protection, Fabric Storm Drain Inlet Protection, Sediment Basin, Rock Dam, Sediment Fence/Straw Bale Barrier, Sediment Trap, Sand Filter System, Sod Drop Inlet Protection, Vegetated Filter Strip, Filter Berm (rock, sandbag, compost, mulch), Filter Sock (compost or mulch), Brush Barrier, Wetlands, Wet Basin, Extended Detention Basin **Stream protection:** Streambank Stabilization, Streambed Stabilization, Temporary Stream Crossing

Sources and Activities	Pollutants and Other Impacts	BMP Examples
Atmospheric deposition Forest fires, windblown dust, sea spray, the smelting of ores, and stack and fugitive dust emissions (dust that escapes emission controls). Nitrogen from microbial decomposition, combustion of fossil fuels, fertilizer and explosives factories, and volatilization of applied ammonia-based fertilizers and pesticides	• Windblown pollutants of greatest concern include metals, such as mercury, and nitrogen.	Pollution prevention and emissions control measures to reduce the exposure and release of pollutants to the air. Pesticide management erosion and sediment control BMPs to reduce the entry of soil-bound pollutants, including those from atmospheric deposition, into stormwater.
Boats and marinas Discharge of sewage, fish cleanings, and food waste from recreational boats; bilge from boat ballast; paints, pesticide, and wood preservatives; chemicals used to deter metal corrosion; biocidal antifouling agents; boat and marina construction; boat hull bottom painting and scrapings; boat operation and dredging activities; refueling activities; bilge or fuel discharges	• Biological oxygen demand and sediment oxygen demand • Nutrients • Pathogens • Metals, including copper and tin • Arsenic from paint pigment, pesticide, and wood preservatives • Zinc from anodes used to deter metal corrosion	Protected Shallow Water Habitats, Proper Storage and Handling of Materials, No-Discharge Zones, Pumpout Facilities (Fixed-Point, Portable, and Dedicated Slipside Systems), Boat Repair and Maintenance Restrictions, Solid Waste Collection Facilities, Fish Cleaning Facilities/Controls

Sources and Activities	Pollutants and Other Impacts	BMP Examples
Septic and other on-site wastewater systems Discharges, seepage, or other releases from malfunctioning or improperly installed on-site wastewater treatment systems	• Nitrogen • Phosphorus • Organic matter • Bacterial and viral pathogens	Chemical Additive Restrictions, Elimination of Garbage Disposals, Inspection and Maintenance, Phosphorus Detergent Restrictions, Denitrification Systems, Floating Aquatic Plant (Aquaculture) Systems, Upgrade or Replacement of Failing Systems, Alternating Bed System, Mound (Fill) System, Pressure Distribution (Low-Pressure Pipe) System, Point-of-Sale Inspections, Inspection and Permitting of Installed Systems, Local Ordinances
Mining and petroleum production	• Salt • Sediment • Petroleum hydrocarbons	Well Decommissioning, Plugging Wells and Test holes
Spill containment and contaminant remediation Spills, leaks, or other releases of chemicals and other pollutants	• Petroleum hydrocarbons • Other chemicals	Household Hazardous Waste and Empty Pesticide Container Collection, Storm Drain Stenciling, Spill Cleanup, Slurry Walls, Grouting, Geomembranes, Hydrodynamic Control, Surface Seals, Surface Drainage, Excavation, Soil Venting, In-Situ Treatment of Contaminants, Well Plugging, Trenching and Disposal, Groundwater Recovery and Disposal

Sources and Activities	Pollutants and Other Impacts	BMP Examples
Hydromodification and stream bed/stream bank protection Increased streamflow and erosive force can damage and erode stream channels	• Sediment, organic matter, and nutrients • Reduced filtration • Reduced water temperature • Reduced absorption of hydraulic energy • Increased movement of pollutants	No-Wake Zones, Livestock Exclusion, Stream Bank Setbacks, Blankets and Mattresses, Branch Packs, Composite Revetment, Gabions, Live Fascines (Wattling Bundles), Live Staking, Tree Revetment, Vegetative Cover, Live Cribwall, Check Dam, Deflectors, Grade Stabilization Structure, Low-Head Dam (Weir), Levee Protection (Vegetation and Animal Control), Hydraulic Structure, Flow Restrictor, Noneroding roadway
Underground storage tanks Spills, leaks, and other releases	• Petroleum hydrocarbons and related chemicals	Slurry Walls, Grouting, Geomembranes, Surface Seals, Surface Drainage, Hydrodynamic Control, Pumping, Interceptor Systems, Soil Venting, Excavation, Biological Degradation, Chemical Degradation, Inspection

Appendix A Certification of Authority

CWA Section 319(b)(2)(D) requires that the Management Program include a certification by the attorney general of the state (or the chief attorney of any state water pollution control agency which has independent legal counsel) that the laws of the state provide adequate authority to implement the Management Program or, if there is not such adequate authority, a list of such additional authorities as will be necessary to implement the Management Program.

For TCEQ, a letter from the agency's General Counsel will be included.

For TSSWCB, a letter from the Office of the Attorney General will be included.

Appendix B CWA Section 319

(CWA Section 319 added by Public Law 100-4)

(a) State Assessment Reports.

(1) Contents. The Governor of each State shall, after notice and opportunity for public comment, prepare and submit to the Administrator for approval, a report which:

(A) identifies those navigable waters within the State which, without additional action to control nonpoint sources of pollution, cannot reasonably be expected to attain or maintain applicable water quality standards or the goals and requirements of this Act;

(B) identifies those categories and subcategories of nonpoint source or, where appropriate, particular nonpoint sources which add significant pollution to each portion of the navigable waters identified under subparagraph (A) in amounts which contribute to such portion not meeting such water quality standards or such goals and requirements;

(C) describes the process, including intergovernmental coordination and public participation, for identifying BMPs and measures to control each category and subcategory of nonpoint sources and, where appropriate, particular nonpoint sources identified under subparagraph (B) and to reduce, to the maximum extent practicable, the level of pollution resulting from such category, subcategory, or source; and

(D) identifies and describes State and local programs for controlling pollution added from nonpoint sources to, and improving the quality of, each such portion of the navigable waters, including but not limited to those programs which are receiving Federal assistance under subsections (h) and (i).

(2) Information Used in Preparation. In developing the report required by this section, the State (A) may rely upon information developed pursuant to sections 208, 303(e), 304(f), 305(b), and 314 [of the CWA], and other information as appropriate, and (B) may utilize appropriate elements of the waste treatment management plans developed pursuant to sections 208(b) and 303 [of the CWA], to the extent such elements are consistent with and fulfill the requirements of this section.

(b) State Management Programs.

(1) In General. The Governor of each State, for that State or in combination with adjacent States, shall, after notice and opportunity for

public comment, prepare and submit to the Administrator for approval a management program which such State proposes to implement in the first four fiscal years beginning after the date of submission of such management program for controlling pollution added from nonpoint sources to the navigable waters within the State and improving the quality of such waters.

(2) Specific Contents. Each management program proposed for implementation under this subsection shall include each of the following:

(A) An identification of the BMPs and measures which will be undertaken to reduce pollutant loadings resulting from each category, subcategory, or particular nonpoint source designated under paragraph (1)(B), taking into account the impact of the practice on groundwater quality.

(B) An identification of programs (including, as appropriate, nonregulatory or regulatory programs for enforcement, technical assistance, financial assistance, education, training, technology transfer, and demonstration projects) to achieve implementation of the BMPs by the categories, subcategories, and particular nonpoint sources designated under subparagraph (A).

(C) A schedule containing annual milestones for (i) utilization of the program implementation methods identified in subparagraph (B), and (ii) implementation of the BMPs identified in subparagraph (A) by the categories, subcategories, or particular nonpoint sources designated under paragraph (1)(B). Such schedule shall provide for utilization of the BMPs at the earliest practicable date.

(D) A certification of the attorney general of the State or States (or the chief attorney of any State water pollution control agency which has independent legal counsel) that the laws of the State or States, as the case may be, provide adequate authority to implement such management program or, if there is not such adequate authority, a list of such additional authorities as will be necessary to implement such management program. A schedule and commitment by the State or States to seek such additional authorities as expeditiously as practicable.

(E) Sources of Federal and other assistance and funding (other than assistance provided under subsections (h) and (i)) which will be available in each of such fiscal years for supporting implementation of such practices and measures and the purposes for which such assistance will be used in each of such fiscal years.

(F) An identification of Federal financial assistance programs and Federal development projects for which the State will review individual assistance applications or development projects for their effect on water quality pursuant to the procedures set forth

in Executive Order 12372 as in effect on September 17, 1983, to determine whether such assistance applications or development projects would be consistent with the program prepared under this subsection; for the purposes of this subparagraph, identification shall not be limited to the assistance programs or development projects subject to Executive Order 12372 but may include any programs listed in the most recent Catalog of Federal Domestic Assistance which may have an effect on the purposes and objectives of the State's nonpoint source pollution management program.

(3) Utilization of Local and Private Experts. In developing and implementing a management program under this subsection, a State shall, to the maximum extent practicable, involve local public and private agencies and organizations which have expertise in control of nonpoint sources of pollution.

(4) Development on Watershed Basis. A State shall, to the maximum extent practicable, develop and implement a management program under this subsection on a watershed-by-watershed basis within such State.

(c) Administrative Provisions.

(1) Cooperation Requirement. Any report required by subsection (a) and any management program and report required by subsection (b) shall be developed in cooperation with local, substate regional, and interstate entities which are actively planning for the implementation of nonpoint source pollution controls and have either been certified by the Administrator in accordance with section 208 [of the CWA], have worked jointly with the State on water quality management planning under section 205(j) [of the CWA], or have been designated by the State legislative body or Governor as water quality management planning agencies for their geographic areas.

(2) Time Period for Submission of Reports and Management Programs. - Each report and management program shall be submitted to the Administrator during the 18-month period beginning on the date of the enactment of this section.

(d) Approval or Disapproval of Reports and Management Programs.

(1) Deadline. Subject to paragraph (2), not later than 180 days after the date of submission to the Administrator of any report or management program under this section (other than subsections (h), (i), and (k)), the Administrator shall either approve or disapprove such report or management program, as the case may be. The Administrator may approve a portion of a management program under this subsection. If the Administrator does not disapprove a report, management program, or portion of a management program in such 180-day period, such report,

management program, or portion shall be deemed approved for purposes of this section.

(2) Procedure for Disapproval. If, after notice and opportunity for public comment and consultation with appropriate Federal and State agencies and other interested persons, the Administrator determines that -

(A) the proposed management program or any portion thereof does not meet the requirements of subsection (b)(2) of this section or is not likely to satisfy, in whole or in part, the goals and requirements of this Act;

(B) adequate authority does not exist, or adequate resources are not available, to implement such program or portion;

(C) the schedule for implementing such program or portion is not sufficiently expeditious; or

(D) the practices and measures proposed in such program or portion are not adequate to reduce the level of pollution in navigable waters in the State resulting from nonpoint sources and to improve the quality of navigable waters in the State;

the Administrator shall within 6 months of the receipt of the proposed program notify the State of any revisions or modifications necessary to obtain approval. The State shall thereupon have an additional 3 months to submit its revised management program and the Administrator shall approve or disapprove such revised program within three months of receipt.

(3) Failure of State to Submit Report. If a Governor of a State does not submit the report required by subsection (a) within the period specified by subsection (c)(2), the Administrator shall, within 30 months after the date of the enactment of this section, prepare a report for such State which makes the identifications required by paragraphs (1)(A) and (1)(B) of subsection (a). Upon completion of the requirement of the preceding sentence and after notice and opportunity for comment, the Administrator shall report to Congress on his actions pursuant to this section.

(e) Local Management Programs.

Technical Assistance. If a State fails to submit a management program under subsection (b) or the Administrator does not approve such a management program, a local public agency or organization which has expertise in, and authority to, control water pollution, resulting from nonpoint sources in any area of such State which the Administrator determines is of sufficient geographic size may, with approval of such State, request the Administrator to provide, and the Administrator shall provide, technical assistance to such agency or organization in developing for such area a management program

which is described in subsection (b) and can be approved pursuant to subsection (d). After development of such management program, such agency or organization shall submit such management program to the Administrator for approval. If the Administrator approves such management program, such agency or organization shall be eligible to receive financial assistance under subsection (h) for implementation of such management program as if such agency or organization were a State for which a report submitted under subsection (a) and a management program submitted under subsection (b) were approved under this section. Such financial assistance shall be subject to the same terms and conditions as assistance provided to a State under subsection (h).

(f) Technical Assistance for State.

Upon request of a State, the Administrator may provide technical assistance to such State in developing a management program approved under subsection (b) for those portions of the navigable waters requested by such State.

(g) Interstate Management Conference.

> (1) Convening of Conference, Notification, Purpose. If any portion of the navigable waters in any State which is implementing a management program approved under this section is not meeting applicable water quality standards or the goals and requirements of this Act as a result, in whole or in part, of pollution from nonpoint sources in another State, such State may petition the Administrator to convene, and the Administrator shall convene, a management conference of all States which contribute significant pollution resulting from nonpoint sources to such portion. If, on the basis of information available, the Administrator determines that a State is not meeting applicable water quality standards or the goals and requirements of this Act as a result, in whole or in part, of significant pollution from nonpoint sources in another State, the administrator shall notify such States. The Administrator may convene a management conference under this paragraph not later than 180 days after giving such notification, whether or not the State which is not meeting such standards requests such conference. The purpose of such conference shall be to develop an agreement among such States to reduce the level of pollution in such portion resulting from nonpoint sources and to improve the water quality of such portion. Nothing in such agreement shall supersede or abrogate rights to quantities of water which have been established by interstate water compacts, Supreme Court decrees, or State water laws. This subsection shall not apply to any pollution which is subject to the Colorado River Basin Salinity Control Act. The requirement that the Administrator convene a management conference shall not be subject to the provisions of section 505 of this Act.
>
> (2) State Management Program Requirement. To the extent that the States reach agreement through such conference, the management programs of

the States which are parties to such agreements and which contribute significant pollution to the navigable water or portions thereof not meeting applicable water quality standards or goals and requirements of this Act will be revised to reflect such agreement. Such management programs shall be consistent with Federal and State law.

(h) Grant Program.

(1) Grants for Implementation of Management Programs. Upon application of a State for which a report submitted under subsection (a) and a management program submitted under subsection (b) is approved under this section, the Administrator shall make grants, subject to such terms and conditions as the Administrator considers appropriate, under this subsection to such State for the purpose of assisting the State in implementing such management program. Funds reserved pursuant to section 205(j)(5) of this Act may be used to develop and implement such management program.

(2) Applications. An application for a grant under this subsection in any fiscal year shall be in such form and shall contain such other information as the Administrator may require, including an identification and description of the BMPs and measures which the State proposes to assist, encourage, or require in such year with the Federal assistance to be provided under the grant.

(3) Federal Share. The Federal share of the cost of each management program implemented with Federal assistance under this subsection in any fiscal year shall not exceed 60% of the cost incurred by the State in implementing such management program and shall be made on condition that the non-Federal share is provided from non-Federal sources.

(4) Limitation on Grant Amounts. Notwithstanding any other provision of this subsection, not more than 15% of the amount appropriated to carry out this subsection may be used to make grants to any one State, including any grants to any local public agency or organization with authority to control pollution from nonpoint sources in any area of such State.

(5) Priority for Effective Mechanisms. For each fiscal year beginning after September 30, 1987, the Administrator may give priority in making grants under this subsection, and shall give consideration in determining the Federal share of any such grant, to States which have implemented or are proposing to implement management programs which will:

(A) control particularly difficult or serious nonpoint source pollution problems, including, but not limited to, problems resulting from mining activities;

(B) implement innovative methods or practices for controlling nonpoint sources of pollution, including regulatory programs where the Administrator deems appropriate;

(C) control interstate nonpoint source pollution problems; or

(D) carry out groundwater quality protection activities which the Administrator determines are part of a comprehensive nonpoint source pollution control program, including research, planning, groundwater assessments, demonstration programs, enforcement, technical assistance, education, and training to protect groundwater quality from nonpoint sources of pollution.

(6) Availability for Obligation. The funds granted to each State pursuant to this subsection in a fiscal year shall remain available for obligation by such State for the fiscal year for which appropriated. The amount of any such funds not obligated by the end of such fiscal year shall be available to the Administrator for granting to other States under this subsection in the next fiscal year.

(7) Limitation on Use of Funds. States may use funds from grants made pursuant to this section for financial assistance to persons only to the extent that such assistance is related to the costs of demonstration projects.

(8) Satisfactory Progress. No grant may be made under this subsection in any fiscal year to a State which in the preceding fiscal year received a grant under this subsection unless the Administrator determines that such State made satisfactory progress in such preceding fiscal year in meeting the schedule specified by such State under subsection (b)(2).

(9) Maintenance of Effort. No grant may be made to a State under this subsection in any fiscal year unless such State enters into such agreements with the Administrator as the Administrator may require to ensure that such State will maintain its aggregate expenditures from all other sources for programs for controlling pollution added to the navigable waters in such State from nonpoint sources and improving the quality of such waters at or above the average level of such expenditures in its two fiscal years preceding the date of enactment of this subsection.

(10) Request for Information. The Administrator may request such information, data, and reports as he considers necessary to make the determination of continuing eligibility for grants under this section.

(11) Reporting and Other Requirements. Each State shall report to the Administrator on an annual basis concerning (A) its progress in meeting the schedule of milestones submitted pursuant to subsection (b)(2)(c) of this section, and (B) to the extent that appropriate information is available, reductions in nonpoint source pollutant loading and improvements in water quality for those navigable waters or watersheds

within the State which were identified pursuant to subsection (a)(1)(a) of this section resulting from implementation of the management program.

(12) Limitation on Administrative Costs. For purposes of this subsection, administrative costs in the form of salaries, overhead, or indirect costs for services provided and charged against activities and programs carried out with a grant under this subsection shall not exceed in any fiscal year 10% of the amount of the grant in such year, except that costs of implementing enforcement and regulatory activities, education, training, technical assistance, demonstration projects, and technology transfer programs shall not be subject to this limitation.

(i) Grants for Protecting Groundwater Quality.

(1) Eligible Applicants and Activities. Upon application of a State for which a report submitted under subsection (a) and a plan submitted under subsection (b) is approved under this section, the Administrator shall make grants under this subsection to such State for the purpose of assisting such State in carrying out groundwater quality protection activities which the Administrator determines will advance the State toward implementation of a comprehensive nonpoint source pollution control program. Such activities shall include, but not be limited to, research, planning, groundwater assessment, demonstration programs, enforcement, technical assistance, education and training to protect the quality of groundwater and to prevent contamination of groundwater from nonpoint sources of pollution.

(2) Applications. An application for a grant under this subsection shall be in such form and shall contain such information as the Administrator may require.

(3) Federal Share; Maximum Amount. The Federal share of the cost of assisting a State in carrying out groundwater protection activities in any fiscal year under this subsection shall be 50% of the costs incurred by the State in carrying out such activities, except that the maximum amount of Federal assistance which any State may receive under this subsection in any fiscal year shall not exceed $150,000.

(4) Report. The Administrator shall include in each report transmitted under subsection (m) a report on the activities and programs implemented under this subsection during the preceding fiscal year.

(j) Authorization of Appropriations. There is authorized to be appropriated to carry out subsections (h) and (i) not to exceed $70,000,000 for fiscal year 1988, $100,000,000 per fiscal year for each of fiscal years 1989 and 1990, and $130,000,000 for fiscal year 1991; except that for each of such fiscal years not to exceed $7,500,000 may be made available to carry out subsection (i). Sums appropriated pursuant to this subsection shall remain available until expended.

(k) Consistency of Other Programs and Projects with Management Programs. - The Administrator shall transmit to the Office of Management and Budget and the appropriate Federal departments and agencies a list of those assistance programs and development projects identified by each State under subsection (b)(2)(F) for which individual assistance applications and projects will be reviewed pursuant to the procedures set forth in Executive Order 12372 as in effect on September 17, 1983. Beginning not later than sixty days after receiving notification by the Administrator, each Federal department and agency shall modify existing regulations to allow States to review individual development projects and assistance applications under the identified Federal assistance programs and shall accommodate, according to the requirements and definitions of Executive Order 12372, as in effect on September 17, 1983, the concerns of the State regarding the consistency of such applications or projects with the State nonpoint source pollution management program.

(l) Collection of Information. The Administrator shall collect and make available, through publications and other appropriate means, information pertaining to management practices and implementation methods, including, but not limited to, (1) information concerning the costs and relative efficiencies of BMPs for reducing nonpoint source pollution; and (2) available data concerning the relationship between water quality and implementation of various management practices to control nonpoint sources of pollution.

(m) Reports of Administrator.

> (1) Annual Reports. Not later than January 1, 1988, and each January 1 thereafter, the Administrator shall transmit to the Committee on Public Works and Transportation of the House of Representatives and the Committee on Environment and Public Works of the Senate, a report for the preceding fiscal year on the activities and programs implemented under this section and the progress made in reducing pollution in the navigable waters resulting from nonpoint sources and improving the quality of such waters.
>
> (2) Final Report. Not later than January 1, 1990, the Administrator shall transmit to Congress a final report on the activities carried out under this section. Such report, at a minimum, shall:
>
>> (A) describe the management programs being implemented by the States by types and amount of affected navigable waters, categories and subcategories of nonpoint sources, and types of BMPs being implemented;
>>
>> (B) describe the experiences of the States in adhering to schedules and implementing BMPs;
>>
>> (C) describe the amount and purpose of grants awarded pursuant to subsections (h) and (i) of this section;

(D) identify, to the extent that information is available, the progress made in reducing pollutant loads and improving water quality in the navigable waters;

(E) indicate what further actions need to be taken to attain and maintain in those navigable waters (i) applicable water quality standards, and (ii) the goals and requirements of this Act;

(F) include recommendations of the Administrator concerning future programs (including enforcement programs) for controlling pollution from nonpoint sources; and

(G) identify the activities and programs of departments, agencies, and instrumentalities of the United States which are inconsistent with the management programs submitted by the States and recommend modifications so that such activities and programs are consistent with and assist the States in implementation of such management programs.

(n) Set Aside for Administrative Personnel. Not less than 5% of the funds appropriated pursuant to subsection (j) for any fiscal year shall be available to the Administrator to maintain personnel levels at EPA at levels which are adequate to carry out this section in such year.

Appendix C Nonpoint Source Priority Watersheds Report

WAP Strategy Definitions

Monitoring – More data are needed to confirm the impairment or delineate the area of the impairment in order to select and initiate the most appropriate strategy to achieve attainment of the TSWQS. This strategy is limited to the collection or acquisition of more water quality data through a special study or targeted monitoring.

Evaluation – A more comprehensive, site-specific analysis than the one conducted for the Integrated Report is required.

TSWQS Review – UAA, which is conducted if the designated use or criterion appears to be inappropriate for a water body. A UAA involves the collection of site-specific information that could result in a use change or the development of a site-specific criterion. Establishing or changing a designated use or criterion requires a revision to the TSWQS, adoption by TCEQ, and approval by EPA.

TMDL/I-Plan– A TMDL and I-Plan are planned, scheduled, under development, or being implemented for the water body. A TMDL determines the maximum amount of a pollutant a water body can receive and still achieve its water quality standards and then allocates this amount (load) to point and nonpoint sources in the watershed. A TMDL I-Plan is locally developed and describes the regulatory and voluntary activities necessary to achieve the pollutant reductions identified in the TMDL.

WPP– A WPP is planned, scheduled, under development, or being implemented. WPPs are a coordinating framework for designing and implementing water quality protection programs and projects. WPPs are locally developed, designed to meet water quality standards, and satisfy EPA guidance and criteria.

Other – The impairment cannot be addressed by one of the other identified strategies (Monitoring, Evaluation, etc.).

Segment	Segment Name	Integrated Report Category	WAP Strategy	Status	Lead
0101A_01	Dixon Creek	5C	Monitoring	Reassessment	SWQM
0101B_01	Rock Creek	5C	TSWQS Review	Consulting	TSWQS
0102_01	Lake Meredith	5C	Evaluation	TBD	TCEQ-WAP
0102_01	Lake Meredith	5C	Evaluation	TBD	TCEQ-WAP
0102_01	Lake Meredith	5C	Evaluation	TBD	TCEQ-WAP
0102_02	Lake Meredith	5C	Evaluation	TBD	TCEQ-WAP
0102_02	Lake Meredith	5C	Evaluation	TBD	TCEQ-WAP
0102_02	Lake Meredith	5C	Evaluation	TBD	TCEQ-WAP
0103_01	Canadian River Above Lake Meredith	5C	Evaluation	TBD	TCEQ-WAP
0103_02	Canadian River Above Lake Meredith	5C	Evaluation	TBD	TCEQ-WAP
0103_03	Canadian River Above Lake Meredith	5C	Evaluation	TBD	TCEQ-WAP
0103A_01	East Amarillo Creek	5C	TSWQS Review	Consulting	TSWQS
0105_01	Rita Blanca Lake	5C	Monitoring	Consulting	SWQM
0201A_01	Mud Creek	5B	Evaluation	TBD	TCEQ-WAP
0201A_01	Mud Creek	5C	Evaluation	TBD	TCEQ-WAP
0202A_02	Bois d'Arc Creek	5B	WPP	Planning	3rd Party
0202A_03	Bois d'Arc Creek	5B	WPP	Planning	3rd Party
0202C_01	Pecan Bayou	5C	Monitoring	Underway	CRP
0202E_01	Post Oak Creek	5C	WPP	TBD	NPS
0202F_01	Choctaw Creek	5B	Evaluation	TBD	TCEQ-WAP
0202F_02	Choctaw Creek	5B	Evaluation	TBD	TCEQ-WAP
0202G_01	Smith Creek	5B	Evaluation	TBD	TCEQ-WAP
0202I_01	Little Pine Creek	5C	TSWQS Review	Completed	TSWQS
0202L_01	Honey Grove Creek	5B	TSWQS Review	Underway	TSWQS
0202N_01	Hicks Creek	5C	TSWQS Review	TBD	TSWQS
0205A_01	Wildhorse Creek	5C	Evaluation	TBD	TCEQ-WAP

Segment	Segment Name	Integrated Report Category	WAP Strategy	Status	Lead
0206B_01	South Groesbeck Creek	5B	Evaluation	TBD	TCEQ-WAP
0207_04	Lower Prairie Dog Town Fork Red River	5B	Evaluation	TBD	TCEQ-WAP
0211_02	Little Wichita River	5C	Monitoring	Underway	SWQM
0212A_01	Little Wichita River above Lake Arrowhead	5C	Monitoring	Underway	SWQM
0214_05	Wichita River Below Diversion Lake Dam	5C	Evaluation	TBD	TCEQ-WAP
0214A_01	Beaver Creek	5B	Evaluation	TBD	TCEQ-WAP
0214A_02	Beaver Creek	5B	Evaluation	TBD	TCEQ-WAP
0214F_01	Unnamed tributary of Buffalo Creek	5B	TSWQS Review	Underway	TSWQS
0219_01	Lake Wichita	5C	Evaluation	TBD	TCEQ-WAP
0219_01	Lake Wichita	5C	Evaluation	TBD	TCEQ-WAP
0219_01	Lake Wichita	5C	Evaluation	TBD	TCEQ-WAP
0221_01	Middle Fork Pease River	5C	Monitoring	Underway	CRP
0221_01	Middle Fork Pease River	5C	Monitoring	Underway	CRP
0221_01	Middle Fork Pease River	5C	Monitoring	Underway	CRP
0223_01	Greenbelt Lake	5C	Monitoring	Underway	SWQM
0226_01	South Fork Wichita River	5C	Monitoring	Underway	CRP
0226_02	South Fork Wichita River	5C	Monitoring	Underway	CRP
0226_03	South Fork Wichita River	5C	Monitoring	Underway	CRP
0226_04	South Fork Wichita River	5C	Monitoring	Underway	CRP
0228_01	Mackenzie Reservoir	5C	Monitoring	Underway	SWQM
0228_01	Mackenzie Reservoir	5C	Evaluation	TBD	TCEQ-WAP
0229_01	Upper Prairie Dog Town Fork Red River	5C	Evaluation	TBD	TCEQ-WAP
0229_02	Upper Prairie Dog Town Fork Red River	5C	Monitoring	Planning	CRP
0299A_01	Sweetwater Creek	5C	Evaluation	TBD	TCEQ-WAP
0302A_02	Big Creek	5C	Monitoring	Reassessment	SWQM
0302H_01	Elliott Creek	5C	Monitoring	Reassessment	SWQM

Segment	Segment Name	Integrated Report Category	WAP Strategy	Status	Lead
0303B_01	White Oak Creek	5B	Evaluation	TBD	TCEQ-WAP
0303B_03	White Oak Creek	5B	Evaluation	TBD	TCEQ-WAP
0303B_03	White Oak Creek	5C	Monitoring	Planning	SWQM
0303B_04	White Oak Creek	5B	Evaluation	TBD	TCEQ-WAP
0303P_01	Mustang Creek	5C	TSWQS Review	Consulting	TSWQS
0304_01	Days Creek	5C	TSWQS Review	TBD	TSWQS
0304C_01	Wagner Creek	5C	Evaluation	TBD	TCEQ-WAP
0306_01	Upper South Sulphur River	5C	Monitoring	Underway	CRP
0307A_01	Middle Sulphur River	5C	Monitoring	Underway	CRP
0401_02	Caddo Lake	5C	Evaluation	TBD	TCEQ-WAP
0401_03	Caddo Lake	5C	Evaluation	TBD	TCEQ-WAP
0401_05	Caddo Lake	5C	Evaluation	TBD	TCEQ-WAP
0401_07	Caddo Lake	5C	Evaluation	TBD	TCEQ-WAP
0401A_01	Harrison Bayou	5C	Evaluation	TBD	TCEQ-WAP
0402_02	Big Cypress Creek Below Lake O' the Pines	5C	Monitoring	Planning	SWQM
0402B_01	Hughes Creek	5C	Monitoring	Planning	CRP
0403_04	Lake O' the Pines	4A	TMDL/I-Plan	Completed	TMDL
0404_02	Big Cypress Creek Below Lake Bob Sandlin	5B	Evaluation	TBD	TCEQ-WAP
0404B_01	Tankersley Creek	5B	Evaluation	TBD	TCEQ-WAP
0404C_01	Hart Creek	5B	Evaluation	TBD	TCEQ-WAP
0404E_01	Dry Creek	5C	TSWQS Review	TBD	TSWQS
0404J_01	Prairie Creek	5C	Evaluation	TBD	TCEQ-WAP
0405_01	Lake Cypress Springs	5C	Evaluation	TBD	TCEQ-WAP
0405_02	Lake Cypress Springs	5C	Evaluation	TBD	TCEQ-WAP
0405_03	Lake Cypress Springs	5C	Evaluation	TBD	TCEQ-WAP
0405A_01	Big Cypress Creek	5B	TSWQS Review	Underway	TSWQS

Segment	Segment Name	Integrated Report Category	WAP Strategy	Status	Lead
0405A_01	Big Cypress Creek	5C	Monitoring	Underway	CRP
0406_01	Black Bayou	5C	Evaluation	TBD	TCEQ-WAP
0406_02	Black Bayou	5C	Evaluation	TBD	TCEQ-WAP
0406_02	Black Bayou	5C	Evaluation	TBD	TCEQ-WAP
0407_01	James Bayou	5C	TSWQS Review	TBD	TSWQS
0407_02	James Bayou	5C	Evaluation	TBD	TCEQ-WAP
0409_01	Little Cypress Bayou (Creek)	5C	Evaluation	TBD	TCEQ-WAP
0409_02	Little Cypress Bayou (Creek)	5C	Evaluation	TBD	TCEQ-WAP
0409_02	Little Cypress Bayou (Creek)	5C	Evaluation	TBD	TCEQ-WAP
0409_04	Little Cypress Bayou (Creek)	5C	Evaluation	TBD	TCEQ-WAP
0409A_01	Lilly Creek	5B	TSWQS Review	Underway	TSWQS
0409B_01	South Lilly Creek	5B	Evaluation	TBD	TCEQ-WAP
0410_02	Black Cypress Bayou (Creek)	5C	Evaluation	Reassessment	SWQM
0410_04	Black Cypress Bayou (Creek)	5C	Monitoring	Underway	CRP
0410A_01	Black Cypress Creek/Bayou	5C	TSWQS Review	TBD	TSWQS
0501_01	Sabine River Tidal	5C	Evaluation	TBD	TCEQ-WAP
0501_02	Sabine River Tidal	5C	Evaluation	TBD	TCEQ-WAP
0501B_01	Little Cypress Bayou	5B	Evaluation	TBD	TCEQ-WAP
0501B_01	Little Cypress Bayou	5C	Evaluation	TBD	TCEQ-WAP
0501B_02	Little Cypress Bayou	5B	Evaluation	TBD	TCEQ-WAP
0501B_02	Little Cypress Bayou	5C	Evaluation	TBD	TCEQ-WAP
0501B_03	Little Cypress Bayou	5B	Evaluation	TBD	TCEQ-WAP
0501B_03	Little Cypress Bayou	5C	Evaluation	TBD	TCEQ-WAP
0502A_01	Nichols Creek	5C	Evaluation	TBD	TCEQ-WAP
0502A_01	Nichols Creek	5C	TSWQS Review	Consulting	TSWQS
0502B_02	Caney Creek	5C	Evaluation	TBD	TCEQ-WAP

Segment	Segment Name	Integrated Report Category	WAP Strategy	Status	Lead
0502E_01	Cypress Creek	5B	Evaluation	TBD	TCEQ-WAP
0505_04	Sabine River Above Toledo Bend Reservoir	5C	Monitoring	Consulting	SWQM
0505B_01	Grace Creek	5B	TSWQS Review	Completed	TSWQS
0505B_02	Grace Creek	5B	Evaluation	TBD	TCEQ-WAP
0505G_01	Wards Creek	5C	Evaluation	TBD	TCEQ-WAP
0506A_01	Harris Creek	5C	Evaluation	Consulting	TSWQS
0507G_01	South Fork of Sabine River	5B	Evaluation	TBD	TCEQ-WAP
0508_01	Adams Bayou Tidal	4A	TMDL/I-Plan	Completed	TMDL
0508_01	Adams Bayou Tidal	4A	TMDL/I-Plan	Completed	TMDL
0508_02	Adams Bayou Tidal	4A	TMDL/I-Plan	Completed	TMDL
0508_02	Adams Bayou Tidal	4A	TMDL/I-Plan	Completed	TMDL
0508_03	Adams Bayou Tidal	4A	TMDL/I-Plan	Completed	TMDL
0508_03	Adams Bayou Tidal	4A	TMDL/I-Plan	Completed	TMDL
0508_04	Adams Bayou Tidal	4A	TMDL/I-Plan	Completed	TMDL
0508_04	Adams Bayou Tidal	4A	TMDL/I-Plan	Completed	TMDL
0508A_01	Adams Bayou Above Tidal	4A	TMDL/I-Plan	Completed	TMDL
0508B_01	Gum Gully	4A	TMDL/I-Plan	Completed	TMDL
0508B_01	Gum Gully	4A	TMDL/I-Plan	Completed	TMDL
0508C_01	Hudson Gully	4A	TMDL/I-Plan	Completed	TMDL
0508C_01	Hudson Gully	4A	TMDL/I-Plan	Completed	TMDL
0511_01	Cow Bayou Tidal	4A	TMDL/I-Plan	Completed	TMDL
0511_02	Cow Bayou Tidal	4A	TMDL/I-Plan	Completed	TMDL
0511_03	Cow Bayou Tidal	4A	TMDL/I-Plan	Completed	TMDL
0511_03	Cow Bayou Tidal	4A	TMDL/I-Plan	Completed	TMDL
0511_04	Cow Bayou Tidal	4A	TMDL/I-Plan	Completed	TMDL
0511_04	Cow Bayou Tidal	4A	TMDL/I-Plan	Completed	TMDL

Segment	Segment Name	Integrated Report Category	WAP Strategy	Status	Lead
0511A_02	Cow Bayou Above Tidal	4A	TMDL/I-Plan	Completed	TMDL
0511B_01	Coon Bayou	4A	TMDL/I-Plan	Completed	TMDL
0511B_01	Coon Bayou	4A	TMDL/I-Plan	Completed	TMDL
0511C_01	Cole Creek	4A	TMDL/I-Plan	Completed	TMDL
0511E_01	Terry Gully	4A	TMDL/I-Plan	Completed	TMDL
0512A_01	Running Creek	5B	Evaluation	TBD	TCEQ-WAP
0512B_01	Elm Creek	5B	Evaluation	TBD	TCEQ-WAP
0513_01	Big Cow Creek	5C	Monitoring	TBD	CRP
0514_01	Big Sandy Creek	5C	Evaluation	TBD	TCEQ-WAP
0601_01	Neches River Tidal	5A	TMDL/I-Plan	Underway	TMDL
0601_02	Neches River Tidal	5A	TMDL/I-Plan	Underway	TMDL
0601_03	Neches River Tidal	5A	TMDL/I-Plan	Underway	TMDL
0601_04	Neches River Tidal	5A	TMDL/I-Plan	Underway	TMDL
0601A_01	Star Lake Canal	5C	Evaluation	TBD	TCEQ-WAP
0603A_01	Sandy Creek	5C	TMDL/I-Plan	Underway	TMDL
0603B_01	Wolf Creek	5C	Evaluation	TBD	TCEQ-WAP
0604A_02	Cedar Creek	5C	Evaluation	TBD	TCEQ-WAP
0604A_03	Cedar Creek	5C	Monitoring	TBD	CRP
0604B_01	Hurricane Creek	5C	Evaluation	TBD	TCEQ-WAP
0604C_01	Jack Creek	5C	TSWQS Review	Completed	TSWQS
0604D_01	Piney Creek	5B	TSWQS Review	Underway	TSWQS
0604D_02	Piney Creek	5C	Evaluation	TBD	TCEQ-WAP
0604M_03	Biloxi Creek	5C	TSWQS Review	Completed	TSWQS
0604M_03	Biloxi Creek	5C	Monitoring	Underway	SWQM
0605A_01	Kickapoo Creek in Henderson County	5C	WPP	Planning	TSSWCB
0605A_01	Kickapoo Creek in Henderson County	5C	WPP	Planning	TSSWCB

Segment	Segment Name	Integrated Report Category	WAP Strategy	Status	Lead
0605A_02	Kickapoo Creek in Henderson County	5C	WPP	Planning	TSSWCB
0606_01	Neches River Above Lake Palestine	5C	TSWQS Review	Completed	TSWQS
0606_02	Neches River Above Lake Palestine	5C	TSWQS Review	Completed	TSWQS
0606_02	Neches River Above Lake Palestine	5B	Evaluation	Reassessment	SWQM
0606A_01	Prairie Creek	5B	Evaluation	TBD	TCEQ-WAP
0606A_03	Prairie Creek	5B	Evaluation	TBD	TCEQ-WAP
0606D_02	Black Fork Creek	5B	TSWQS Review	Underway	TSWQS
0607_01	Pine Island Bayou	5B	Evaluation	TBD	TCEQ-WAP
0607_02	Pine Island Bayou	5B	Evaluation	TBD	TCEQ-WAP
0607_03	Pine Island Bayou	5B	Evaluation	TBD	TCEQ-WAP
0607_04	Pine Island Bayou	5B	Evaluation	TBD	TCEQ-WAP
0607A_02	Boggy Creek	5B	Evaluation	TBD	TCEQ-WAP
0607B_01	Little Pine Island Bayou	5B	TSWQS Review	Underway	TSWQS
0607C_01	Willow Creek	5B	Evaluation	TBD	TCEQ-WAP
0608C_01	Cypress Creek	5B	Evaluation	TBD	TCEQ-WAP
0608E_01	Mill Creek in Hardin County	5C	Monitoring	Consulting	SWQM
0610A_01	Ayish Bayou	5C	TSWQS Review	Completed	TSWQS
0610A_02	Ayish Bayou	5C	TSWQS Review	Completed	TSWQS
0611_01	Angelina River Above Sam Rayburn Reservoir	5C	Monitoring	Underway	TSSWCB
0611_04	Angelina River Above Sam Rayburn Reservoir	5C	Evaluation	Completed	TSWQS
0611A_01	East Fork Angelina River	5C	TSWQS Review	Completed	TSWQS
0611A_02	East Fork Angelina River	5C	TSWQS Review	Completed	TSWQS
0611B_01	La Nana Bayou	5B	Evaluation	Completed	TSWQS
0611B_02	La Nana Bayou	5B	Evaluation	Completed	TSWQS

Segment	Segment Name	Integrated Report Category	WAP Strategy	Status	Lead
0611B_03	La Nana Bayou	5B	Evaluation	Completed	TSWQS
0611C_01	Mud Creek	5B	Monitoring	Underway	TSSWCB
0611D_01	West Mud Creek	5C	Monitoring	Underway	TSSWCB
0612_01	Attoyac Bayou	5C	WPP	Underway	TSSWCB
0612_02	Attoyac Bayou	5C	WPP	Underway	TSSWCB
0612_03	Attoyac Bayou	5C	WPP	Underway	TSSWCB
0615_01	Angelina River/Sam Rayburn Reservoir	5C	Evaluation	TBD	TCEQ-WAP
0615A_01	Paper Mill Creek	5B	TSWQS Review	Completed	TSWQS
0701_01	Taylor Bayou/North Fork Taylor Bayou Above Tidal	5B	Monitoring	Consulting	SWQM
0701_02	Taylor Bayou/North Fork Taylor Bayou Above Tidal	5B	Monitoring	Consulting	SWQM
0701D_01	Shallow Prong Lake	5C	Monitoring	Consulting	CRP
0702_01	Intracoastal Waterway Tidal	5C	Evaluation	TBD	TCEQ-WAP
0702_02	Intracoastal Waterway Tidal	5C	Evaluation	TBD	TCEQ-WAP
0703_01	Sabine-Neches Canal Tidal	5C	Evaluation	TBD	TCEQ-WAP
0704_01	Hillebrandt Bayou	5B	Evaluation	TBD	TCEQ-WAP
0704_02	Hillebrandt Bayou	5A	Evaluation	TBD	TCEQ-WAP
0801C_01	Cotton Bayou	5C	TMDL/I-Plan	Planning	3rd Party
0801C_01	Cotton Bayou	5C	TMDL/I-Plan	Planning	3rd Party
0803_01	Lake Livingston	5B	TSWQS Review	Completed	TSWQS
0803_02	Lake Livingston	5B	TSWQS Review	Completed	TSWQS
0803_03	Lake Livingston	5B	TSWQS Review	Completed	TSWQS
0803_04	Lake Livingston	5B	TSWQS Review	Completed	TSWQS
0803_05	Lake Livingston	5B	TSWQS Review	Completed	TSWQS
0803_06	Lake Livingston	5B	TSWQS Review	Completed	TSWQS

Segment	Segment Name	Integrated Report Category	WAP Strategy	Status	Lead
0803_07	Lake Livingston	5B	TSWQS Review	Completed	TSWQS
0803_08	Lake Livingston	5B	TSWQS Review	Completed	TSWQS
0803_09	Lake Livingston	5B	TSWQS Review	Completed	TSWQS
0803_10	Lake Livingston	5B	TSWQS Review	Completed	TSWQS
0803_11	Lake Livingston	5B	TSWQS Review	Completed	TSWQS
0803_12	Lake Livingston	5B	TSWQS Review	Completed	TSWQS
0804G_01	Catfish Creek	5B	Evaluation	Completed	TSWQS
0804G_01	Catfish Creek	5B	Evaluation	TBD	TCEQ-WAP
0804H_01	Upper Keechi Creek	5B	Evaluation	TBD	TCEQ-WAP
0804K_01	Lower Keechi Creek	5C	Evaluation	Consulting	TSWQS
0804L_01	Town Creek	5C	Monitoring	Underway	CRP
0805_03	Upper Trinity River	4A	Evaluation	TBD	TCEQ-WAP
0805_04	Upper Trinity River	4A	Evaluation	TBD	TCEQ-WAP
0806D_01	Marine Creek	5C	Evaluation	TBD	TCEQ-WAP
0806E_01	Sycamore Creek	4A	Evaluation	TBD	TCEQ-WAP
0809B_01	Ash Creek	5B	Evaluation	TBD	TCEQ-WAP
0809C_01	Dosier Creek	5C	TSWQS Review	TBD	TSWQS
0809D_01	Derrett Creek	5C	TSWQS Review	TBD	TSWQS
0810_01	West Fork Trinity River Below Bridgeport Reservoir	5C	WPP	Underway	3rd Party
0810C_01	Martin Branch	5C	Evaluation	TBD	TCEQ-WAP
0811B_01	Beans Creek	5C	TSWQS Review	TBD	TSWQS
0812_01	West Fork Trinity River Above Bridgeport Reservoir	5C	Evaluation	Completed	TSWQS
0812_01	West Fork Trinity River Above Bridgeport Reservoir	5C	Evaluation	TBD	TCEQ-WAP

Segment	Segment Name	Integrated Report Category	WAP Strategy	Status	Lead
0812_02	West Fork Trinity River Above Bridgeport Reservoir	5C	Evaluation	TBD	TCEQ-WAP
0814_02	Chambers Creek Above Richland-Chambers Reservoir	5C	TSWQS Review	TBD	TSWQS
0815_01	Bardwell Reservoir	5C	Monitoring	Underway	CRP
0818B_01	Cedar Creek above Cedar Creek Reservoir	5C	Evaluation	Consulting	TSWQS
0818C_01	Kings Creek	5C	Evaluation	Consulting	TSWQS
0819_01	East Fork Trinity River	5C	Evaluation	TBD	TCEQ-WAP
0819_01	East Fork Trinity River	5C	Evaluation	TBD	TCEQ-WAP
0820B_01	Rowlett Creek	5C	WPP	Underway	NPS
0821_01-04	Lake Lavon	SI[(1)]	WPP	Completed	TSSWCB
0821C_01	Wilson Creek	5C	WPP	Underway	TSSWCB
0821D_01	East Fork Trinity River above Lake Lavon	5C	WPP	Underway	TSSWCB
0822A_02	Cottonwood Branch	4A	Evaluation	TBD	TCEQ-WAP
0822B_01	Grapevine Creek	4A	Evaluation	TBD	TCEQ-WAP
0823C_01	Clear Creek	5C	WPP	Planning	3rd Party
0824_03	Elm Fork Trinity River Above Ray Roberts Lake	5C	Evaluation	TBD	TCEQ-WAP
0827A_01	White Rock Creek above White Rock Lake	5C	Evaluation	Completed	TSWQS
0828_01-08	Lake Arlington	SI	WPP	Completed	NPS
0828A_01	Village Creek	5C	WPP	Completed	NPS
0829_02	Clear Fork Trinity River Below Benbrook Lake	5C	Evaluation	TBD	TCEQ-WAP
0831_01	Clear Fork Trinity River Below Lake Weatherford	5C	Evaluation	TBD	TCEQ-WAP
0831_04	Clear Fork Trinity River Below Lake Weatherford	5C	Evaluation	TBD	TCEQ-WAP

Segment	Segment Name	Integrated Report Category	WAP Strategy	Status	Lead
0833_03	Clear Fork Trinity River Above Lake Weatherford	5B	Evaluation	TBD	TCEQ-WAP
0833_04	Clear Fork Trinity River Above Lake Weatherford	5B	Evaluation	TBD	TCEQ-WAP
0833A_01	Clear Fork Trinity River Above Strickland Creek.	5C	Monitoring	Consulting	CRP
0836_07	Richland-Chambers Reservoir	5C	Evaluation	TBD	TCEQ-WAP
0836B_01	Cedar Creek	5B	TSWQS Review	Completed	TSWQS
0837_01	Richland Creek Above Richland-Chambers Reservoir	5C	Evaluation	TBD	TCEQ-WAP
0838_01-03	Joe Pool Lake	SI	WPP	Underway	NPS
0841_01	Lower West Fork Trinity River	4A	Evaluation	TBD	TCEQ-WAP
0841F_01	Cottonwood Creek	4A	Evaluation	TBD	TCEQ-WAP
0841G_01	Dalworth Creek	4A	Evaluation	TBD	TCEQ-WAP
0841I_01	Dry Branch Creek	5C	TMDL/I-Plan	Planning	TMDL
0841K_01	Fish Creek	4A	Evaluation	TBD	TCEQ-WAP
0841L_01	Johnson Creek	4A	Evaluation	TBD	TCEQ-WAP
0841M_01	Kee Branch	4A	Evaluation	TBD	TCEQ-WAP
0841N_01	Kirby Creek	4A	Evaluation	TBD	TCEQ-WAP
0841P_01	North Fork Cottonwood Creek	5A	TMDL/I-Plan	Underway	TMDL
0841Q_01	North Fork Fish Creek	5A	TMDL/I-Plan	Completed	TMDL
0841U_01	West Irving Creek	4A	Evaluation	TBD	TCEQ-WAP
0841V_01	Crockett Branch	4A	Evaluation	TBD	TCEQ-WAP
0901_01	Cedar Bayou Tidal	5C	WPP	Underway	TSSWCB
0901A_01	Cary Bayou	5C	WPP	Underway	TSSWCB
0901A_01	Cary Bayou	5C	WPP	Underway	TSSWCB

Segment	Segment Name	Integrated Report Category	WAP Strategy	Status	Lead
0902_01	Cedar Bayou Above Tidal	5C	WPP	Underway	TSSWCB
0902_01	Cedar Bayou Above Tidal	5C	WPP	Underway	TSSWCB
1002_06	Lake Houston	4A	Evaluation	TBD	TCEQ-WAP
1003_01	East Fork San Jacinto River	4A	WPP	Underway	NPS
1003_02	East Fork San Jacinto River	4A	WPP	Underway	NPS
1003_03	East Fork San Jacinto River	4A	WPP	Underway	NPS
1004_01	West Fork San Jacinto River	4A	WPP	Completed	NPS
1004_02	West Fork San Jacinto River	4A	WPP	Completed	NPS
1004E_02	Stewarts Creek	4A	WPP	Completed	NPS
1004J_01	White Oak Creek	5A	TMDL/I-Plan	TBD	TMDL
1006_05	Houston Ship Channel Tidal	5C	TMDL/I-Plan	Underway	TMDL
1006D_01	Halls Bayou	4A	Evaluation	TBD	TCEQ-WAP
1006D_02	Halls Bayou	4A	Evaluation	TBD	TCEQ-WAP
1006F_01	Big Gulch Above Tidal	4A	Evaluation	TBD	TCEQ-WAP
1006H_01	Spring Gully Above Tidal	4A	Evaluation	TBD	TCEQ-WAP
1006I_01	Unnamed Tributary of Halls Bayou	4A	Evaluation	TBD	TCEQ-WAP
1006J_01	Unnamed Tributary of Halls Bayou	4A	Evaluation	TBD	TCEQ-WAP
1007_05	Houston Ship Channel/Buffalo Bayou Tidal	5C	Monitoring	Underway	3rd Party
1007A_01	Canal C-147	4A	Evaluation	TBD	TCEQ-WAP
1007B_01	Brays Bayou Above Tidal	4A	Evaluation	TBD	TCEQ-WAP
1007B_02	Brays Bayou Above Tidal	4A	Evaluation	TBD	TCEQ-WAP
1007C_01	Keegans Bayou Above Tidal	4A	Evaluation	TBD	TCEQ-WAP
1007D_01	Sims Bayou Above Tidal	4A	Evaluation	TBD	TCEQ-WAP
1007D_02	Sims Bayou Above Tidal	4A	Evaluation	TBD	TCEQ-WAP
1007D_03	Sims Bayou Above Tidal	4A	Evaluation	TBD	TCEQ-WAP
1007E_01	Willow Waterhole Bayou Above Tidal	4A	Evaluation	TBD	TCEQ-WAP

Segment	Segment Name	Integrated Report Category	WAP Strategy	Status	Lead
1007F_01	Berry Bayou Above Tidal	4A	Evaluation	TBD	TCEQ-WAP
1007G_01	Kuhlman Gully Above Tidal	4A	Evaluation	TBD	TCEQ-WAP
1007H_01	Pine Gully Above Tidal	4A	Evaluation	TBD	TCEQ-WAP
1007H_01	Pine Gully Above Tidal	5C	Evaluation	TBD	TCEQ-WAP
1007I_01	Plum Creek Above Tidal	4A	Evaluation	TBD	TCEQ-WAP
1007I_01	Plum Creek Above Tidal	5C	Evaluation	TBD	TCEQ-WAP
1007K_01	Country Club Bayou Above Tidal	4A	Evaluation	TBD	TCEQ-WAP
1007K_01	Country Club Bayou Above Tidal	5C	Evaluation	TBD	TCEQ-WAP
1007L_01	Unnamed Tributary of Brays Bayou	4A	Evaluation	TBD	TCEQ-WAP
1007M_01	Unnamed Tributary of Hunting Bayou	4A	Evaluation	TBD	TCEQ-WAP
1007N_01	Unnamed Tributary of Sims Bayou	4A	Evaluation	TBD	TCEQ-WAP
1007O_01	Unnamed Tributary of Buffalo Bayou	4A	Evaluation	Consulting	SWQM
1007O_01	Unnamed Tributary of Buffalo Bayou	5C	Evaluation	Consulting	SWQM
1007R_01	Hunting Bayou Above Tidal	4A	Evaluation	TBD	TCEQ-WAP
1007R_01	Hunting Bayou Above Tidal	5C	Evaluation	Consulting	SWQM
1007R_02	Hunting Bayou Above Tidal	4A	Evaluation	TBD	TCEQ-WAP
1007R_03	Hunting Bayou Above Tidal	4A	Evaluation	TBD	TCEQ-WAP
1007R_04	Hunting Bayou Above Tidal	4A	Evaluation	TBD	TCEQ-WAP
1007R_04	Hunting Bayou Above Tidal	5C	Evaluation	Consulting	SWQM
1007S_01	Poor Farm Ditch	4A	Evaluation	TBD	TCEQ-WAP
1007T_01	Bintliff Ditch	4A	Evaluation	TBD	TCEQ-WAP
1007U_01	Mimosa Ditch	4A	Evaluation	TBD	TCEQ-WAP
1007V_01	Unnamed Tributary of Hunting Bayou	4A	Evaluation	TBD	TCEQ-WAP
1007W_01	Harris County Flood Control Ditch D 138	5A	Evaluation	Planning	TSWQS
1008_02	Spring Creek	4A	WPP	Underway	NPS
1008_03	Spring Creek	4A	WPP	Underway	NPS

Segment	Segment Name	Integrated Report Category	WAP Strategy	Status	Lead
1008_04	Spring Creek	4A	WPP	Underway	NPS
1008C_01	Lower Panther Branch	4A	WPP	Underway	NPS
1008C_02	Lower Panther Branch	4A	WPP	Underway	NPS
1008H_01	Willow Creek	4A	Evaluation	TBD	TCEQ-WAP
1008I_01	Walnut Creek	5A	WPP	Underway	NPS
1008J_01	Brushy Creek	5A	WPP	Underway	NPS
1009_01	Cypress Creek	4A	WPP	Underway	NPS
1009_02	Cypress Creek	4A	WPP	Underway	NPS
1009_03	Cypress Creek	4A	WPP	Underway	NPS
1009_04	Cypress Creek	4A	WPP	Underway	NPS
1009C_01	Faulkey Gully	4A	WPP	Underway	NPS
1009D_01	Spring Gully	4A	WPP	Underway	NPS
1009E_01	Little Cypress Creek	4A	WPP	Underway	NPS
1010_02	Caney Creek	4A	Evaluation	TBD	TCEQ-WAP
1010_03	Caney Creek	5A	TMDL/I-Plan	Underway	TMDL
1010_04	Caney Creek	4A	Evaluation	TBD	TCEQ-WAP
1010C_01	Spring Branch	5A	TMDL/I-Plan	Completed	TMDL
1010C_01	Spring Branch	5C	Monitoring	TBD	SWQM
1011_01	Peach Creek	4A	Evaluation	TBD	TCEQ-WAP
1011_02	Peach Creek	4A	Evaluation	TBD	TCEQ-WAP
1013_01	Buffalo Bayou Tidal	4A	Evaluation	TBD	TCEQ-WAP
1013A_01	Little White Oak Bayou	4A	Evaluation	TBD	TCEQ-WAP
1013A_01	Little White Oak Bayou	5C	Evaluation	TBD	TCEQ-WAP
1013C_01	Unnamed Non-tidal Tributary of Buffalo Bayou Tidal	4A	Evaluation	TBD	TCEQ-WAP

Segment	Segment Name	Integrated Report Category	WAP Strategy	Status	Lead
1013C_01	Unnamed Non-tidal Tributary of Buffalo Bayou Tidal	5C	Evaluation	TBD	TCEQ-WAP
1014_01	Buffalo Bayou Above Tidal	4A	Evaluation	TBD	TCEQ-WAP
1014A_01	Bear Creek	4A	Evaluation	TBD	TCEQ-WAP
1014B_01	Buffalo Bayou/Barker Reservoir	4A	Evaluation	TBD	TCEQ-WAP
1014C_01	Horsepen Creek	5A	TMDL/I-Plan	Underway	TMDL
1014E_01	Langham Creek	4A	Evaluation	TBD	TCEQ-WAP
1014H_01	South Mayde Creek	4A	Evaluation	TBD	TCEQ-WAP
1014H_02	South Mayde Creek	4A	Evaluation	TBD	TCEQ-WAP
1014K_01	Turkey Creek	4A	Evaluation	TBD	TCEQ-WAP
1014K_02	Turkey Creek	4A	Evaluation	TBD	TCEQ-WAP
1014L_01	Mason Creek	4A	Evaluation	TBD	TCEQ-WAP
1014M_01	Newman Branch (Neimans Bayou)	4A	Evaluation	TBD	TCEQ-WAP
1014M_01	Newman Branch (Neimans Bayou)	5B	Evaluation	TBD	TCEQ-WAP
1014N_01	Rummel Creek	4A	Evaluation	TBD	TCEQ-WAP
1014O_01	Spring Branch	4A	Evaluation	TBD	TCEQ-WAP
1015A_01	Mound Creek	4A	WPP	Completed	NPS
1016_01	Greens Bayou Above Tidal	4A	Evaluation	TBD	TCEQ-WAP
1016_02	Greens Bayou Above Tidal	4A	Evaluation	TBD	TCEQ-WAP
1016_03	Greens Bayou Above Tidal	4A	Evaluation	TBD	TCEQ-WAP
1016A_03	Garners Bayou	4A	Evaluation	TBD	TCEQ-WAP
1016B_01	Unnamed Tributary of Greens Bayou	4A	Evaluation	TBD	TCEQ-WAP
1016C_01	Unnamed Tributary of Greens Bayou	4A	Evaluation	TBD	TCEQ-WAP
1016D_01	Unnamed Tributary of Greens Bayou	4A	Evaluation	TBD	TCEQ-WAP
1017_01	Whiteoak Bayou Above Tidal	4A	Evaluation	TBD	TCEQ-WAP
1017_02	Whiteoak Bayou Above Tidal	4A	Evaluation	TBD	TCEQ-WAP

Segment	Segment Name	Integrated Report Category	WAP Strategy	Status	Lead
1017_03	Whiteoak Bayou Above Tidal	4A	Evaluation	TBD	TCEQ-WAP
1017_04	Whiteoak Bayou Above Tidal	4A	Evaluation	TBD	TCEQ-WAP
1017A_01	Brickhouse Gully/Bayou	4A	Evaluation	TBD	TCEQ-WAP
1017B_02	Cole Creek	4A	Evaluation	TBD	TCEQ-WAP
1017C_01	Vogel Creek	4A	Evaluation	TBD	TCEQ-WAP
1017D_01	Unnamed Tributary of White Oak Bayou	4A	Evaluation	TBD	TCEQ-WAP
1017D_01	Unnamed Tributary of White Oak Bayou	5C	Evaluation	TBD	TCEQ-WAP
1017E_01	Unnamed Tributary of White Oak Bayou	4A	Evaluation	TBD	TCEQ-WAP
1017F_01	Rolling Fork Creek	4A	Evaluation	TBD	TCEQ-WAP
1101_01	Clear Creek Tidal	4A	Evaluation	TBD	TCEQ-WAP
1101_02	Clear Creek Tidal	4A	Evaluation	TBD	TCEQ-WAP
1101_03	Clear Creek Tidal	4A	Evaluation	TBD	TCEQ-WAP
1101A_01	Magnolia Creek	4A	Evaluation	TBD	TCEQ-WAP
1101B_01	Chigger Creek	4A	Evaluation	TBD	TCEQ-WAP
1101C_01	Cow Bayou	4A	Evaluation	TBD	TCEQ-WAP
1101D_01	Robinson Bayou	4A	Evaluation	TBD	TCEQ-WAP
1101D_02	Robinson Bayou	4A	Evaluation	TBD	TCEQ-WAP
1101E_01	Unnamed Tributary of Clear Creek Tidal	4A	WPP	Underway	NPS
1101E_01	Unnamed Tributary of Clear Creek Tidal	5C	WPP	Planning	3rd Party
1102_02	Clear Creek Above Tidal	4A	WPP	Completed	NPS
1102_03	Clear Creek Above Tidal	4A	WPP	Completed	NPS
1102_04	Clear Creek Above Tidal	4A	WPP	Completed	NPS
1102A_01	Cowart Creek	4A	WPP	Underway	NPS
1102A_02	Cowart Creek	4A	WPP	Underway	NPS
1102B_01	Mary's Creek/North Fork Mary's Creek	4A	WPP	Underway	NPS
1102D_01	Turkey Creek	4A	WPP	Underway	NPS

Segment	Segment Name	Integrated Report Category	WAP Strategy	Status	Lead
1102F_01	Mary's Creek Bypass	4A	WPP	Underway	NPS
1102G_01	Unnamed Tributary of Mary's Creek	4A	WPP	Underway	NPS
1103_01	Dickinson Bayou Tidal	4A	Evaluation	TBD	TCEQ-WAP
1103_01	Dickinson Bayou Tidal	5B	Monitoring	Completed	3rd Party
1103_02	Dickinson Bayou Tidal	4A	Evaluation	TBD	TCEQ-WAP
1103_02	Dickinson Bayou Tidal	5B	Monitoring	Completed	3rd Party
1103_03	Dickinson Bayou Tidal	4A	Evaluation	TBD	TCEQ-WAP
1103_03	Dickinson Bayou Tidal	5B	Monitoring	Completed	3rd Party
1103_04	Dickinson Bayou Tidal	4A	Evaluation	TBD	TCEQ-WAP
1103_04	Dickinson Bayou Tidal	5B	Monitoring	Completed	3rd Party
1103A_01	Bensons Bayou	4A	Evaluation	TBD	TCEQ-WAP
1103A_01	Bensons Bayou	5B	TSWQS Review	TBD	TSWQS
1103B_01	Bordens Gully	4A	Evaluation	TBD	TCEQ-WAP
1103B_01	Bordens Gully	5C	TSWQS Review	TBD	TSWQS
1103C_01	Geisler Bayou	4A	Evaluation	TBD	TCEQ-WAP
1103C_01	Geisler Bayou	5B	Evaluation	TBD	TCEQ-WAP
1103D_01	Gum Bayou	4A	Evaluation	TBD	TCEQ-WAP
1103E_01	Cedar Creek	4A	Evaluation	TBD	TCEQ-WAP
1103F_01	Unnamed Tributary of Dickinson Bayou Tidal	5A	Monitoring	Underway	3rd Party
1103F_01	Unnamed Tributary of Dickinson Bayou Tidal	5C	Monitoring	Underway	3rd Party
1103G_01	Unnamed Tributary of Gum Bayou	5A	TMDL/I-Plan	Underway	TMDL
1104_01	Dickinson Bayou Above Tidal	4A	Evaluation	TBD	TCEQ-WAP
1104_02	Dickinson Bayou Above Tidal	4A	Evaluation	TBD	TCEQ-WAP
1105_01	Bastrop Bayou Tidal	5C	WPP	Completed	NPS

Segment	Segment Name	Integrated Report Category	WAP Strategy	Status	Lead
1105A_03	Flores Bayou	5B	Evaluation	Consulting	TSWQS
1105B_01	Austin Bayou Tidal	5C	WPP	Completed	NPS
1105C_01	Austin Bayou Above Tidal	5B	WPP	Completed	NPS
1105E_01	Brushy Bayou	5B	WPP	Completed	NPS
1105E_01	Brushy Bayou	5C	WPP	Completed	NPS
1107_01	Chocolate Bayou Tidal	5A	Evaluation	TBD	TCEQ-WAP
1108_01	Chocolate Bayou Above Tidal	5A	TMDL/I-Plan	Underway	TMDL
1109_01	Oyster Creek Tidal	5A	Evaluation	TBD	TCEQ-WAP
1110_01	Oyster Creek Above Tidal	5A	Evaluation	TBD	TCEQ-WAP
1110_01	Oyster Creek Above Tidal	5C	Evaluation	TBD	TCEQ-WAP
1110_03	Oyster Creek Above Tidal	5C	Evaluation	TBD	TCEQ-WAP
1113_02	Armand Bayou Tidal	5B	TSWQS Review	Consulting	TSWQS
1113_03	Armand Bayou Tidal	4A	Evaluation	TBD	TCEQ-WAP
1113_03	Armand Bayou Tidal	5B	TSWQS Review	Consulting	TSWQS
1113A_01	Armand Bayou Above Tidal	4A	Evaluation	TBD	TCEQ-WAP
1113A_01	Armand Bayou Above Tidal	5B	TSWQS Review	Consulting	TSWQS
1113B_01	Horsepen Bayou Tidal	4A	Evaluation	TBD	TCEQ-WAP
1113C_01	Unnamed Tributary to Horsepen Bayou	4A	Evaluation	TBD	TCEQ-WAP
1113D_01	Willow Springs Bayou	4A	Evaluation	TBD	TCEQ-WAP
1113E_01	Big Island Slough	4A	Evaluation	TBD	TCEQ-WAP
1202J_01	Big Creek	5A	TMDL/I-Plan	Underway	TMDL
1202J_02	Big Creek	5A	TMDL/I-Plan	Planning	TMDL
1202K_01	Mill Creek	5C	WPP	Underway	TSSWCB
1204A_01	Camp Creek	5C	Monitoring	Underway	SWQM
1205_01-05	Lake Granbury	SI	WPP	Completed	NPS
1208_02	Brazos River Above Possum Kingdom Lake	5C	Evaluation	TBD	TCEQ-WAP

Segment	Segment Name	Integrated Report Category	WAP Strategy	Status	Lead
1208_04	Brazos River Above Possum Kingdom Lake	5C	Evaluation	TBD	TCEQ-WAP
1208_05	Brazos River Above Possum Kingdom Lake	5C	Evaluation	TBD	TCEQ-WAP
1209_05	Navasota River Below Lake Limestone	5A	WPP	Underway	TSSWCB
1209C_01	Carters Creek	4A	Evaluation	TBD	TCEQ-WAP
1209D_01	Country Club Branch	4A	Evaluation	TBD	TCEQ-WAP
1209E_01	Wickson Creek	5B	Evaluation	TBD	TCEQ-WAP
1209H_01	Duck Creek	5B	Monitoring	Underway	SWQM
1209H_02	Duck Creek	5C	WPP	Underway	TSSWCB
1209H_02	Duck Creek	5B	Monitoring	Underway	SWQM
1209I_01	Gibbons Creek	5B	WPP	Underway	TSSWCB
1209I_01	Gibbons Creek	5C	WPP	Underway	TSSWCB
1209I_02	Gibbons Creek	5B	WPP	Underway	TSSWCB
1209J_01	Shepherd Creek	5C	WPP	Underway	TSSWCB
1209K_02	Steele Creek	5B	WPP	Underway	TSSWCB
1209L_01	Burton Creek	4A	Evaluation	TBD	TCEQ-WAP
1210A_01	Navasota River Above Lake Mexia	5C	Monitoring	Underway	SWQM
1211A_02	Davidson Creek	5C	Monitoring	Underway	TSSWCB
1211A_02	Davidson Creek	5C	Monitoring	Reassessment	SWQM
1212A_02	Middle Yegua Creek	5C	Monitoring	Reassessment	SWQM
1213_04	Little River	5C	WPP	Planning	NPS
1213A_01	Big Elm Creek	5B	WPP	Underway	NPS
1217_01-05	Lampasas River Above Stillhouse Hollow Lake	SI	WPP	Completed	TSSWCB
1217D_01	North Fork Rocky Creek	5C	Monitoring	Reassessment	SWQM
1218_01	Nolan Creek/South Nolan Creek	5C	WPP	Completed	NPS
1218_02	Nolan Creek/South Nolan Creek	5C	WPP	Completed	NPS

Segment	Segment Name	Integrated Report Category	WAP Strategy	Status	Lead
1218C_01	Little Nolan Creek	5B	WPP	Completed	NPS
1218D_01	Long Branch	5C	Evaluation	TBD	TCEQ-WAP
1221_06	Leon River Below Proctor Lake	5C	WPP	Underway	TSSWCB
1221A_01	Resley Creek	5B	WPP	Underway	TSSWCB
1221A_01	Resley Creek	5B	WPP	Underway	TSSWCB
1221A_02	Resley Creek	5B	WPP	Underway	TSSWCB
1221D_01	Indian Creek	5B	WPP	Underway	TSSWCB
1221D_02	Indian Creek	5B	WPP	Underway	TSSWCB
1221G_01	Coryell Creek	5C	WPP	Underway	TSSWCB
1222A_01	Duncan Creek	5C	Monitoring	Underway	SWQM
1222B_01	Rush-Copperas Creek	5C	Monitoring	Underway	SWQM
1222C_01	Sabana River	5B	Evaluation	TBD	TCEQ-WAP
1222E_01	Sweetwater Creek	5C	Monitoring	Underway	SWQM
1223_01	Leon River Below Leon Reservoir	5C	Evaluation	TBD	TCEQ-WAP
1223_01	Leon River Below Leon Reservoir	5C	Evaluation	TBD	TCEQ-WAP
1226_02	North Bosque River	4A	TMDL/I-Plan	Completed	TMDL
1226_03	North Bosque River	4A	TMDL/I-Plan	Completed	TMDL
1226_04	North Bosque River	4A	TMDL/I-Plan	Completed	TMDL
1226B_01	Green Creek	5C	Evaluation	Reassessment	SWQM
1226G_01	Spring Creek	5C	WPP	Underway	3rd Party
1226K_01	Little Duffau Creek	5C	Evaluation	TBD	TCEQ-WAP
1227_01	Nolan River	5B	TSWQS Review	Completed	TSWQS
1227_01	Nolan River	5B	TSWQS Review	Completed	TSWQS
1227_02	Nolan River	5C	TSWQS Review	Completed	TSWQS
1227_02	Nolan River	5B	TSWQS Review	Completed	TSWQS
1227_02	Nolan River	5B	TSWQS Review	Completed	TSWQS

Segment	Segment Name	Integrated Report Category	WAP Strategy	Status	Lead
1232_04	Clear Fork Brazos River	5C	Evaluation	TBD	TCEQ-WAP
1232A_01	California Creek	5C	Monitoring	Reassessment	SWQM
1238_01	Salt Fork Brazos River	5C	Monitoring	Underway	SWQM
1238_02	Salt Fork Brazos River	5C	Monitoring	Underway	SWQM
1238_03	Salt Fork Brazos River	5C	Monitoring	Reassessment	SWQM
1238_03	Salt Fork Brazos River	5C	Monitoring	Underway	SWQM
1240_01	White River Lake	5B	Evaluation	TBD	TCEQ-WAP
1240_01	White River Lake	5B	Evaluation	TBD	TCEQ-WAP
1241_01	Double Mountain Fork Brazos River	5B	Monitoring	Reassessment	SWQM
1241A_02	North Fork Double Mountain Fork Brazos River	5C	Evaluation	TBD	TCEQ-WAP
1242B_01	Cottonwood Branch	5C	TMDL/I-Plan	Underway	TMDL
1242B_02	Cottonwood Branch	5C	TMDL/I-Plan	Underway	TMDL
1242C_02	Still Creek	5C	TSWQS Review	Completed	TSWQS
1242D_01	Thompsons Creek	5B	TMDL/I-Plan	Underway	TMDL
1242D_02	Thompsons Creek	5B	TMDL/I-Plan	Underway	TMDL
1242D_02	Thompsons Creek	5B	Evaluation	TBD	TCEQ-WAP
1242F_01	Pond Creek	5C	TSWQS Review	Completed	TSWQS
1242I_01	Campbells Creek	5C	Monitoring	Underway	SWQM
1242J_01	Deer Creek	5C	Monitoring	Underway	TSSWCB
1242K_01	Mud Creek	5B	Monitoring	Scheduled	TSSWCB
1242L_01	Pin Oak Creek	5B	Monitoring	Scheduled	TSSWCB
1242M_01	Spring Creek	5B	Monitoring	Scheduled	TSSWCB
1242O_01	Walnut Creek	5B	Monitoring	Scheduled	TSSWCB
1242P_01	Big Creek	5B	Evaluation	TBD	TCEQ-WAP
1244_01	Brushy Creek	5C	Evaluation	TBD	TCEQ-WAP

Segment	Segment Name	Integrated Report Category	WAP Strategy	Status	Lead
1244_03	Brushy Creek	5C	Evaluation	TBD	TCEQ-WAP
1245_01	Upper Oyster Creek	4A	Evaluation	TBD	TCEQ-WAP
1245_02	Upper Oyster Creek	4A	Evaluation	TBD	TCEQ-WAP
1245_03	Upper Oyster Creek	4A	Evaluation	TBD	TCEQ-WAP
1245_03	Upper Oyster Creek	4A	Evaluation	TBD	TCEQ-WAP
1245C_01	Bullhead Bayou	5C	Monitoring	Underway	SWQM
1245D_01	Unnamed Tributary of Bullhead Bayou	5C	Monitoring	Underway	SWQM
1245F_01	Alcorn Bayou	5B	Evaluation	Completed	TSWQS
1245I_01	Steep Bank Creek	5C	Evaluation	Completed	TSWQS
1246E_01	Wasp Creek	5B	Evaluation	TBD	TCEQ-WAP
1247A_01	Willis Creek	5C	Evaluation	TBD	TCEQ-WAP
1248C_01	Mankins Branch	5C	Evaluation	TBD	TCEQ-WAP
1255_01	Upper North Bosque River	5C	TMDL/I-Plan	Completed	TMDL
1255_01	Upper North Bosque River	4A	Evaluation	TBD	TCEQ-WAP
1255_02	Upper North Bosque River	5C	TMDL/I-Plan	Completed	TMDL
1255_02	Upper North Bosque River	5C	Evaluation	TBD	TCEQ-WAP
1255_02	Upper North Bosque River	4A	Evaluation	TBD	TCEQ-WAP
1255A_01	Goose Branch	5C	Monitoring	Underway	SWQM
1255C_01	Scarborough Creek	5C	Monitoring	Underway	SWQM
1255D_01	South Fork North Bosque River	5C	Evaluation	Completed	TSWQS
1255E_01	Unnamed Tributary of Goose Branch	5C	Monitoring	Underway	SWQM
1255G_01	Woodhollow Branch	5C	Monitoring	Underway	SWQM
1259_01	Leon River Above Belton Lake	5C	WPP	Completed	NPS
1259_03	Leon River Above Belton Lake	5C	WPP	Completed	NPS
1301_01	San Bernard River Tidal	5C	WPP	Completed	NPS
1302_01	San Bernard River Above Tidal	5C	WPP	Completed	NPS

Segment	Segment Name	Integrated Report Category	WAP Strategy	Status	Lead
1302_02	San Bernard River Above Tidal	5C	WPP	Completed	NPS
1302_03	San Bernard River Above Tidal	5C	WPP	Completed	NPS
1302A_01	Gum Tree Branch	5C	WPP	Completed	NPS
1302B_01	West Bernard Creek	5C	WPP	Completed	NPS
1302B_01	West Bernard Creek	5C	WPP	Completed	NPS
1302B_02	West Bernard Creek	5C	WPP	Completed	NPS
1302D_01	Peach Creek	5B	Evaluation	Consulting	TSWQS
1302E_01	Mound Creek	5C	WPP	Completed	NPS
1304_01	Caney Creek Tidal	5A	TMDL/I-Plan	Underway	TMDL
1304_02	Caney Creek Tidal	5A	TMDL/I-Plan	Planning	TMDL
1304A_01	Linnville Bayou	5A	TMDL/I-Plan	Underway	TMDL
1305_03	Caney Creek Above Tidal	5C	Monitoring	Consulting	SWQM
1402C_01	Buckners Creek	5C	TSWQS Review	Completed	TSWQS
1402H_01	Skull Creek	5B	Monitoring	TBD	SWQM
1403A_04	Bull Creek	5C	Monitoring	Underway	SWQM
1403J_01	Spicewood Tributary to Shoal Creek	4A	WPP	Underway	NPS
1403K_01	Taylor Slough South	4A	Evaluation	TBD	TCEQ-WAP
1407A_01	Clear Creek	5C	Evaluation	TBD	TCEQ-WAP
1407A_01	Clear Creek	5C	Evaluation	TBD	TCEQ-WAP
1411_01	E. V. Spence Reservoir	5C	Evaluation	TBD	TCEQ-WAP
1411_01	E. V. Spence Reservoir	4A	TMDL/I-Plan	Completed	TMDL
1411_01	E. V. Spence Reservoir	4A	TMDL/I-Plan	Completed	TMDL
1411_02	E. V. Spence Reservoir	5C	Evaluation	TBD	TCEQ-WAP
1411_02	E. V. Spence Reservoir	4A	TMDL/I-Plan	Completed	TMDL
1411_02	E. V. Spence Reservoir	4A	TMDL/I-Plan	Completed	TMDL
1412_02	Colorado River Below Lake J. B. Thomas	5B	Monitoring	Completed	SWQM

Segment	Segment Name	Integrated Report Category	WAP Strategy	Status	Lead
1412B_03	Beals Creek	5B	Evaluation	TBD	TCEQ-WAP
1413_01	Lake J. B. Thomas	5B	TSWQS Review	Underway	TSWQS
1413_01	Lake J. B. Thomas	5B	TSWQS Review	Underway	TSWQS
1415_05-06	Llano River	SI	WPP	Completed	TSSWCB
1416_01	San Saba River	5C	Evaluation	TBD	TCEQ-WAP
1416A_03	Brady Creek	5C	WPP	Completed	NPS
1421_08	Concho River	5C	Evaluation	TBD	TCEQ-WAP
1425_01	O. C. Fisher Lake	5C	Evaluation	TBD	TCEQ-WAP
1425_01	O. C. Fisher Lake	5C	Evaluation	TBD	TCEQ-WAP
1426_01-04	Colorado River Below E. V. Spence Reservoir	SI	WPP	Completed	NPS
1428B_05	Walnut Creek	4A	Evaluation	TBD	TCEQ-WAP
1428C_01	Gilleland Creek	4A	Evaluation	TBD	TCEQ-WAP
1428C_03	Gilleland Creek	4A	Evaluation	TBD	TCEQ-WAP
1428C_04	Gilleland Creek	4A	Evaluation	TBD	TCEQ-WAP
1429A_01	Shoal Creek	SI	WPP	Underway	NPS
1429C_01	Waller Creek	5C	Evaluation	TBD	TCEQ-WAP
1429C_02	Waller Creek	4A	TMDL/I-Plan	Completed	TMDL
1429C_03	Waller Creek	4A	TMDL/I-Plan	Completed	TMDL
1433_01	O. H. Ivie Reservoir	5C	Monitoring	Underway	CRP
1433_02	O. H. Ivie Reservoir	5C	Monitoring	Underway	CRP
1433_03	O. H. Ivie Reservoir	5C	Monitoring	Underway	CRP
1433_04	O. H. Ivie Reservoir	5C	Monitoring	Underway	CRP
1434G_01	Alum Creek	5C	Monitoring	Planning	CRP
1501_01	Tres Palacios Creek Tidal	4A	Evaluation	TBD	TCEQ-WAP
1501_01	Tres Palacios Creek Tidal	5B	TSWQS Review	Consulting	TSWQS

Segment	Segment Name	Integrated Report Category	WAP Strategy	Status	Lead
1602_02	Lavaca River Above Tidal	5A	WPP	Completed	NPS
1602_03	Lavaca River Above Tidal	5A	WPP	Completed	NPS
1602B_01	Rocky Creek	5A	WPP	Completed	NPS
1602C_01	Lavaca River Above Campbell Branch	5B	Evaluation	TBD	TCEQ-WAP
1602C_02	Lavaca River Above Campbell Branch	5B	Evaluation	TBD	TCEQ-WAP
1803A_01	Elm Creek	5B	Evaluation	TBD	TCEQ-WAP
1803B_01	Sandies Creek	5B	Evaluation	Completed	TSWQS
1803B_01	Sandies Creek	5B	Evaluation	TBD	TCEQ-WAP
1803B_02	Sandies Creek	5B	Evaluation	Completed	TSWQS
1803B_02	Sandies Creek	5B	Evaluation	TBD	TCEQ-WAP
1803C_01	Peach Creek	5B	Evaluation	Completed	TSWQS
1803C_01	Peach Creek	5B	TSWQS Review	Completed	TSWQS
1803C_03	Peach Creek	5B	Evaluation	Completed	TSWQS
1803C_03	Peach Creek	5B	TSWQS Review	Completed	TSWQS
1804A_01	Geronimo Creek	5C	WPP	Underway	TSSWCB
1806_08	Guadalupe River Above Canyon Lake	5C	Monitoring	Underway	CRP
1806A_01	Camp Meeting Creek	5A	TMDL/I-Plan	Underway	TMDL
1806D_01	Quinlan Creek	4A	Evaluation	TBD	TCEQ-WAP
1806E_01	Town Creek	4A	Evaluation	TBD	TCEQ-WAP
1810_01	Plum Creek	4B	Evaluation	TBD	TCEQ-WAP
1810_02	Plum Creek	4B	Evaluation	TBD	TCEQ-WAP
1810_03	Plum Creek	4B	Evaluation	TBD	TCEQ-WAP
1811_01	Comal River	5C	WPP	Completed	NPS
1811A_01	Dry Comal Creek	5C	WPP	Completed	NPS
1814_01-04	Upper San Marcos River	SI	WPP	Completed	NPS
1815_01	Cypress Creek	5C	Monitoring	Scheduled	SWQM

Segment	Segment Name	Integrated Report Category	WAP Strategy	Status	Lead
1901_02	Lower San Antonio River	4A	Evaluation	TBD	TCEQ-WAP
1901_03	Lower San Antonio River	4A	Evaluation	TBD	TCEQ-WAP
1901_04	Lower San Antonio River	4A	Evaluation	TBD	TCEQ-WAP
1901A_01	Escondido Creek	5C	Evaluation	TBD	TCEQ-WAP
1901B_01	Cabeza Creek	5C	Evaluation	TBD	TCEQ-WAP
1901F_01	Ecleto Creek	5C	Monitoring	Underway	CRP
1901F_01	Ecleto Creek	5C	Monitoring	Underway	CRP
1902_01	Lower Cibolo Creek	5C	WPP	Completed	TSSWCB
1902_02	Lower Cibolo Creek	5C	WPP	Completed	TSSWCB
1902_03	Lower Cibolo Creek	5C	WPP	Completed	TSSWCB
1902A_01	Martinez Creek	5C	TMDL/I-Plan	Completed	TMDL
1902C_01	Clifton Branch	5C	Evaluation	TBD	TCEQ-WAP
1902C_01	Clifton Branch	5B	Evaluation	TBD	TCEQ-WAP
1903_01	Medina River Below Medina Diversion Lake	5C	TMDL/I-Plan	Consulting	TMDL
1903_02	Medina River Below Medina Diversion Lake	5C	TMDL/I-Plan	Consulting	TMDL
1903_03	Medina River Below Medina Diversion Lake	5C	TMDL/I-Plan	Consulting	TMDL
1905_01	Medina River Above Medina Lake	5C	Monitoring	Underway	CRP
1908_01	Upper Cibolo Creek	5C	Monitoring	Underway	CRP
1910_02	Salado Creek	4A	TMDL/I-Plan	Completed	TMDL
1910_03	Salado Creek	4A	TMDL/I-Plan	Completed	TMDL
1910_04	Salado Creek	4A	TMDL/I-Plan	Completed	TMDL
1910_04	Salado Creek	4A	Evaluation	TBD	TCEQ-WAP
1910A_01	Walzem Creek	4A	TMDL/I-Plan	Completed	TMDL
1910D_01	Menger Creek	4A	Evaluation	TBD	TCEQ-WAP
1911_02	Upper San Antonio River	4A	TMDL/I-Plan	Completed	TMDL
1911_03	Upper San Antonio River	4A	TMDL/I-Plan	Completed	TMDL

Segment	Segment Name	Integrated Report Category	WAP Strategy	Status	Lead
1911_04	Upper San Antonio River	4A	TMDL/I-Plan	Completed	TMDL
1911_05	Upper San Antonio River	4A	TMDL/I-Plan	Completed	TMDL
1911_07	Upper San Antonio River	4A	WPP	Completed	NPS
1911_08	Upper San Antonio River	4A	WPP	Completed	NPS
1911_09	Upper San Antonio River	4A	WPP	Completed	NPS
1911B_01	Apache Creek	4A	WPP	Completed	NPS
1911C_01	Alazan Creek	4A	WPP	Completed	NPS
1911C_02	Alazan Creek	4A	WPP	Completed	NPS
1911D_01	San Pedro Creek	4A	WPP	Completed	NPS
1911D_02	San Pedro Creek	4A	WPP	Completed	NPS
1911E_01	Sixmile Creek	4A	WPP	Completed	NPS
1911H_01	Picosa Creek	5C	WPP	Completed	NPS
1911I_01	Martinez Creek	5A	WPP	Completed	NPS
1912_01	Medio Creek	5C	TMDL/I-Plan	Consulting	TMDL
2001_01	Mission River Tidal	4A	WPP	Underway	NPS
2003_01	Aransas River Tidal	4A	WPP	Underway	NPS
2004_02	Aransas River Above Tidal	4A	WPP	Underway	NPS
2004A_01	Aransas Creek	5C	WPP	Underway	NPS
2004B_02	Poesta Creek	4A	WPP	Underway	NPS
2102_01	Nueces River Below Lake Corpus Christi	5C	WPP	Underway	TSSWCB
2102_02	Nueces River Below Lake Corpus Christi	5C	WPP	Underway	TSSWCB
2104_01	Nueces River Above Frio River	5C	Evaluation	TBD	TCEQ-WAP
2105_02	Nueces River Above Holland Dam	5C	Monitoring	Underway	SWQM
2106_01	Nueces/Lower Frio River	5B	TSWQS Review	Completed	TSWQS
2106_02	Nueces/Lower Frio River	5C	Evaluation	TBD	TCEQ-WAP
2106_02	Nueces/Lower Frio River	5B	TSWQS Review	Completed	TSWQS

Segment	Segment Name	Integrated Report Category	WAP Strategy	Status	Lead
2107_01	Atascosa River	5B	TSWQS Review	Underway	TSWQS
2107_02	Atascosa River	5B	TSWQS Review	Underway	TSWQS
2107_02	Atascosa River	5B	Monitoring	Scheduled	SWQM
2108_01	San Miguel Creek	5B	Evaluation	TBD	TCEQ-WAP
2109_01	Leona River	5C	Monitoring	TBD	SWQM
2109_02	Leona River	5C	Monitoring	TBD	SWQM
2109_03	Leona River	5C	Monitoring	TBD	SWQM
2109_03	Leona River	5C	Monitoring	Underway	CRP
2116_01	Choke Canyon Reservoir	5C	Monitoring	TBD	SWQM
2116_02	Choke Canyon Reservoir	5C	Monitoring	TBD	SWQM
2116_03	Choke Canyon Reservoir	5C	Monitoring	TBD	SWQM
2116_04	Choke Canyon Reservoir	5C	Monitoring	TBD	SWQM
2116_05	Choke Canyon Reservoir	5C	Monitoring	TBD	SWQM
2116_06	Choke Canyon Reservoir	5C	Monitoring	TBD	SWQM
2116_07	Choke Canyon Reservoir	5C	Monitoring	TBD	SWQM
2117_01	Frio River Above Choke Canyon Reservoir	5C	Monitoring	Underway	SWQM
2117_01	Frio River Above Choke Canyon Reservoir	5C	Monitoring	Underway	CRP
2117_02	Frio River Above Choke Canyon Reservoir	5C	Monitoring	Underway	SWQM
2117_02	Frio River Above Choke Canyon Reservoir	5C	Monitoring	Underway	CRP
2117_03	Frio River Above Choke Canyon Reservoir	5C	Monitoring	Underway	CRP
2117_04	Frio River Above Choke Canyon Reservoir	5C	Monitoring	Underway	CRP
2117_05	Frio River Above Choke Canyon Reservoir	5C	Monitoring	Underway	CRP
2117_06	Frio River Above Choke Canyon Reservoir	5C	Monitoring	Underway	CRP
2201_01	Arroyo Colorado Tidal	5C	WPP	Completed	NPS
2201_02	Arroyo Colorado Tidal	5C	WPP	Completed	NPS
2201_03	Arroyo Colorado Tidal	5C	WPP	Completed	NPS

Segment	Segment Name	Integrated Report Category	WAP Strategy	Status	Lead
2201_04	Arroyo Colorado Tidal	5C	WPP	Completed	NPS
2201_04	Arroyo Colorado Tidal	5C	WPP	Completed	NPS
2201_05	Arroyo Colorado Tidal	5C	WPP	Completed	NPS
2201_05	Arroyo Colorado Tidal	5C	WPP	Completed	NPS
2201B_01	Unnamed Drainage Ditch Tributary (B) in Cameron County Drainage District #3	5B	WPP	Completed	NPS
2202_01	Arroyo Colorado Above Tidal	5C	WPP	Completed	NPS
2202_02	Arroyo Colorado Above Tidal	5C	WPP	Completed	NPS
2202_03	Arroyo Colorado Above Tidal	5C	WPP	Completed	NPS
2202_04	Arroyo Colorado Above Tidal	5C	WPP	Completed	NPS
2203_01	Petronila Creek Tidal	5C	WPP	Underway	TSSWCB
2204_01	Petronila Creek Above Tidal	5B	WPP	Underway	TSSWCB
2204_01	Petronila Creek Above Tidal	4A	TMDL/I-Plan	Completed	TMDL
2204_01	Petronila Creek Above Tidal	4A	TMDL/I-Plan	Completed	TMDL
2204_01	Petronila Creek Above Tidal	4A	TMDL/I-Plan	Completed	TMDL
2204_02	Petronila Creek Above Tidal	5B	WPP	Underway	TSSWCB
2204_02	Petronila Creek Above Tidal	4A	TMDL/I-Plan	Completed	TMDL
2204_02	Petronila Creek Above Tidal	4A	TMDL/I-Plan	Completed	TMDL
2204_02	Petronila Creek Above Tidal	4A	TMDL/I-Plan	Completed	TMDL
2302_03	Rio Grande Below Falcon Reservoir	5C	Evaluation	TBD	TCEQ-WAP
2302A_01	Arroyo Los Olmos	5B	TSWQS Review	Planning	TSWQS
2304_01	Rio Grande Below Amistad Reservoir	5C	Evaluation	TBD	TCEQ-WAP
2304_02	Rio Grande Below Amistad Reservoir	5C	Evaluation	TBD	TCEQ-WAP
2304_03	Rio Grande Below Amistad Reservoir	5C	Evaluation	TBD	TCEQ-WAP
2304_07	Rio Grande Below Amistad Reservoir	5C	Evaluation	TBD	TCEQ-WAP
2304_09	Rio Grande Below Amistad Reservoir	5C	Evaluation	TBD	TCEQ-WAP

Segment	Segment Name	Integrated Report Category	WAP Strategy	Status	Lead
2306_01	Rio Grande Above Amistad Reservoir	5B	Evaluation	TBD	TCEQ-WAP
2306_02	Rio Grande Above Amistad Reservoir	5B	Evaluation	TBD	TCEQ-WAP
2306_03	Rio Grande Above Amistad Reservoir	5B	Evaluation	TBD	TCEQ-WAP
2306_04	Rio Grande Above Amistad Reservoir	5B	Evaluation	TBD	TCEQ-WAP
2306_05	Rio Grande Above Amistad Reservoir	5B	Evaluation	TBD	TCEQ-WAP
2306_06	Rio Grande Above Amistad Reservoir	5B	Evaluation	TBD	TCEQ-WAP
2306_07	Rio Grande Above Amistad Reservoir	5B	Evaluation	TBD	TCEQ-WAP
2306_08	Rio Grande Above Amistad Reservoir	5B	Evaluation	TBD	TCEQ-WAP
2307_01	Rio Grande Below Riverside Diversion Dam	5B	Evaluation	TBD	TCEQ-WAP
2307_01	Rio Grande Below Riverside Diversion Dam	5B	Evaluation	TBD	TCEQ-WAP
2307_02	Rio Grande Below Riverside Diversion Dam	5B	Evaluation	TBD	TCEQ-WAP
2307_02	Rio Grande Below Riverside Diversion Dam	5B	Evaluation	TBD	TCEQ-WAP
2307_03	Rio Grande Below Riverside Diversion Dam	5C	Evaluation	TBD	TCEQ-WAP
2307_03	Rio Grande Below Riverside Diversion Dam	5B	Evaluation	TBD	TCEQ-WAP
2307_03	Rio Grande Below Riverside Diversion Dam	5B	Evaluation	TBD	TCEQ-WAP
2307_04	Rio Grande Below Riverside Diversion Dam	5C	Evaluation	TBD	TCEQ-WAP
2307_04	Rio Grande Below Riverside Diversion Dam	5B	Evaluation	TBD	TCEQ-WAP
2307_04	Rio Grande Below Riverside Diversion Dam	5B	Evaluation	TBD	TCEQ-WAP
2307_05	Rio Grande Below Riverside Diversion Dam	5C	Evaluation	TBD	TCEQ-WAP
2307_05	Rio Grande Below Riverside Diversion Dam	5B	Evaluation	TBD	TCEQ-WAP
2307_05	Rio Grande Below Riverside Diversion Dam	5B	Evaluation	TBD	TCEQ-WAP
2308_01	Rio Grande Below International Dam	5C	Evaluation	TBD	TCEQ-WAP
2310_01	Lower Pecos River	5C	Monitoring	Underway	CRP
2310_02	Lower Pecos River	5C	Monitoring	Underway	CRP
2311_03	Upper Pecos River	5B	WPP	Underway	TSSWCB
2313_01	San Felipe Creek	5C	Evaluation	TBD	TCEQ-WAP

Segment	Segment Name	Integrated Report Category	WAP Strategy	Status	Lead
2314_01	Rio Grande Above International Dam	5C	Evaluation	TBD	TCEQ-WAP
2411_01	Sabine Pass	5C	Evaluation	TBD	TCEQ-WAP
2421B_01	Little Cedar Bayou	5C	Monitoring	Underway	SWQM
2421OW_01	Upper Galveston Bay (Oyster Waters)	4A	Evaluation	TBD	TCEQ-WAP
2422B_01	Double Bayou West Fork	5C	WPP	Underway	TSSWCB
2422B_01	Double Bayou West Fork	5B	WPP	Underway	TSSWCB
2422D_01	Double Bayou East Fork	5C	Evaluation	TBD	TCEQ-WAP
2422OW_01	Trinity Bay (Oyster Waters)	4A	Evaluation	TBD	TCEQ-WAP
2423OW_01	East Bay (Oyster Waters)	4A	Evaluation	TBD	TCEQ-WAP
2424A_02	Highland Bayou	5C	WPP	Underway	3rd Party
2424A_03	Highland Bayou	5C	WPP	Underway	3rd Party
2424A_04	Highland Bayou	5C	WPP	Underway	3rd Party
2424A_04	Highland Bayou	5C	WPP	Underway	3rd Party
2424A_05	Highland Bayou	5C	WPP	Underway	3rd Party
2424A_05	Highland Bayou	5B	WPP	Underway	3rd Party
2424B_01	Lake Madeline	5C	Evaluation	TBD	TCEQ-WAP
2424C_01	Marchand Bayou	5C	WPP	Underway	3rd Party
2424C_01	Marchand Bayou	5C	WPP	Underway	3rd Party
2424G_01	Highland Bayou Diversion Canal	5C	Evaluation	TBD	TCEQ-WAP
2424OW_02	West Bay (Oyster Waters)	4A	Evaluation	TBD	TCEQ-WAP
2425B_01	Jarbo Bayou	4A	Evaluation	TBD	TCEQ-WAP
2431A_01	Moses Bayou	5C	WPP	Underway	3rd Party
2431C_01	Unnamed Tributary to the Southern Arm of Moses Lake (West)	5C	WPP	Underway	3rd Party
2432A_01	Mustang Bayou	5A	TMDL/I-Plan	Underway	3rd Party
2432A_02	Mustang Bayou	5A	TMDL/I-Plan	Underway	3rd Party

Segment	Segment Name	Integrated Report Category	WAP Strategy	Status	Lead
2432B_01	Willow Bayou	5A	TMDL/I-Plan	Underway	TMDL
2432C_01	Halls Bayou Tidal	5A	TMDL/I-Plan	Underway	TMDL
2432D_01	Persimmon Bayou	5C	TMDL/I-Plan	Underway	TMDL
2432E_01	New Bayou	5C	TMDL/I-Plan	Underway	TMDL
2432OW_01	Chocolate Bay (Oyster Waters)	4A	Evaluation	TBD	TCEQ-WAP
2433OW_01	Bastrop Bay/Oyster Lake (Oyster Waters)	4A	Evaluation	TBD	TCEQ-WAP
2433OW_02	Bastrop Bay/Oyster Lake (Oyster Waters)	4A	Evaluation	TBD	TCEQ-WAP
2434OW_01	Christmas Bay (Oyster Waters)	4A	Evaluation	TBD	TCEQ-WAP
2435OW_01	Drum Bay (Oyster Waters)	4A	Evaluation	TBD	TCEQ-WAP
2435OW_02	Drum Bay (Oyster Waters)	4A	Evaluation	TBD	TCEQ-WAP
2439OW_01	Lower Galveston Bay (Oyster Waters)	4A	Evaluation	TBD	TCEQ-WAP
2441OW_01	East Matagorda Bay (Oyster Waters)	5A	Evaluation	TBD	TCEQ-WAP
2452OW_01	Tres Palacios Bay/Turtle Bay (Oyster Waters)	5A	Evaluation	TBD	TCEQ-WAP
2452TP_01	Tres Palacios Bay (Recreational Beaches)	5A	Evaluation	TBD	TCEQ-WAP
2453A_01	Garcitas Creek Tidal	5B	TSWQS Review	Completed	TSWQS
2453C_01	Arenosa Creek	5A	WPP	Underway	NPS
2453D_01	Lavaca Bay Ship Channel Area	5C	TSWQS Review	Completed	TSWQS
2453OW_02	Lavaca Bay/Chocolate Bay (Oyster Waters)	5A	Evaluation	TBD	TCEQ-WAP
2453OW_03	Lavaca Bay/Chocolate Bay (Oyster Waters)	5A	Evaluation	TBD	TCEQ-WAP
2455OW_01	Keller Bay (Oyster Waters)	5A	Evaluation	TBD	TCEQ-WAP
2456_02	Carancahua Bay	5A	WPP	Completed	NPS
2456A_01	West Carancahua Creek Tidal	5C	TSWQS Review	Consulting	TSWQS
2456OW_02	Carancahua Bay (Oyster Waters)	5A	Evaluation	TBD	TCEQ-WAP
2462OW_01	San Antonio Bay/Hynes Bay/Guadalupe Bay/Mission Lake (Oyster Waters)	5A	Evaluation	TBD	TCEQ-WAP

Segment	Segment Name	Integrated Report Category	WAP Strategy	Status	Lead
2472OW_01	Copano Bay/Port Bay/Mission Bay (Oyster Waters)	5C	Evaluation	TBD	TCEQ-WAP
2481CB_03	Corpus Christi Bay (Recreational Beaches)	5A	TMDL/I-Plan	Underway	TMDL
2481CB_04	Corpus Christi Bay (Recreational Beaches)	5A	TMDL/I-Plan	Underway	TMDL
2481CB_06	Corpus Christi Bay (Recreational Beaches)	5A	TMDL/I-Plan	Underway	TMDL
2485_02	Oso Bay	5B	Evaluation	TBD	TCEQ-WAP
2485_03	Oso Bay	4A	TMDL/I-Plan	Completed	TMDL
2485A_01	Oso Creek	5A	TMDL/I-Plan	Completed	TMDL
2485OW_01	Oso Bay (Oyster Waters)	5A	Evaluation	TBD	TCEQ-WAP
2491_01	Laguna Madre	5B	Evaluation	TBD	TCEQ-WAP
2491_02	Laguna Madre	5C	Evaluation	TBD	TCEQ-WAP
2491_02	Laguna Madre	5B	Evaluation	TBD	TCEQ-WAP
2491B_01	North Floodway	SI	WPP	Underway	NPS
2491C_01-04	Drainage ditches flowing into Lower Laguna Madre	SI	WPP	Underway	NPS
2491OW_02	Laguna Madre (Oyster Waters)	5C	Evaluation	TBD	TCEQ-WAP
2492A_01	San Fernando Creek	5C	WPP	Underway	TSSWCB
2494_01	Brownsville Ship Channel	SI	WPP	Underway	NPS
2494A_01	Port Isabel Fishing Harbor	5C	WPP	Completed	NPS
2501_01	Gulf of Mexico	5C	Evaluation	TBD	TCEQ-WAP
2501_02	Gulf of Mexico	5C	Evaluation	TBD	TCEQ-WAP

(1) SI - Special Interest – indicates a water body which is not impaired but is targeted for protection activities.

Appendix D Groundwater Constituents of Concern Report

Table D.1 Groundwater Constituents of Concern Based on Sampling from Fiscal Year 2010 through 2019

Major Aquifer	Region	Constituent(s) of Concern
Carrizo-Wilcox	South to East Texas	Fluoride, Nitrate, Selenium, Chloride, Iron, Manganese, Sulfate, Dissolved Solids
Edwards (Balcones Fault Zone)	Central Texas	Fluoride, Nitrate, Chloride, Iron, Sulfate, Dissolved Solids
Edwards-Trinity (Plateau)	Terrell, Reagan, and Crockett counties	Arsenic, Fluoride, Nitrate, Selenium, Chloride, Iron, Manganese, Sulfate, Dissolved Solids
Gulf Coast	Rio Grande Valley	Arsenic, Nitrate, Selenium, Fluoride, Chloride, Iron, Manganese, Sulfate, Dissolved Solids
Hueco-Mesilla Bolsons	Far West Texas	Arsenic, Nitrate, Chloride, Manganese, Sulfate, Dissolved Solids
Ogallala	Southern High Plains, Panhandle	Arsenic, Nitrate, Fluoride, Selenium, Chloride, Iron, Manganese, Sulfate, Dissolved Solids
Pecos Valley	West Texas	Arsenic, Fluoride, Nitrate, Chloride, Iron, Manganese, Sulfate, Dissolved Solids
Seymour	North Central	Nitrate, Chloride, Sulfate, Dissolved Solids
Trinity	Central Texas North - Outcrop Area Only	Arsenic, Fluoride, Nitrate, Chloride, Iron, Manganese, Sulfate, Dissolved Solids
Minor Aquifer	**Region**	**Constituent(s) of Concern**
Blaine	North Central	Nitrate, Chloride, Iron, Sulfate, Dissolved Solids
Blossom	Northeast Texas	Not Applicable
Bone Spring-Victorio Peak	Far West Texas	Nitrate, Chloride, Sulfate, Dissolved Solids

Brazos River Alluvium	Southeast Texas	Nitrate, Iron, Manganese, Dissolved Solids
Capitan Reef Complex	West Texas	Selenium, Fluoride, Sulfate, Dissolved Solids
Cross Timbers	North Central	Nitrate
Dockum	Panhandle, West Texas - Outcrop Area Only	Arsenic, Fluoride, Nitrate, Chloride, Iron, Sulfate, Dissolved Solids
Edwards-Trinity (High Plains)	Southern High Plains	Arsenic, Fluoride, Nitrate, Selenium, Chloride, Sulfate, Dissolved Solids
Ellenburger-San Saba	Central Texas	Nitrate, Iron, Sulfate, Dissolved Solids
Hickory	Llano Uplift	Nitrate, Chloride, Iron, Manganese, Dissolved Solids
Igneous	Far West Texas	Nitrate, Fluoride, Manganese
Lipan	Concho, Runnels, Tom Green, and Coke counties	Nitrate, Chloride, Sulfate, Dissolved Solids
Marathon	Brewster County	Nitrate, Manganese, Sulfate, Dissolved Solids
Marble Falls	Central Texas/Llano Uplift	Not Applicable
Nacatoch	Northeast Texas	Not Applicable
Queen City	Texas Coastal Plain	Nitrate, Chloride, Iron, Manganese, Sulfate, Dissolved Solids
Rita Blanca	Far West Texas	Fluoride, Iron
Rustler	Culberson and Reeves counties	Nitrate, Chloride, Fluoride, Sulfate, Dissolved Solids
Sparta	Texas Coastal Plain	Chloride, Sulfate, Dissolved Solids
West Texas Bolsons	Far West Texas	Nitrate, Fluoride
Woodbine	North Central Texas	Fluoride, Sulfate, Dissolved Solids
Yegua-Jackson	Texas Coastal Plain	Chloride, Iron, Manganese, Sulfate, Dissolved Solids

Table D.2 Aquifer Vulnerability Ranking

Major Aquifers	Average DRASTIC Index	Vulnerability Rank*
Seymour	144	High
Edwards (Balcones Fault Zone - San Antonio)	135	High
Edwards (Balcones Fault Zone - Austin)	126	High
Carrizo-Wilcox	117	Medium
Edwards-Trinity (Plateau)	107	Medium
Ogallala (South)	99	Medium
Gulf Coast	95	Medium
Trinity	95	Medium
Pecos Valley	95	Medium
Ogallala (North)	87	Low
Hueco-Mesilla Bolsons	84	Low
Minor Aquifers	**Average DRASTIC Index**	**Vulnerability Rank***
Brazos River Alluvium	144	High
Ellenburger-San Saba	126	High
Marble Falls	126	High
Hickory	114	Medium
Nacatoch	111	Medium
Blossom	109	Medium
Queen City	108	Medium
Lipan	108	Medium
Rustler	106	Medium
Blaine	102	Medium
Bone Spring-Victorio Peak	100	Medium
Capitan Reef Complex	98	Medium
Sparta	98	Medium
Marathon	96	Medium

West Texas Bolsons	90	Low
Edwards-Trinity (High Plains)	83	Low
Rita Blanca	83	Low
Woodbine	82	Low
Igneous	79	Low
Dockum	78	Low
Yegua-Jackson	Not Available	Not Available
Cross Timbers	Not Available	Not Available

* DRASTIC index developed from Report 89-01, "Groundwater Quality of Texas: An Overview of Natural and Man-Affected Conditions," Texas Water Commission, March 1989.

Appendix E Nonpoint Source Program Milestones

Milestones are estimated based upon projected future CWA Section 319(h) grant commitments between EPA, the state, and collaborating entities.

Table E.1 Nonpoint Source Program Milestones Schedule[1]

Goals / Objectives	Milestone	Milestone Description	Milestone Measurement	Program Year					
				2022	2023	2024	2025	2026	2027
ST1/A	Nonpoint Source Assessment Report	The state will produce the Integrated Report in accordance with applicable EPA guidance.	Integrated Report	1	0	1	0	1	0
LT/2	Nonpoint Source Management Program Updates	The state will update the Management Program in accordance with applicable EPA guidance.	Management Program updates	1	0	0	0	0	1
LT/2	Nonpoint Source Performance Partnership Grant (PPG) End of Year Reports	The state will produce an End of Year Report for PPG activities completed by TCEQ.	PPG End of Year Reports	1	1	1	1	1	1

Goals / Objectives	Milestone	Milestone Description	Milestone Measurement	Program Year					
				2022	2023	2024	2025	2026	2027
LT/7	Nonpoint Source Annual Report	The state will produce the Nonpoint Source Annual Report in accordance with applicable EPA guidance.	Nonpoint Source Annual Report	1	1	1	1	1	1
LT/5	Implementation of Coastal Nonpoint Source Pollution Control Management Measures	Applicable Management Measure	Nonpoint Source Annual Report and GLO Reporting Mechanisms	TBD	TBD	TBD	TBD	TBD	TBD
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	2	2	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	2	2	2	2
LT/2	Section 319(h) Grant Program Reporting	The state will report grant funded activities to GRTS in accordance with EPA guidance.	GRTS updates	4	4	4	4	4	4

Goals / Objectives	Milestone	Milestone Description	Milestone Measurement	Program Year					
				2022	2023	2024	2025	2026	2027
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	0	1	0	1	0	1
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	0	1	0	1	0
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 Education Programs (number of programs)	8	8	8	7	7	7

Goals / Objectives	Milestone	Milestone Description	Milestone Measurement	Program Year					
				2022	2023	2024	2025	2026	2027
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	2	2	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	250	250	250	250	250
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	2	2	2	2

Goals / Objectives	Milestone	Milestone Description	Milestone Measurement	Program Year					
				2022	2023	2024	2025	2026	2027
ST1/C	Watershed Characterization	The state will support projects designed to evaluate watershed characteristics and produce information needed for watershed characterization and water quality models.	Watershed characterization projects	3	3	2	2	2	2
ST2/A,C	Watershed Coordination	The state will support watershed coordination projects which facilitate the implementation of WPPs.	Watershed coordination projects	11	12	12	9	10	12
ST1/D	Develop WPPs	The state will support projects which provide for the development of WPPs that satisfy applicable EPA guidance.	WPP development projects	8	5	4	3	3	3
ST2/D	Implement WPPs	The state will support projects which provide for the implementation of management measures specified in WPPs that satisfy applicable EPA guidance.	WPP implementation projects	44	42	42	42	42	42

Goals / Objectives	Milestone	Milestone Description	Milestone Measurement	Program Year					
				2022	2023	2024	2025	2026	2027
ST1/D	Develop TMDLs and I-Plans	The state will support projects which provide for the development of TMDLs and I-Plans that satisfy applicable state, federal, and program regulations and guidance.	TMDL and I-Plan development projects	0	0	0	0	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 that satisfy applicable state, federal, and program regulations and guidance.	TMDL I-Plan implementation projects	8	5	3	3	3	3
ST2/B,C	Load Reductions	The state will support projects which provide for the reduction of loadings of nonpoint source pollutants.	Nonpoint source load reduction projects	26	18	16	16	16	16
ST2/B,C	Load Reductions (Nitrogen)	The state will ensure project reductions are reported utilizing GRTS.	GRTS Report	RQ[2]	RQ	RQ	RQ	RQ	RQ

Goals / Objectives	Milestone	Milestone Description	Milestone Measurement	Program Year					
				2022	2023	2024	2025	2026	2027
ST2/B,C	Load Reductions (Phosphorus)	The state will ensure project reductions are reported utilizing GRTS.	GRTS Report	RQ	RQ	RQ	RQ	RQ	RQ
ST2/B,C	Load Reductions (Sediment)	The state will ensure project reductions are reported utilizing GRTS.	GRTS Report	RQ	RQ	RQ	RQ	RQ	RQ
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	15	12	10	10	10	10

(1) Goals and objectives are described in Chapter 2.

(2) RQ – Reportable Quantity – the value will be reported in the Nonpoint Source Annual Report.

Appendix F Summary of Public Comments and the State's Responses

Public comments were received in response to the published draft of the Management Program.

Table F.1 Responses to Public Comments

Tracking Number	Date Received	Affiliation of Commenter	Summary of Request or Comment	Summary of TCEQ/TSSWCB Action or Explanation