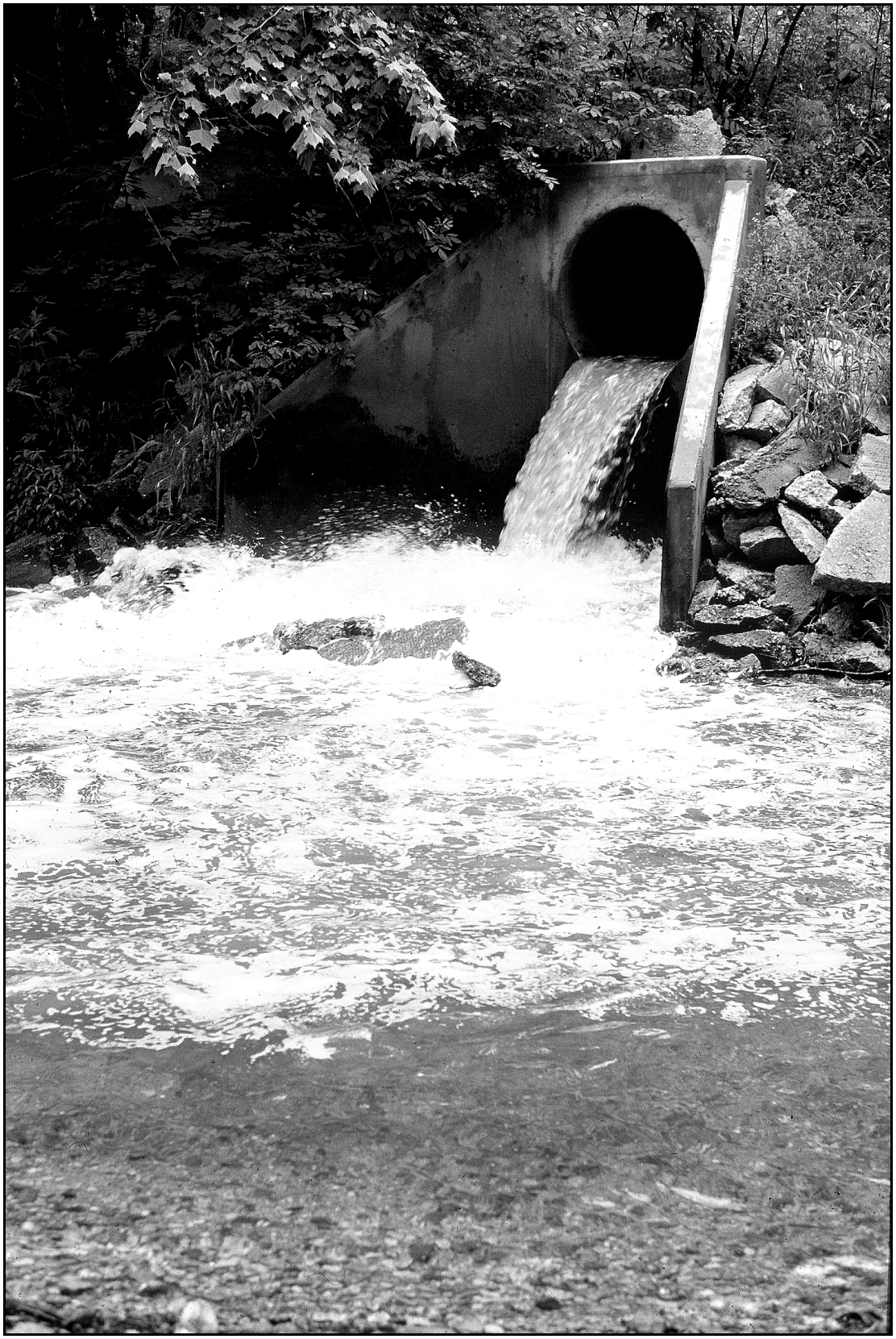
Water Pollution Control Program



Brazos River Authority Wastewater Treatment Plant discharge to Nolan Creek

Water Pollution Control Program

The TNRCC administers the state water quality management programs with the goal of protecting, maintaining, and restoring the water resources of Texas in accordance with Chapter 26 of the TWC. TNRCC programs are funded from a variety of sources, such as general revenue appropriated by the Texas Legislature, annual fee assessments on all waste discharge permittees and on many surface water users authorized to withdraw water, as well as federal grants that are administered by the EPA under the CWA. The TNRCC provides comprehensive descriptions of state water quality management in a document entitled Water Quality Management Program: Continuing Planning Process (TNRCC, 1999c).

Watershed Approach

The management of water resources in Texas relies on a host of local, state, and federal programs, landowners, industry and environmental groups, civic organizations, and individuals to manage, protect, and maintain public health and the environment. In addition, management activities for the state's water resources are fragmented due to multiple jurisdictional boundaries, statutory limitations, and the distinct classification of surface and ground water into separate resources. To address these issues, the TCEQ has implemented a comprehensive approach to coordinate water resource management activities geographically by river basin (or watershed).

By looking at an entire watershed, we can begin to appreciate the complexities of protecting our lakes, bays, and streams—not only in terms of the number of sources and the variety of water body types and interactions, but also in the number of people that must be involved. Using a watershed approach, we often find that problems seen at one point in a stream or lake are caused further upstream. With this in mind, we identify and fix water quality problems in what is usually the most efficient way—by attacking them at their most upstream source.

What Is a Watershed?

A watershed is a geographic area in which water, sediments, and dissolved materials drain into a common outlet. This outlet could be a stream, lake, playa, estuary, aquifer, or ocean. Watersheds are also commonly called basins or drainage areas.

In a city, the gutters that run along the curb on your street are the drainage outlet for your street's watershed. The water in the small watershed of your neighborhood flows into a storm drain system that empties into a nearby stream, which is the drainage outlet from several neighborhoods that form a larger watershed. That stream, in turn, flows into a larger stream or river that encompasses a still larger watershed. Everything that is done in a watershed can affect the quality of the receiving water body.

A Joint Effort

Many local, regional, state, and federal agencies other than the TCEQ have specific responsibilities that are critical to the restoration of polluted water bodies. Nongovernment organizations, especially at the watershed level, can provide information about local concerns and infrastructure, and can help build support for the pollution controls that may be required to restore water quality. For this reason, the TCEQ encourages public participation at all stages of watershed management. Public participation in watershed plans provides the following benefits:

- improves the quality and quantity of information used to develop plans,
- promotes government accountability,
- ensures that state government considers the local perspective in its decisions,
- helps stakeholders gain insight into the nature of water quality problems and alternate solutions in their areas, and
- leads to voluntary individual actions to curb pollution.

1 - Canadian River Basin
2 - Red River Basin
3 - Sulphur River Basin
4 - Cypress Creek Basin
5 - Sabine River Basin
6 - Neches River Basin
7 - Neches-Trinity Coastal Basin
8 - Trinity River Basin
9 - Trinity-San Jacinto Coastal Basin
10 - San Jacinto River Basin
11 - San Jacinto-Brazos Coastal Basin
12 - Brazos River Basin
13 - Brazos-Colorado Coastal Basin
14 - Colorado River Basin
15 - Colorado-Lavaca Coastal Basin
16 - Lavaca River Basin
17 - Lavaca-Guadalupe Coastal Basin
18 - Guadalupe River Basin
19 - San Antonio River Basin
20 - San Antonio-Nueces Coastal Basin
21 - Nueces River Basin
22 - Nueces-Rio Grande Coastal Basin
23 - Rio Grande River Basin

Figure 15-1. Major River and Coastal Basins of Texas

The Basin Management Cyle

Texas uses the major watersheds, or river basins, of the state as the geographic units around which it builds its watershed approach to managing water quality (Figure 15-1). The basin management cycle (Figure 15-2) is the mechanism through which the state works with local

residents who have a stake in water quality. This approach is used to continuously identify water quality problems, to establish statewide and local water quality priorities, to develop community-based solutions, and to collaborate with local stakeholders to implement those solutions.

Because environmental planning and implementation are rarely one-time activities, the basin management cycle has five phases that are repeated at fixed five-year intervals. The repeating management cycle reflects the dynamic nature of watershed management. A successful management framework must be flexible enough to accommodate this dynamic nature in an orderly manner over time. Stakeholders are involved in every step of the basin management cycle through participation in standing and special committees established under the Texas Clean Rivers Program. The TCEQ also makes information about assessments, plans, and implementation activities available on its Web site.

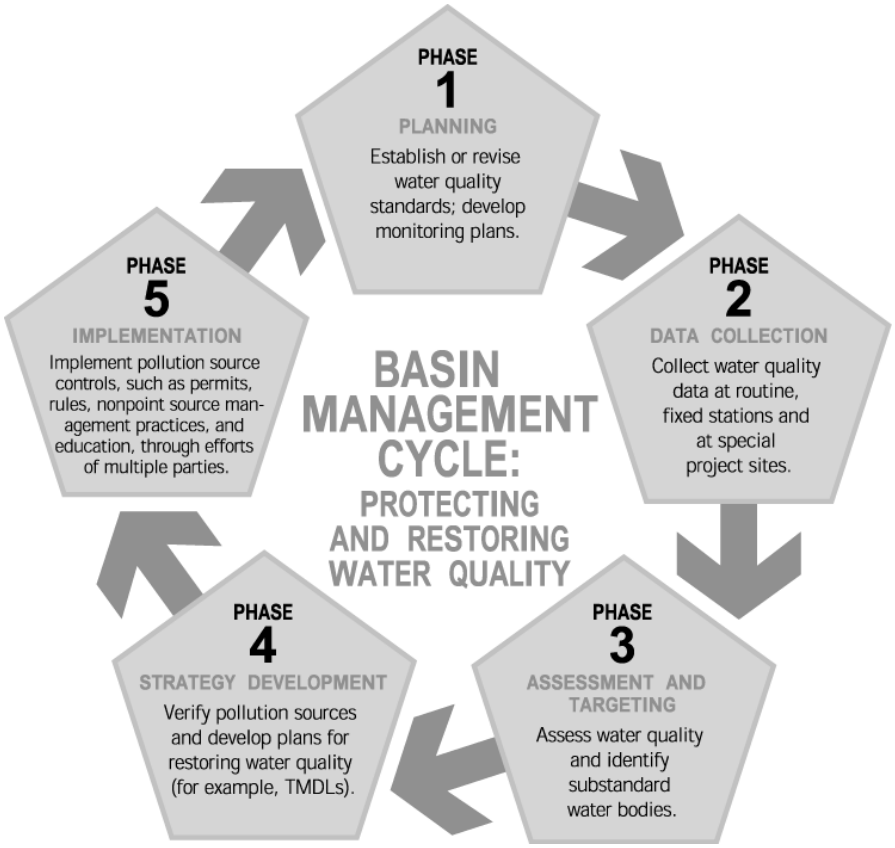


Figure 15-2. The Basin Management Cycle

Steps in the Basin Management Cycle

The following basic steps are included in the TCEQ's watershed management approach.

Set Surface Water Quality Standards

Surface water quality standards establish instream water quality goals. The TSWQS have been promulgated as Title 30, Chapter 307, of the TAC. Standards are reviewed and revised at least every three years to address new state and federal initiatives, to incorporate new data and information, and to address public concerns. State water quality standards are approved by the EPA in accordance with Section 303(c) of the CWA.

Monitor Instream Surface Water Conditions

Monitoring conducted at fixed sites at regular intervals, or for specific studies, is used to:

(1) determine baseline water quality,
(2) determine appropriate instream standards, and
(3) obtain sufficient data for predicting pollutant impacts.

Data sources include the TCEQ statewide SWQMP fixed station network, contractors collecting data under the CRP, data from other state and federal agencies, TCEQ intensive surveys and special studies, receiving water assessments conducted by TCEQ regional offices, data supplied by permittees, additional local and regional monitoring programs, and citizens' volunteer monitoring (Texas Watch).

Assess Pollutant Input

The TCEQ determines the amount of pollutant loading from various sources that can be assimilated without violating water quality standards or degrading water quality. Predictive mathematical models are applied to various sources of loadings of oxygen-demanding materials, toxic substances, and other pollutants. The results provide an estimate of the level of pollutant control needed in order to maintain water quality standards. Total maximum daily loads are developed to assess the cumulative impacts of multiple discharges to water bodies. These evaluations can include an assessment of nonpoint sources as well as permitted point source discharges.

Limit Pollutant Input

Permits and best management practices are implemented to ensure that water quality standards and other requirements are maintained. For permitted wastewater discharges, effluent limitations are established in accordance with the TCEQ document entitled Implementation of the Texas Surface Water Quality Standards via Permitting. Typical permit

requirements can include effluent limitations for total suspended solids, biochemical oxygen demand, pH, temperature, various dissolved salts, and toxic pollutants. Larger discharges also have requirements to conduct effluent toxicity biomonitoring with representative aquatic organisms. Under Section 401 of the CWA, the TCEQ also reviews and certifies federal permits issued by the U.S. Army Corps of Engineers for dredge and fill operations.

Enforce Permit Limits and Other Requirements

Enforcement ensures compliance with permitted levels that protect instream water quality. The TCEQ has the authority to levy administrative fines as a mechanism for enforcement.

Re-Monitor

Continue monitoring to determine whether water quality standards are being maintained, and to determine whether the existing water quality standards are appropriate. Continued monitoring provides the basic information to assess the effectiveness of water quality management. Data from river basins are assessed every two years under the CRP. In the Texas Water Quality Inventory, the TCEQ provides an extensive statewide assessment of how well individual water bodies in Texas comply with water quality standards. Monitoring data are used to identify continuing problem areas, which are listed as impaired water bodies under Section 303(d) of the CWA, or identified as areas of concern. TMDLs, additional monitoring, and other management activities are carried out on all on water bodies identified as impaired or where water quality concerns exist.

Texas Surface Water Quality Standards

The Texas Surface Water Quality Standards (Title 30, Chapter 307 of the Texas Administrative Code) establish explicit water quality goals throughout the state. Section 303 of the Federal Water Pollution Control Act [also referred to as the Clean Water Act, 1972, 33 U.S.C.1313(c)] requires all states to adopt water quality standards for surface water. Water quality standards are the basis for establishing discharge limits in waste discharge permits.

Regional hydrologic and geologic diversity is given consideration by dividing major river basins, bays and estuaries into defined segments (referred to as classified or designated segments). Segment-specific standards are established which identify appropriate uses (aquatic life, contact or noncontact recreation, drinking water, etc.) and list upper and lower limits for common indicators (criteria) of water quality - such as dissolved oxygen, temperature, pH, dissolved minerals, and indicator bacteria. TCEQ has adopted site-specific standards for all classified water

bodies and presumed standards for all unclassified water bodies for which the state has not yet completed site-specific studies.

Use-attainability analyses are conducted to evaluate and review water quality standards for individual water bodies. Physical evaluations of the streambeds, water chemistry, flow characteristics and habitat descriptions may be categorized; fish sampling and sometimes macroinvertebrate sampling may also be conducted. Use-attainability analyses are submitted to the EPA for review. As part of the federal review process, EPA consults with the U.S. Fish and Wildlife Service (USFW)to evaluate potential impacts on endangered species.

To determine standards for unclassified streams, the TCEQ has established a program to conduct receiving-water assessments, which are special-purpose studies consisting of fish sampling and habitat assessment, and in some cases invertebrate sampling, to determine attainable aquatic-life uses and dissolved-oxygen criteria. A receiving-water assessment is conducted when a permitting action is proposed that could affect an unclassified, perennial stream. Sampling is conducted over one or two days in an area of the stream that is relatively unimpacted. When a stream has been individually studied, the results may be incorporated into a use-attainability analysis and proposed for addition to the water quality standards.

The Texas Surface Water Quality Standards are divided into ten sections. §307.1 is a General Policy Statement, §307.2 is a Description of the Standards, and §307.3 lists Definitions and Abbreviations. The General Criteria (§307.4) of the Texas Surface Water Standards contain a variety of narrative statewide provisions which define the general goals to be attained by all waters in the state. These provisions are particularly important in dealing with those pollutants which are not addressed by specific numerical criteria. The general criteria also specify procedures which are used to develop site-specific standards for small unclassified water bodies.

The Antidegradation Policy (§307.5) establishes extra protection for high quality water bodies, in accordance with EPA regulation. The antidegradation policy affords three tiers or levels of protection to the waters in the state. Tier 1 stipulates that water quality sufficient to protect existing uses shall be maintained. Under Tier 1 in the proposed rules, reviews will ensure that existing uses are not impaired by pollutant loadings. All proposed discharges which could cause an impairment of an existing use are subject to Tier 1 reviews. Tier 2 provides that no activities subject to regulatory action which would cause degradation of waters that exceed fishable/swimmable quality will be allowed unless it can be shown to the commission's satisfaction that the lowering of water

quality is necessary for important economic or social development. Tier 3 stipulates that the quality of Outstanding National Resource Waters (ONRW) be maintained and protected, and that no degradation will be allowed. No ONRWs have been designated in Texas.

Standards for Toxic Materials (§307.6) include numerical criteria (as maximum instream concentrations) for 39 toxic pollutants in order to protect aquatic life. Human consumption of fish and drinking water is protected by numerical criteria for 65 toxic pollutants. This section also requires larger wastewater dischargers to conduct biomonitoring, which involves exposing selected aquatic organisms to samples of the discharge effluent. Any significant toxicity observed during biomonitoring must then be evaluated and eliminated.

Appropriate numerical criteria needed to support various water-quality related uses are defined in §307.7. Conditions under which some standards do not apply - such as in mixing zones near discharge points, or at unusually low stream flows - are noted in §307.8. Sampling and analytical procedures to assess standards attainment are described in §307.9. Site-specific standards for individual water bodies are individually listed in §307.10 (Appendices A,B,C,D and E).

Procedures to implement the standards are established in "Procedures to Implement the Texas Surface Water Quality Standards" (Standards Implementation Procedures). This document is publicly reviewed and approved by EPA in accordance with the TCEQ Continuing Planning Process.

The Federal Clean Water Act requires that water quality standards be publicly revised at least every three years in order to incorporate new information on potential pollutants and additional data about water quality conditions in specific water bodies, and to address new state and federal regulatory requirements.

After extensive public coordination, TCEQ last adopted major revisions to the water quality standards on July 26, 2000. Major revisions included the following.

- Specifically including habitat as a part of aquatic life uses. Vegetative and physical components of the aquatic environment are currently maintained or mitigated to protect existing aquatic life uses. Procedures to protect habitat in permits for dredge and fill activities are already specified in §404 of the Federal Clean Water Act and in 30 TAC Chapter 279 (relating to Water Quality Certification.) Specific inclusion of habitat in the aquatic life provision would (1) reflect the review that is currently being conducted in the consideration of

discharge permits, and (2) be consistent with the memorandum of agreement for assumption of permitting by the TCEQ under the National Pollutant Discharge Elimination System (NPDES).

- Including seagrass propagation as a new water-quality related use that is protected under the Texas Surface Water Quality Standards. The TCEQ, in conjunction with the Texas General Land Office, Galveston Bay Estuary Program, Coastal Bend Bays and Estuary Program, and Texas Parks and Wildlife Department sponsored the "Seagrass Conservation Plan" for Texas where the TCEQ agreed to consider adding seagrass propagation to the standards as part of the seagrass plan.

- Adding "wetland water quality functions" as a category of water-quality related use.

- Revising the water quality standards for three segments based upon the results of Use Attainability Analyses. The riverine section of Sam Rayburn Reservoir, where the Angelina River enters the reservoir, is changed from high to intermediate aquatic life use for a small, newly created segment in the upper riverine portion of the reservoir. A proposed site-specific standard for aluminum in this area of the Angelina River is deleted pending additional toxicity testing. The Nueces River Tidal at Corpus Christi is changed from exceptional to high aquatic life use, and the lower Pease River is changed from high to intermediate aquatic life use.

- Providing new provisions for temporary variances, clarifying how interim effluent limits relate to temporary variances, and providing a new provision for temporary standards.

- Revising definitions for terms such as "fecal coliform," "best management practices," "mixing zone," "surface water in the state;" adding new definitions for terms such as "attainable use," "biological integrity," "E. coli," "Enterococci," "existing use," "designated use," "pollution," "presumed use," "seagrass propagation," "significant aquatic life use," "storm water," "storm water discharge," "tidal," and "wetland water quality functions."

- Revising narrative provisions in the general criteria concerning toxic criteria applicability, salinity provisions, and the general provision to maintain dissolved oxygen for aquatic life categories.

- Amending the antidegradation policy to conform to the EPA terminology referring to a "tier" approach, and clarifying

antidegradation review procedures for wastewater, dredge and fill projects, and other activities.

- Revising toxic criteria to protect aquatic life, including the adjustment of criteria for dissolved metals as required by the EPA.

- Revising numerous toxic criteria to protect human health based on updated information on toxicity of specific toxic substances.

- Changing the indicator bacteria for contact recreation from fecal coliform to E. coli in freshwater and Enterococci in saltwater.

- Clarifying the low-flow condition for applying acute toxic criteria in streams and providing a clarification of standards applicability to storm water discharges.

- Updating procedures for assessing instream standards compliance and providing new provisions for measuring biological integrity.

- Revising Appendices A-E to add and update site-specific standards for numerous water bodies, in addition to revising aquatic-life uses for three segments in Appendix A (as discussed above). An additional 103 sites are assigned aquatic life uses and criteria for dissolved oxygen in Appendix D, and an additional 15 sites are assigned site-specific toxic criteria in Appendix E. Criteria for total dissolved solids, chloride, and sulfate were revised for 108 water bodies in Appendix A based on additional instream data.

Federal approval is required before standards revisions are applicable under federal Clean Water Act. EPA actions on the revisions of the water quality standards as of September 13, 2002 has included the following:

07/29/01	The EPA disapproved site-specific standards revision in Appendix A for Upper Sam Rayburn Reservoir/Angelina River (Segment 0615)
12/03/01	The EPA approved all site-specific standards revisions in Appendix D
02/06/02	After consultation, the National Marine Fisheries Service concurred with site specific toxic criteria for copper in marine waters (in Appendix E)
02/27/02	EPA approved: (1) site-specific Standards Revisions for Segment 0230 - Pease River in Appendix A and the associated segment description changes for Segments 0230

and 0220 - Upper Pease/North Fork Pease River in Appendix C; (2) facility specific copper water effects ratios (WERs) for Segments 0501 - Sabine River Tidal, 0505 - Sabine River Above Toledo Bend Reservoir, 1006 Houston Ship Channel (HSC) (Tucker Bayou portion and Greens Bayou portion), 1201 - Brazos River Tidal and 1242 - Brazos River Above Navasota River (Lake Creek Reservoir) in Appendix E; and, (3) segment wide copper WERs for Segments 1001 - San Jacinto River Tidal, 1005 - HSC/San Jacinto River Tidal, 1006 - HSC Tidal, 1007 - HSC/Buffalo Bayou Tidal, 1013 - Buffalo Bayou Tidal and 2427 - San Jacinto Bay in Appendix E.

Point Source Control Program

he TCEQ is given authority by Chapter 26 of the Texas Water Code to adopt rules and procedures to control and limit discharges of wastewater into or adjacent to water in the State. Wastewater must meet certain standards before being discharged.

On September 14, 1998 the TCEQ assumed the federal NPDES program under the CWA and administers the TPDES program governing discharges from all point sources in the state (except for oil and gas discharges, outside of TCEQ jurisdiction). TPDES Permits are developed to be consistent with state and federal statutes, regulations and rules and also incorporate state and federal policies.

In industrial TPDES permits, technology based effluent limitations are at least as stringent as Best Practical Control Technology Currently Available (BPT), Best Available Technology Economically Achievable (BAT), and Best Conventional Pollutant Control Technology (BCT) limitations in accordance with Effluent Limitations and Standards as promulgated for categorical industries. Production based limitations are based on a reasonable measure of actual production levels at a facility. Mass limitations for concentration-based guideline limits are developed using the appropriate wastewater flows. In municipal TPDES permits, technology-based effluent limitations require secondary treatment requirements according to 30 TAC Chapter 309. In Texas, CAFO permit requirements are more stringent than the minimum technology guidelines. Additional CAFO requirements govern land application of wastewater and solid waste. CAFO rules establish best management practices to abate and prevent pollutant runoff from land application of waste and wastewater.

In addition to the technology guidelines, any applicable watershed protection rules, or the secondary treatment rules, effluent limitations and other permit provisions must meet applicable surface water quality

standards. These standards are implemented into industrial, CAFO, and municipal TPDES permits. When point source discharges or nonpoint source impacts have reduced or eliminated the assimilative capacity of a water body, such that the water quality standards cannot be attained, Wasteload Evaluations (WLEs) or TMDLs have been established as a water quality management plan to maintain or restore water quality.

Municipal TPDES permits include provisions for the management of domestic sewage sludge. The TCEQ has authority as described in Chapter 361 of the Texas Health and Safety Code to control municipal solid waste. The TCEQ has adopted 30 TAC Chapter 312 which implements all of the federal sewage sludge requirements (40 CFR Part 503). TCEQ also authorizes and controls the use and disposal of water treatment sludge. CAFO controls are in 30 TAC Chapter 321, Subchapter B. All industrial TPDES permits require that industrial solid waste, including hazardous waste, be managed and disposed of in accordance with 30 TAC Chapter 335 and any applicable requirements of the Resource Conservation and Recovery Act (RCRA). These requirements are designed to ensure the solid wastes are properly disposed of to preclude possibly water quality impacts.

Among all states, Texas has one of the highest number of point source discharges, due to the geographical size of the state, its economy, and patterns of water district proliferation surrounding several of the major urban centers. In September, 2002, Texas had 841 industrial, 2401 municipal, and 578 CAFO permits issued in the state. Of these, 568 industrial and municipal facilities are not subject to TPDES since discharges are not into a surface water, but instead rely upon storage of wastewater, irrigation, evaporation, or subsurface percolation. Of the municipal dischargers, 128 must maintain a pretreatment program to control discharges of wastewater from industrial users of the sewer system, in order to prevent pass-through of pollutants or interfere with wastewater treatment.

In 1987, Congress amended the CWA to specify that storm water discharges from certain activities are point sources subject to the requirements of NPDES. In this manner, certain intermittent and episodic discharge events previously considered as the discharge of pollutants from nonpoint sources, became point sources. Initially, the EPA began implementation of Phase 1 (see description below) of the NPDES storm water program. The TCEQ did not begin implementation of a similar state program, due to its intent to assume NPDES and avoid dual permitting. With the assumption of NPDES in 1998, TCEQ assumed responsibility for implementation of a storm water program under the TPDES program. Additionally, with the advent of 1999 regulations by EPA, all states that

carry out the NPDES program must begin implementation of Phase 2 (see description below) of the program, as well.

Phase 1 of the TPDES storm water program includes the following regulated categories.

- The discharge of storm water associated with industrial activity (largely identified by specific SIC codes), and also includes storm water associated with construction activities which disturb greater than five acres of land.
- The discharge of storm water from large and medium municipal separate storm sewer systems (MS4s). Large and medium MS4s located in municipalities with a population greater than 100,000.

Phase 2 of the TPDES storm water program includes the following regulated categories.

- The discharge of storm water associated with construction activities which disturb greater than one and less than five acres of land.
- The discharge of storm water from small MS4s. Permit coverage will be required for MS4 urbanized areas, and potentially required for MS4s serving a population of greater than 10,000 outside of urbanized areas.

Nonpoint Source Pollution Control Program

Characteristics of Pollution from Storm Water

Storm water pollution is a form of water pollution that originates from urban and rural landscapes. Common and everyday activities such as landscape maintenance, the operation of automobiles, farming, and building construction can cause water pollution under certain circumstances. Pollution occurs when rainfall runoff or infiltrating groundwater carry accumulated pollutants to receiving water bodies such as surface lakes, streams, and coastal waters or groundwater aquifers. Humans or livestock, when concentrated in a relatively small space (such as in a city or a concentrated animal feeding operation), can cause significant pollutant discharges following rainfall and the transport of accumulated contaminants. The fertilizers used to maintain urban landscapes and to produce agricultural crops can cause excessive growths of aquatic vegetation (such as algae) and can lead to unhealthful concentrations of nitrates in groundwater used as drinking water supply. Metals and organic compounds associated with the operation of automobiles can be toxic or carcinogenic to human health and to wildlife. Air emissions that originate from a multitude of industrial, urban, and mobile sources are deposited onto the ground, with the potential to add

pollutants to surface and ground water when rainfall runoff occurs. Sediments that erode from land areas disturbed by construction and agricultural activities can impair aquatic wildlife habitats, shorten the design life of reservoirs, and act as a carrier for other contaminants.

Pollution from storm water is differentiated from conventional sources of water pollution, such as the discharges of wastewater from municipal and industrial wastewater treatment plants. These "point source" discharges are strictly regulated by TPDES permits containing effluent limits, monitoring requirements and enforcement mechanisms. As described above in the point source control section, a large subset of urban storm water is now controlled under the TPDES program and identified as point source discharges of storm water. Pollution from the remainder of storm water not under the TPDES program is called "nonpoint source" pollution because it originates from dispersed and diffuse locations.

Water pollution problems from storm water are less obvious and are not as easy to control through the traditional "end-of-pipe" treatment strategies that have been useful for the control of wastewater discharges. The duration, intensity, and areal extent of rainfall events, combined with the complex nature of land use activities and the differing characteristics of the landscape, means that storm water pollution exhibits highly variable temporal and spatial characteristics. The lack of a single identifiable source or action responsible for causing a water quality problem makes it difficult to establish cause-and-effect relationships. The familiar and often necessary nature of the activities that lead to pollution from storm water makes it difficult to appreciate the potential adverse consequences of those activities. When a NPS assessment has been completed or when existing regulations establish a NPS control, it is generally referred to as a best management practice, or BMP. BMPs are the most effective practice or combination of practices identified for the control of NPS pollution. BMPs may be structural, such as detention ponds or filter systems, or nonstructural, such as riparian buffer zones along stream banks. BMPs also include activities such as education of the public on NPS pollution.

Assessments of Pollution from Storm Water

The EPA reports that, on a national basis, storm water runoff contributes to more water quality impairments than do discharges from municipal and industrial wastewater treatment facilities. In Texas, nonpoint sources contribute to pollution in 220 of the 238 water bodies (92 percent) identified as impaired or threatened on the 2000 303(d) List.

Section 319 of the Clean Water Act specifies requirements for state NPS pollution abatement programs. These requirements include provisions for the preparation and submittal of a NPS Assessment Report. The statute

and the associated guidance specifies that the assessment report is to identify waters that were impaired, threatened by, or vulnerable to NPS pollution; characterize the sources that contribute to those impacts; and describe programs and methods for controlling it. The TNRCC originally prepared a NPS Assessment Report in 1988. Updates were completed since then, including the latest Assessment Report completed in 1999 and approved by EPA on February 25, 2000. This document is available from TNRCC and is found at the TNRCC Web site. The document is entitled Texas Nonpoint Source Pollution Assessment Report and Management Program (TNRCC, 2000c).

1999 NPS Assessment Report: Extent and Nature of the Problem in Texas Surface Waters

The TNRCC assesses nonpoint source pollution in Texas in accordance with Section 319(a) of the Clean Water Act, with the cooperation of the TSSWCB and other interested parties in the state. The 1999 assessment compiled available information from various nonpoint source water quality assessments. Statewide water quality monitoring data, watershed characterization information, and information solicited through an intergovernmental coordination and public participation process were used to produce the assessments of NPS impairments to Texas surface waters.

Identification of NPS Impaired Waters

Texas' §319(a) assessment of NPS-impaired waters is based on its CWA §305(b) water quality inventory and §303(d) list of impaired and threatened waters. In preparing the state's §305(b) assessment, the TNRCC compares water quality monitoring data against criteria in the Texas Surface Water Quality Standards and EPA §305(b) guidance to determine how well the waters of the state support their designated beneficial uses. Section 303(d) of the Clean Water Act requires the state to identify all waters within its boundaries that do not meet water quality standards and establish a priority listing of those waters for remedial or protective action.

The Texas §319(a) assessment focuses on those surface waters which have been degraded by nonpoint source pollution, as identified in the state's 303(d) list. NPS-degraded surface waters appearing on this list will be targeted by the state for additional NPS monitoring and restoration activities.

During the next five years, the state will be refining the process for assessing and ranking water bodies and the process used for preparing the CWA §305(b) report, the CWA §303(d) list, and the §319(a) NPS list. Basin analyses performed by the TNRCC and regional partners under the guidance of the CRP are the foundation for the state's CWA §305(b) report and subsequent statewide ranking and prioritization of NPS segments. The

long-term objective of the Nonpoint Source Program is to update the assessment on a schedule which coincides with the preparation of the Texas §305(b) report and the water quality assessments prepared by the CRP.

Texas' NPS Management Approach

Previous state Management Programs for the TSSWCB and the TNRCC placed priority on working closely with federal, state, and private agencies to promote NPS pollution prevention and abatement projects. The majority of these projects either demonstrated innovative NPS pollution abatement technologies or were statewide NPS pollution educational projects. Although these past projects have been effective in terms of accomplishing work plan tasks and raising awareness of NPS pollution, it has been difficult to quantify the success of these projects in terms of water quality improvements.

NPS management presents an enormous challenge to federal, state, and local agencies because of the difficulty in identifying the sources of the pollution, the relatively low public awareness of the problem, the huge variation in vegetation and land types, and the economic and technical infeasibility of some best management practices. Even though significant funding sources exist, there remains a gap between available funding and the amount needed to address all program priorities.

The state's management program for nonpoint source pollution utilizes baseline water quality management programs and regulatory, non-regulatory, financial, and technical assistance approaches to achieve a balanced NPS management program. These programs include ongoing work to update and establish water quality standards and monitor and assess water bodies for water quality impacts.

State resources for implementation will focus on water bodies that do not meet their standards as scoping and assessment activities are initiated in each individual watershed. Through basin steering committees and local watershed action committees, local stakeholders are encouraged to participate in the assessment and evaluation of a watershed's water quality impairments, as well as in the development and implementation of necessary management strategies. Watershed analyses are used to specify quantifiable targets for water quality improvement, and watershed action plans outline activities necessary to attain and maintain applicable water quality standards. The Nonpoint Source Program is active in supporting each phase of the watershed management process, from initial identification of NPS-impaired waters for the §303(d) and §319(a) lists to implementation and oversight of priority management activities.

Nonpoint Source Program Goals and Objectives

Within its cooperative, watershed-based framework, Texas has identified goals and objectives to guide nonpoint source program activities. These goals and objectives encompass elements intended to provide a strong foundation for maintaining a comprehensive nonpoint source program. These goals and objectives have been formally adopted and approved by the TNRCC Commission, the Texas Governor, and the EPA Regional Administrator and are contained in the Texas Nonpoint Source Pollution Assessment Report and Management Program (TNRCC, 2000c).

Nonpoint Source Program Highlights

Many nonpoint source assessments and implementation projects have been occurring and are ongoing in Texas. These include activities funded by the EPA through annual §319 awards to the TNRCC and TSSWCB. Additional funding through state fees to support the Texas Clean Rivers Program and general revenue provided by the Texas Legislature fund NPS-related assessment activities. Other federal, state, and local agencies provide funding support of a diverse amount of activity which results in nonpoint source pollution abatement in this state. Readers interested in detailed descriptions and highlights are referred to the Texas Nonpoint Source Pollution Assessment Report and Management Program and also to the 1999 Annual Report: Texas Nonpoint Source Pollution Management Program. Both documents describe the entities involved in Texas, recent activities, and nonpoint source pollution abatement success stories.

Coastal Zone Act Reauthorization Amendments (CAZRA)

The Texas Coastal Management Program (CMP) was approved by the National Oceanic and Atmospheric Administration (NOAA) on January 10, 1997. The Texas CMP is administered by the Texas Coastal Coordination Council (TCCC) and staff of the Texas General Land Office. The CCC includes as one member Chairman of the TNRCC. Section 6217 of the CZARA requires each state with an approved CMP to develop a federally approvable program to control coastal nonpoint source pollution. The program must be submitted within 30 months of CMP approval. As a result, the Texas Coastal Nonpoint Source Pollution Control Program was submitted in December, 1998 by the CCC (TCCC, 1998). The program recognizes the TNRCC and the TSSWCB as holding primary responsibility over the development and implementation of the program. Other supporting agencies involved also include the GLO, TPWD, Texas Department of Transportation (TXDOT), and the RCT.

At this time, the program is under review by NOAA and EPA. In response to comments on the initial submittal, the participating agencies are currently developing amendments to the 1998 program for consideration

by TCCC and submittal to NOAA. Texas currently estimates approval of the program in mid-2003. Additional activities include the development of 15-year Program Strategies and 5-year Implementation Plans for the coastal nonpoint program, consistent with 1999 guidance released by EPA and NOAA.

The Assessment and Listing Process

The Texas Surface Water Quality Standards protect the ways that the water bodies in the state will be used and define measurements that will assure the water quality is good enough to maintain those uses. The standards are developed with a significant margin of safety, such that conditions at or just less than the standards indicate a potential for use impairment, before actual impairment is likely to occur.

Using those standards and measurements, the Texas Commission on Environmental Quality (TCEQ), in collaboration with other federal, regional, and local agencies, carries out a regular program of monitoring and assessment to determine which water bodies are meeting the standards set for their use, and which are not. The results of this monitoring and assessment effort are published in The Texas Water Quality Inventory and List of Impaired Waters, as required by federal Clean Water Act (CWA) Sections 305(b) and 303(d).

The Texas Water Quality Inventory and List of Impaired Waters involves:

- selecting acceptable data and information used to develop the report;
- assessing these data and information to determine the status (described in greater detail in Guidance for Screening and Assessing Texas Surface and Finished Drinking Water Quality Data);
- preparing a draft report;
- ranking the impaired water bodies for TMDL development;
- revising and finalizing the report based on public input.

To refine the draft report, the TCEQ relies on a formal public comment period to solicit additional data and information to support the process. Other data and information can be used to support or revise results of the initial screening analysis and to determine the priority ranking of water bodies. The appropriateness and accuracy of these data are evaluated by TCEQ water quality staff on a case-by-case basis. These data and information may also be used to direct future water quality monitoring activities. If a water body is impaired, the TCEQ determines the need and feasibility for a TMDL and the water body is scheduled for the appropriate TMDL action. The assessment is available on the agency website at: http://www.tnrcc.state.tx.us/water/quality/

Total Maximum Daily Loads

Restoration and maintenance of surface water quality so that designated uses are met is an important priority of the Texas Commission on Environmental Quality (TCEQ). The TCEQ implements this water pollution control program by identifying water bodies that do not meet surface water quality standards (development of 303(d) lists), by developing and implementing Total Maximum Daily Loads (TMDLs) and Implementation Plans (IPs) for these impaired water bodies, and by ensuring that water quality standards are periodically reviewed and revised as appropriate. When approved, TMDLs are incorporated into the TCEQ's water quality management plan.

TMDL Process

The TMDL Program restores water quality in impaired streams, reservoirs, and estuaries (water bodies) identified on the 303(d) list by implementing the Texas TMDL Development and Approval process (Figure 15-3). The primary objective of the TMDL Program is to restore and maintain the designated beneficial uses (e.g. drinking water, recreation, aquatic life) of impaired or threatened water bodies (TNRCC, 1999d). Achieving this objective will be a major component of the state's watershed management efforts over the next 10 to 20 years.

The TCEQ has established a methodology for determining when and where TMDL projects will be initiated. During the 303(d) listing process, impaired water bodies are assigned a High, Medium or Low priority for TMDL development. The criteria for assigning priorities are outlined in "Methodology for Developing the Texas List of Impaired Water Bodies." This ranking is important, but not the only factor used to establish the priorities for developing TMDLs. Additional factors considered in developing TMDLs for listed water bodies include:

Local Support for TMDL Development. Local resources and commitment to a particular water body may accelerate TMDL development.

Watershed Proximity and Related Pollutants. In order to make more efficient use of the state's resources, TMDLs may be scheduled as one project for multiple water bodies either in close proximity or for related pollutants. In this case, one or more water bodies ranked as a low priority for TMDL development may be scheduled ahead of water bodies ranked as medium, because the lower ranked water body is part of a larger project.

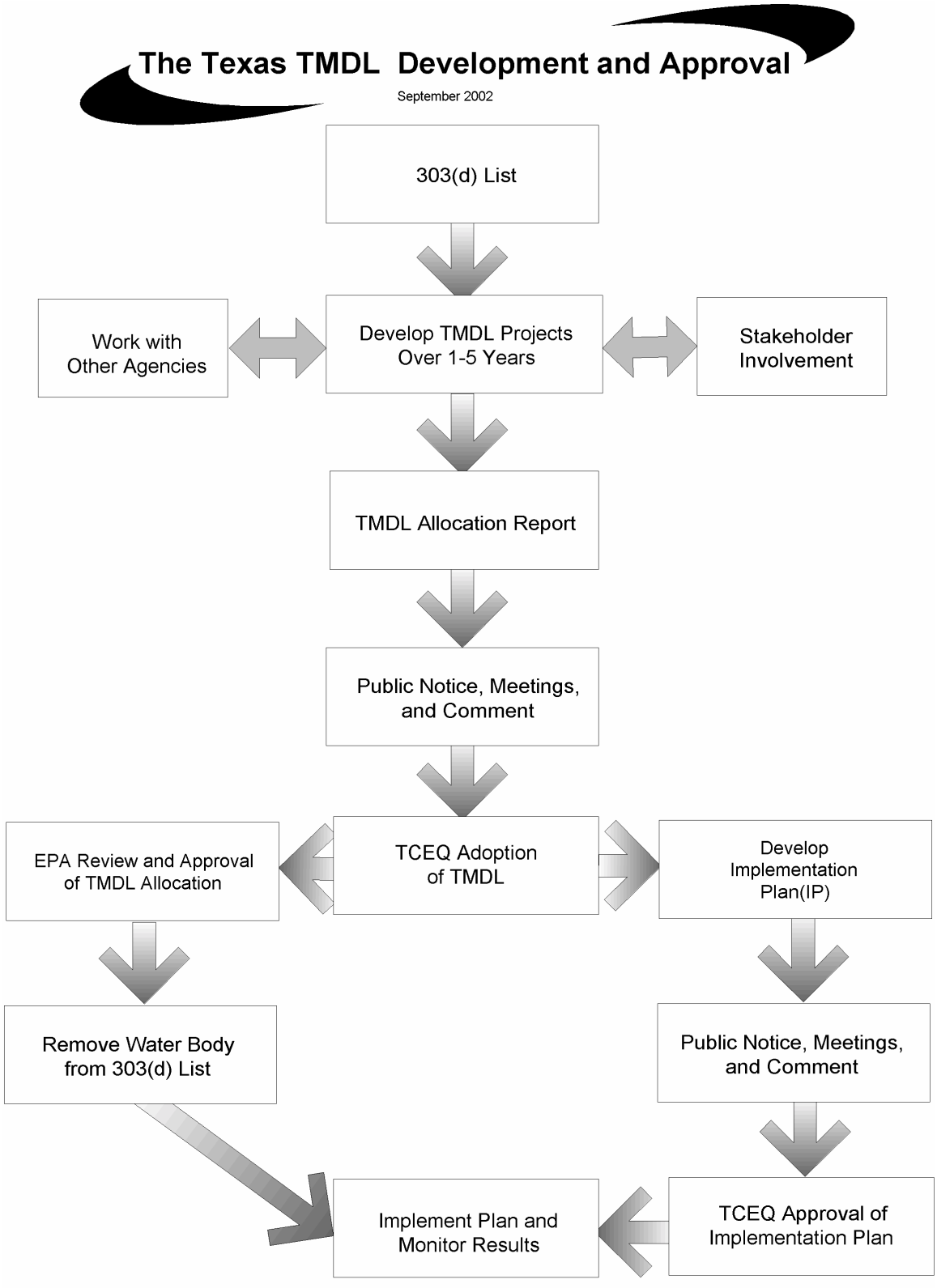


Figure 15-3. The Texas TMDL Development and Approval Process

Data Availability. For most 303(d)-listed water bodies, additional data collection will be required to develop models accurate enough to develop a TMDL. For water bodies where sufficient quality-assured data is available, TMDLs may be scheduled earlier than if such data did not exist.

Targeting by Strategy. Depending on the impairment, the TCEQ initially addresses water bodies in one of four ways:

- initiate TMDL development if additional data is not required,
- initiate additional data collection to verify the extent and severity of the impairment and/or to support the TMDL model,
- initiate an evaluation of the appropriateness of the existing standard, or
- build on existing efforts of other programs or agencies that are addressing the same water body and the same pollutant.

The time needed to complete a TMDL project varies. In some cases, a project may be completed in a year or less; in other cases, several years may be needed. Factors influencing the TMDL time frame include the complexity and extent of the impairment, the data available at the outset, the modeling, and the assessment required. Other factors include stakeholder consensus and the number of agencies involved.

TMDL Projects

There are currently 37 ongoing TMDL projects in 134 segments addressing various impairments throughout the state (Table 15-1). Each project is at varying stages of development. The six major milestones in a TMDL project include: plan project, review historical data and collect new data, set water quality target, allocate pollutant load (TMDL), develop implementation plan (IP), and implement the plan and monitor results (Figure 15-4). The following is a description of each milestone, which is also reflected in the "status of project" column on Table 1 to help convey the milestone achieved to date by each project.

Plan Project

Project planning includes a number of different activities. For example, determine the particular strategy for a water body/pollutant, schedule the project, secure contractor assistance, initiate contract, develop work orders/plans, and prepare/approve Quality Assurance Project Plans (QAPP).

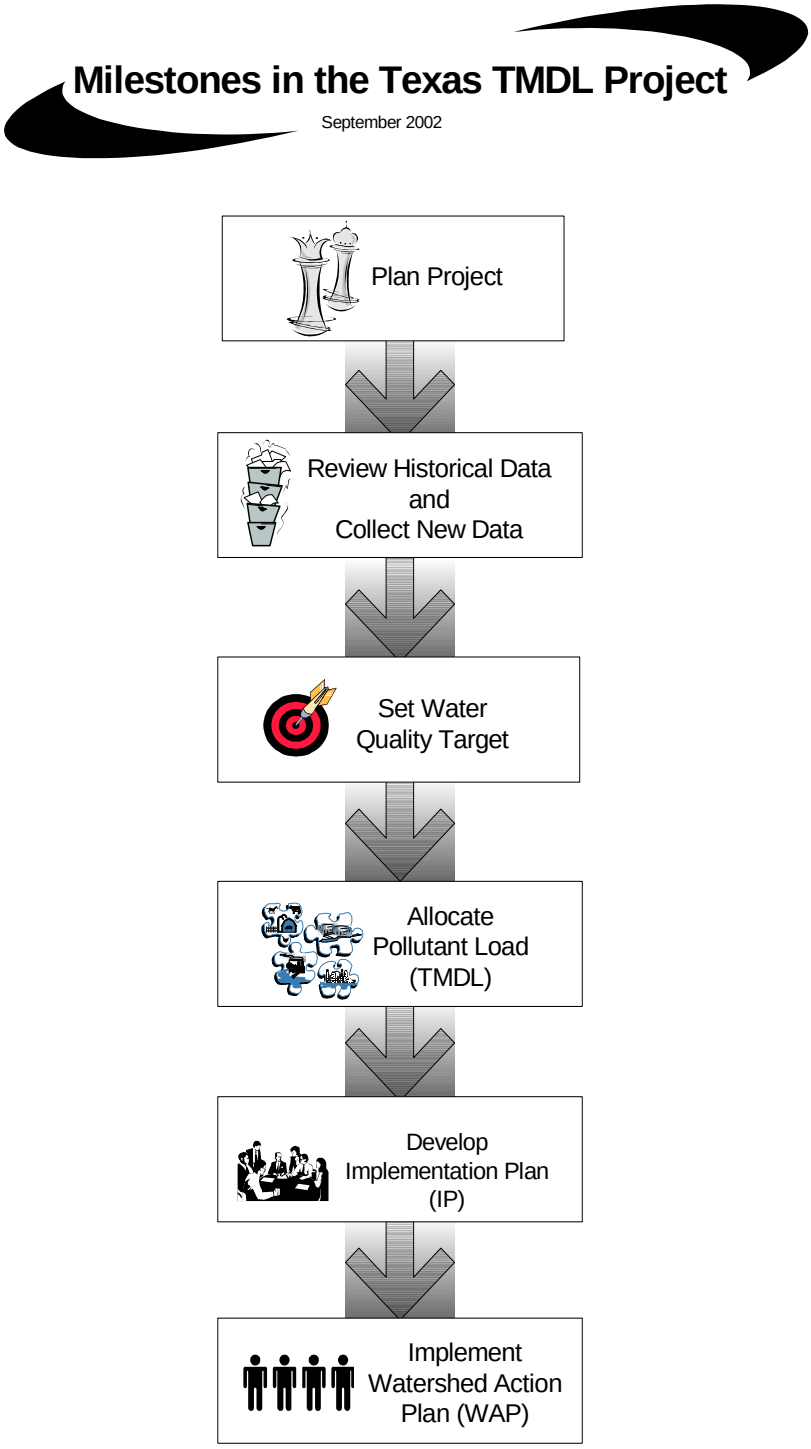


Figure 15-4. Milestones in the Texas TMDL Project

Review Historical Data and Collect New Data

A historical data review is one of the first steps necessary to determine data availability. Additional water quality data collection is often

necessary to verify the extent and severity of the impairment, to evaluate existing water quality standards, or to support TMDL development. Watershed land use/land cover, hydrography and hydrology data may also be collected to support TMDL assessment and/or modeling.

Set Water Quality Target

TMDL projects must identify a quantifiable water quality target for each constituent that causes a body of water to appear on the 303(d) list. For most pollutants, the primary water quality target has been established by the TCEQ through the TSWQS (30 TAC §§307.1 –307.10).

Over the course of some TMDL projects, a key aspect of water quality planning and management that may come into greater focus is the water body's present water quality standard. As a TMDL project is conducted, two alternative outcomes may materialize as existing and additional data are assessed to characterize the constituent of concern and watershed conditions:

- the TCEQ may determine that it is appropriate and feasible to conduct a Use Attainability Analysis (UAA) to determine the adequacy of the designated use [40 CFR §§131.10(h) and 131.10(d)]; or
- the water quality criterion that was exceeded, placing the water body on the 303(d) list, may not be appropriate and should be replaced by a site-specific criterion, which would result in a change to the water quality standards, screening criteria, or both for some parameters [40 CFR §131.11(b)].

The TCEQ recognizes that, within the current regulatory framework, changes to designated uses may be feasible in very limited situations only. The TCEQ is interested in establishing more site-specific water quality criteria for a variety of technical, scientific, economic, and administrative reasons. Consideration of the appropriateness of an existing water quality criterion is an important early step of every TMDL project.

Allocate Pollutant Load (TMDL)

Before pollutant loads are allocated among sources, the location and types of sources (i.e. point, nonpoint, natural background, atmospheric deposition), and the current and projected pollutant load for each source are identified. The TMDL loading allocation process culminates in allocating pollutant loads among various point, nonpoint, and natural background sources in the watershed. This phase determines the current pollutant loading in the water body and the estimated loading needed to restore water quality. Pollutant loads are allocated among the sources throughout the watershed and often involve the use of water quality models.

Table 15-1. Summary of TMDL Projects in Texas.

Status of projects reflect milestone (Figure 15-4) achieved as of September 2002. See project overviews on the TMDL Web page at *www.tnrcc.state.tx.us/water/quality/tmdl/*.

Project Name	Segment Number	Use(s) Impaired	Cause of Impairment	Status of Project
1. Houston Ship Channel Nickel	2426, 1001, 2436, 2430, 2429, 2427, 1017, 1016, 1014, 1013, 1007, 1006, 1005, 2428	aquatic life	nickel	Implementation ongoing.
2. Fort Worth Legacy Pollutants	0806, 0806A, 0806B, 0829, 0829A	fish consumption	chlordane, DDE, dieldrin, PCBs	Implementation ongoing.
3. Lake Austin Dissolved Oxygen	1403	aquatic life	dissolved oxygen	Implementation ongoing.
4. E.V. Spence Reservoir	1411	general	sulfate, total dissolved solids	Implementation ongoing.
5. Dallas and Tarrant Counties Legacy Pollutants	0841, 0841A, 0805	fish consumption	chlordane, heptachlor epoxide, dieldrin, PCBs, DDT, DDD	Implementation ongoing.
6. North Bosque River Phosphorus	1255, 1226	general	total phosphorus	IP out for public comment.
7. Arroyo Colorado Legacy	2202, 2202A	fish consumption	toxaphene, PCBs, chlordane, DDE	Implementation ongoing.
8. Clear Creek Chlordane	1101, 1102	fish consumption	chlordane	Implementation ongoing.
9. Clear Creek Volatile Organic Compounds	1101, 1102	fish consumption	trichloroethane, dichloroethane	Implementation ongoing.
10. Aquilla Reservoir Atrazine	1254	public water supply	atrazine	Implementation ongoing.
11. Salado Creek Dissolved Oxygen	1910	aquatic life	dissolved oxygen	TMDL complete IP deemed not necessary.

Table 15-1. Summary of TMDL Projects in Texas (Continued)

Project Name	Segment Number	Use(s) Impaired	Cause of Impairment	Status of Project
12. Arroyo Colorado Tidal Dissolved Oxygen	2201	aquatic life	dissolved oxygen	Draft TMDL complete.
13. Martin Creek Reservoir Selenium	0505F	fish consumption	selenium	Data collection ongoing.
14. Welsh Reservoir Selenium	0404D	fish consumption	selenium	Data collection ongoing.
15. Brandy Branch Reservoir Selenium	0505E	fish con-sumption	selenium	Data collection ongoing.
16. East Texas Mercury	0401, 0402, 0402A, 0504, 0603, 0608G, 0610	fish con-sumption	mercury	Project planning underway. Multi-media; coordinating with national efforts.
17. Dickinson Bayou Dissolved Oxygen	1103	aquatic life	dissolved oxygen	Data collection ongoing.
18. Patrick Bayou	1006	general, aquatic life	thermal modifications, water and sediment toxicity, copper	Water toxicity and copper have been recommended for delisting. TMDL development is ongoing for thermal modifications and sediment toxicity.
19. Lake O' the Pines Dissolved Oxygen	0403	aquatic life	dissolved oxygen	TMDL under development
20. Nonpoint Source Bacteria	0207A, 0608B, 0612B	contact recreation	pathogens	Draft TMDL complete
21. Nueces Bay Oyster Tissue - Zinc	2482	oyster waters	zinc	Historical data review underway.
22. Houston Bacteria - Buffalo and Whiteoak Bayous	1013, 1014, 1017	contact recreation	pathogens	TMDL under development
23. Armand Bayou Dissolved Oxygen	1113, 1113A	aquatic life	dissolved oxygen	Data collection ongoing for UAA.

Table 15-1. Summary of TMDL Projects in Texas (Continued)

Project Name	Segment Number	Use(s) Impaired	Cause of Impairment	Status of Project
24. Oso Bay Dissolved Oxygen	2485	aquatic life	dissolved oxygen	Data collection ongoing for UAA.
25. Upper Oyster Creek Dissolved Oxygen and Bacteria	1245	aquatic life, contact recreation	dissolved oxygen, pathogens	Data collection ongoing.
26. Houston Ship Channel Dioxin	2426, 1001, 1005, 1006, 2421, 2427, 2428, 2429, 2430, 2436, 2438, 0901, 1007	fish consumption	dioxin	Data collection ongoing.
27. Lavaca Bay - Mercury and Dissolved Oxygen	2453	aquatic life, fish consumption	dissolved oxygen, mercury in fish tissue and water	Data collection ongoing.
28. Clear Fork Trinity Dissolved Oxygen	0833, 0831	aquatic life	dissolved oxygen	Data collection ongoing for UAA.
29. Tidal Streams Use Assessment	0511, 1501, 2453A	aquatic life	dissolved oxygen	Data collection ongoing for UAA.
30. Statewide Ambient Toxicity	1209A, 1209B, 2306, 2304, 0702A, 1007A, 0702A, 2201	aquatic life	water and sediment toxicity	Data collection ongoing.
31. South Central Texas - Bacteria and Dissolved Oxygen	1815, 2113, 2107, 2104, 1913, 1908, 1906, 1806A, 1803B, 1803A, 1427, 1906	aquatic life, contact recreation	dissolved oxygen, pathogens	Data collection ongoing.
32. Creeks - Dissolved Solids	2204, 1426, 1244, 1214, 2204	general	chloride, sulfate, total dissolved solids	Data collection ongoing.
33. Middle Brazos River Basin Dissolved Oxygen	1217A, 1222A, 1243	aquatic life	dissolved oxygen	Data collection ongoing.

Table 15-1. Summary of TMDL Projects in Texas (Continued)

Project Name	Segment Number	Use(s) Impaired	Cause of Impairment	Status of Project
34. San Antonio River Basin and Leon River - Bacteria	1901, 1911, 1903, 1221, 1910	contact recreation	pathogens	Data collection ongoing.
35. Gulf Coast Oyster Waters	2421, 2422, 2423, 2424, 2432, 2439, 2441, 2442, 2451, 2452, 2453, 2456, 2462, 2472,	oyster waters	pathogens	Historical data review underway.
36. Sam Rayburn Reservoir	0610, 0615	aquatic life	dissolved oxygen, pH, aluminum	Historical data review underway.
37. Orange County - Bacteria, Dissolved Oxygen, and pH	0511A, 0511C, 0508, 0508B, 0511B, 0511, 0508A	aquatic life, contact recreation, general	dissolved oxygen, pathogens, pH	Historical data review underway.

The TCEQ is required to submit all TMDLs to EPA for review and approval. This approval process may take as long as a year.

Develop Implementation Plan (IP)

After a TMDL is completed, an implementation plan is developed that describes the regulatory and voluntary activities necessary to achieve the pollutant reductions identified in the TMDL. Management activities incorporate both nonregulatory and regulatory mechanisms, such as permit effluent limits and recommendations, nonpoint source pollution management practices, stream standard revisions, special projects, pollution prevention, public education, and watershed-specific rule recommendations. The best strategies for each individual watershed are developed in cooperation with regional and local stakeholders.

The implementation plan describes these various activities, the schedule for implementing them, and the legal authority for the regulatory measures. It also provides reasonable assurance that the voluntary practices will be undertaken. For instance, the plan may identify grant funds that have been secured to implement voluntary actions. The plan also includes the measurable results that will be achieved through the plan, along with a follow-up monitoring plan to determine its success. The ultimate goal is always the attainment of the water quality standard, but additional, interim results may be evaluated to assess progress toward that goal.

Even after plans are fully implemented, it is difficult to accurately predict how long it will take for improvements to occur in the stream, or how much improvement will be seen. For this reason, there is a schedule for phasing in implementation activities, especially those that address nonpoint sources of pollution. Less expensive, time-tested activities are implemented first, and their impacts are assessed. If water quality standards are not yet achieved, then another round of activities is implemented. Through this adaptive management approach, the water body is continually reassessed, and adjustments are made in the implementation of activities as needed to attain water quality standards in the stream.

Implement Plan and Monitor Results

The Implementation Plan provides local, regional, and state organizations a comprehensive strategy for restoring and maintaining water quality in an impaired water body. It is the blueprint for the goals, activities, and expected results of restoration efforts in the watershed. Progress of implementation is tracked and monitoring is conducted to verify resulting improvement.