REGIONAL MANAGEMENT AGENCIES

Angelina & Neches River Authority
(Upper and Central Neches Basin, Angelina Basin)
(936) 632-7795

Brazos River Authority
(254) 761-3100

Guadalupe-Blanco River Authority
(830) 379-5822

Houston-Galveston Area Council
(San Jacinto Basin, Trinity-San Jacinto, San Jacinto-Brazos, and Brazos-Colorado Coastal Basins)
(713) 627-3200

International Boundary and Water Commission
(Rio Grande Basin)
(915) 832-4100

Lavaca-Navidad River Authority
(361) 782-5229

Lower Colorado River Authority
(Colorado Basin)
(512) 473-3200

Lower Neches Valley Authority
(409) 892-4011

Northeast Texas Municipal Water District
(Cypress Creek Basin)
(903) 639-7538

Nueces River Authority
(Nueces and Nueces Coastal Basins)
(361) 825-3193

Red River Authority of Texas
(940) 723-0855

Sabine River Authority
(409) 746-3284

San Antonio River Authority
(210) 227-1373

Sulphur River Basin Authority
(903) 223-7887

Trinity River Authority
(817) 467-4343

GET INVOLVED

To get involved with water quality in your area, contact the regional management agency for your river basin or the TCEQ central office. Mailing addresses and other information about regional management agencies are available on the TCEQ Web site at www.tceq.state.tx.us. Click on *Index*. Find *Watersheds*. Choose *Clean Rivers Program*, then *Partner Agencies*.

For additional information about this booklet, TMDLs, or watershed management, please call (512) 239-4900, or write to:

Texas Commission on Environmental Quality
Total Maximum Daily Load Program
MC 150
P.O. Box 13087
Austin, Texas 78711-3087

You can also visit our Web site. Go to **www.tceq.state.tx.us**. Click on *Index*. Find *Watersheds*, then choose *Total Maximum Daily Load Program*. There you will find information about current TMDL projects, program guidance, water quality assessments, contract opportunities, and public meetings and hearings.

Texas Natural Resource Conservation Commission

Texas Commission on Environmental Quality

Same Agency, New Name! (on Sept.1, 2002)

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CLEAN WATER FOR TEXAS

Working Together for Water Quality

8/02 GI-284

CONTENTS

Water.

We can't live without it. From sustaining life to providing recreation, water is an elemental part of our lives.

We drink it. We use it to irrigate our farms and run our businesses. We eat the fish that we catch from it. We swim in it and boat on it. Water adds beauty to the landscape and provides habitat for many species of aquatic plants and animals. Protecting, and in some cases restoring water quality in our streams, rivers, lakes, and estuaries benefits us all.

Water pollution can arise from a variety of sources, including urban growth, suburban development, mining, industry, and agriculture. The solutions to these diverse problems require a variety of efforts by many people.

The Texas Commission on Environmental Quality (TCEQ) and other state and federal agencies are charged with managing water resources in Texas. However, the job of protecting our environment requires cooperation from many parties. Citizens, businesses, educators, agricultural producers, universities, and others must work together with government agencies to ensure the protection and restoration of water resources.

This booklet provides an overview of the status of water quality in Texas lakes, rivers, bays, and other surface water bodies. It also explains the state's program for managing water quality and how to get involved in the process.

WATER QUALITY– WHAT IS IT AND HOW IS IT MEASURED?

In order to protect water quality, we must define and measure it, identify the types and sources of pollution, and implement plans to protect or restore water quality.

Under the federal Clean Water Act, Texas and other states must establish standards that describe the ways that water bodies are used.

Four general categories for water use are defined in state law under the Texas Surface Water Quality Standards: **aquatic life use, contact recreation, public water supply, and fish consumption.** The standards assign specific uses for all medium to large water bodies, and general uses for all water bodies. For example, Possum Kingdom Lake must meet requirements for the specific uses of public water supply, swimming and other recreation, and high-quality environment for fish and other aquatic species. Each use defined in the standards is linked to measurements for specific conditions or pollutants. These measurements are used to evaluate whether water quality is good enough to maintain designated uses.

Aquatic Life

Standards associated with the **aquatic life use** are designed to protect plant and animal species that live in and around the water. Some pollutants or conditions that may result in harm to aquatic species include low levels of dissolved oxygen or the presence of toxic substances such as metals or pesticides. Because oxygen is necessary to support life, its concentration in water is a single, easy-to-measure characteristic that generally reflects the occurrence and diversity of aquatic life, and therefore the overall biological health of a water body. Concentrations of metals (for example, selenium, mercury, and zinc) and organics (substances from pesticides and industrial chemicals) also indicate whether water quality is suitable for aquatic life use.

Contact Recreation

The standard associated with the **contact recreation use** is designed to ensure that water is safe for swimming or other water sports that involve direct contact with the water. High concentrations of certain bacteria in water indicate that there may be a risk of becoming ill from recreational activities. Though it is possible to swim in water that does not meet this standard without being affected, the probability of becoming ill is higher.

Public Water Supply

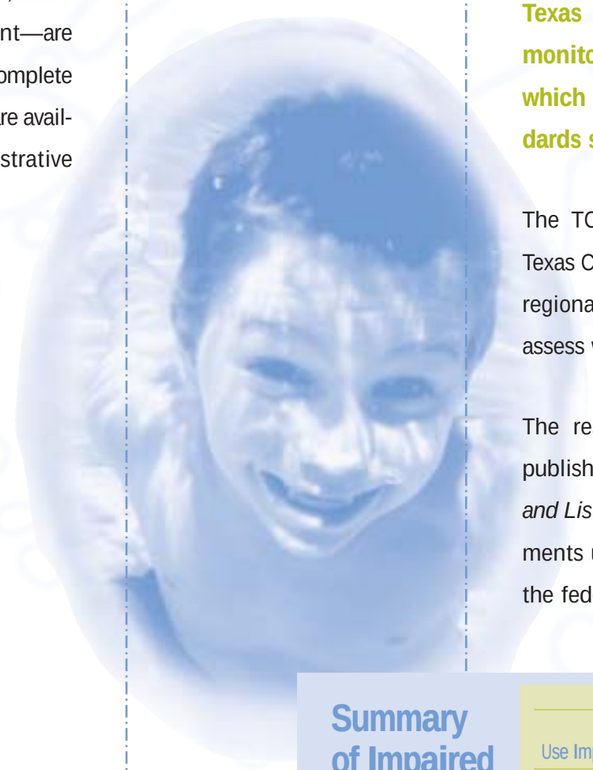
Standards associated with the **public water supply use** indicate whether water from a lake or river is suitable for use as a source for a public water supply system. Source water is treated before it is delivered to your tap; a separate set of standards governs treated drinking water. Indicators used 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 or chloride, are also measured since treatment to remove high levels of salts from drinking water is expensive.

Fish Consumption

Standards associated with the **fish consumption use** are designed to protect people from eating fish or shellfish that may be contaminated. These standards identify levels at which certain toxic substances dissolved in water may accumulate in the tissue of aquatic species. Fish tissue is then examined for accumulated substances to determine the risk to human health from consuming fish or shellfish. If significant risk is identified, the Texas Department of Health issues advisories for such water bodies that restrict or limit consumption of fish taken from them. The standards also specify limits on bacteria levels in marine waters to ensure that oysters or other shellfish are safe for public sale and consumption.

Indicators of water quality that are not tied to specific uses—such as dissolved solids, nutrients, and toxic substances in sediment—are also described in the standards. The complete Texas Surface Water Quality Standards are available in Title 30 of the Texas Administrative Code (TAC), Chapter 307.[1]

[1] To obtain a copy, go to the TCEQ's Web site, **www.tceq.state.tx.us**. Click on *Rules* to find a link to 30 TAC, Chapter 307. Copies may also be obtained from TCEQ Publications at (512) 239-0028.



IDENTIFYING WATER QUALITY PROBLEMS

Texas carries out a regular program of monitoring and assessment to evaluate which water bodies are meeting the standards set for their use and which are not.

The TCEQ works in collaboration with the Texas Clean Rivers Program and other federal, regional, and local agencies to collect and assess water quality data.

The results of this coordinated effort are published in the *Texas Water Quality Inventory and List of Impaired Waters*, satisfying requirements under Sections 305(b) and 303(d) of the federal Clean Water Act. The report identifies water bodies that do not meet the standards set for their use and the pollutants or conditions responsible.[2]

In 1996, 61 percent of the assessed water bodies in Texas fully supported their designated uses. By 2000, 54 percent fully supported their uses. This drop is due in large part to an increase in monitoring efforts and the ability to detect impairments, rather than to an actual decline in water quality.

The types of impairments identified in the 2000 assessment indicate a complex array of water quality problems (summarized in the table below). In a particular stream or lake, water quality may be insufficient to support one use, like contact recreation, and still be good enough to support other uses. A water body may be impaired by more than one pollutant, or for more than one use.

Summary of Impaired Water Bodies in Texas

Based on the 2000 list of impaired waters

Use Impaired	Pollutant or Condition Causing Impairment	Percent of Water Bodies Impaired*
Aquatic life support	Low dissolved oxygen, metals, organics, or toxicity in ambient water or sediment	47%
Contact recreation	Fecal coliform bacteria	46%
Public water supply	Metals or organics	5%
Fish consumption	Metals or organics	24%
Oyster harvesting	Fecal coliform bacteria or metals	9%
General water quality and nutrients	Total dissolved solids, chloride, sulfate, pH, temperature,	27%

** Total adds to more than 100% because many of the 240 impaired water bodies have more than one impairment.*

[2] To obtain a copy, go to **www.tceq.state.tx.us**. Click on *Index*, then choose *Water Quality*. Follow the link to *Monitoring and Assessment* and then to *Water Quality Monitoring and Assessment Reports.*

Photo this page: John B. Ashmun, Jr.

WHAT CAUSES POLLUTION?

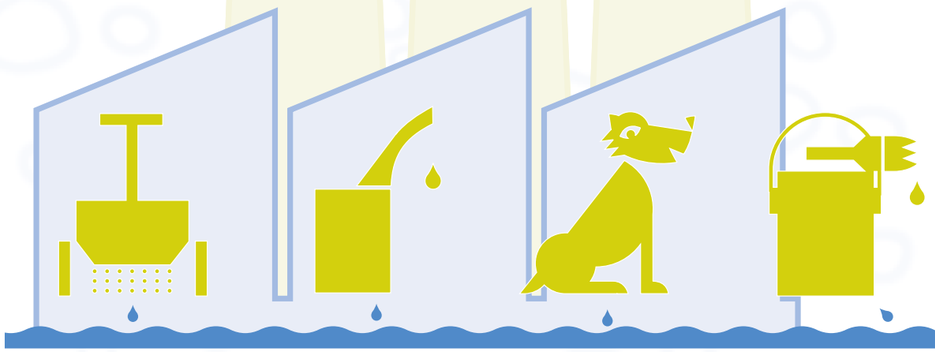
The sources of water pollution fall into two main categories, called point and nonpoint sources.

Pollution from *point sources* can be traced to a specific location, such as an industrial operation or a wastewater treatment plant. Pollution from most point sources is controlled through regulations that require treatment of a facility's wastewater before it is discharged into a nearby lake or stream.

Nonpoint source pollution comes in small amounts from multiple locations, carried by rainfall runoff. For example, pollutants may wash off lawns, construction areas, farms, or highways during a heavy rain, and then be carried to a nearby creek. Nonpoint source pollutants are more difficult to control because they often come from the everyday activities of many different people, such as fertilizing a lawn, using a pesticide, or constructing a new building. Nonpoint source pollution may also originate from natural sources due to the effects of winds and storms.

Most water bodies are affected by both point sources and nonpoint sources of pollution.

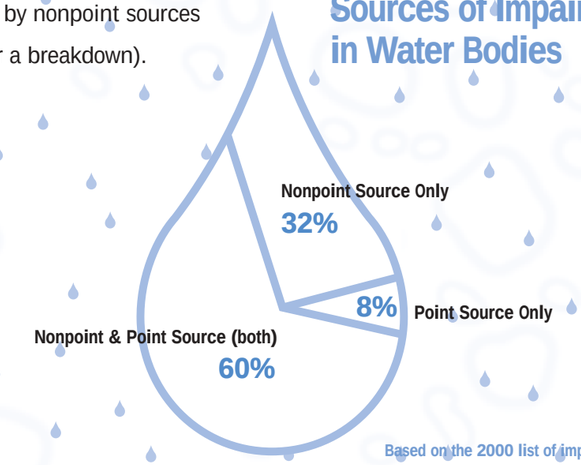
For example, high levels of bacteria signal that pathogens may be reaching a water body. The bacteria may be originating from point sources, such as inadequately treated sewage or improperly managed animal waste from livestock operations. They could also come from nonpoint sources, like pet wastes, aquatic birds, or failing septic systems.



Since the passage of the Clean Water Act in 1972, states have focused on controlling point sources of pollution, the most serious causes of water pollution. As a result, the quality of surface waters across the country has improved significantly over the last 30 years. Where problems remain, the chances that they are caused by nonpoint sources have increased over time as treatment technologies have improved and as most point source dischargers have complied with regulatory discharge limits. In addition, human populations have increased in many watersheds, multiplying the impacts from their many activities that lead to nonpoint source pollution. As of 2000, 92 percent of the impaired waters in Texas were affected, at least in part, by nonpoint sources (see illustration below for a breakdown).

In spite of the successes in improving surface water quality by controlling point sources of pollution, 46 percent of the assessed water bodies in Texas were still impaired as of 2000. The Clean Water Act anticipated this possibility. It requires that where point source controls are not sufficient to attain water quality standards, then a total maximum daily load (TMDL) must be established to solve the remaining water quality problems. The TMDL is an important scientific tool in the state's watershed management approach, and is described in detail later in this booklet.

Sources of Impairment in Water Bodies



Based on the 2000 list of impaired waters

THE WATERSHED MANAGEMENT APPROACH

As we have seen, the human activities and natural forces that take place in a watershed can affect the quality of the area's water body.

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.

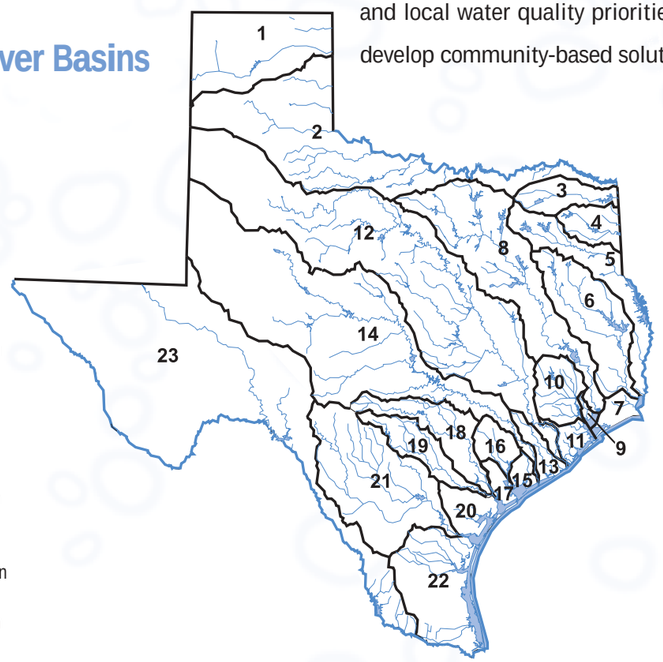
Using a watershed approach, we often find that problems seen at one point in a stream or lake are caused further upstream. With this in mind, we identify and fix water quality problems in what is usually the most efficient way—by attacking them at their most upstream source. Texas uses the major watersheds, or river basins, of the state as the geographic units around which it builds its watershed approach (see the map below).

The *basin management cycle* 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.

Texas River Basins

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 Basin



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 (as shown in the flowchart below). 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.

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.

TOTAL MAXIMUM DAILY LOADS

To restore quality in an impaired water body, it is first necessary to be reasonably certain of the sources and causes of pollution. One way to accomplish this is to develop a scientific model called a total maximum daily load (TMDL). A TMDL:

- determines the maximum amount of a pollutant that a water body can receive and still both attain and maintain its water quality standards; and
- allocates this allowable amount (load) to point and nonpoint sources in the watershed.

TMDLs must be submitted to the Environmental Protection Agency (EPA) for review and approval. A TMDL is normally prepared for each pollutant in every impaired water body.

The time needed to complete a TMDL varies. In some cases, a TMDL 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, and the modeling and assessment required. Other factors include stakeholder consensus and the number of agencies involved.

Implementation Plans

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.

The best strategies for each individual watershed are developed in cooperation with regional and local stakeholders. 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 implementation plan describes these various activities, the schedule for implementing them, and the legal authority for the regulatory measures. The plan 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. In addition, the plan 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 activities as needed to attain water quality standards in the stream.

The TMDL and the implementation plan together form a blueprint for actions in the watershed. This action plan is used by agencies at all levels to carry out the activities needed to restore water quality.

A JOINT EFFORT

The TCEQ is designated by law as the lead state agency for water quality in Texas. The Texas State Soil and Water Conservation Board (TSSWCB) also plays an important role as the lead agency in the state for the management of agricultural and silvicultural (forestry) nonpoint source pollution. The Texas Clean Rivers Program — a partnership of regional water management authorities — plays a key role in monitoring water quality and providing forums for stakeholder involvement.

Many other local, regional, state, and federal agencies 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 kind of pollution controls that may be required to restore water quality.

A coalition of government agencies and citizens is needed to develop and especially to implement TMDLs. Public participation in watershed action 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.

To encourage public support and awareness in watershed areas with active TMDL projects, the TCEQ received a grant from the EPA to develop a public education campaign—Please Don't Feed the Storm Drain—about nonpoint source pollution. The campaign works with city, state, and government organizations, as well as nonprofits and corporate sponsors to provide information and materials that citizens of Texas can use to change their daily activities to reduce nonpoint source pollution. Visit the project Web site at www.tceq.state.tx.us. Click on *Index*, then *Watersheds*, then *Nonpoint Source Pollution*.