



Site Navigation

- Cleanups, Remediation
- Emergency Response
- Licensing
- Permits, Registrations
- Preventing Pollution
- Recycling
- Reporting
- Rules

- Data
- Forms
- Maps
- Public Notices
- Publications
- Records
- Webcasts

- About Us
- Contact Us

How 's our Customer Service? Please fill out our [Customer Satisfaction Survey](#)

You are here: [Home](#) → [Publications](#) → [Periodicals](#) → [Natural Outlook](#) → [Spring 2004](#) → [Rapid Reporting and Response](#)

» Questions or Comments: [ac@tceq.texas.gov](mailto:ac@tceq.texas.gov)

# Rapid Reporting and Response

Texas' network for monitoring air quality and water quality is the largest state-run system in the country. The TCEQ and its partners operate automated equipment around the state, and more advanced data collection is fast approaching.

## Monitoring operations gain the ability to more quickly detect and react to pollution

### *In this story:*

- [Evolution of Air Network A New Phase](#)
- [Water Program Advances Put to the Test](#)
- [Sidebar: Mobile Monitoring](#)
- [Sidebar: Checking Local Monitors](#)
- [Sidebar: Under the Microscope](#)

The TCEQ's environmental monitoring program is preparing to improve its collection and reporting of data.

The air and water quality networks are relying more and more on near "real-time" data that can show--in as little as 15 minutes after data collection--when significant changes have occurred in the environment.

Changes in air chemistry, for example, might signal a release of pollution from an industrial complex--emissions that could begin feeding the formation of ozone. The TCEQ will study incoming data for signs of pollution in development, then immediately alert nearby industrial sources so corrective actions can be taken. A pilot project in Houston is scheduled to begin in June.

Similarly, incoming surface water data might point to a local creek or river at which pollution has originated. If needed, investigators will be dispatched to the site. A pilot project focusing on the dairy-intensive area north of Waco is due to get under way in August.

After refining these air and water models of the Environmental Monitoring and Response System, the program may expand to other parts of the state next year.

"We're moving into a system that will enable us to detect fast, then react fast," explained Commissioner R.B. "Ralph" Marquez. "This represents a tremendous shift in the way this agency responds to situations that might pose a threat to human health and the environment. We hope to be in the position where we can anticipate problems and prevent them before anything serious develops."

[Back to the top](#)

## Evolution of Air Network

Texas has been monitoring air quality since the 1950s, though the equipment then was primitive by today's standards. The program rapidly expanded as urban areas were designated as nonattainment for federal clean air standards. Today, 32 counties are being monitored for levels of ozone.

The TCEQ's air quality network is now the largest state-run monitoring program in the United States. Operating with some of the best technology available, the network--representing both public and private ownership--encompasses more than 200 stations (a single station can contain one to 10 monitors). The main components of the network are:

- 87 continuous monitoring stations taking five-minute average measurements of ozone, nitrogen oxides, carbon monoxide, and/or other compounds;
- 9 automated gas chromatographs owned by the TCEQ and another 7 owned by industry and tied into TCEQ computers. This equipment, which separates and identifies up to 54 compounds, can provide results in one hour.



The San Jacinto Monument serves as an impressive backdrop to a TCEQ air monitoring station on Houston's east side. The monitor collects hourly data on ozone. Illustration by Tommy Hultgren.

- 50 stations, primarily along the Gulf Coast, taking canister samples for volatile organic compounds (VOCs). The 24-hour measurements, including those for air toxics and ozone precursors, are collected every six days. This sampling technique involves trapping air in stainless steel containers. The containers are then picked up and delivered to Austin for analysis at the TCEQ.
- 24 continuous PM2.5 stations measuring for microscopic particulate matter such as soot and dust.
- 46 stations operated by the cities of Houston, Dallas, Fort Worth, and El Paso.

In addition, the TCEQ uses state-of-the-art equipment to track meteorological conditions and to issue ozone forecasts. By following wind speed and direction, temperatures, and other conditions along the surface and upper air—and by consulting satellite and camera images—the agency can follow pollution patterns during the day.

A wind shift in Houston, for example, might affect the mix of emissions or send ozone in a different direction. Such developments might trigger the issuance of ozone alerts to city and health authorities so children or residents with health concerns can be warned.

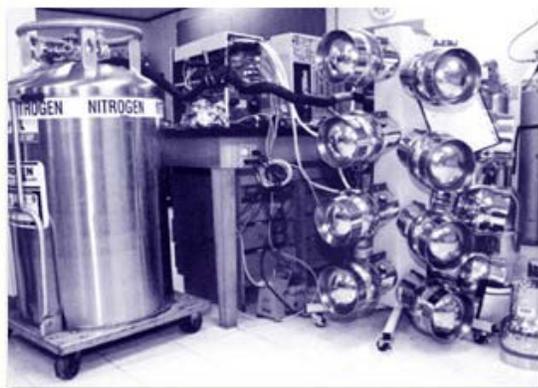
All together, the monitoring network collects an estimated 65 million data elements a year. The analysis and interpretation of that data influence regulatory decisions made by both the TCEQ and the Environmental Protection Agency (EPA).

[Back to the top](#)

## A New Phase

Without a doubt, the Texas air network is large and complex, but why?

"Because we're a big state," said Steve Spaw, director of TCEQ monitoring operations. "More importantly, in the urban areas that are nonattainment for ozone, we need a number of ozone monitors so we can determine compliance or noncompliance with federal standards. These monitors also help us understand ozone formation and movements. With this information, we can determine how to address the problem."



Every week, the TCEQ laboratory in Austin receives about 100 of these 6-liter stainless steel canisters—most of which contain air collected over a 24-hour period. The contents are analyzed for about 100 compounds. In this photo, the contents of canisters are being emptied and cooled down with liquid nitrogen in preparation for analysis.

The TCEQ's Houston office probably wished for a rapid notification capability last August when the city experienced its worst ozone day of the year. West winds swept ozone from the Houston Ship Channel on the east side, then reversed and carried the heavy concentration across the city for a second time.

Not surprisingly, the air monitoring pilot project will initially focus on Harris County and the local emissions of highly reactive VOCs, which contribute to rapid escalation of ozone.



The number of emission sources is another reason for the size of the network. While EPA's Toxics Release Inventory shows a substantial decline over the last decade, Texas still has more emissions of air toxics than any other state.

All of which explains the design of the pilot project: to find developing air quality problems and get solutions under way. This requires having industry and other partners tied directly into the network.

With the Environmental Monitoring and Response System, the TCEQ and project participants will have near real-time access to the monitoring data. The TCEQ will notify industry of rising levels of pollutants that suggest ozone formation or problems with air toxics, so corrections can be made quickly.

A similar, small-scale project has been operating in Corpus Christi with an air monitor set up to issue alarms directly to local plants when air toxics levels jump.

When troublesome patterns develop, the TCEQ headquarters will notify the Houston regional office and all industrial sources within five miles of the monitor with high readings.

The program eventually will expand to encompass other counties and to include additional chemicals.

[Back to the top](#)

## Water Program Advances

On a routine basis, the TCEQ regional offices and its partners in the Clean Rivers Program take samples of rivers, lakes, bayous, and the Gulf of Mexico to determine whether water quality standards are being met.

As with air monitoring, the TCEQ operates continuous, automated stations in several river basins that measure for pollutants and adverse conditions.

Usually these inconspicuous stations are composed of a small building or trailer housing analytical instruments and communications equipment.



**This real-time monitor on the Leon River operates unnoticed in the rural landscape near Gatesville. The trailer perched on the hill is part of a network testing water quality in the Bosque and Leon watersheds. An underwater multiprobe gathers information on dissolved oxygen, temperature, conductivity, and pH. The collected data is carried via cable inside a pipeline to the trailer containing additional instrumentation. A phone line transmits data to the TCEQ.**

The TCEQ has eight continuous monitoring stations in place around the state. The most scrutiny is concentrated in the Bosque and Leon watersheds. The North Bosque River feeds into Lake Waco--a source of drinking water.

Stretching from Waco to Stephenville, the two watersheds host an estimated 100,000 dairy cows belonging to many commercial operations. The runoff from dairies has been identified as a major source of phosphorus.

The resulting algae can deplete a water body of needed oxygen and cause fish kills, as well as odor and taste problems in drinking water.

At four sites along the North Bosque River, readings are taken every 15 minutes for dissolved oxygen, pH, conductivity, and temperature.

Monitors due to be installed this summer will provide new information on nutrients--nitrate, ammonia, and orthophosphate--from measurements recorded every one to six hours.

In addition, two upstream sites will take readings every 15 minutes for water flow and precipitation.

All the data will be transmitted to the TCEQ by modem, satellite, or a

combination of radio and landline.

The emphasis of the water project also is corrective action. Any troubling patterns detected in water quality data can trigger investigations upstream to determine what may be causing the problem.

[Back to the top](#)

## Put to the Test

The science of continuously monitoring surface water quality has lagged behind that of air monitoring, but the technology is starting to catch up. Some of the cutting-edge equipment being installed by the TCEQ was not commercially available several years ago.

In fact, with its decades of experience, the TCEQ has devised ways of applying advancements in air monitoring to water quality projects to get faster measurements.

"In our ongoing efforts to monitor air and water quality," said Marquez, "we are learning and modifying these systems as we gain more experience. We don't expect perfection, but we do want answers to every question that comes up. These new pilot projects will put the TCEQ in the position to better respond to the public."



**Ron Wells, a member of the TCEQ's Air Pollution Meteorology Team, displays satellite images from May 2003, when much of Texas was covered with smoke from Mexican agricultural fires. TCEQ meteorologists receive a constant data stream of weather information from several satellites and other sources. Meteorology is a critical component in understanding and forecasting ozone action days and other air pollution events.**



**Caddo Lake in East Texas is home to two of the TCEQ's continuous monitoring platforms. The station collects data for weather and for water quality. On one pole are meteorological monitoring devices that measure for wind speed and direction and precipitation. Another pole holds solar panels to power the operation and a traffic box containing a data logger. All data is transmitted by radio. The water quality instrumentation is under water.**



The TCEQ's extensive air monitoring network will get a workout in a major new study of the Gulf Coast and East Texas. As an extension of the Texas 2000 Air Quality Study, researchers, state and federal agencies, private industry, and local governments will join forces in 2005–2006 for another look at issues related to the formation of ozone and particulate matter, and the movement of these pollutants around the state and beyond.

The study holds the potential of pushing the science even further.

[Back to the top](#)

## Mobile Monitoring

All the homes are dark and the streets are quiet as an unmarked van glides along the perimeter of a subdivision and rolls to a stop near an empty field. The sleeping residents are unaware that several people emerge from the vehicle and set about assembling special equipment.

It's 4 a.m., and air monitoring has begun in a small North Texas community. Given steady winds, the TCEQ staff will remain at the post—just downwind of an industrial plant—for 11 hours, using meteorological equipment and

specialized sampling instruments. Meanwhile, another TCEQ vehicle parks upwind of the plant and begins separate air sampling tests.

The outing is in response to homeowners' complaints about odors and particulate matter that they believe originate at the nearby industrial facility. The collected samples of particulate matter, as well as many volatile organic compounds, will be delivered to the TCEQ laboratory in Austin for analysis. The results will be used to determine whether the facility is in compliance with state and federal air quality standards. Also, agency toxicologists will analyze the samples, in case the emissions released by the plant pose health concerns for residents.

The TCEQ's regional offices conduct about 20 field trips each year with an array of mobile resources. An assignment may require only a couple of staff members for a few hours, or as many as 20 who man the instruments day and night for a week.

Mobile monitoring provides a snapshot of air quality conditions over a limited time. A mobile team can provide evidence of pollution that peaks during short periods, and it can help identify the sources of specific emissions.

Often the results will fill in the emissions picture, providing clues unavailable from fixed monitors.

[Back to the top](#)

## Checking Local Monitors

The TCEQ posts results from continuous monitoring for both air quality and water quality. The Web site contains an array of information on environmental monitoring, much of which is updated hourly:

- [Air monitor readings in different regions of the state.](#)
- [Water quality monitoring and the most recent impairment status of water bodies.](#)

Data from the new air quality project in Harris County will be displayed after initial testing is completed.

[Back to the top](#)

## Under the Microscope

With a vast network of air and water quality monitors, it is not enough that the TCEQ gathers millions of pieces of information each month. Someone has to process the chemical, physical, and biological data.

The TCEQ has its own laboratories that examine air and water samples.

Most of the air analysis is done in-house because the work is so specialized. In Austin, the TCEQ has one of the biggest labs in the country for analyzing canister samples.

The air lab receives, on average, almost 400 samples each month for volatile organic compounds. Each sample is analyzed for about 100 target compounds.

Much of the water analysis occurs in the TCEQ's Houston Laboratory, although private entities also contract for this

work. Two dozen chemists and lab technicians in Houston process samples of surface water, drinking water, and groundwater. These samples come from 2,000 TCEQ stations and 5,000 stations in the Clean Rivers Program.

The results of water quality monitoring and assessment are compiled annually and made available to the public. The information also is used by the TCEQ for permitting and enforcement decisions.

[Back to the top](#)

[Print this](#) —

---

[Site Help](#) | [Disclaimer](#) | [Web Policies](#) | [Accessibility](#) | [Helping our Customers](#) | [TCEQ Homeland Security](#) | [Contact Us](#)



Last Modified Fri, 22 Jul 2011  
©2002–2011 Texas Commission on Environmental Quality