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Real-Time Results

Just a few years after establishing the state's first continuous water quality monitor, the TCEQ is operating more than 20 such sites around the state and has plans for more.

Advanced monitors provide timely updates on water bodies

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One summer day in 2001, a group of aquatic scientists from the TCEQ gathered in Erath County to drop a probe into Green Creek. With the device securely in place, the team moved up the banks to a nearby trailer where they began activating equipment capable of logging water quality data from the probe. Within a few hours, the small station was analyzing water samples and transmitting the results electronically to TCEQ headquarters.

That day marked the beginning of continuous water quality monitoring by the TCEQ.

Now the agency is constructing its 23rd continuous monitor, at Lake Whitney near Hillsboro. The floating platform—complete with solar panels, a battery pack, telemetry, data-acquisition electronics, and meteorological sensors—will be held in place with concrete anchors. A cable-winch unit will lower instruments to predetermined depths to take hourly readings of water quality.

All the data will be transmitted to Austin every 15 minutes via wireless modem.

This project is designed to study water conditions immediately before and during algal blooms, episodes that produce toxins and can lead to fish kills.

The TCEQ was one of the first environmental agencies to test real-time data-gathering techniques and has emerged as a leader in the field. At critical locations around the state, the agency has deployed a range of sophisticated equipment, including automatic analyzers that monitor nutrients and other water quality parameters.

These monitoring advancements, probably the first established in any of the states, are being pursued to improve the scientific knowledge of water quality, explains Commissioner Larry R. Soward.

"Over a relatively short period of time, we have adopted a more timely approach to collecting important data," he says. "The first step was to test the concept and the process, which allowed us to learn from our experiences. We still have to implement certain quality-control steps, but eventually continuous water monitoring is something we want to do in all regions of the state."

The TCEQ and its regional offices have not undertaken these ambitious projects alone. The agency works in partnership with the National Park Service, the U.S. Geological Service (USGS), and several river authorities and water districts, which help operate and maintain the TCEQ sites.

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Projects Under Way

At more than 20 continuous-monitoring sites, data gathering goes on day and night. Every 15 minutes, instruments monitor for water conditions such as temperature and pH. At some sites, auto-analyzers are programmed to sample every six hours for nutrients such as nitrate, ammonia, and total reactive phosphate.

The TCEQ Web site displays all reported data in hourly averages.

Around-the-Clock Monitoring

A continuous water monitoring site employs various types of equipment to track changing conditions above and below water. In addition to monitoring for pollutants, here are some of the measurements taken at sites around the state.

Water Conditions

- | | |
|-------------------|------------------|
| water temperature | sample depth |
| flow rate | dissolved oxygen |
| velocity | water pH |

Meteorological Conditions

- | | |
|--------------------|---------------------|
| wind speed | precipitation |
| wind direction | outdoor temperature |
| maximum wind gusts | |

Soward points out that the field of water monitoring is evolving quickly.

"Think of the enormous amount of data gathering we do each day, and compare that to the traditional practice of sending someone out to a stream or river once every three months to take water samples by hand. By pushing the standard in Texas, we receive a comprehensive picture of what's happening in monitored water bodies every day, not just once a quarter," he says.

These pioneering steps would not be possible without modern communications, he adds. The remote sites around the state transmit data not only by land telephones, but also by cellular phones, satellites, cable modems, radios, and the wireless Internet.

Here are examples of continuous monitoring sites in Texas:

West Texas. Two sites in Big Bend National Park—one at a campground and the other at a ranch—are maintained by park service staff. Lack of water flow in the Rio Grande has raised concerns on both sides of the border over the resulting increase in dissolved solids and salinity. Monitoring data are sent to the TCEQ via a satellite operated by the National Oceanic and Atmospheric Administration.

Upper Colorado River. A site on Beals Creek near Big Spring is maintained by the Colorado River Municipal Water District. Salinity is the main concern, especially during low-flow conditions. Based on the data collected, water district officials decide when to divert high salinity waters to off-channel evaporation ponds. This diversion protects downstream reservoirs that supply drinking water for the area.

East Texas. Two sites positioned on platforms built in Caddo Lake near Jefferson are maintained by the Caddo Lake Institute. The monitor readings are being used to learn more about depressed levels of dissolved oxygen. Wireless modems send the collected data to the TCEQ.

Austin. Two seasonal sites on Lake Austin are maintained by the Lower Colorado River Authority. The sites become operational each summer when oxygen levels at the bottom of the lake dip, as a result of releases from Mansfield Dam.

San Antonio. Five monitoring sites located on the Medina River and Leon Creek are sponsored by the San Antonio River Authority and maintained by the USGS. These locations monitor for short-term changes in water quality resulting from storms or accidental spills, as well as for long-term changes following increased development and urbanization.

Waco area. Four monitoring sites in the Bosque-Leon watersheds are part of a pilot project that could enable dairy operations, local governments, and the TCEQ to respond more quickly when measurements indicate the encroachment of significant pollution (see article, [Pioneering a New Approach](#)).

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Deployment Plans

The TCEQ is mapping expansion plans for continuous water monitoring. Twelve sites, including Lake Whitney, will be added this fiscal year. Ten more sites are on the drawing board, and the agency already is working to identify projects for future years.

For funding, the TCEQ will continue to use state and federal resources, while seeking to expand its partnerships and bring in universities and scientific institutes willing to assume some of the monitoring duties and equipment upkeep.

"This really benefits everyone in the state," Soward notes. "By working together, we can develop an in-depth picture of what's going on with individual rivers and lakes, and what sorts of changes are occurring day to day. The better the data, the better the decisions we can make to protect our natural resources."

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