Texas Water Resources Institute

Winter 1994
Volume 20
No. 4

Texas Clean Rivers Act

TNRCC Program Increases Information on Water Quality in Texas Watersheds

By Jean Bowman

In 1991 the Texas Legislature passed the Texas Clean Rivers Act (Senate Bill 818). The goal was to provide waterways in this State with coordinated monitoring and protection, and also to find out where the water quality problems are and come up with solutions on a river basin by river basin basis. The plan is innovative; it allows for public input into the decision-making process through regional steering groups so that residents of each river basin take part in managing and protecting the water resources closest to their homes and hearts. It also provides funding for the program through fees assessed on wastewater and water rights permit holders. The Texas Clean Rivers Act has been hailed as a program that will, in time, provide the backbone for real solutions to real problems. It is part of a continuing evolution of statewide water quality programs, and is picking up where some of the other programs have left off.

The hurdles of the program's start-up are behind us and the full rewards of its implementation are ahead. This is a good time to take stock of progress that has been made in evaluating the quality of Texas rivers and deciding how best to focus protection and restoration money and effort. This issue of *Texas Water Resources* examines the state of the Clean Rivers Act and what it is doing for Texas rivers.

The Act, which is among the first and most progressive of its kind in the country, came in response to growing concern over the health of Texas rivers and estuaries. It also arose out of recognition that water quality problems in this State were not being addressed in an integrated, systematic manner, that nonpoint sources of pollution were not adequately addressed, and that an appropriate funding base for addressing the problems was not available. Long-standing and predominant regional problems (such as high salinity in West Texas, septic pollution in parts of East Texas, and dairy waste pollution in several regions of the State), as well as specific water quality problems in individual basins have combined to necessitate a better-coordinated effort on the part of state, local and federal agencies charged with managing water resources. So the goals of the Act are not only to

assess the quality of water in each of Texas' river basins, but to do so efficiently, with minimal overlap among State, federal, county and local agencies, and with a significant degree of input and coordination from local and regional representatives.

To put the goals of the Clean Rivers Act into motion, the Texas Natural Resource Conservation Commission (TNRCC) created the Clean Rivers Program as directed by the Act. The Program is, for the most part, an assessment program as opposed to a "fixing" program. The idea is that the assessments will provide the information needed to fix water quality problems. The Program is based on the concept of coordinated, statewide monitoring that will provide information for prioritizing water quality problem areas, identifying hot spots, preventing further pollution, and protecting the areas with high water quality. The idea is to collect enough water quality data over time to get an accurate *base* of information. With data that are consistent, comparable, and covering a long enough period of record, informed decisions can be made on priority problems and areas needing special attention. Beyond that, the Program is authorized to collect fees (up to $5 million a year) from wastewater and water rights permits holders to cover operational costs and to support targeted studies and pilot projects. The special studies are tailored to address areas of urban and agricultural nonpoint source pollution. Specifically, the goal of the Program is to maintain and improve the quality of water resources within each river basin in Texas through an ongoing partnership involving the TNRCC, other agencies, river authorities, local governments, industry, and citizens.

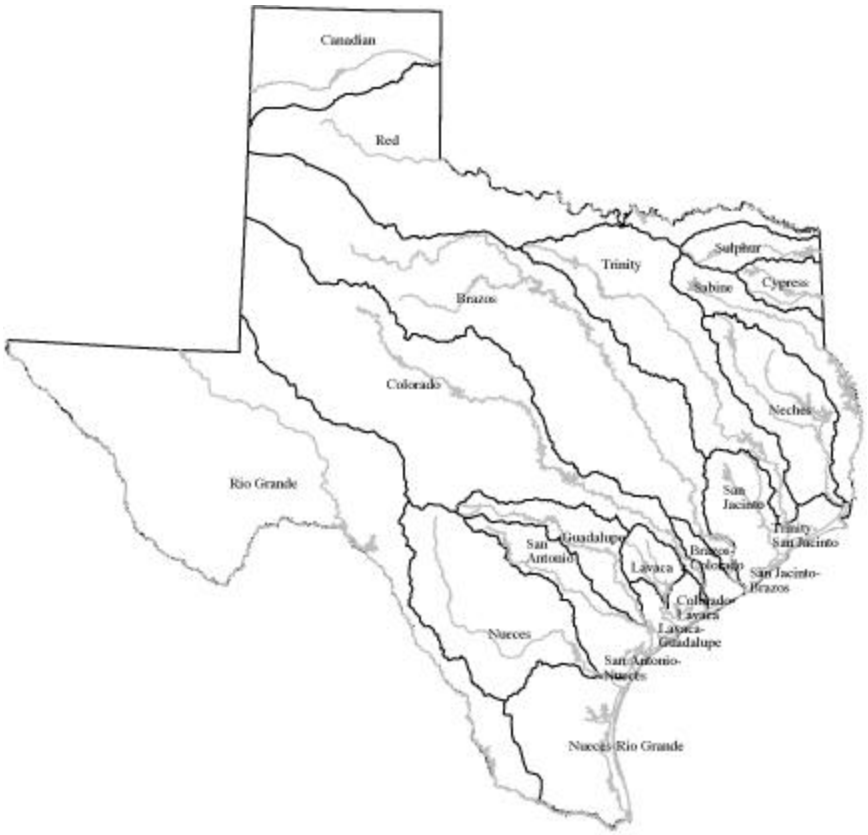
Here's How it Works

The TNRCC is charged with providing technical assistance to the regional partners (usually river authorities) in conducting and preparing regional water quality assessments and preparing a statewide summary of all individual regional assessments. River authorities and other regional partners are responsible for carrying out the appropriate monitoring and reporting activities under contract to TNRCC. The money that is collected through the Program is allocated through TNRCC to the participating regional partners. The regional partners and TNRCC work as teams in developing appropriate assessment plans for each basin, with direction and guidance on priorities coming from each of the basin steering committees. The law specifies that regional partners then can be reimbursed for actual expenses incurred in implementing the Act.

The TNRCC currently contracts with 16 regional partners to accomplish the work. Most of the partners are river authorities or combinations of river authorities, but in specific cases (such as in the Lower Rio Grande Valley) the TNRCC acts as the regional partner under the Program, as does the Houston-Galveston Area Council of Governments (HGAC) in the case of many coastal basins in its area.

According to the Act, river authorities and other similar entities covering an area 10 counties or more in size must participate in the Program. For the most part, participation in the Program goes along with recovering a share of the program fees for implementing or expanding local programs. Under the Program, *all* of these entities are partners in the process and will carry the responsibility of monitoring and reporting to TNRCC. While it

is the primary responsibility of TNRCC to oversee the Program, it is the job of all the partners to decide how best to protect and assess water quality of Texas rivers.



The business of getting a handle on water quality in a state as big as Texas, however, is complicated and it takes time. The Program began in 1991 with an agreement between the partners that the first step in statewide water quality assessment had to be finding the gaps in information. Most of the regional partners in the Program conduct at least some water quality monitoring. However, the existing monitoring is highly variable from basin to basin, leaving inevitable gaps in data. For this reason, the first task in most of the assessment plans was conducting an inventory of what is and is not known about water quality in each basin. It is important to note that little or no money from this statewide assessment program has yet gone into actual monitoring. The individual regional partners, for the most part, contribute monitoring within their basins as an "in-kind" service to supplement the Program. One of the cornerstones of the Program is that water quality monitoring efforts not be duplicated, but rather that information from *all* sources be joined, shared, and combined.

Water Quality Assessments

The TNRCC and its regional partners have recognized that establishing a network to bring together an accurate, consistent baseline of water quality data will take time -- perhaps many years. In the meantime, though, water quality assessment reports are due from each participating river basin to the TNRCC every second year. In each assessment, water quality priority issues are identified.

The first water quality assessment reports were due in October, 1992. The Program had just gotten started, and many of the first reports reflected the confusion of any large-scale,

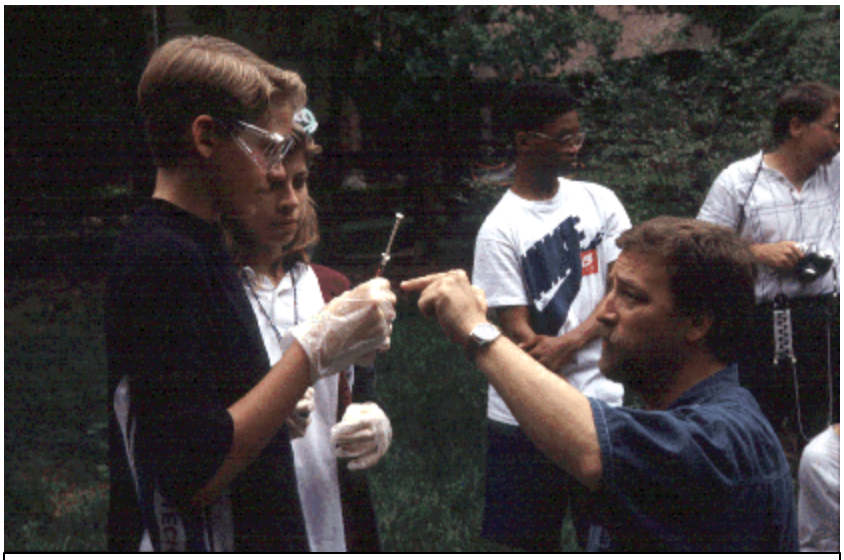
new program. The assessments were based on only about nine months of work summarizing and synthesizing 10 or more years of existing data from various sources. Some of the basins found themselves in the position of relying solely on water quality data collected by others (such as the United States Geological Survey (USGS) because they didn't have an established monitoring network "in house." By contrast, some basins like the Sabine River Authority (SRA) had long-standing monitoring efforts in place that provided extensive data. Monitoring practices (sampling techniques, methods of reporting, and data analyses) varied greatly from basin to basin.

In spite of those problems, the 1992 assessments shed significant light on the some of the fundamental water quality problems and strengths identified by watershed managers throughout the State. The assessments also served to underscore the value of the "partnership" approach to water resources management championed in the Clean Rivers Act. The *value* being the inclusion of all interested parties in the business of river basin assessment and a genuine effort to break down the duality of "regulators" versus "regulated." Basically, all groups with an interest in the outcome of river basin protection, clean-up and management have a voice in the assessment process. That includes the regional watershed managers, representatives of the "sources" (both point and non-point) of pollution who are in many cases the "fee payers" into the Program, the users and consumers of water who rely on clean, abundant water for recreation, aesthetics, irrigation, cooling water, process water, and other in-stream and out-of-stream uses. The Program incorporates this broad base of special public and private interests into the partnership at the outset for successful water quality assessment in Texas.

In October, 1994, the *second* round of water quality assessments was completed and reports submitted to TNRCC. By this time, the regional partners were all reporting on the same 10-year period (1983-1992). The data were screened and evaluated against pollutant threshold levels, which are based on water quality standards, and all regional partners followed consistent monitoring and analysis patterns. The 1994 assessments take Texas a long way toward the specific goals of the Program. Perhaps most importantly, the assessments have shed light on what information is still needed for water quality priorities to be addressed. Comprehensive and consistent river basin assessment is being pieced together gradually. Admittedly, much is still missing from that puzzle and TNRCC staff members suggest that it may be 1998 before a complete and uniform baseline of water quality information is available for Texas. While some areas may come together before that, the ultimate goal of a statewide water quality baseline is probably still several years away. In the meantime, the Program has passed a major milestone in helping identify what information will be needed to establish water quality priorities for Texas.

The Regional Partners' Role

One of the keystones of the Program is the coordination of water quality management efforts by the scores of local, state and federal programs and agencies charged with overseeing the State's water. The Program seeks to unify water quality assessment, protection, and clean-up activities by coordinating the activities of the various water agencies at all levels in the State. A large piece of that goal is inherently addressed in the structure of the Program by incorporating regional partners and local steering groups into the assessment process.



Tom Routt, eighth grade earth science teacher at Boles Junior High in Arlington, assists Earth Alert Club members as they prepare to test the water in an Arlington Creek.

The role of the regional partners is pivotal. For the Program to be successful, they must heed the direction set by their steering committees, develop assessment plans that meet both the needs and priorities of their basins *and* the technical requirements of TNRCC, and then implement those work plans with funds from the Program. For the most part, the Program has provided an opportunity for the regional partners to expand their technical capabilities and implement programs. The Program has established comprehensive, uniform analytical procedures for data management and analysis, provided aggressive public outreach campaigns for each basin, and supported active volunteer monitoring networks to augment water quality data.

Because many of the river authorities in Texas are both water purveyors and wastewater treaters, some of them find themselves in the dual role of both fee payer into the Clean Rivers Program, and recipient of funds from the Program. As permit holders, they understand the need for detailed, accurate information on which to base permit requirements. Since Program partners will be working to provide better data which should lead to more accurate permits in the future, some fee payers in the Program haven't balked at the fees; even though they are footing the bill, they may yet see a payoff.

Regional partners have flexibility to address their water quality priorities, so they are gathering and dispersing information in many different ways. For some, Clean Rivers Program projects have been *hydrologic* in nature. The SRA addressed one of its major

problems by dividing its basin into 110 sub-watersheds. The SRA has not been able to provide comprehensive monitoring simply because of the size of the basin -- providing exhaustive monitoring in every reach of the basin would have been prohibitively expensive. Instead, the SRA developed a biomonitoring screening methodology which is applied to each of the 110 sub-watersheds. The rapid bioassessments screen certain aquatic insects which are known to be good indicators of water quality problems. When a problem is uncovered, more comprehensive testing is conducted.

The Lavaca-Navidad River Authority (LNRA) has concentrated on establishing computerized analytical capabilities for water quality data analysis. The Program has also allowed the river authority to redefine its partnership with the USGS. The LNRA and the USGS have maintained a joint 50-50 venture in water quality monitoring and flow gauging in the basin. With money from the Program, the LNRA will now perform monitoring for nutrients (nitrates, fecal coliform, etc.) in the basin, instead of paying the USGS to do so. The LNRA established a partnership with the Guadalupe-Blanco River Authority (GBRA) for analysis of the samples. The GBRA facility was already equipped for water sample analysis of nutrient parameters, so the LNRA will simply contract with the GBRA for analysis. In addition, the Trinity River Authority (TRA), used Program support to provide matching funds for a multiple watershed modeling project organized by the Tarrant County Water Control and Improvement District but conducted by the United States Soil Conservation Service. These types of partnerships illustrate the successes of the Program participants in teaming up in their efforts instead of duplicating effort.

Earth Alert Club members work on a clean-up project in the Arlington area.

In addition to these kinds of scientific projects, a number of the regional partners have introduced *educational* and *public participation* programs under Clean Rivers (see Tables 1 and 2). The HGAC, which represents the Trinity-San Jacinto Coastal Basin, the San Jacinto River Basin, the San Jacinto-Brazos Coastal Basin, and the Brazos-Colorado Coastal Basin, incorporates a wide range of public involvement. Examples are the "San Jacinto River Cleanup Battle," (a volunteer trash cleanup and environmental awareness event), and efforts to involve disadvantaged youths and minority communities in water quality protection by providing information in English and Spanish.

In addition, the TRA produced videos being used statewide to train Texas Watch Program volunteers, and co-sponsors volunteer rural and urban trash pick-up events, and storm drain stenciling in which youth groups paint slogans like "Don't Dump Your Oil." The Lower Colorado River Authority (LCRA) has held a variety of waste collection events, including household hazardous wastes, agricultural pesticide containers for recycling, and surplus agricultural pesticides. The San Antonio River Authority (SARA) sponsors an aquatic ecology program, "The Ecology of a River." The program is used by schools for students ranging from fourth grade to university and graduate students; it is also used by a variety of other civic groups.

Many of the regional partners have also established cooperation with citizens groups and the general public. Public involvement has included participation in the Texas Watch Program, a volunteer-based water quality monitoring project, and other volunteer based monitoring projects. Regional partners have been able, through Program funding, to purchase the water quality monitoring kits and establish networks of volunteer "water watchers."

Building volunteer partnerships has been a dividend for the river authorities in a number of ways, not the least of which has been increasing public awareness of the importance of clean water. Through involvement in the process of water quality assessment, the public in many river basins has gained a new appreciation for water quality protection. Because the data collected by volunteers are *in addition* to the routine monitoring conducted by the river authorities, the water watchers have provided valuable support. While citizen monitors probably will not replace more sophisticated monitoring, information from the water watchers often provides a valuable "first detection" function for water quality problems.

Many of the regional partners support active Texas Watch and other volunteer programs; several are highlighted here as examples. The TRA has more than 40 groups of Water Watchers, and is participating in the "Urban Watch" program, initiated by the City of Fort Worth, that relies on volunteers to sample water flowing from storm drains to provide additional information on urban water quality. The HGAC maintains a massive volunteer citizen monitoring effort (numbering more than 1000) under Texas Watch, and the Brazos River Authority (BRA) boasts an extensive citizen monitoring network, which has expanded into the schools as a "Classroom on the Creek" along Salado Creek in the Milam County area.

These programs and others like them are operating thanks to Clean Rivers funding. The question remains, *what comes next*? Now that the statewide water quality assessment is well under way, should the Clean Rivers Program become a "monitoring" program, a "remediation" program, or should the Program be gradually phased out after having accomplished its original goals of river basin assessment? Continued strong legislative guidance and leadership will insure that needs identified via the assessment process are addressed in a comprehensive manner.

Table 1. Examples of Volunteer Water Quality Monitoring and Public Involvement Efforts in the Clean Rivers Program

Houston-Galveston Area Council

- 1,000 Texas Watch monitoring groups
- "San Jacinto River Cleanup Battle"

Trinity River Authority

- Training videos for Texas Watch
- Maintain 40 water quality monitoring volunteer groups under Texas Watch
- "Urban Watch" storm drain sampling and stenciling
- Co-sponsors "Trinity Awareness Day" trash pick-up along Dallas--Fort Worth rivers and streams

Lower Colorado River Authority

- Waste collection events for household hazardous wastes
- "Amnesty Day" for collection of unused agricultural chemicals

Table 2. Examples of Education Programs Being Conducted to Complement the Clean Rivers Act

Houston--Galveston Council of Governments

- Bilingual education programs for youth in English and Spanish

Brazos River Authority

- "Classroom on the Creek" on Salado Creek

San Antonio River Authority

- Sponsors aquatic ecology program, "The Ecology of a River"

What Has Been Learned So Far?

To put the "what comes next" question into perspective, it is helpful to review what the Clean Rivers Program has helped us learn so far about Texas rivers. In addition to promoting increased awareness among Texans of the importance of water quality, the Program has also provided the building blocks for answers to a number of important water quality questions in the State.

A summary and analysis of the 1994 assessment reports has been developed by the TNRCC and is pending publication. The prevailing conclusion from the 1994 assessment reports is that nutrient contamination of surface water is by far the most prevalent water quality problem in the State. The TNRCC reports that high nitrate concentrations occur in

most every region of the State. In some places, failing on-site septic systems are the probable culprit; in others, the source is most likely runoff from agricultural lands and livestock grazing and feedlot areas; in still others, nutrients are likely resulting from inadequate wastewater treatment plants, and from urban and suburban runoff carrying lawn fertilizers, pet wastes, and other sources of nitrogen.

On the other hand, some problems originally thought to be major were found to be less serious through Program assessments. Rice irrigation return flows into Lake Texana in the Lavaca-Navidad River Basin were assumed to be high in total dissolved solids and, therefore, a serious problem. Assessment work in the LNRA showed that the rice return flows do not represent a significant water quality threat.

Other priority issues brought to light in the 1994 assessments included: 1) salinity problems in parts of the Colorado River Basin as well as most basins in West Texas which may stem from improperly sealed oil test and production wells and brine disposal pits; 2) agricultural runoff pollution in the Brazos River Basin; 3) evidence of dissolved mercury in the Frio River portion of the Nueces River Basin; and 4) some evidence of organic compounds in several of the basins. Table 3 shows examples of priority issues identified in several of the 1994 assessment reports.

These examples point to just a few of the specific findings of the 1994 assessment cycle, but perhaps the more important findings throughout the basins were those identifying areas of concern and areas needing more study. All of the participating river authorities made such identifications in the 1994 assessment reports, and they will be used to shape the future of the Clean Rivers assessment and monitoring program.

Table 3. Selected Results from the 1994 Water Quality Assessments

Statewide
High levels of nutrients in rivers, lakes
Lavaca Navidad Coastal Basin
Return flows from rice irrigation not as high in dissolved solids as first thought
Colorado River Basin
High salinity, localized eutrophication, San Angelo fish kills
Brazos River Basin
High levels of nutrients and salinity
Nueces River Basin
Dissolved mercury, lead, and silver in Frio River
San Antonio River Basin
High fecal coliform and nutrient levels and evidence of trace metals

The Role of University Research

Most of the river authorities have been compiling their water quality assessments without the direct assistance of university researchers. There are a few exceptions.

Researchers Patrick Michaud and Rocky Freund of the Conrad Blucher Institute for Surveying and Science, Texas A&M University - Corpus Christi, have teamed up with the Nueces River Authority (NRA) to help manage the large amounts of data required for the assessments. The work involves developing and maintaining a computerized system to transfer and maintain water quality data.

Natural salt pollution in the Brazos River Basin is considered to be a significant water quality problem. Ralph Wurbs of the Civil Engineering Department at Texas A&M University has studied how salinity affects the amount of usable water in the basin and how reservoirs in the basin may be operated as a system to maximize yields. The BRA also funded studies by Wes James of the Texas A&M Civil Engineering Department, who is investigating the use of shallow well recovery and deep-well brine injection to control salinity.

The Angelina-Neches River Authority is working with Leon Young of the Agriculture Department at Stephen F. Austin State University on a poultry litter project to determine if runoff from poultry waste may be impacting water quality in Lake Sam Rayburn.

The LNRA is working with David Maidment and James Anderson of the Civil Engineering Department of the University of Texas at Austin, to develop a geographic information system that will provide a framework for analyzing such water quality issues as urban and rural point and non-point pollution.

The Texas Tech Water Resources Center is assisting the BRA in evaluating water quality in playa lakes that contribute runoff to the river. Lloyd Urban and Tony Mollhagen tested 100 playa lakes for pesticide residues that may have resulted from agricultural practices. Results show that low levels of pesticides were found in some playa lakes.

Another significant way in which the research community has been able to support the work of the Clean Rivers Program has been through participation in the basin steering committees. Numerous representatives of the water-related research community throughout the State hold positions both on the steering committees and on technical advisory committees which provide support.

What Comes Next?

With the assessment framework in place, the Clean Rivers Program may begin to shift its focus to ongoing monitoring. Until now, the vast majority of monitoring has been in existence by river authorities, TNRCC, and other agencies and was being done with funding *other* than the Clean Rivers Program. As the statewide water quality picture becomes more clear, and the players know where and what water quality parameters need to be monitored most closely, the Clean Rivers Program is expected to turn its efforts to supporting monitoring.

What is clear is that even with up to $5 million in fees a year, the program cannot support unlimited sampling and analysis of all parameters in all of the participating river basins.

Priorities are being established for future monitoring. Highly urbanized basins will likely focus more heavily on monitoring for heavy metals and certain organic compounds used in many industrial processes, and agricultural basins will likely focus on monitoring nutrients and other organic compounds related to pesticide use.

It will be the job of the Clean Rivers Program, through the actions of TNRCC and its regional partners, to prepare reasonable plans to make the most of the monitoring dollars through inter-agency cooperation, volunteer participation, and careful pinpointing of our rivers' special needs.

Summary

This issue of *Texas Water Resources* has highlighted progress made in evaluating water quality in Texas for the purpose of its protection and improvement. Clearly, that progress has been great. However, there is still much to be done. Many difficult water quality questions still need to be addressed through the framework of the Clean Rivers Program. Among them:

1. Are current water quality standards appropriate for all streams in Texas?
2. How should standards be established for intermittent streams?
3. How can monitoring data be used to develop programs for NPS control?
4. How should "natural" and "man-made" or "man-facilitated" sources of pollution be differentiated, if at all?

These questions and others like them illustrate some of the difficult aspects of the job ahead for the Clean Rivers Program. The future of the program will likely provide opportunities for researchers and others to help identify and solve the pressing water quality issues facing Texas.

For More Information

The Texas Clean Rivers Program Long Term Action Plan: 1991-2000; TNRCC, 1995.

The Texas Clean Rivers Program "1994 Water Quality Assessment" Reports of the Regional Partners; (multiple volumes are available through the regional partners and TNRCC); 1994.

Texas Watch Field Test Kit Training Video, Video 52, Trinity River Authority and the Clean Rivers Program.

Trinity River Revival, Video 294, Trinity River Authority and the Clean Rivers Program.