The Water Monitor

Spring 2008
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Texas Commission on Environmental Quality—Water Quality Monitoring and Assessment Section

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If there is magic on this planet, it is contained in water -Loran Eisley

Welcome to The Water Monitor

Welcome to ***The Water Monitor***, a newsletter focusing on issues related to monitoring and protecting surface water quality. Each quarter this newsletter will bring updates on the happenings within three of the TCEQ's water quality programs: Surface Water Quality Monitoring, Texas Clean Rivers, and Nonpoint Source (NPS). This newsletter will be reporting on statewide activities and work being done through these programs as well as other field happenings and water-related topics.

Surface Water Quality Monitoring

The statewide SWQM Program is responsible for the collection of data that accurately describe the physical, chemical, and biological characteristics of state waters. Data collected as part of the statewide monitoring program and for special projects are used to achieve the following goals:

-Characterize existing water quality and emerging problems.
-Define long-term trends.
-Determine water quality standards compliance.
-Describe seasonal variation and frequency of occurrence of selected water quality constituents.
-Produce the *State of Texas Water Quality Inventory*, which is required by Section 305(b) of the CWA. This assessment enables the public, local governments, state agencies, the Texas Legislature, the USEPA, and Congress to make water quality management decisions.

Texas Clean Rivers

The Texas Clean Rivers Program (CRP) is a state program for water quality monitoring, analysis, and public outreach on water-related issues. The CRP is a collaboration of 15 partner agencies, including 12 river authorities, one water district, one federal agency, one council of government, and the TCEQ.

Water quality monitoring and analysis under the CRP focuses on strategic, coordinated sampling to identify water quality issues and evaluate whether water quality conditions are changing. The information developed through the CRP is presented to stakeholders who assist in setting priorities for water quality activities within their basins.

THE TEXAS CLEAN RIVERS PROGRAM

Nonpoint Source

The Texas Nonpoint Source (NPS) Program involves the administration and implementation of projects to reduce and prevent NPS pollution. The state's official roadmap for implementing the NPS Program is a document titled *Texas Nonpoint Source Management Program* (SFR-068/04), which describes the goals, priorities, strategies, and milestones for Texas. The Program is administered by the TCEQ and the Texas State Soil & Water Conservation Board.

A few examples of the types of projects conducted are:

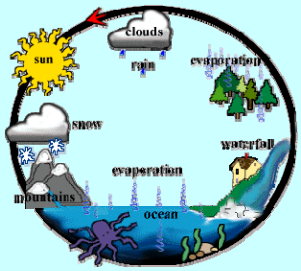
- watershed planning
- implementation of best management practices to prevent & reduce pollution
- educational campaigns to prevent & reduce pollution
- effectiveness monitoring for implemented projects
- nutrient management plans
- storm water management

NONPOINT SOURCE POLLUTION

An East Texas Riddle – Or What the Old Folks Have Always Known

by Art Crowe, TCEQ Region 5 Tyler

"How can a stream go from dry to bank- full stage in a week with no rainfall runoff? How can an East Texas stream have a 6 foot Secchi depth?"



Riddle me this—How can a stream go from dry to bank-full stage in a week with no rainfall runoff? How can the same stream have zero flow, yet high flow severity? How can an East Texas stream have a 6 foot Secchi depth? And why did it take us five years to answer this riddle?

As a way of explanation, it should be noted that in the past we have occasionally observed very clear water at several of our routine stream sites in East Texas. We have observed it seasonally on the upper Neches River and Catfish Creek. However, drinking water clarity in East Texas is not the norm. It took a drought to figure it all out.

Last year, the Neches River just outside Tyler went from dry to bank-full stage in a week. The water had a pH in the low 3's and was very clear. Fingers were pointed at industry and municipalities. We mounted an investigation to apprehend the guilty party. Several opinions were voiced—all of them wrong.

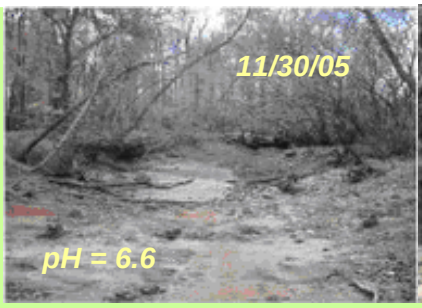
We went to the first upstream bridge crossing—normal-looking water, normal pH. We started contacting landowners for access points in between.

We got access to a large fish farm, more or less midway between. There was nothing unusual. Immediately off this property, however, there were the some tell-tale signs—certain areas had bluish-green water with low pH. The landowner agreed to show me the source of clear water. We went down to the river on his backhoe and 100 m from the river he dug a six-foot deep trench and we waited 30 minutes. At that time there was enough water in the trench to measure pH—a pH of 3. He was surprised that us college-educated people did not know what the old folks around these parts have known for years—when the sap drops in the trees, the river rises. However, some of my co-workers were skeptical.

I set out to prove the old folks' hypothesis. Starting in October, I checked the water level and pH in the Neches River once a week. In the second year of the worst drought in East Texas since the 1950s the upper Neches River had been dry for months. During mid-October, rain began to fall in the1.0-1.5 inch variety with little runoff. On October 30th and November 3rd there were three isolated pools near SH64 with pH values varying from 3.5 to 4.5 to 5.4. By November, fall was well underway and by November 10th leaf color was at its peak. During this time the Neches River was at bank-full stage—no flow, very clear water and a pH of 3.2.

Support for the hypothesis: The huge number of trees in East Texas affect groundwater levels. When they go dormant in the late fall to early winter, groundwater levels rise. When groundwater flows through sulfur-bearing minerals, a dilute sulfuric acid is formed which precipitates out suspended solids and makes for clear water conditions. It is also conceivable that metals could go into suspension during these events. In the past, all these conditions have been masked by normal rainfall which dilutes everything.

Lest you think this oddity is an isolated occurrence, the following streams have been observed with similar water this fall: Clear Creek in Upshur County, Catfish Creek in Anderson County, and Bowles Creek in Rusk County. The low pH appears to be highly specific to areas with certain geological characteristics and the number of deciduous trees in the watershed.



Neches River at SH 64

Texas Watershed Protection Plans

WPPs in Progress

Arroyo Colorado (2201 & 2202)*

Armand Bayou (1113)

Bastrop Bayou Tidal (1105)

Brady Creek (1416)

Buck Creek (0207A)

Caddo Lake (0401)

Cedar Creek Reservoir (0818)

Concho River (1421)

Dickinson Bayou Tidal (1103)

Eagle Mountain Reservoir (0809)

Granger Lake (1247)

North Bosque River (1226 &1255)

Pecos River (2310, 2311& 2312)

Plum Creek (1810)

Upper San Antonio River* (1911)

**these WPPs have been completed and are in the implementation phase*

In Texas, watershed protection plans (WPP) are locally developed plans that coordinate activities and resources to manage water quality. They facilitate the restoration of impaired water bodies and/or the protection of threatened waters before they become impaired. These stakeholder-driven plans give the decision-making power to the local groups interested in the goals specified in the plans. The watershed planning process merges the scientific and regulatory concerns of state and federal agencies with the social and economic considerations of local groups and communities, thereby increasing public understanding of all the issues involve. Most importantly, it increases public commitment to the solutions.

While watershed protection plans can take many forms, the development of plans funded by Clean Water Act §319(h) grants must follow guidelines issued by the Environmental Protection Agency.

These guidelines describe the nine elements fundamental to a successful plan:

1. Identification of Causes and Sources of Impairment
2. Expected Load Reductions from Management Measures
3. Proposed Management Measures
4. Technical and Financial Assistance Needs
5. Information, Education, and Public Participation Component
6. Schedule for Implementing Management Measures
7. Interim Milestones for Progress in Implementation
8. Criteria for Determining Pollutant Load Reductions and Water Quality Improvement
9. Load Reduction and Water Quality Monitoring Component

The TCEQ and the Texas State Soil and Water Conservation Board (TSSWCB) are facilitating the development of watershed protection plans in watersheds around the state by providing technical assistance and funding through CWA §319 grants to local stakeholder groups. Projects to implement elements of watershed plans that adequately address the nine elements listed above can be funded with CWA §319 grant funds. The following is an example of a watershed protection plan in progress.

Armand Bayou Watershed

Lower Armand Bayou is one of very few unchannelized stream segments in the Houston metropolitan area. Just over half its watershed is in undeveloped or "open" space (about 21,000 land acres and about 1,000 acres of open water). It retains some very unique and valuable natural areas, a few of which are permanently protected—most notably the 2,500 acres associated with the Armand Bayou Nature Center and the 300-acre Armand Bayou Coastal Preserve. The watershed has also experienced heavy impacts by development over the years.

The tidal and above-tidal portions of Armand Bayou are currently on the State's list of impaired water bodies because of low dissolved-oxygen levels that seasonally occur in the Bayou. Seven major fish kills have occurred in the Armand Bayou watershed since 1971, most located in the tributaries. Four were attributed to low dissolved oxygen. The completed Phase I Armand Bayou Watershed Plan presents the current state of the watershed, the current management programs, and practices and strategies used throughout the watershed, with particular focus on the preservation of open space. The Phase II Armand Bayou Watershed Plan will build on the Phase I plan to begin to implement the mission and vision of the Watershed Partnership. Visit the WPP plan Web site at <www.armandbayou.org>.

For general information regarding watershed protection plans contact the NPS Program at <nps@tceq,state.tx.us> or online at <http://www.tceq.state.tx.us/compliance/monitoring/nps/mgmt-plan/> <http://www.tsswcb.state.tx.us/managementprogram>

Access Texas SWQM Data Online—NEW!!

The ***Surface Water Quality Web Reporting Tool*** will allow you to select TCEQ water quality monitoring stations to view and optionally download sample data. This data comes from the TCEQ's new Surface Water Quality Monitoring Information System (SWQMIS).

<http://www8.tceq.state.tx.us/SwqmisWeb/public/index.faces>

"***What makes a river so restful to people is that it doesn't have any doubt—it is sure to get where it is going, and it doesn't want to go anywhere else***."

— Hal Boyle

"**This program has been immensely successful as water quality has shown significant improvement and fish kills have been virtually eliminated**."

For more information on this project visit the UCRA Web site at <www.ucratx.org/>

The Rio Concho "Downtown" NPS Project

The "Downtown" demonstration project is a culmination of a 10-year program implemented by the Upper Colorado River Authority (UCRA) to improve water quality along a 4.75 mile segment of the North Concho River through urban San Angelo. This stretch of the river was determined to be one of the most heavily impacted in Texas for nonpoint source pollution, displaying repeated fish kills and deteriorated water quality conditions. The initial Clean Water Act (CWA) 319 (h) project (funded in the early mid-90s), involved the construction of a highly visible structural control and a comprehensive public information effort resulting in a master plan for best management practice (BMP) development within the watershed. Over $3 million has been allocated to the program by the UCRA, the City of San Angelo (COSA), and the USEPA (managed by the TCEQ) to date.

This program has been immensely successful as water quality has shown significant improvement and fish kills have been virtually eliminated. As a result, the UCRA and the COSA have both received local and national recognition for these efforts. Because of the water quality improvements, the COSA recently initiated an $11 million project along the river for sediment dredging, tree and bank stabilization, and recreational enhancements.

The project area, Irving Street to Johnson Dam, has been characterized by the local community as the "heart of the city". This area serves as the center for many events and receives daily foot traffic. The "Downtown" demonstration project was paired with other enhancements to the area that resulted in a cost savings for water quality improvements and the much needed completion of the Paseo improvement project. The total cost of the combined projects was $1.345 million.

The constructed abatement feature is multi-faceted, operating as a practical storm water treatment system, an outstanding public education tool, and an aesthetic enhancement to the area. The system is a radical departure from the other constructed BMPs with a "state of the art" treatment system utilized as a model for other systems constructed within the city. The system consists of a vortex separator, filtration system, and a recirculation system within a series of decorative ponds. The decorative ponds demonstrate the efficiency of the system and serve as a "living laboratory" for public education. The project will also assist in the completion of a BMP identified in the Concho River Basin Watershed Protection Plan relating to public education and plan implementation.

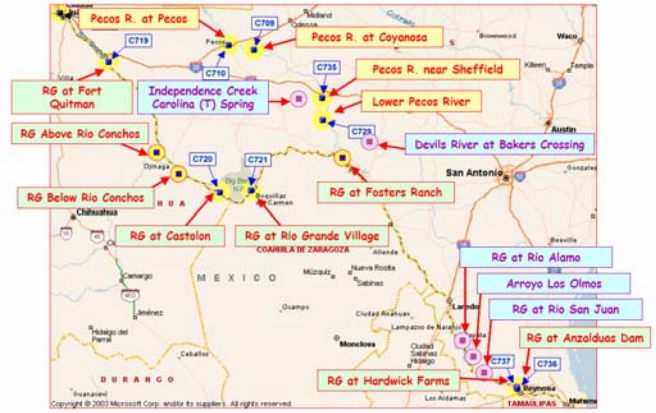
A project dedication was held October 20, 2007 in partnership with the COSA and the San Angelo Museum of Fine Arts. The dedication served as a kickoff for an all day Ecological Fair sponsored by the Museum and was a spectacular beginning for the many facets of this exciting project.

We forget that the water cycle and the life cycle are one.

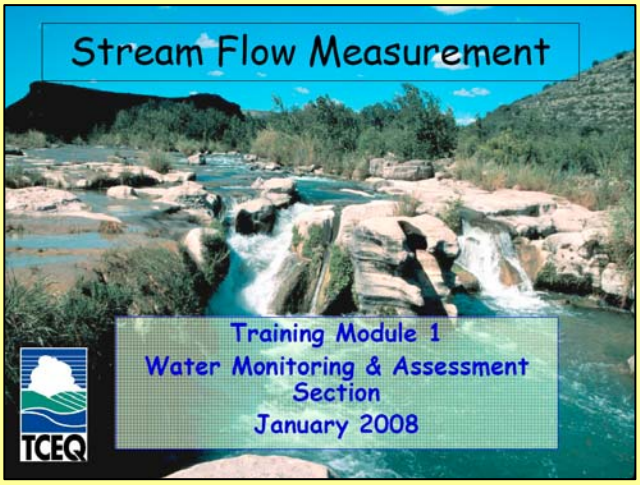
- Jacques Cousteau

To access Rio Grande Basin and other TCEQ CWQMN data online go to

<http://www.texaswaterdata.org>



Rio Grande CWQMN Stations
(Stations in blue are scheduled for installation in 2008)



Stream Flow Training Module

Rio Grande CWQMN

Increasing salinity has become the greatest water quality challenge facing water bodies in the Rio Grande Basin. The challenge faced in remote areas of west Texas, where these water bodies flow, was finding a way to enhance existing water quality monitoring. The Rio Grande flows 1,276 miles along the Texas-Mexico border from El Paso to the Gulf of Mexico. The Texas portion of the Pecos River flows approximately 400 miles from Red Bluff Reservoir to the Rio Grande confluence.

Field instruments used to measure water quality adapt well to continuous monitoring. The first project in this network of continuous water quality monitoring (CWQM) stations started in 2004 on the Upper Pecos River. The network has been growing ever since; from two sites in 2004 to 11 sites in 2007 with five more scheduled for installation in 2008.

For more information on these projects contact,

Christine Kolbe
TCEQ, SWQM Program
RG Basin Project Lead
<ckolbe@tceq.state.tx.us>

WQ Training Modules

Each year it becomes more difficult to provide training to new water quality monitoring staff across the state. The challenge is to be more responsive to training needs in a time of shrinking resources. A pilot project was started in 2007 to make detailed training materials available. *Stream Flow Measurement*, the pilot module, was completed in January 2008. A companion video is in the planning stages. The training modules are available online as a PowerPoint file and as a PDF document.

To access the Stream Flow Measurement module and other TCEQ SWQM Guidance documents online go to <www.texaswaterdata.org>.

Training modules in progress include routine basic field and water sample collection and sediment sample collection. Photos from the field are always welcome. For more information contact,

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The Coordinated Monitoring Schedule

Coordinated monitoring makes collecting and analyzing data on surface water more efficient for the SWQM Program and its participants—CRP, other state and federal agencies, municipalities, and others. The coordinated monitoring schedule (CMS) is planned and developed from March through May of the preceding fiscal year. The TCEQ supports coordinated monitoring with guidance for site selection and for sampling requirements for routine monitoring, special study, and targeted monitoring. The most recent information on all surface water monitoring being conducted by the TCEQ or under TCEQ contract can be found on the CMS. Information on special studies across the state can also be found on the CMS Web site.

The CMS is continually updated during the planning period for coordinated monitoring. The final version for FY 2009 will be available May 31, 2008. To view CMS online go to <cms.lcra.org>.

Lower Sabine Tidal-Flow Study

The Lower Sabine Tidal Study (LSTS) documented the extent of saltwater intrusion, the effects of tide on flow, the sediment and nutrient concentrations of freshwater flowing into Sabine Lake, and attempted to better understand the dynamic nature of this complex river system. The LSTS was conducted by the Sabine River Authority of Texas under the Texas Clean Rivers Program in cooperation with the Texas Commission on Environmental Quality. Sampling was conducted bimonthly from 02/22/06 through 02/22/07 from SH12, at river mile 40.2 at the Sabine River near Ruliff, Texas, to the mouth of the Sabine River at the northeast end of Sabine Lake. The study area included sites in Adams and Cow Bayous in Texas and on the Gulf Intracoastal Waterway and Black Bayou in Louisiana. The most upstream intrusion of the saltwater wedge was on the Old River Channel near Nibletts Bluff, LA. Tidal saltwater flowed predominantly upstream during low stream flow and during high tide conditions. Adams and Cow Bayous followed the general flow direction of the Sabine River; however this was not true of the flow in Black Bayou and the Gulf Intracoastal Waterway. The flow in Black Bayou was consistently counter to the tidal flow in the river and was most likely the result of hydrologic changes from the Gulf Intracoastal Waterway. There appeared to be no relationship between sediment, in the form of suspended solids, and flow. Nutrient concentrations were assessed using total Kjeldahl nitrogen (TKN) and total phosphorus (TP) and found to be fairly uniform across the stream profile and within ranges typical for the lower Sabine River.

For information on this and other projects in the Sabine River Basin visit the Sabine River Authority online at <www.sratx.org>.

Map of Tidal Reach of the Sabine River

Monitoring on Tidal Reach of the Sabine River

The EPA's National Lakes Assessment

The EPA's national monitoring studies are designed to report on the condition of the nation's lakes, streams, rivers, wetlands, and coastal waters. In 2007, TCEQ staff participated in the National Lake Assessment (NLA). The EPA assigned Texas 25 NLA. Texas added an additional 20 sites to get a statistically valid data set at the state level.

The goal of the NLA is to address two key questions on a national level:

1. What percent of the nation's lakes are in good, fair, or poor condition for the key indicators of trophic state, ecological health, and recreation?

2. What is the relative importance of key stressors such as nutrients and pathogens?

To answer these questions, the following data was collected:

Trophic Indicators
-*In situ* temperature and dissolved- oxygen profiles
-Water chemistry/nutrients
-Chlorophyll *a*, Secchi depth, turbidity, and color

Ecological Integrity Indicators
-Sediment Diatoms
-Phytoplankton
-Zooplankton
-Shoreline physical habitat
-Macroinvertebrates

Recreational Indicators
-Enterococci
-Algal toxin (Microcystins)
-Sediment mercury

A few of the benefits from the TCEQ's participation in the NLA include:

-Development of the capacity to use probabilistic sampling methods.
-Provided a useful tool for directing future targeted monitoring.

-Provided a statistically valid estimate of various constituent levels in Texas lakes including mercury, nutrients, and DO.

-Compared where Texas lakes stand in relation to national averages.

-Development of biological methods for reservoirs using macroinvertebrates and plankton.

For more information, contact:

Bill Harrison
SWQM Program
NLS Project Lead
<bharriso@tceq.state.tx.us>

Sediment Core

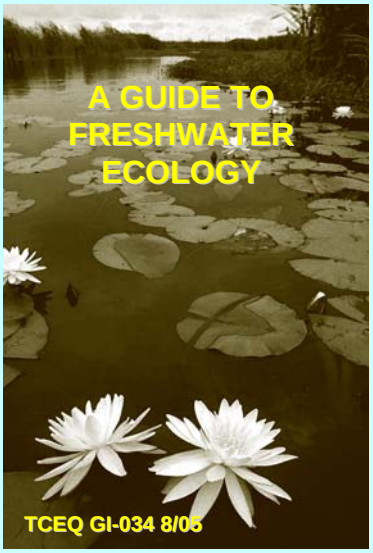
EPA National Lake Study
<http://www.epa.gov/owow/lakes/lakessurvey/>

Texas Watch Gets a New Name

Texas Stream Team, formerly Texas Watch, supports the TCEQ's nonpoint source pollution prevention program through a partnership with Texas State University-San Marcos and the USEPA-Region 6. Texas Stream Team conducts environmental education and training activities through a statewide network of individuals; schools; civic organizations; local, state, and federal governments; and industries and businesses that cooperatively monitor, collect, and share valuable water quality information. Texas Stream Team staff conduct workshops, monitoring training, field activities, and presentations; distribute outreach and educational materials, including a quarterly newsletter; and support a comprehensive Web site. Volunteer monitors are certified at various levels depending on their resources, time commitment, involvement, and environmental goals. Participation is open to groups of all sizes and ages from third grade and up.

Texas Stream Team
Caring for Our Waters

For more information, call Texas Stream Team at 1-877-506-1401 or visit <texaswatch.rivers.txstate.edu**>**



This and other TCEQ publications are available online at <http://www.tceq.state.tx.us/> and *click on Publications*

The Leaky Wader

A Cool Drink of Water

It all began rather innocently one summer back in 2000. Scott Burns, Jim Wright, and I were preparing for a sampling run in the Canadian River Basin. Still being naïve and a little green at the monitoring game, Scott and I were trying our best to minimize problems in the field. One of the things we did was pre-label our sample collection bottles before we left, to ensure we always knew we had a complete set for each site before we ever left the office. Well, that year it was particularly hot, it was just June and the temperatures were already breaking 100°. I got the ingenious idea of freezing water in new half-gallon milk jugs to use as ice blocks—my theory being that we knew we were going to have to add ice before the trip was over, why not kill two birds with one stone by using the melting water from the milk jugs as drinking water while in the field? So, we prepared for the trip, I froze the water, and everything was good to go.

We left early to get a head start on the summer heat. Our first site was a pretty little spot called Sweetwater Creek, known to have bacteria issues. So we collected our samples and were off to the next site, Wolf Creek, feeling proud of our hard work. By the time we arrived at Wolf Creek, the sun was beating down and the temperature was well over 100°. Being the super troopers we are, we finished our sampling and decided to partake of a cool drink of water from the milk jugs I had carefully marked, frozen, and loaded in the ice chest. Relaxing a bit in the shade, I decided I was still thirsty and reached into the ice chest, grabbed another jug and chugged away. After my third chug-a-lug I was putting my water back in the cooler when I noticed the startled and confused look on Scott's face. Wide-eyed, he looked at me and said: "Did you just drink *THAT*?" Admiring my ingenuity with the frozen milk bottles, I replied that I did. He turned to Jim and started howling with laughter. Between laughs he kept repeating "do you know what he did?" Jim didn't know so Scott enlightened us. He reached into the ice chest and pulled out my very cool, tasty jug of water and held it up for us to see, all the while laughing so hard he could barely stand. When I finally read what he was holding, I was almost sick right then and there. It was the unpreserved sample from Sweetwater Creek.

To this day I get asked if I would like a drink of sample water now and again. I politely decline. So if you see me, please don't ask me to drink your water. Needless to say, we've learned a few things since those formative years.

David "Sweetwater" Holub
Red River Authority of Texas

Statewide Fish Tissue Program

The Statewide Fish Tissue Monitoring Program was initiated in 2003 to increase the number of water bodies sampled for fish tissue contamination (metals and organics). The objective of Tier 1 was the identification of water bodies with contaminated fish tissue. Tier 1 reservoir sampling was conducted by Texas Parks and Wildlife Department (TPWD) staff, and rivers were sampled by TCEQ staff. Tier 1 included predator and bottom-dwelling fish species from 66 reservoirs and 15 rivers.

The Tier 1 portion ended on 8/31/2007. Three to five predator fish and three to five bottom-dwelling fish were collected from each water body, if possible. Predator species collected included largemouth bass and freshwater drum. Bottom-dwelling fish included common carp, channel catfish, blue catfish, and smallmouth buffalo.

Tier 2 of the project consists of human health risk characterizations of water bodies identified in the Tier 1 study as having fish with contaminants exceeding Texas Department of State Health Services (DSHS) screening values. DSHS collected and analyzed fish from Tier 2 water bodies. A fish consumption advisory for Canyon Lake was issued by DSHS as a result of Tier 2 sampling efforts.

For more information contact:

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512-239-5255
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2008 Texas Water Quality Inventory

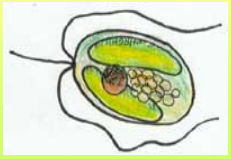
The Texas Water Quality Inventory [or 305(b)] Report describes the overall status of Texas surface waters based on historical water quality data. The Inventory identifies water bodies not meeting water quality standards (set for designated uses such as aquatic life, recreation, and human health) and places them on the 303(d) List.

These reports satisfy the requirements of the federal Clean Water Act for both Section 305(b) water quality reports and Section 303(d) lists. The Inventory and List are produced every two years in even-numbered years, as required by law. A list must be approved by the EPA before it is considered final. The 2008 draft Inventory and 303(d) List have been completed and are available for review online. This Web site also includes assessments by river basin, water quality concerns, the assessment guidance, and other information related to the 305(b)/303(d) process in Texas.

To view current and past assessment information online visit <www.texaswaterdata.org>

For information on Harmful Algal Blooms (HABs) in Texas visit the TPWD Web site at <www.tpwd.state.tx.us/hab>

Site contains updates on current **Red Tide** and **Golden Alga** blooms, ongoing research and other related information.



Critter of the Quarter-*Guadalupe Bass*

The Guadalupe bass, a member of the genus *Micropterus* within the sunfish family, was named the official state fish of Texas by the 71st Legislature in 1989. It is included in a group of fish known as "black bass".

The Guadalupe bass, like other black bass including largemouth, smallmouth, and spotted bass, is not a true bass at all but a member of the sunfish family Centrarchidae. The Guadalupe bass is generally green in color and may be distinguished from similar species found in Texas by the lack of vertical bars seen in smallmouth bass, a jaw that doesn't extend beyond the eyes as in largemouth bass, and coloration that extends much lower on the body than in spotted bass.

The Guadalupe bass is found only in Texas and is native to the northern and eastern Edwards Plateau including headwaters of the San Antonio River, the Guadalupe River above Gonzales, the Colorado River north of Austin, and portions of the Brazos River drainage. Relatively small populations can also be found outside of the Edwards Plateau. Typically, Guadalupe bass are found in flowing water, whereas largemouth bass are found in quiet water.

For additional information on the Guadalupe bass and the TPWD *Black Bass Identification Guide* visit <http://www.tpwd.state.tx.us/huntwild/wild/species/gdb/>.

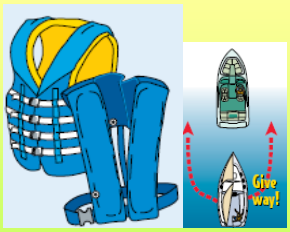
Illustration © TPWD

Guadalupe Bass—*Micropterus treculii*

Boater Safety

To access the TPWD's *The Handbook of Texas Boating Laws and Responsibilities* online visit:

<http://www.boat-ed.com/tx/handbook/index.htm>



Stay Current, Stay Safe!!

E.coli Holding Time Study

An *E. coli* Holding Time Study was done in an effort to comply with new requirements from the Texas Legislature. These new requirements make it mandatory for surface water bacteria samples to be analyzed in a National Environmental Laboratory Accreditation Conference (NELAC) accredited lab. Since the few accredited Texas labs are geographically dispersed it has become necessary to consider the option of shipping water samples, often long distances, in order to meet holding time requirements of bacteria samples. Though the holding time for bacteria samples is 8 hours, this study shows that *E.coli* samples can be held for up to 48 hours when the samples are held at 4 °C and not allowed to freeze.

Method changes based on these findings will be contingent upon approval by EPA Region 6.

For additional information contact:

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SWQM Program
<searnest@tceq.state.tx.us>

Interesting Web Sites

- Clean Rivers Program video: <ftp://videos.h-gac.com/clean_rivers.wmv>
- Water on the Web, Online water quality primer: <http://wateronthewеb.org/under/index.html>
- Watershed Planning Short Course: <http://watershedplanning.tamu.edu/index.php>
- Texas Instream Flow Program: <http://www.twdb.state.tx.us/InstreamFlows/index.html>
- EPA guidance on developing WPPs: <http://www.epa.gov/owow/nps/watershed_handbook>
- USGS Real-Time Water Data for Texas: <http://waterdata.usgs.gov/tx/nwis/current/?type=flow>
- Texas Water Matters: <http://www.texaswatermatters.org/>

Photo Corner

We will be looking for photos for future editions. Anything related to field work.

Congratulations to Mike VanBuskirk for taking the plunge and doing a lap around the boat on *Lake Fork Reservoir* **in February.** Well Done! Due to global warming issues, the swim wasn't as dramatic as first hoped—water temperatures were 10°C. But next year, he intends to do **Lake Jacksonville in January**! "Is there anyone in the State of Texas who can even equal this feat"? What some people do for free food!!!! Submitted by Art Crowe, TCEQ, Tyler Region.

To access Texas Surface Water Quality Data, Guidance Documents, and other program information online, go to <http://www.texaswaterdata.org>.

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512-239-5831

Thanks to Cory Horan for his contributions to the newsletter. Cory is leaving the Clean Rivers Program to join the Water Supply Division, Water Rights Section.

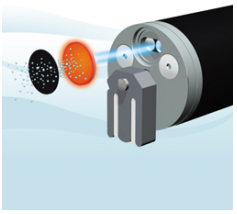
New Technology-Optical DO Sensor

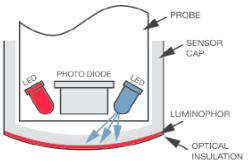
The optical DO sensor is a relatively new technology that is available for most of the major multiprobe instruments (Hydrolab, YSI, In-Situ, and Eureka). Each manufacturer has a different way of packaging the optical technology. However, each sensor works on the same basic principle.

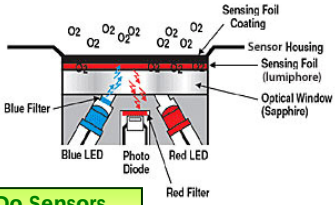
"Optical DO sensors have a tip coated on the inside with a thin layer of oxygen-sensitive fluorescent dye. A light-emitting diode (LED) shines blue light on the dye layer, causing the dye to emit red fluorescent light that travels to a photodetector.

Oxygen diffusing into the sensor tip interferes with the light emitted by the dye. This interference reduces the intensity of the light emitted, the amount of time the dye fluoresces, and the amount of time between blue light emission and red light response. This phenomenon is known as "quenching". The degree of quenching is directly related to oxygen concentration. Different brands of DO sensors use different physical aspects of quenching to calculate DO concentration in surface water quality monitoring."
From USGS Open-File Report 2006-1047.

The TCEQ has approved the use of optical DO sensors for surface water quality monitoring.



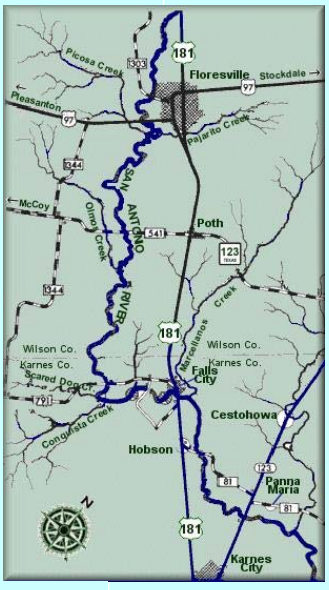




Example Optical Do Sensors
Visit the manufacturer Web sites for more information

Historic Monitoring Site

Submitted by Larry Koenig, TCEQ TMDL Program



Station 16580—*San Antonio River at Conquista Crossing, approximately 2.4 km downstream from FM 791 in Karnes County near Falls City.*

As the name indicates, the station is a site where Spanish expeditions crossed the river in the late 1600s (looking for LaSalle) and early 1700s, before San Antonio itself was founded and before the SA-Goliad trail that later went through the area. The crossing was shown to the Spanish by Indians, and had been used long before the Spanish arrived. From descriptions, it is a place where a solid bedrock outcrop allows easy crossing of the river; some allege that wagon ruts from 18th and 19th century use are visibly worn into the rock. The area was also part of the 18th century Spanish ranching (picture Spaniards dressed in American Revolution period costumes fighting Comanches while herding cattle and goats). The bedrock outcrop itself seems to mark about where the San Antonio River cuts into the Oakville Escarpment. From there, the Spanish moved along the ridge of the escarpment toward Cuero (where they often established base camps near Irish Creek/Guadalupe River confluence) and then on to LaGrange area along the relatively level and easy-traveling ridge, or towards Victoria/Garcitas Creek via the nearby Chicolete Prairie. Those were all well established Indian routes.