

THE WATER MONITOR

Summer-Fall 2012

Texas Commission on Environmental Quality—Water Quality Planning Division—Monitoring & Assessment Section

Inside This Issue

| | |
|--|---|
| EPA Approves 2010 Texas Integrated Report..... | 1 |
| TCEQ <i>E. coli</i> Holding Time Study..... | 1 |
| Looking for Surface Water Quality Data? SWQMIS Data Management Reference Guide | 2 |
| Online ID Guide to Marine Organisms.... | 3 |
| New Biological Data Module Added to SWQMIS..... | 3 |
| Texas Beach Watch Program..... | 4 |
| Revised SWQM Procedures | 5 |
| H-GAC Water Quality App..... | 5 |
| USGS Data Tools..... | 5 |
| Marine Invasive Species..... | 6 |
| Effects of Drought on the Texas Coast.... | 7 |
| New CRP Program Lead Announced..... | 7 |
| Freshwater Fish ID Online..... | 8 |
| The Texas Coast in Pictures..... | 8 |
| 2012 National Lakes Assessment..... | 8 |

EPA Approves 2010 Texas Integrated Report

Formerly called the Texas Water Quality Inventory and 303(d) List, the Texas Integrated Report (IR) describes the status of Texas' surface waters. The IR is based on data collected during the most recent seven-year period. The Texas IR satisfies the requirements of the Federal Clean Water Act Sections 305(b) and 303(d). The TCEQ produces a new report every two years in even-numbered years. The IR describes the condition of all waters with adequate data. In addition, it identifies water bodies not meeting various designated uses such as aquatic life use, recreation, fish consumption, and public water supply. TCEQ received final [EPA approval](#) on the 2010 Texas IR November 18, 2011.

The [2010 IR](#) includes the guidance, list of impaired waters, and water body assessments by river basin.

TCEQ Study on Extended Holding Times for *E. coli*

Sample holding time is an important aspect of bacteria monitoring and analysis. Holding time is defined as the amount of time between sample collection and the initiation of sample analysis.

Extending the holding time for *Escherichia coli* (*E. coli*) samples beyond 8-hours would provide the additional time needed to transport routine bacteria samples to TCEQ's laboratory in Houston with other water quality samples.

In 2008, the EPA granted conditional approval of an extended 48-hour holding time to the TCEQ for *E. coli* samples analyzed using the [IDEXX Colilert](#) method. This approval was contingent on the collection and analytical results of new, more extensive, data sets that verify 48-hours to be an acceptable holding time. A more extensive study by the TCEQ SWQM Team is currently underway.

Study Objective

The objective of this study is to determine if analytical results from *E. coli* samples collected and held for extended time periods are comparable to results from samples analyzed within the recommended 8-hour holding time. For this project 20 unique sites are being sampled through all seasons and analyzed at laboratories accredited for [National Environmental Laboratory Accreditation Program](#) (NELAP) standards.

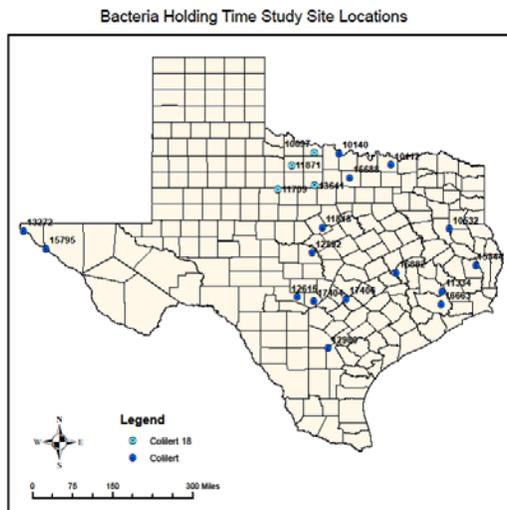
Project Description

Study sites were selected from freshwater streams and rivers characteristic of various geographical regions in Texas whose bacteria geometric means range from 100 to 2,400 MPN/100mL (2010 Texas IR).

Holding Time Study continues on page 2

2 The Water Monitor

Holding Time Study continued from page 1



E. coli holding time study map of sampling locations.

The following Guidelines were used for this project,

- Water bodies with a specific conductance <10,000 μS .
- Perennial streams or intermittent streams with perennial pools.
- Temperature, pH, dissolved oxygen, conductivity and flow severity are measured at each site to confirm variation in ambient water quality.
- Samples with specific conductance <3,000 μS are analyzed using Colilert-24.
- Samples with specific conductance >3,000 to 10,000 μS are analyzed using Colilert-18.
- Field measurements and bacteria samples are collected one time at each site.
- Samples are being collected from April 2011 through August 2012.

Sample Analysis

Samples are sub-sampled into eight replicates for each distinct holding time (8-hours, 30-hours, and 48-hours). Three additional laboratory quality control samples are collected for each holding time. Sub-samples are prepared in the field, placed immediately on ice (maintained between 1° and 6°C), and transported to the lab. Samples are analyzed according to Standard Methods for the Examination of Water and Wastewater 9223B and individual laboratory standard operating procedures.



Sub-samples being prepared in the field by Robin Cypher. Photo by Dan Burke, TCEQ.

Data Analysis

The analytical results from samples held for the three holding times will be evaluated using multiple statistical methods to determine if significant differences exist between the results. The project contact is Robin Cypher, <robin.cypher@tceq.texas.gov>.

Looking for Surface Water Quality Monitoring Data?

The [Surface Water Quality Monitoring Web Reporting Tool](#) allows you to select monitoring stations and download data from the TCEQ Surface Water Quality Information System Database (SWQMIS). For larger data needs you may want to submit a [Standard Data Request Form](#).

SWQMIS Data Management Reference Guide

The [2012 Data Management Reference Guide](#) (DMRG) is now available. The purpose of the DMRG is to assist the Clean Rivers Program planning agencies, contractors, SWQM Program staff, and other entities that submit data to SWQMIS. The guide outlines the processes for requesting parameter codes, station ID numbers, submitting and collecting entity codes, monitoring type, and tag prefixes. It also explains the review, qualification, and reporting of data; how to submit SWQMIS data change requests; and how to request data reports.

SWQMIS DMRG continues on page 3

3 The Water Monitor

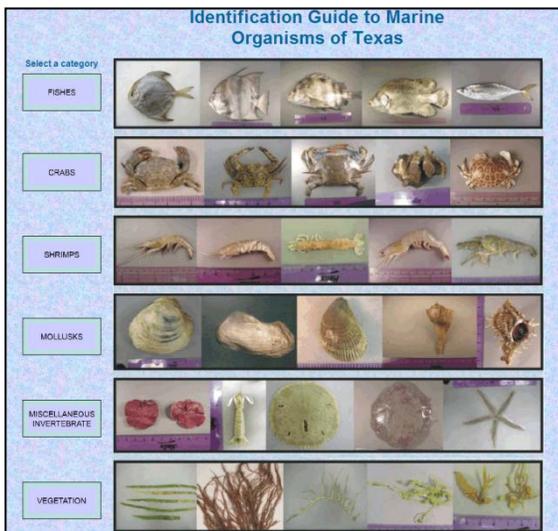
SWQMIS DMRG continued from page 2

If you have any questions related to the management of surface water quality data, contact the Data Management & Analysis Team by phone at 512/239-1678 or at wdma@tceq.texas.gov.

New Online ID Guide to Marine Organisms of Texas

Excerpts from *Brenda Bowling, Texas Parks and Wildlife Department*

Brenda Bowling of the TPWD has created a valuable online resource called [Identification Guide to Marine Organisms of Texas](#). The site is designed for users of different levels of expertise, from the general public to professional biologists.



View of TPWD's Identification Guide to Marine Organisms of Texas home page.

This guide provides detailed photos and descriptions that aid in the identification of individual organisms.

The site includes,

- Interactive keys that allow users to identify or narrow down the identity of an organism based on body characteristics.
- Separate taxonomic keys for identifying families of organisms and species within each family.
- A query system, similar to the taxonomic keys, where a list of possible species can be

narrowed down based on general features such as mouth type, tail shape, dorsal spines, dorsal fins, body shape, body patterning, and distinctive features, and families.

- A glossary of technical terms used with drawings and photos of specific features and diagnostic characteristics of each group of organisms.



Partial view of the Marine Crabs of Texas thumbnail page.



View of the calico box crab page.

New Biological Data Module Added to SWQMIS

By *Saumya Srivastava, TCEQ*

TCEQ has streamlined the process for reporting biological data to SWQMIS, as well as extracting biological data from the database.

SWQMIS Data Module continued on page 4

4 The Water Monitor

SWQMIS Data Module continued from page 3

These modifications will simplify the SWQMIS biological data user's experience by improving the accuracy of queried biological data and reports. The following is a brief summary of the four major changes.

Biological data types are now subdivided by five separate sampling categories. These include nekton, benthic, habitat, algae, and zooplankton. The field collector should be aware of the data types and sampling categories for each sampling event. For example, if the monitoring event is fish collected by electrofishing, the data type will be "Nekton" and the sampling category will be "Nekton Electrofishing". The collector is expected to record all of the parameter codes associated with "Nekton Electrofishing".

Parameter code 89888 was created specifically to identify biological data. The value reported for 89888 designates the sampling category and serves a very useful purpose when querying biological data and running reports.

When reporting biological data to SWQMIS, data providers can now report only one sampling category per sample set. For example, the number of species collected using a hoop net will be reported in one sample set for "Nekton Hoop Net", and the number of species collected using a gill net at the same event will be reported in a separate sample set for "Nekton Gill Net".

Binary Large Object (BLOB) files are electronic files (with maximum capacity of 4MB) that may be reported with the biological data. These files can include site maps, the habitat transect worksheets, fish voucher photos, or other biological data related images/picture files or document files related to the sample event. BLOB files can be attached to the samples event or sample set levels in SWQMIS, but only by authorized TCEQ staff.

More detailed information regarding these changes can be found in Chapters 6 and 12 of the [DMRG](#).

Texas Beach Watch Monitoring Program

Bacteria Monitoring

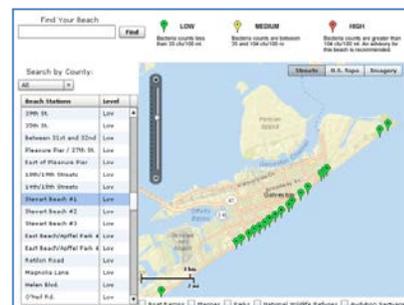
The Texas Beach Watch Program (TBWP) was implemented by the Texas General Land Office (GLO) in the late 1990's to monitor water quality and notify swimmers of health hazards along the Texas coast. In 2000, Congress passed the Beaches Environmental Assessment and Coastal Health (BEACH) Act to protect public health in coastal recreational waters.

Currently, the TBWP collects water samples from 169 stations along the Texas coast in Aransas, Brazoria, Cameron, Galveston, Jefferson, Matagorda, Kleberg, San Patricio, and Nueces Counties. The GLO contracts with universities, local governments and laboratories to collect these samples and analyze Enterococcus levels. Samples are collected May through September and every other week October through April.



Water samples being collected as part of the TBWP. Photo by GLO.

The GLO maintains the [Texas Beach Watch](#) web page with current data for all beach stations along the coast. The bacteria data is displayed on an interactive map and color coded as low (green), medium (yellow), or high (red). If the levels are high a swimming advisory is recommended.



TBWP webpage view showing current bacteria levels at Galveston Island beaches.

5 The Water Monitor

New Revision of the SWQM Procedures Now Available

TCEQ has just published the latest revision to the [Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods](#), RG-415, August 2012. Hard copies are also available. The manual is revised every 2-3 years or as needed. Changes made between revisions are posted online as [Updates to the SWQM Procedures](#).

Houston Area Surface Water Quality App—How's the Water?

A free iPhone application called *How's the Water?* is now available from the Houston-Galveston Area Council (H-GAC). This app is a guide to water quality in the 13-county area around Houston. Download this app from the iTunes store (search for *How's the Water?*).



If you don't have an iPhone visit H-GAC's website to access information on monitoring stations and water quality data via the [Water Resource Information Map](#). This is an interactive map that provides information on monitoring stations, wastewater outfalls, watershed boundaries, and more.

USGS Data Tools

WaterAlert

Receive instant, customized updates about water conditions by subscribing to [WaterAlert](#). The US Geological Survey (USGS) WaterAlert service sends email or text messages data collected as a USGS real-time monitoring station exceeds user-definable thresholds. Parameters measured vary by station. Follow the [instructions](#) to customize WaterAlert to your needs.

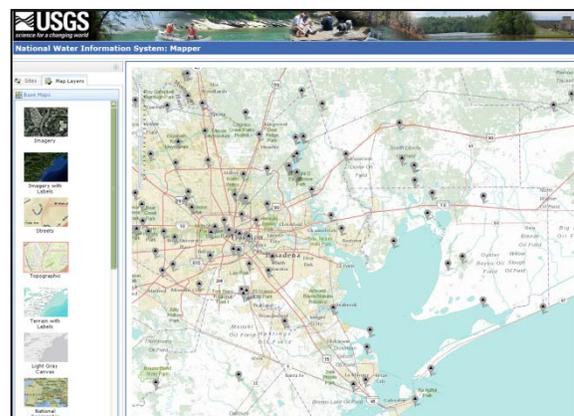
Online Water Data Reports

USGS [Water Data Reports](#) compiled after 2006 are available online. These reports provide water quality data summaries for sites across the U.S. The [Annual Water Data Mapper](#) allows the user to select a station using Google maps and download PDF of the Annual Water Data Report for that station. Information on [Water Data Reports](#) published prior to 2006 is also available on this site.

National Water Information System: Web Interface

The [NWIS: Web Interface](#) provides access to water-resources data collected at approximately 1.5 million sites in all 50 States, the District of Columbia, Puerto Rico, the Virgin Islands, Guam, American Samoa and the Commonwealth of the Northern Mariana Islands. Online access to this data is organized in data categories—surface water (flow and lake levels), groundwater (levels in wells), and water quality (chemical and physical data for streams, lakes, springs, wells).

The [NWIS: Mapper](#) tool provides easy access to available water data for individual sites.



Webpage view of the USGS National Water Information System: Mapper.

“To have faith is to trust yourself to the water. When you swim you don't grab hold of the water, because if you do you will sink and drown. Instead you relax, and float.”

Allan Watts, English Philosopher, 1915-1973

6 The Water Monitor

More Lions, Fewer Tigers Reported in Texas

Excerpts from an article by *Jim Hiney, Texas Shores Newsletter, Texas SeaGrant*

Sightings in the past year of lionfish at the Flower Garden Banks National Marine Sanctuary have more than doubled—and the fish are getting bigger—while fewer black tiger shrimp are making it back to Texas ports despite the skyrocketing number being reported in other areas of the Gulf of Mexico. Lionfish and black tiger shrimp are only two of more than 40 species of non-indigenous sea life moving into the Gulf of Mexico from their native waters, but they are seen by many resource experts as the most threatening. Both species are native to the Indian and western Pacific Oceans and are noted for their aggressive feeding behaviors and hardiness—they can live in a wide range of water temperatures and salinities. These traits make them dangerous invaders.

Lionfish

The first lionfish (*Pterois volitans*) reported at the Flower Garden Banks was seen last summer. Since then, both sanctuary staff and recreational divers have reported seeing 49 in and around the sanctuary, located about 100 miles off the Texas-Louisiana border. Lionfish are strikingly colored, brightly striped venomous fish that can quickly populate an area and decrease native populations through either eating them or chasing them away. They were most likely introduced to the Gulf of Mexico through the aquarium trade—either as an accidental or intentional release from an aquarium.

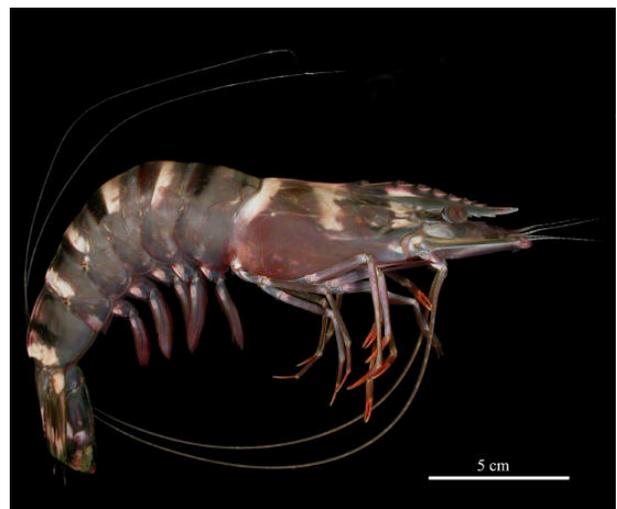
Asian Tiger Shrimp

The Asian tiger shrimp (*Penaeus monodon*) is also establishing a foothold in the Gulf. Officials at the USGS and the National Oceanic and Atmospheric Administration have seen a nearly ten-fold rise in the number of these shrimp reportedly caught in the Gulf. They do not know if the increased reports reflect a growing population or represent a growing awareness of the invasive species by shrimp fisherman. The largest species of shrimp in the world, Asian tiger shrimp are grown in aquaculture facilities at



Lionfish (Pterois volitans) photo from the USGS Nonindigenous Aquatic Species Database.

several places around the world, although not in the U.S. One popular theory is that some of the shrimp escaped from an aquaculture pond in the Caribbean during a hurricane in 2005. Others speculate that the shrimp hitched a ride from Asia waters in the ballast tanks of ships. Only five of the shrimp, which can grow to more than a foot long and approach one pound in weight, have been documented in Texas waters. All were caught within the past year. Most captures have occurred off the Louisiana, Mississippi, and Alabama coasts.



Asian tiger shrimp (Penaeus monodon) photo from the USGS Nonindigenous Aquatic Species Database.

The complete article *More Lions, Fewer Tigers Reported in Texas* can be found in the Spring/Summer 2012, Texas Seagrant, [Texas Shores Newsletter](#).

Information about these and other invasive aquatic species can be found online at the [USGS Nonindigenous Aquatic Species Database](#).

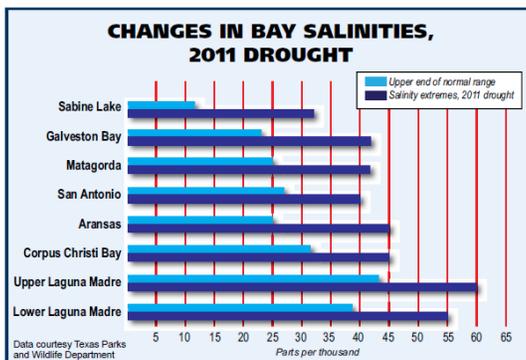
7 The Water Monitor

Effects of 2011 Drought on the Texas Coastal Ecosystem

Adapted from the Article “Water, Water Everywhere...” by Cindy Powell, *Texas Shores Newsletter, Texas Seagrant*

The Texas drought of 2011 was the worst single-year drought in the state since record-keeping began and may turn out to be one of the costliest natural events in state history—direct agricultural losses alone reached \$7.62 billion. Its effects were obvious—dry lakes, empty stock ponds, and massive wildfires, including the worst in Texas’ history. What about on the coast? Unlike the more visible signs of drought, many coastal effects occur beneath the water surface.

Texas’ coastal zone supports a series of estuaries, partially enclosed areas where freshwater rivers mingle with tidal-driven seawater, that are home to vibrant ecosystems and abundant life. Most Texas estuaries are shallow, enclosed bays, protected from the open Gulf by narrow barrier islands or peninsulas. Estuaries have been called the “nurseries of the sea”, and are among the most productive habitats in the world. The lifeblood of these estuaries is freshwater inflow from rivers that may travel hundreds of miles before emptying into a bay. When drought severely reduces water in these rivers, freshwater inflows are greatly reduced, affecting salinity and the amount of nutrients entering the estuaries.



Graph illustrating the changes in bay salinities in comparison to normal levels.

“All the bay habitat conditions change in a very dramatic way,” says Dr. Paul Montagna, who holds the Endowed Chair for Ecosystem Studies

and Modeling at the Harte Research Institute for Gulf of Mexico Studies at Texas A&M University-Corpus Christi. “With higher salinities and lower nutrients, the net result is a nutrient-starved bay. That sets up the biological effects, and the food chain gets starved as well.”

Red Tide

The 2011 red tide (*Karenia brevis*) event, one of the largest and longest in duration recorded for Texas, may also have been a side effect of reduced freshwater inflow. The bloom extended from Lower Laguna Madre to the southern end of Galveston Bay killing 4.4 million fish—striped mullet, scaled sardine, Gulf kingfish, Atlantic bumper, pinfish, spotted seatrout, red drum, black drum, and southern flounder.



Photo taken during a TPWD aerial survey of the 2011 red tide event near Palacios, Texas. Photo by Winston Denton, TPWD.

The complete article *Water, Water Everywhere...* can be found in the Spring/Summer 2012, *Texas Seagrant*, [Texas Shores Newsletter](#).

Details on [red tide](#) events can be found on the TPWD Harmful Algal Bloom web site.

New Texas Clean Rivers Program Leader Announced

Patricia Wise, long-time member of the TCEQ family, recently accepted the position as group leader of the Texas Clean Rivers Program.

Patricia has been with the state more than 20 years. Her tenure at the TCEQ includes 3 years as an Aquatic Scientist on the Water Quality Standards Team and 14 years as a Project Manager for CRP.

You may have met her at one of the SWQM

New CRP Leader continued on page 8

The Water Monitor

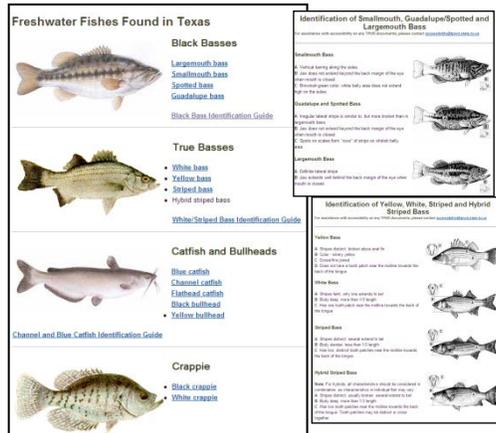
New CRP Leader continued from page 7

workshops where she is often found giving a presentation on Watershed Action Planning or Coordinated Monitoring, working at a field station, or throwing candy during the games. She also enjoys many outdoor activities including golf, hiking, diving, and paddling. Closer to home she enjoys home projects, cooking, and trying to convince her crazy rescue dog (found by a creek) that stuffed animals are not real prey and should not be shaken to death (until all the stuffing falls out), but at least it's not the real thing.

Patricia is replacing Allison Woodall who recently became Assistant Director of the Water Availability Division in the Office of Water. This division includes the Water Rights, Watermaster, River Compacts, and Groundwater Programs.

Freshwater Fish ID Online

Need help identifying common freshwater fishes in Texas? TPWD has an online identification guide to [Freshwater Fishes in Texas](#) that can help.



The Texas Coast in Pictures

By *The Harte Research Institute*

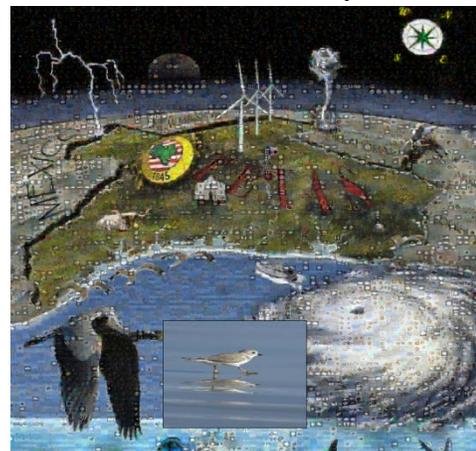
Title: *Mosaic Mural of Texas and the Gulf of Mexico—Homage to Mother Nature*

Artist: Dixie Smith, HRI's former Senior Executive Assistant, created the mosaic during 2008-2009.

About the Mural: The interactive mosaic is a stylized map of Texas and the Gulf of Mexico.

This mosaic is comprised of a database of over 10,000 photographs portraying various subjects from south Texas and the Gulf. The mural is 100 percent computer generated via a blending of four software programs; Google Earth, Microsoft Paint, Adobe Photoshop, and Andrea Mosaic.

How to View: Click on the image of the mural to access the [interactive mural](#). When the viewer moves a computer mouse over any part of the mural, individual photos used to create the mosaic pops up. Click on the individual photos and a larger version of the image pops up in a new window. In this way, all photos used to build the mosaic are individually viewable.



View of the Mosaic Mural of Texas and the Gulf of Mexico, Harte Research Institute.

TCEQ Participates in the 2nd EPA National Lakes Assessment

Texas has been involved in the National Aquatic Resource Surveys since the initial phase in 2004—the National Wadeable Streams Assessment. In 2007, the SWQM staff led the Texas effort in the National Lakes Assessment (NLA), the National Rivers and Streams Assessment in 2008-2009, the National Coastal Condition Assessment in 2010, and the National Wetlands Condition Assessment in 2011. These surveys are designed to provide statistically valid regional and national estimates of the condition of rivers, streams, lakes, wetlands, and estuaries. In 2012, the EPA initiated the second [NLA](#) by holding nine sessions that trained 89 sampling

EPA NLA continued on page 9

9 The Water Monitor

EPA NLA continued from page 8

crews nationwide. Texas crews were trained in April at Lake Murray State Park near Ardmore, Oklahoma. Consistent sampling and analytical procedures ensure that results can be compared across the country. The 2012 survey season (June –September 30th) will lead to the second national report on the condition of the nation's lakes, ponds, and reservoirs. The 1st [national report](#) for the 2007 NLA was published in 2010.

The following describes the key survey indicators.

Ecological Integrity

Ecological integrity describes the ecological condition of a lake based on aquatic community assemblages and their physical habitat. The indicators include plankton (phytoplankton and zooplankton), benthic macroinvertebrates, diatoms, macrophytes, and the physical habitat of the shoreline and littoral (near shore) zones.



Ed Ragsdale, TCEQ SWQM Team, collecting a benthic macroinvertebrate sample from a Soil Conservation Service lake in Hays County. Photo by Christine Kolbe

Human Indicators

Human use indicators address the ability of a lake to support recreational uses such as swimming, fishing, and boating. The primary indicators include algal toxins (microcystins) and triazine pesticides.

Trophic Status and Water Quality Indicators

Lakes are classified according to their trophic state. Trophic means nutrition or growth. A eutrophic lake has high nutrients and high plant

growth. Three variables, chlorophyll *a*, total phosphorus, and Secchi disk transparency, are most often used to estimate biomass and define the trophic state of a particular lake. Depth profiles for field measurements (temperature, pH, dissolved oxygen, specific conductance), water chemistry, chlorophyll *a*, and Secchi disk transparency will be used to determine a lakes trophic status.



Plankton sample collection on a private lake in Henderson County, Texas. Photo by Christine Kolbe

Texas is attempting to complete 50 randomly selected lakes by the end of September. This has been a challenge with lakes still recovering from the lack of rain. An EPA contractor sampled 21 lakes and the SWQM Program (central and regional office staff) is getting close to finishing 29 lakes across Texas. Since many of the sites have been on private land a great deal of work goes into securing land owner permission to access the lakes. For more information on this project contact Bill Harrison at [<bill.harrison@tceq.texas.gov>](mailto:bill.harrison@tceq.texas.gov).

Newsletter Contact

To sign-up for automatic notification of new issues of “The Water Monitor” online newsletter, go to the [TCEQ home page](#). Click on the “sign up for e-mail updates” icon and follow the instructions.

Previous issues are also available on the SWQM Program web page.

If you have any suggestions for future newsletters or to contribute an article or photos contact Christine Kolbe at [<christine.kolbe@tceq.texas.gov>](mailto:christine.kolbe@tceq.texas.gov)