Coordinated Monitoring Schedule Enhancements

By Patricia Wise, TCEQ

Each spring, monitoring organizations statewide meet to develop a Coordinated Monitoring Schedule (CMS) for the coming fiscal year. The goal of this activity is for monitoring organizations who collect data under an approved quality assurance project plan (QAPP) to coordinate with each other and the TCEQ. The statewide CMS web site is maintained by the Lower Colorado River Authority and has undergone many enhancements since the spring of 2010.

Overall, the CMS web site is more secure, a little faster, and the maps are larger. Some changes on the home page include modifying the colors and the basin and region selections are all listed instead of using drop down menus. Some of the other enhancements include:

—Access through the home page at <http://cms.lcra.org>. The CMS page can be searched by station description, station ID, segment, and monitoring codes. At the top of the page, an icon has been added for Report View. Any query from the CMS page, can now be viewed in the Report View mode and sorted by any column heading. For example, you may want to know how many 24-hour dissolved oxygen (DO)

American Recovery and Reinvestment Act

By Gail Rothe, TCEQ

In February 2009, President Obama signed the American Recovery and Reinvestment Act (ARRA), known informally as “stimulus funds.” In May 2009, EPA awarded TCEQ $1,809,700 from this grant under Section 604(b) of the Clean Water Act (CWA) for water quality management planning activities. In line with CWA or ARRA requirements, or EPA or TCEQ priorities, TCEQ directed the funds as follows:

—Over 97% of these funds were awarded to other entities to carry out nine projects across the state.
—Nine projects were funded to support either watershed planning or water quality monitoring.
—Forty percent of the funds were passed through to the regional planning agencies, i.e., the Councils of Government.
—All nine projects create or retain full or part-time jobs. Job creation/retention is calculated for each quarter (every three months) and currently stands at between eight to nine total jobs.

—At least 34% of funding was targeted to economically-distressed areas of the state, and 46% was targeted to the Houston–Galveston region, an area hard-hit by Hurricane Ike in September 2008.

The nine projects funded are:

Volunteer Monitoring The Ark-Tex Council of Governments, in partnership with the Texas Stream Team at Texarkana College, used funding to strengthen and build additional volunteer monitoring efforts in its nine-county region, which include parts of the Sulphur River, Cypress Creek, and Red River Basins.

Please see ARRA on page 4
GEAR UP Waco Marsh Madness—Hands-On Learning about Water Quality

By Melissa Mullins
Environmental Educator, Baylor University, Center for Reservoir and Aquatic Systems Research

In 2006, Baylor University received a six-year grant from the U.S. Department of Education’s GEAR UP program (Gaining Early Awareness and Readiness for Undergraduate Programs). GEAR UP Waco includes programs focused on strengthening student academic performance in the participating school districts in math and science, programs that increase family proficiency in English, and programs that increase student and family awareness of how to apply and pay for post-secondary education.

Marsh Madness, a GEAR UP Waco program focused on providing educational adventures in a wetland environment, is a partnership between Baylor’s Center for Reservoir and Aquatic Systems Research (CRASR) and the Lake Waco Wetland, a City of Waco facility situated on U.S. Army Corps of Engineers Property near Lake Waco.

Every semester, a different field trip exercise is developed by Marsh Madness staff, and most of these have included a strong, grade-level appropriate water monitoring component. For instance, as 7th graders competing in the “Wetland Warrior GPS Adventure Race”, one of the challenges students completed required them to measure pH of the Lake Waco Wetland and other solutions using simple test strips and decide which they thought was most suitable for aquatic life; another had them compare two different methods for measuring pH (a pen probe and a color comparator) and decide which they thought was most accurate. In “Arthropod Adventure”, students were introduced to the biological monitoring aspects of water quality. During “World in a Drop of Water”, students measured dissolved oxygen (D.O.) and CO2 levels while also looking at microscopic organisms.

Last year, 9th and 10th grade students completed a “Mystery Water” exercise, in which they decided whether the water sample they obtained was Drinking Water, treated Wastewater Effluent, (simulated) Stormwater, or Lake Waco Wetland Water. They measured nutrients, turbidity, and conductivity using commercially available test kits and meters as well as observing the presence of other indicators such as algal growth. The exercise focused on investigating how land use and treatment affect the quality of water. The most common “mistake” made was difficulty in telling drinking water from treated wastewater because they were both “clean”- a surprising result for most students.

Please see GEAR UP Waco on page 5
The Water Monitor

TCEQ E-mail and Domain Change

Our e-mail and website addresses are changing--but, don't worry, our old addresses still work.

The TCEQ is changing employee e-mail addresses to <Firstname.Lastname@tceq.texas.gov> and group e-mail addresses to end in <@tceq.texas.gov>.

Our public website addresses are changing from <www.tceq.state.tx.us> to <www.tceq.texas.gov>.

We are phasing this in, but much of the changeover was rolled out on Jan. 15, 2011. You may notice these changes in correspondence you receive back from the agency, but not because of e-mail bouncing back and rarely from broken website links. Our old e-mail addresses and domain name will work for at least five years—however, we encourage you to update your bookmarks and e-mail address books.

If you encounter a broken link, try replacing state.tx.us with texas.gov. If that doesn’t work, then the page no longer exists or has moved and the broken link is not due to the change to tceq.texas.gov. If you have questions or problems please contact <webmast@tceq.texas.gov>.

Available Online Training

The Texas Watershed Steward Program offers free online training. There is no time limit for completion of the course and has an optional certificate. The course takes about six hours and consists of the following topics: watershed systems, watershed impairments, managing to improve watershed function, community-driven watershed protection and management. To access the training go to <http://tws.tamu.edu/online-course>.

Biodiversity of the Gulf of Mexico Database

Excerpts from an article by Fabio Moretzsohn & Patrick Michaud

A new database, the Biodiversity of the Gulf of Mexico (BioGoMx), has been launched on Hart Research Institute’s (HRI) GulfBase.org, a web portal on Gulf of Mexico research. The BioGoMx database was developed by HRI’s Dr. Fabio Moretzsohn, Dr. Wes Tunnell, Dr. Tom Shirley, GulfBase.org’s Dr. Patrick Michaud, and The Nature Conservancy’s Dr. Jorge Brenner (formerly a Postdoctoral Research Associate at HRI).

The database has been in development since 2008, and is based on the massive volume of the Gulf of Mexico biota (Felder and Camp, eds., 2009). That volume, part of HRI’s Gulf of Mexico book series, was the result of collaboration of 140 experts from 80 institutions in 15 countries. Together, they compiled a list of 15,419 species living in the Gulf of Mexico; it is one of the most comprehensive biotic inventories of a large marine ecosystem.

The complete article is located online at <http://www.harteresearchinstitute.org/newsletter/winter2011/article3.html>.

To access the BioGoMx database go to <http://gulfbase.org/biogomx/biosearch.php>.
Regional Nonpoint Source Pollution Initiative. The Houston-Galveston Area Council is using the funding for three projects:

—A watershed protection plan (WPP) for the San Bernard River in Brazoria County that will help a largely rural watershed prepare for anticipated growth and urbanization.
—Assist local governments incorporate appropriate Best Management Practices (BMPs) in their jurisdictions.
—Analysis of nonpoint source (NPS) pollution problems to provide information to water quality managers to strengthen watershed modeling efforts.

Watershed Protection for Water Supply. The North Central Texas Council of Governments is using funding to develop tools to incorporate a long-range watershed protection strategy for water supply (drinking water) reservoirs into a regional ecosystem framework. The tools are:

—An assessment of challenges to watersheds of water supply reservoirs.
—The “green-printing” of priority watersheds. Green-printing is an interactive, community-based process that uses Geographic Information System (GIS) models to identify conservation priorities as a guide to planning, and for the protection of parks and natural resources.
—The development of a long-range watershed protection strategy.

Monitoring of Wastewater Treatment Plants. The Lower Rio Grande Valley Development Council, in partnership with Texas A&M University-Kingsville, is collecting nutrient outfall data in the Arroyo Colorado watershed. Seventeen outfalls from permitted wastewater treatment plants and three sites discharging from constructed wetlands are being sampled. The data will be used to refine pollutant loading estimates and to gage the effectiveness of water quality wetland systems and other measures to mitigate pollutant loading.

Rio Grande and Pecos River Monitoring. TCEQ and the U.S. Geological Survey (USGS) collected continuous water quality and quantity data from September 2009 to August 2010. On the Rio Grande, water quality and discharge monitoring data were collected at five sites. These data support multiple initiatives by TCEQ and other entities including dissolved solids assessment, flow and water rights, and flood forecasting. On the Pecos River, continuous discharge monitoring data were collected at two sites. These data support the Pecos River Watershed Protection Plan, assessment of water quality, and studies of golden alga (*Prymnesium parvum*) blooms.

Watershed Delineation. See article on page 6.

Highland Bayou Watershed Protection Plan. TCEQ and the Coastal Watershed Program of Texas Sea Grant/Texas AgriLife Extension are developing the initial components of a WPP for Highland Bayou in Galveston County. Two segments (2424A and 2424C) of the water body are currently on the 303 (d) List of Impaired Waters for low dissolved oxygen (DO) and high bacteria concentrations.

Double Bayou Watershed Protection Plan. TCEQ and the GeoTechnology Research Institute are developing the initial components of a WPP for Double Bayou in Chambers County. The West Fork of Double Bayou (Segment 2422B), is currently on the 303 (d) List of Impaired Waters for low DO and high bacteria concentrations. In addition, the receiving water, Trinity Bay, is classified as impaired due to elevated levels of bacteria in oyster producing waters.

Houston Laboratory. In 2008, the Laboratory processed almost 5,000 water and sediment samples. Almost 90% of the data collected by TCEQ were the result of samples processed at the Houston Laboratory. These data are the basis for water quality assessments, TMDL development, permit monitoring, special investigations, and monitoring the effectiveness of watershed restoration and protection initiatives. The current facility has been in continuous use for nearly 20 years. The funding is being used to enhance the existing laboratory facilities.
The current field trip exercise for 10th and 11th grade students is called “Water Water Everywhere” and because most of the students are in Physics and Chemistry, it focuses on exploring the chemical and physical properties of water, including bonding, and making connections to what these properties mean to aquatic organisms and ecosystems. The exercise includes making predictions through density calculations and specific gravity measurements about whether various objects will float in the Lake Waco Wetland or in a simulated Gulf of Mexico (then throwing them in!); comparing pH of the Lake Waco Wetland and a simulated East Texas bog habitat, and using probes and dataloggers to investigate the effects of photosynthesis and respiration on pH, D.O. and CO₂ levels. Every field trip exercise is correlated to the Texas Essential Knowledge and Skills (TEKS) and to the school district curriculum, to maximize the connections between classroom and in-the-field learning.

Lunch break during Marsh Madness field trips often includes speakers that talk informally to the students regarding career opportunities and education in the environmental fields. Environmental investigators, section managers, and even the regional director from the TCEQ Region 9 (Waco) office have spoken to students about their jobs and what the TCEQ does, particularly when the topic has been water quality. On one occasion, they demonstrated biological monitoring techniques with a backpack electroshocker, which was especially exciting for students as they rarely get to see the fish in the wetland.

The Marsh Madness Program also works with teachers from the participating school districts, at Saturday in the Swamp events and during a week-long Summer Swamp School. Local Master Naturalists (Heart of Texas and Central Texas Chapters) participate in these events and provide volunteers during field trips. Many different professional development opportunities are provided; in terms of water quality, the Texas Stream Team has provided training during Summer Swamp School that certified teachers as water quality monitors, allowing them to submit data into the citizen science database. In 2010, the Lake Waco Wetlands Education Team was proud to be recognized with a TCEQ Environmental Excellence Award for Education. Additionally, Dr. Robert Doyle received recognition for outstanding service in Environmental Education by the North American Lake Management Society (NALMS) for his role in Marsh Madness; this national award is granted to one recipient annually.

For more information regarding the Marsh Madness program, contact Melissa Mullins at Melissa_mullins@baylor.edu or (254) 710-2382. For more information regarding the Lake Waco Wetland, contact Nora Schell at Noras@ci.waco.tx.us or (254) 848-9654. The GEAR UP Waco Director is Dr. Jewel Lockridge, Jewel_lockridge@baylor.edu.

“When you put your hand in a flowing stream, you touch the last that has gone before and the first of what is still to come.”
Leonardo da Vinci
Conservation Biology for All – Free Textbook Download

The Oxford University Press conservation biology textbook, *Conservation Biology for All*, written by some of the world’s most prominent ecologists and conservation biologists is now available as a free download.

*Conservation Biology for All* provides cutting-edge but basic conservation science to a global readership. A series of authoritative chapters have been written by the top names in conservation biology with the principal aim of disseminating cutting-edge conservation knowledge as widely as possible. Important topics such as balancing conversion and human needs, conservation planning, designing and analyzing conservation research, ecosystem services, endangered species management, extinctions, fire, habitat loss, and invasive species are covered.

Watershed Delineation

By Bill Harrison and Gail Rothe, TCEQ

TCEQ maintains a database of surface water quality data from about 3,000 active sites in the state. Data on water chemistry, biological communities, and physical habitat are routinely collected and have multiple uses. One use is to identify impairments. The next step, identifying the cause of the impairment, can be significantly enhanced with information about the upstream influences on conditions at a site. These upstream influences, such as the size of the contributing watershed or the land uses within the watershed, have not been systematically developed or documented.

To improve this information, the TCEQ has directed ARRA funding to a project implemented by the USGS.

The goals of this project are,

- To delineate watershed boundaries, calculate drainage area, and compute other standard watershed characteristics, for 3,000 or more surface water quality monitoring sites.

- To delineate watershed boundaries, calculate drainage area, and compute other standard watershed characteristics for special projects such as Use Attainability Analyses (UAA), permit actions, and other projects that require sampling at stations not currently in the database.

Conservation Biology for All is available online at [http://www.mongabay.com/conservation-biology-for-all.html](http://www.mongabay.com/conservation-biology-for-all.html)

Disclaimer: This publication is provided as a general resource and does not necessarily reflect TCEQ policies.

Map of TCEQ’s SWQM sites across Texas. Map by Sophia Gonzales - sgonzales@usgs.gov and Christy-Ann Archuleta - carchule@usgs.gov, U.S. Geological Survey Texas Water Science Center

Please see Watershed Delineation on page 8
Mark Your Calendar

The Harte Research Institute hosted the first State of the Gulf of Mexico Summit in 2006 and is working with several partners to organize a second event, Summit 2011: State of the Gulf of Mexico. This event is set for December 4-8, 2011, at the Omni Galleria Hotel in Houston. For additional information go to <http://www.harteresearchinstitute.org/newsletter/winter2011/article2.html>

The Sixth Symposium on Harmful Algae in the U.S. will be held in Austin, Texas November 13 - 17, 2011. This is the sixth in a series of biannual meetings intended to provide a forum for scientific exchange and technical communication on all aspects of Harmful Algal Bloom research in the United States. Visit <http://oceanz.tamu.edu/~campbell/6thUSHAB/welcome.html> for more information.

Diatom Identification Website

Information from Website

The initial development of the Diatoms of the United States-Diatom Identification Guide and Ecological Resource web site was funded by the EPA Office of Research and Development (ORD) through the Regional Environmental Monitoring and Assessment Program (R-EMAP) and the Rocky Mountain Cooperative Ecosystem Studies Unit (RM-CESU).

David Lubinski (Institute of Arctic and Alpine Research, University of Colorado at Boulder) and Sarah Spaulding (USGS) worked together to design a web-based identification and ecological guide for diatoms of the western U.S. (http://westerndiatoms.colorado.edu). This guide builds on the previous work and success of the National Science Foundation (NSF)-funded web resource Antarctic Freshwater Diatoms (http://huey.colorado.edu/diatoms), created by Spaulding, Lubinski, and others.

The new guide takes advantage of a large diatom dataset for the western U.S., created by the EPA R-EMAP. The guide integrates diatom taxonomy, nomenclature, reference images, maps, sample information, species count data, literature references, and ecological analysis. The guide promotes taxonomic consistency by analysts working on state and federal programs, including the USGS National Water Quality Assessment (NAWQA) Program.

In particular, this resource allows agencies to implement EPA recommendations to accurately assess diatom assemblages, thereby supporting compliance with the Clean Water Act. The guide built for this project is a pilot, with pages for 25 species as a starting point.

In 2010, funding from the USGS NAWQA Program and RM-CESU supported several expert contributors to develop pages for approximately 200 additional species.

The images and data for this web site are organized within a web-friendly, custom-designed relational database. The numerous taxon contributors and review board members can add and update taxa themselves, without requiring technical web knowledge.

<http://westerndiatoms.colorado.edu/>

Example page from the Diatoms of the United States web site. This page allows searching taxa by morphology.
Due to the varying topography of Texas, the project has required a thorough review of watershed boundaries. For example, due to their unique hydrologic characteristics, special emphasis has been focused on the Rio Grande basin, the Gulf Coast, and the Panhandle.

Watershed characteristics include (see Figure below):
- watershed area
- land cover, and perimeter
- rainfall
- percent slope
- road crossing density
- elevation
- main channel length and sinuosity ratio
- riparian land cover.

The riparian zone, as defined for this study, includes the stream bank and the portion of the flood plain within approximately 50 meters of the center of the stream. This portion of the watershed, immediately adjacent to the stream, is an important determinant of instream water chemistry and food availability to instream biota, and in turn determines characteristics of the instream biotic assemblage. Information about riparian land cover will allow TCEQ to evaluate the relative effects of near stream land use on instream water quality and biotic integrity.

Increasingly, TCEQ water quality management strategies are developed at the watershed scale and watershed protection plans are a good example. This project will provide valuable empirical context for the relationship between watershed characteristics such as size and land use patterns and water quality and biotic integrity that TCEQ has long recognized.

As future funding allows, possibilities to expand this work include the following:
- Create a public facing web site for watersheds and stations (see Figure below).
- Link Surface Water Quality Monitoring Information System (SWQMIS) data (e.g. water chemistry and biological data) to stations/watersheds.
- Conduct time series analyses to examine temporal patterns for water quality and biological health as related to land-cover, flow, and other characteristics.
- Link permit data to watersheds allowing analysis of relationships between permits and water quality/biology at the watershed level.
- Link permit documents to watersheds allowing review of existing permits at a watershed level.
- Link other documents such as special projects, to watersheds.
- Link photos to stations/watersheds.
- Develop a custom tool to access and download data at the watershed level via ArcGIS.
The Water Monitor

Data Corner

By Nancy Ragland, TCEQ

Did you know that TCEQ’s Surface Water Quality Monitoring Information System (SWQMIS) database houses over 9.5 million discrete sample results dating back as far as February 1968?

Did you know there are at least four ways you can access this data?


- If you have access to SWQMIS, you can query the data using the SWQMIS Reports Module. For information on the requirements for obtaining user access to SWQMIS, send an email to <wdma@tceq.texas.gov>.

- If you do not have access to SWQMIS, you can request data using the Standard Data Request form at <http://www.tceq.texas.gov/compliance/monitoring/water/quality/data/wdma/wdma_forms.html>.

EPA’s Watershed Academy Webcasts

The Watershed Academy is a focal point in EPA's Office of Water for providing training and information on implementing watershed approaches. The Academy's self-paced training modules, webcast seminars and live training courses provide current information from national experts across a broad range of watershed topics; <http://water.epa.gov/learn/training/wacademy/index.cfm>.

Webcast Seminars—The Watershed Academy offers free monthly Webcast seminars. Participants can register for live webcasts or view the presentations and listen to the streaming audio of archived webcasts.

A list of past Webcasts such as, Introduction to the Clean Water Act, Introduction to Water Quality Standards, and Monitoring and Assessment Under the Clean Water Act are available at <http://water.epa.gov/learn/training/wacademy/archives.cfm>.
The National Wetlands Condition Assessment

By Christine Kolbe, TCEQ

The National Wetlands Condition Assessment (NWCA) is a statistically based survey by the US Environmental Protection Agency (EPA) to evaluate the condition of the nation’s wetlands. In addition to wetlands, the National Aquatic Resource Surveys (NARS) have focused on rivers, streams, lakes, and coastal bays in a revolving sequence. The purpose of these assessments is to generate statistically-valid reports on the condition of our Nation’s water resources and identify key stressors to these systems.

TCEQ has been involved in the NARS since 2004 with the initial phase, the National Wadeable Streams Assessment. The TCEQ led the Texas effort in the National Lakes Survey in 2007, the National Rivers and Streams Assessment (NRSA) in 2008-2009, and the National Coastal Condition Assessment (NCCA) in 2010. The NWCA is the next phase of EPA’s multiphase monitoring initiative.

CMS from page 1

—The text file Download feature has been moved to the bottom of the Report View page. These text files can be imported into spreadsheet software or the schedule can just be copied and pasted into a spreadsheet.

—A Waterbody ID column has been added. This provides the information used in the Integrated Report for unclassified water bodies. The water bodies under each segment heading are sorted first by the Waterbody ID, then numerically. For example, Segment 1428B is the unclassified water body Walnut Creek which is a tributary to the classified Segment 1428 Colorado River Below Lady Bird Lake.

—To save on space, many of the columns have been narrowed. The resulting abbreviations (e.g., SE, CE, MT) can be interpreted by placing the mouse over the abbreviation. A pop up box will appear with the full name and explanation. For example, move the mouse over the column heading 24 Hr DO. If you want to reverse the order, just click again. If you select the Site Description column, then the order switches to alphabetical.

—In addition, there are many abbreviations within the query boxes at the top of the page. For example, if you want to know who is monitoring on the Rio Grande. You might see a Collecting Entity code BB you do not recognize. Go to the top where you can select the Collecting Entity and scroll down to BB, mouse over, and you find it is the Big Bend National Park Service.

The University of Houston-Clear Lake—Environmental Institute of Houston will be leading the field work for the NWCA. Forty-two sites have been identified in Texas. Sampling will be conducted between April and October, 2011.

For additional information contact Christine Kolbe, <ckolbe@tceq.state.tx.us>.
Photo Gallery—Winter in the Field

Closing Time: Lower Colorado River Authority staff end a winter biological monitoring event on the Colorado River at Columbus. Photo by D. Cowan, LCRA

Upper Pecos River Biological Survey—January 2011 TCEO, IBWC, TPWD

To sign-up for automatic notification of when new issues of the “The Water Monitor” online newsletter are posted, go to <www.tceq.texas.gov>, click on the “sign up for e-mail updates” icon and follow the instructions.

Previous issues are also available on the web at, <http://www.tceq.texas.gov/compliance/monitoring/water/newsletter.html>

If you have any suggestions for future newsletters or to contribute an article contact Christine Kolbe at <christine.kolbe@tceq.texas.gov>.