



TEXAS STATE UNIVERSITY
SAN MARCOS

Edwards Aquifer Research and Data Center



Newsletter

Spring 2008

The Texas Legislature established the Edwards Aquifer Research and Data Center in 1979. EARDC's mission is to promote the study, understanding and use of the Edwards Aquifer.

EARDC Staff

Director.....Dr. Glenn Longley
Hydrogeology.....Raymond Slade, Jr.
.....Rene Barker
.....Stephen Porter
Education.....Lendon Gilpin
Lab Manager.....Joe Guerrero
Biomonitoring.....Victor Castillo III
Administrative Assistant.....Gail Crews
Research Associates.....Michelle Allison
.....Michelle Guardiola
.....Lori Kalich
.....Barbara Porter
Student Workers.....Caitlin Wright
.....Alicia Williford
.....Laura Alanis
.....Claudia Luna
.....Tiffany Mauldin
.....Victoria Ulrich

EARDC activities are organized around a Technical Services Center, an Education Center, a Research Center and a Data Center.

Dr. Glenn Longley and Victor Castillo III are featured in a new documentary video about the Texas blind salamander "Edwards Aquifer, Ezell's Cave and the Search for the Blind Monster." Information about the video can be found at

<http://www.texasblindsalamandermovie.com/>



TEXAS BLIND SALAMANDER

Agency Interns:

EARDC has a contract to supply interns to work year-around for the Texas Commission for Environmental Quality (TCEQ). TCEQ interns mainly work in the Division of Water Hygiene. Interns also work for Texas Parks and Wildlife Department (TPWD) and the U.S. Fish and Wildlife Service (USFWS). These internships are an excellent opportunity for students to get real-world experience and for the agencies to look at possible future employees. For information about these programs contact Dr. Glenn Longley at <mailto:GL01@txstate.edu>.

Technical Services Center Activities:

Biomonitoring services-

EARDC has provided freshwater biomonitoring services since 1990 and has participated in EPA's Quality Assurance Plan since 1991. Available services include 24-hour acute screen and definitive testing, 48-hour and 96-hour acute testing and 7-day chronic testing. An ISCO Model 6712 Sampler is available for composite or sequential sampling services and for collection of industrial pretreatment samples.

For information about biomonitoring services, contact Victor Castillo at (512) 245-3546 or e-mail <mailto:VC05@txstate.edu>.

In addition to performing toxicity testing, the biomonitoring lab cooperates with the U.S. Fish and Wildlife Service to collect individual Texas blind salamanders (*Typhlomolge rathbunii*), San Marcos salamanders (*Eurycea nana*) and Comal Springs salamanders (*Eurycea sp.*) and distribute them to refugia.



Water analysis services-

The EARDC water analysis laboratory has been providing environmental services since 1979. The EARDC lab is certified by the Texas Commission of Environmental Quality (TCEQ) for the analysis of bacteria in drinking, source, surface and wastewater.

The laboratory is equipped with basic water quality instrumentation and more advanced

instrumentation such as Gas Chromatographs, Ion Chromatograph and Atomic Absorption Spectrophotometer with Graphite Furnace. Furthermore, EARDC has a Nikon Optiphot-2 microscope equipped with an Episcopic-Fluorescence attachment and associated attachments for detecting *Giardia* and *Cryptosporidium*. EARDC is in the process of updating equipment to meet new EPA requirements for the analysis of *Giardia* and *Cryptosporidium*. After requirements are met and proficiency is demonstrated EARDC will seek certification for the analysis of *Giardia* and *Cryptosporidium*.

The EARDC Laboratory operates under a stringent Quality Assurance Program that insures that data produced is scientifically sound, legally defensible and of known documentable and verifiable quality. The quality assurance system at EARDC stresses training and planning that yields increased personal performance and improved laboratory management.

EARDC has provided a wide range of services for private citizens and numerous organizations including the Environmental Protection Agency (EPA), TCEQ, Texas Parks and Wildlife Department (TPWD), Barton Springs Edwards Aquifer Conservation District (BSEACD) and City of San Marcos. Current customers for the EARDC water analysis lab include the City of San Marcos and the City of Killeen.

EARDC provides opportunities for students to train alongside biologists and chemists as student workers, work-study students or non-paid interns assisting in the preparation and performance of basic analyses. Students are trained and are allowed to perform analyses only after proficiency is demonstrated. Laboratory hours are Monday-Friday 8 a.m. – 5 p.m. Containers and sampling instructions can be provided upon request. Bacteriological samples are not accepted on Friday. Special

arrangements can be made to submit samples on Friday or after hours, if necessary. For information about laboratory services, contact Joe Guerrero at (512) 245-3545 or e-mail <mailto:JG13@txstate.edu>.

Education Center Activities:

Aquatic Sciences Adventure Camp –

Eight week-long and two 2-day camp sessions were held during the summer of 2007. The camps were attended by 243 students and 29 teachers. The teachers who attended received 20 hours of Continuing Professional Education (CPE) and 20 hours of Texas Environmental education Advisory Committee (TEEAC) credit and 6 hours of Differentiated Curriculum/20 hours of Biology and Chemistry credit from the Texas Association for the Gifted and Talented.

The camp provides students aged 9–15 the opportunity to learn about aquatic biology and water chemistry in a university atmosphere while also enjoying various water-oriented recreational activities. Information about the summer camp program can be found on the camp website,

<http://www.eardc.txstate.edu/camp.html>.



Campers eagerly watching the precipitate settle in their dissolved oxygen sample.

We would like to thank The Edwards Aquifer Authority, Guadalupe-Blanco River Authority and the HEB Grocery Company for providing

scholarships for many of our campers this past year.

Aquatic studies field days-

During the past year, 854 students and 100 teachers from 36 schools attended aquatic studies field days. The field day program gives students an opportunity to collect living aquatic organisms from a creek on the Texas State campus and observe them under a microscope. Students also learn about the Edwards Aquifer and its biota, collect organisms from a flowing artesian well and view San Marcos Springs from a glass-bottom boat at Aquarena Center. The field day website can be found at <http://www.eardc.txstate.edu/aquaticfielddays.html>.

For information about the Aquatic Sciences Adventure Camp or to schedule a field day, contact the education center at (512) 245-3541 or e-mail <mailto:LG16@txstate.edu>.



Field day participants observing aquatic life in the freshwater aquarium at Aquarena Center.

Research Center/Data Center Activities:

During the past year, Stephen, Raymond, and Rene continued to assist the research and thesis-related endeavors of several Texas State graduate students, including John (Eric) Dedden, Jaimie Maher, Susan Roberts, and Justin Kirk. Also during this time, collaborative associations were maintained with Texas State professors Dr. Vincent Lopes, Dr. Walter Rast, and Dr. Alan Groeger.

The majority of Raymond Slade's, Stephen Porter's, and Rene Barker's time during 2007 was spent on EARDC's cooperative study with the Southern Plains Network (SOPN) of the National Park Service (NPS).

To satisfy SOPN's needs, EARDC developed a set of long-term monitoring protocols to cover the sampling, analysis, and observation of surface-water quality and quantity, and groundwater quantity at ten SOPN parks in Colorado, Kansas, New Mexico, Oklahoma, and Texas. Through a combination of historical baseline (legacy) water-quality data compiled by EARDC from the results of past work—and data that will be acquired and analyzed through future activities—this study was designed to advance the understanding of temporal trends in the water quality of streams and lakes in addition to groundwater levels in each of SOPN's park units.



Southern Plains Inventory and Monitoring Network

Toward the end of 2007 efforts shifted to an activity involving another NPS network—the Inventory and Monitoring Program of the Chihuahuan Desert Network (CHDN). The CHDN encompasses six park units in New Mexico and Texas, plus the Rio Grande Wild and Scenic River. The scarcity of water resources in this arid region is driving the need to better understand the distribution and vulnerability of park ecosystems. Six of the seven network entities contain important

surface-water bodies and (or) groundwater reservoirs (aquifers).



Chihuahuan Desert Inventory and Monitoring Network

Water quality and quantity are high-priority issues at CHDN. NPS mandates and policy require that parks characterize and monitor water quality and quantity and plan for the protection of water resources. This project consists of analyzing existing data (where available) for historical trends and developing future long-term monitoring protocols. The monitoring protocols will cover the activities and instrumentation required to sample, analyze, and observe the following vital (environmental) signs:

- 1) surface water and groundwater quality;
- 2) invertebrates in aquatic systems;
- 3) persistence of springs & seeps;
- 4) surface water dynamics;
- 5) groundwater dynamics; and
- 6) lake elevation for Amistad Reservoir.

Protocols for each of these six vital signs will be treated as separate standard operating procedures. Through a combination of selected existing data and additional data acquired and analyzed through future activities, this plan provides an opportunity to account for long-term trends in the water quality and quantity of streams and lakes and groundwater levels within each of the six network parks. The project will aid in the understanding and either maintaining or improving the quality and quantity of the water resources within the CHDN. Dr. Glenn Longley is the Project Director for both the Southern Plains Network and Chihuahuan

Desert Network Inventory and Monitoring Programs.

Throughout the year, EARDC hydrogeologists maintained close relations and active dialog with several local, county, state, and federal water agencies including the Hays Trinity Groundwater Conservation District (HTGCD), Texas Parks & Wildlife, Barton Springs Edwards Aquifer Groundwater Conservation District, Texas Water Development Board, Wimberley Valley Watershed Association, Hill Country Alliance, as well as the Austin- and San Antonio-based offices of the U.S. Geological Survey.

To help HTGCD better understand and more effectively manage the district's water resources, Raymond advised personnel with respect to flood runoff and the effects of variations in rainfall, runoff, and aquifer recharge. Rene helped to update maps of potentiometric conditions in the local Trinity aquifer, evaluate rainfall distributions across western Hays County, and prepare guidelines for streamlining the analysis of aquifer tests associated with applications for new groundwater development.

During the early part of 2007, Rene attended workshops on behalf of HTGCD to aid with their participation in a program sponsored collaboratively by the Lyndon B. Johnson School of Public Affairs at the University of Texas-Austin and Groundwater Management Area 9 (GMA-9). The workshops are part of an effort to examine the processes through which GMA-9 is developing groundwater management plans based on desired future conditions (DFCs) for the region's Trinity Aquifer. The program seeks to assist HTGCD and other groundwater conservation districts with their adoption of DFCs to meet the needs of citizens and water users throughout the Hill Country of central Texas based on computer-simulated effects of different water-management scenarios.

Other collaborations with HTGCD included EARDC's:

- Review of aquifer-test analyses and groundwater-modeling reports;
- Formulation of guidelines for conducting Theis-based aquifer tests in the Trinity aquifer of western Hays County;
- Compilation of documents to explain how time-drawdown data measured from single (pumping) wells in can be used to expedite the estimation of aquifer transmissivity for the predominantly carbonate-rock strata of HTGCD;
- Derivation of a method for identifying and analyzing hydrologic and meteorological databases to document drought conditions for the Trinity aquifer;
- Development of statistical means of evaluating the probable effects of a proposed wastewater discharge site near the upgradient margin of the environmentally sensitive Edwards aquifer recharge zone; and
- Assistance provided by **Brian Slone** and **Victor Castillo** toward the construction and maintenance of HTGCD's Internet website.

In addition to his water-quality and benthic macroinvertebrate work with the EARDC National Park Service projects, Stephen Porter developed a series of 3-day, freshwater algae short courses that will be offered at EARDC during 2008. The short courses represent an introduction to the identification of diatoms and soft-bodied algae, as well as the analysis and water-quality interpretation of algal data. Stephen recently published a large database of nearly 6,000 algal species and water-quality relations (USGS Data-Series Report), in addition to an interpretative, autecological report describing algal-metric relations with water chemistry and land use in an international journal (Freshwater Biology).

For further information about these activities, e-mail Rene Barker (RB42@txstate.edu), Raymond Slade (RS40@txstate.edu) or Stephen Porter (SP31@txstate.edu).

Reports produced by EARDC staff in 2007:

Slone, B.L., Slade, R.M. Slade, Barker, R.A., and Longley, Glenn, February 2007, A dynamic graphing procedure to document temporal trends in water quality for National Park Service sampling sites, Southern Plains Network: Edwards Aquifer Research and Data Center Departmental Report No. R1-07, Texas State University, San Marcos, Texas, 21p.

EARDC, September 2007, Review of and recommendations for hydrologic-monitoring activities in Southern Plains Network, National Park Service: Edwards Aquifer Research and Data Center Departmental Report No.R2-07, Texas State University, San Marcos, Texas, 75p.

Porter, S.D., Mueller, D.K., Spahr, N.E., Munn, M.D., and Dubrovsky, N.M., 2007, Efficacy of algal metrics for assessing nutrient and organic enrichment in flowing waters: Freshwater Biology, 19 p.

Porter, S.D., 2007, Algal Attributes: An autecological classification of algal taxa collected by the USGS National Water-Quality Assessment Program: U.S. Geological Survey Data-Series Report, 48 p.

To contact EARDC:

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