



TEXAS STATE UNIVERSITY
SAN MARCOS

Edwards Aquifer Research and Data Center



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Newsletter

Spring 2006

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.

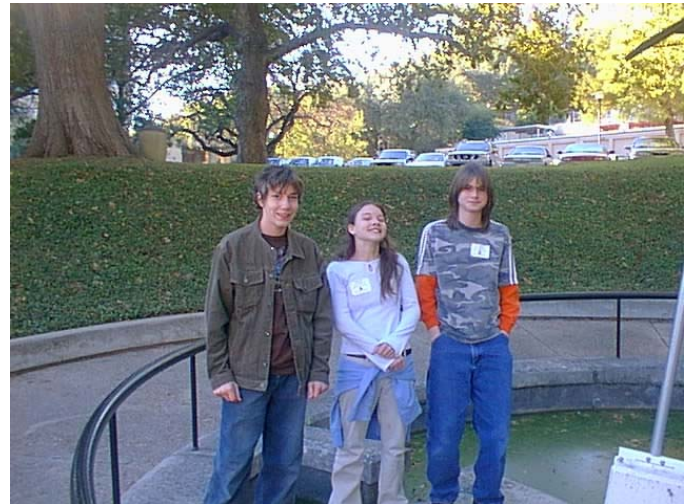
EARDC Staff

Director.....Dr. Glenn Longley
Hydrogeology.....Raymond Slade, Jr.
.....Rene Barker
Education.....Lendon Gilpin
Lab Manager.....Joe Guerrero
Biomonitoring.....Victor Castillo III
.....Meredith Cole
.....Lori Kalich
Administrative Assistants.....Gail Crews
.....Michelle Guardiola
Research Associates.....Karen Serna
.....Michelle Allison
Undergraduate Research Assistant.....
.....Rebecca Cormier
Student Workers. Diego Araujo
..... Audri Cavazos
.....Caroline Fernandez
.....Shana Lenz
..... Brent Moore
.....Kaitlin Osburn
..... Scott Shell
..... Catherine Sutton
.....Gayle Williams

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

On November 16, 2005 Georgetown Partners in Education sponsored three students from Benold and Tippit Middle Schools in Georgetown to

spend the day at Texas State University-San Marcos for a job shadowing event. After spending the morning at Aquarena Center learning about activities there, the students spent the afternoon at EARDC. They learned about the various water analysis procedures and equipment that are used to test water quality from lab manager Joe Guerrero. They also learned about biomonitoring and toured the wet lab facilities where fathead minnows are raised. Then they viewed several Texas blind salamanders and collected shrimp from the artesian well on campus.



Students who participated in the Georgetown Partners in Education job shadowing event (left to right), Christian Bunte (Tippit Middle School), Cassandra Tuten and Marshall Burdick (Benold Middle School).

Agency Interns:

EARDC has an agreement to furnish interns to work for the Texas Commission for Environmental Quality (TCEQ). These interns work at least 20 hours per week at the TCEQ headquarters in Austin and gain valuable experience with the agency. EARDC also furnishes interns for the Texas Parks and Wildlife Department (TPWD) in San Marcos

and workers for the U.S. Fish and Wildlife Service (USFWS) for their San Marcos River Invasive Plant Removal Project. 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.

The biomonitoring lab is currently in Phase II of a Texas Department of Transportation (TX DOT) project to determine the effectiveness of their highway runoff filtration system and the toxicity of highway runoff to EPA aquatic target toxicity test organisms (fathead minnow, *Pimephales promelus* and water flea, *Ceriodaphnia dubia*) and the endangered fountain darter (*Etheostoma fonticola*).



TX DOT highway runoff collection/filtration compartments.

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.

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

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.

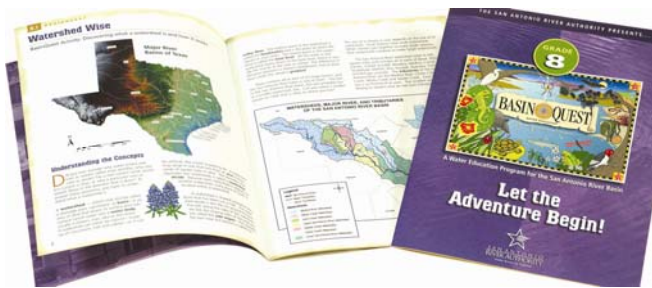
EARDC has provided a wide range of services for private citizens and numerous organizations including the Environmental Protection Agency (EPA), TCEQ, Texas Parks and Wildlife Department (TPWD), Barton Springs Edwards

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:

San Antonio River Authority educational materials (Basin Quest)-



Basin Quest Middle School educational materials.

The Basin Quest middle school curriculum has been completed and will showcase at the Planet H₂O event sponsored by KLRN (San Antonio Public Television) to take place on April 1, 2006. Education Center director, Lendon Gilpin, along with Dr. Violetta Lien and Dr. Sandra West of Texas State developed the curriculum for the San Antonio River Authority (www.sara-tx.org). The curriculum is tailored to the San Antonio River Basin and is designed to

serve 6th, 7th and 8th grades. The 6th grade unit focuses on the water cycle; the 7th grade on water pollution and water monitoring; and the 8th grade on watershed protection and management. The materials consist of a teacher guide and student materials for each grade level. All materials are aligned with the Texas Essential Knowledge and Skills (TEKS) and follow the 5E instructional model (an inquiry-based model).

Aquatic Sciences Adventure Camp –

For the summer 2006 camp sessions, the Edwards Aquifer Authority in San Antonio has agreed to provide camp sponsorships for students and teachers who live within the EAA's jurisdictional boundaries of Uvalde, Medina, Bexar, and parts of Atascosa, Comal, Guadalupe, Hays and Caldwell Counties. These sponsorships will cover the entire cost of the 2-day day camps and can also go toward the week-long camp tuition. If you would like more information, contact EARDC.



Campers enjoying Gruene Rapid on the Guadalupe River.

We have added on-line registration and have redesigned our camp website. More camp information can be found on the camp website, <http://www.eardc.txstate.edu/camp.html>.

The Aquatic Studies Summer Camp has been held each year since 1989. It 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. During the 2005 summer camp season, 107 students and 15 teachers participated in the camp.

Aquatic studies field days-

During the past year, 982 students and 70 teachers from 35 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/fielddays.html>.



Field day participants sampling for invertebrates in Sessom Creek.

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>.

Research Center/Data Center Activities:

Staff hydrogeologists Raymond Slade and Rene Barker split their attention during 2005 and early 2006 about equally between surface-water hydrology and groundwater hydrogeology. The highlights of their involvement with EARDC graduate students and collaboration with Federal, State and locally relevant research and environmental issues included activities in Hays County as well as completing the groundwork

for proposed, potentially EPA-funded research in the Bee Creek watershed of Travis County.

Raymond and Rene continued as advisors to graduate student Eric Dedden and his study of the relations among the habitat, biota, and hydrogeologic conditions within a five-mile reach of Cypress Creek, just upstream of its confluence with the Blanco River in west-central Hays County. Eric is using springflow data from the U.S. Geological Survey (USGS) monitoring station at Jacob's Well (upstream limit of study area) in addition to miscellaneous Flowtracker measurements to determine the seasonal patterns of streamflow gains and losses along eight reaches of this largely spring-fed watercourse near Wimberley, Texas.

Eric is also collecting groundwater data to construct potentiometric maps with which to delineate the primary directions of groundwater flow and evaluate the extent of groundwater-surface water interaction in the area. In addition to the associated USGS study of Jacob's Well, Eric's research is coordinated with objectives of the Hays Trinity Groundwater Conservation District (HTGCD), the Wimberley Valley Watershed Association, and the Blanco River Basin Study (sponsored by River Systems Institute at Texas State University and the Nature Conservancy of Texas).



Eric Dedden using Flowtracker to measure streamflow in Cypress Creek, just downstream of Jacob's Well.

During March 2005, Raymond and Rene—at the request of HTGCD—conducted a hydrogeologic reconnaissance of the Dead Man’s Creek watershed, which drains roughly 10 square miles of the Pedernales River Basin in northern Hays County. (Dead Man’s Creek is less than three miles southwest of Westcave Preserve and Hamilton Pool Park, both of which compose part of the Balcones Canyonlands Preserve, an endangered species habitat and home to the golden-cheeked warbler.) Earlier dam-construction activities had dislodged sediment from the stream bank less than 1,000 feet upstream of Dead Man’s Hole, a collapsed limestone grotto and centerpiece of a delicately balanced ecosystem of exceptional beauty, featuring a jade-green plunge pool that is nearly encircled by fern-draped cliffs of fossiliferous limestone.



Dead Man’s Hole, northern Hays County.

As described by the Austin American-Statesman, the dam construction “sent sediment pouring into Dead Man’s Hole, clouding the [normally clear] waters a milky green and creating a minor ruckus” among neighboring landowners. A group of these landowners, with the purpose of protecting and conserving the Dead Man’s Creek ecosystem, recognized a need to establish a baseline of water-quality data with which to compare future observations of biological and chemical constituents and evaluate the importance of water-quality variations over time. Consequently, an agreement was reached with EARDC to sample,

analyze, and document background water-quality conditions along Dead Man’s Creek, beginning one mile upstream and extending just downstream of Dead Man’s Hole.

In addition to field measurements of pH, temperature, specific conductance, and dissolved oxygen, water samples collected from Dead Man’s Creek are being analyzed for pesticides, volatile organic compounds, total organic carbon, biochemical oxygen demand, turbidity, and nutrient and sediment levels. The results of the 2005 hydrogeologic reconnaissance, water sampling, and laboratory analyses are documented in EARDC departmental report R1-05.

Other hydrogeologic activity associated with EARDC include: (1) Assessing the plausibility of gaging Sink Creek and estimating its contribution to the water budget of Spring Lake, in San Marcos; (2) Evaluating the hydrogeology of Freeman Ranch, five miles west of San Marcos, to help locate a new well or alternative sources of livestock water; (3) Collaborating with Dr. Vincent Lopes (Texas State University Aquatic Biology Department) to plan, and seek EPA funding for, community-based research in the Bee Creek watershed of west-central Travis County; (4) Accompanying Ray Kamps (Texas State Limnology Research Project) to Lake Amistad in Val Verde County to observe and consult in regard to the hydrogeology of Goodenough Spring; and (4) Contracting with HTGCD to:

- Review aquifer-test analyses and groundwater modeling reports;
- Document procedures for applying the Cooper-Jacob “straight-line” methodology (1946) to time-drawdown data obtained from single (pumping) well tests in the Trinity aquifer of south-central Texas;

- Compile guidelines for conducting aquifer tests in the mostly carbonate-rock strata within jurisdiction of HTGCD in western Hays County;
- Derive method for identifying and analyzing hydrologic and meteorological databases to document drought conditions for the Trinity aquifer; and
- Develop 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.

Inquiries regarding EARDC hydrogeology activities may be made to Raymond Slade (<mailto:rs40@txstate.edu>) or Rene Barker (<mailto:rb42@txstate.edu>).

Springs Study in the Texas Trans-Pecos Region:

Texas State graduate students David Flores and Craig Watts are involved in a two year study to collect current water quality data for 28 springs in the Trans-Pecos region of Texas (Brewster, Culbertson, Jeff Davis, Pecos, Presidio, Reeves and Terrell Counties). Historic and current data is being compared and analyzed for trends in water quality and flow. Spring biota is being studied by Rapid Bioassessment Protocols. The project is funded by USDA as part of the Rio Grande Basin Initiative. The project is funded through June 2006.

To contact EARDC:

Phone (512) 245-2329

FAX (512) 245-2669

Website: <http://www.eardc.txstate.edu/>