THE TEXAS CLEAN RIVERS PROGRAM

AQUA VITAE

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COLORADO RIVER WATCH NETWORK

CRWN volunteer Sherra Theisen at the Llano River. Read how she teaches students about philosophy and science in the Monitor Spotlight on page seven.

Aqua Vitae is a newsletter published by LCRA for Colorado River Watch Network volunteers, Clean Rivers Program steering committee members and citizens concerned with the environmental quality of the Colorado River and its tributaries. If you want to be added to our mailing list, or if you do not want to continue receiving this publication, please contact Robin Dorrough Berry, editor, at 1-800-776-5272, Ext. 2416, or in Austin at 473-3333, Ext. 2416 (e-mail robin.berry@lcra.org). Visit LCRA's Web page at http://www.lcra.org/water/crwn.html.

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An Uncommon Tribute: Naming a Creek for a Volunteer Monitor

By Steven Hubbell, CRWN volunteer water quality monitor

On a beautiful fall afternoon in November 2009, former students, family and friends of the late Robert (Bob) A. Furtado gathered at his old monitoring site in Austin to dedicate a creekside bench and plaque to his memory. But what made this event so extraordinary was that they also christened the creek with a new name. The stream, which was formerly an unnamed tributary to Bull Creek, is now officially Furtado Creek.

Bob Furtado was an Anderson High School teacher who monitored water quality with his students at this tributary. In 1988, he was one of the founding Colorado River Watch Network (CRWN) teacher volunteers, and he coauthored the first CRWN biomonitoring manual. Above all, Bob was a dynamic advocate of clean water and an inspiration to his students and peers. For him, teaching was not just a profession — it was a calling. As his son observed, "He lived teaching."

Robert A. Furtado inspired students through his quirky teaching style. Drawing courtesy of former student and CRWN volunteer, Karen Thomas.

The Waiting Period

After Bob passed away in 2002, some of his former students asked me, then CRWN program coordinator, about naming the creek for him. We learned that there is a five-year waiting period before such requests will be considered by the U.S. Geological Survey (USGS). As the five-year waiting period drew to a close, one student, Jennifer Quereau, took the initiative to gather and submit the necessary information, including supportive statements from Bob's colleagues and students. Meanwhile, Jacob Daniel Apodaca, LCRA water quality coordinator, obtained permission from the park for the bench and plaque to be installed near the monitoring site.

I find it immensely satisfying to know that a simple man, who sought neither fame nor riches, a dedicated teacher who inspired scholarship and stewardship, should be honored in such a meaningful and enduring way.

— Steven Hubbell

Bob would have laughed at the idea of a creek bearing his name, but I believe he would have been deeply moved by the dedication and perseverance of his students and very proud of their achievement. Sitting on this comfortable bench in the shade, I watch dragonflies flit above the surface of this lovely little creek. I find it immensely satisfying to know that a simple man, who sought neither fame nor riches, a dedicated teacher who inspired scholarship and stewardship, should be honored in such a meaningful and enduring way.

Steven Hubbell, former CRWN program coordinator (1995-2004), is a volunteer monitor and a site assistant at Westcave Preserve. He may be contacted at steven_hubbell@sbcglobal.net

Lisa Benton conducted phase I and II training for Betsy Roberts and Jeff Henke in CRWN's new Lab.

Welcome New Monitors:

Ray and Carol Buchanan .... Lake Buchanan at Highway 29
Dan Rodgers ....Bee Creek at Bee Creek Rd and Lake Travis at Hurst Harbor
Betsy (Lois) Roberts .... Shoal Creek at Northwest Park
Jeff Henke ....Shoal Creek below 34th Street
Crystal Funke, Michael Brewster and Sally Wolfe .... Hamilton Pool

Robin Berry begins training for new volunteer monitor Dan Rodgers. Dan will sample on Bee Creek and provide back-up for Lake Travis at Hurst Harbor.

Fond Farewells:

Thank you to Jennifer Blossom, who is retiring after monitoring since 2006. Jennifer contributed 28 data points from Lake Austin and participated in the trial testing of dissolved oxygen meters. Thanks again for your commitment to water quality, Jennifer!

HELP WANTED:

Volunteer needed to monitor the Colorado River at Wharton and Lake Buchanan. Must be willing to sample in all weather conditions and at the same time of each month. The volunteer position requires a two-year commitment and a six-hour, three-phase training session.

Intern Update:

Austin Ellington, an intern for the River Watch this fall, has a passionate interest in water quality and conservation. He came to the Colorado River Watch Network through an environmental studies course at St. Edward's University, which focuses on sustainability, conservation, and issues affecting the environment. When he graduates from St. Edwards University, Austin will receive an undergraduate degree in political science with a minor in environmental science and policy.

Austin also plans to pursue a graduate degree in public administration, with an emphasis on urban and environmental planning. When he graduates, he hopes to promote sustainable, environmentally friendly growth in Austin and the surrounding area. With the help of members of the community, like the devoted CRWN volunteers, he feels that a "new era of environmental awareness is in the making, one person at a time."

St. Edward's University student Austin Ellington is building an inexpensive sampling pole as his CRWN intern project.

CLEAN RIVERS QUARTERLY

The Intuitive Protection of Riparian Corridors

by David Cowan, LCRA Clean Rivers Program coordinator

I recently attended the Land, Water, People conference hosted by the River Systems Institute in San Marcos. While there, I met representatives from the Texas Riparian Association who were espousing the benefits of healthy riparian areas, of which there are many. Healthy riparian areas improve water quality, reduce soil erosion, provide wildlife habitat, reduce downstream flooding, and increase aquifer recharge.

This is not news to volunteer monitors who observe and report landscape changes as they wade creeks and traipse through riparian corridors to collect samples each month. And while it isn't news to water resource managers, the value of preserving riparian areas is too often overlooked — overlooked because we, as aquatic scientists, are trained to focus on measurable data.

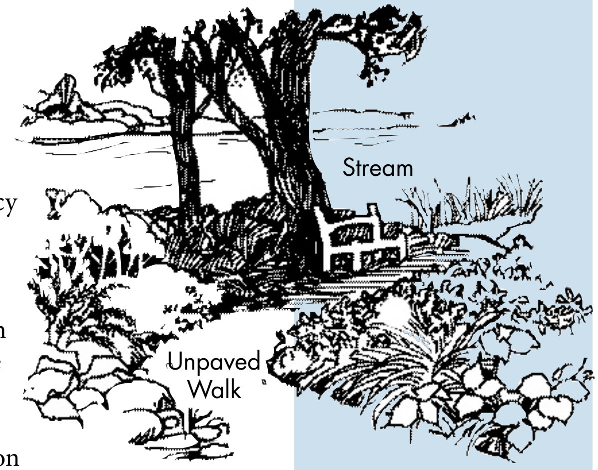
Data Collection and Water Quality

The data most often used to protect water quality includes dissolved oxygen, bacteria levels, macroinvertebrate populations and the amount of nitrate or phosphate in the water. This is what our system of water quality standards and wastewater permitting is based upon. It's not wrong, but it is also not holistic.

For example, water quality regulations stipulate that more than 126 colonies of E.coli bacteria constitute a breach of Texas Surface Water Quality Standards and may be a public health risk. Less than 5 mg/L of dissolved oxygen in most streams is detrimental to aquatic life and a breach of standards as well. These are defined limits that all water bodies should be able to attain. And if they don't, there are state and federal funding sources to remediate.

Protection of Riparian areas

But how much riparian area does it take to filter stormwater runoff from a cow pasture or from an urban area? How much riparian area does it take to provide habitat for songbirds? Without scientific measurements to validate water quality conditions or improvement, protection of riparian areas is impossible to quantify and difficult to champion in public policy arenas.



A riparian area is the interface between land and stream. The riparian buffer helps shade and partially protect a stream from the impact of adjacent land uses. It plays a key role in protecting water quality.

In his Depression-era novel The Grapes of Wrath, John Steinbeck wrote, "Nitrates are not the land, nor phosphates and the length of fiber in the cotton is not the land. Carbon is not a man, nor salt nor water nor calcium. He is all these, but he is much more…and the land is so much more than its analysis."

Steinbeck recognized that scientific analysis offers only one dimension of the natural world. The premise that land and natural resources should be addressed by more than data analyses continues today. Landowners facing suburban sprawl and increasing tax burdens are turning to conservation easements as a means of protecting their land and their heritage. Recognizing the importance of protecting water quality lands, nongovernmental organizations and city and county governments are pooling resources to purchase land and create easements that will preserve and enhance riparian areas and improve water quality for future generations.

Internet Resources

Texas Riparian Association:
http://www.texasriparian.org/
Riparian Vegetation in Central Texas:
http://www.nuecesra.org/CP/LS/literature/yrr.php
Texas State Web site for the conference:
http://www.rivers.txstate.edu/projects/conferences/Land-Water-People-09.html

THE WATER COLUMN

Watching the River Flow: Excerpted from *Water on the Web*

Flow is a fundamental property of streams that affects everything from temperature and concentration of substances in the water, to the distribution of habitats and organisms throughout the stream. Low flow periods in warm weather allow the stream to heat up rapidly and in cooler weather to drop quickly. Flow directly affects the amount of oxygen dissolved in the water. Higher volumes of fast moving water, increases the turbulent diffusion of atmospheric oxygen into the water. Low flow conditions are much less conducive to oxygenation and when water temperature is high, DO levels can become critically low.

Fast moving water moves cobbles, boulders and woody debris, and increases the diffusion of oxygen into the water.

The amount of sediment and debris a stream can carry also depends on its flow since higher velocity increases stream bank and stream channel scouring and erosion, and also keeps particulate materials suspended in the water. The precipitation inputs that cause higher flows may also wash higher amounts of particulate and dissolved materials from the watershed directly into the stream. Stream flow, acting together with the downward slope (gradient), and the geology of the channel (its bottom substrate), determines the types of habitats present (pools, riffles, cascades, etc), the shape of the channel, and the composition of the stream bottom.

Reasons for Natural Variation

The volume of stream flow is determined by many factors. Precipitation is of course the primary factor. However, there is usually a lag period between the time a storm reaches it highest intensity and the time the stream reaches peak flow. This lag time is affected by land use practices in the watershed. Vegetation increases the time it takes the water to reach the stream by allowing it to slowly infiltrate into the soil before it reaches the stream. Wetlands and ponds in the watershed also add to this temporary storage.

If it rains hard and long enough, the ground may saturate with water and then the precipitation will run directly into the stream. Because flow is such an important factor in determining the overall ecology of a stream, we have to be particularly careful about how we modify it. Because of its natural variability, we also must be careful to interpret water quality data in light of how the streams are flowing.

Expected Impact of Pollution

The increased, and more variable flows associated with storm water runoff pose a direct threat to aquatic organisms by modifying their physical habitat. Organisms are adapted to certain ranges and intensities of water velocity. Urbanization increases impervious surfaces like roofs, roads and parking lots that speed the delivery of water into streams. They become "flashier." Higher velocities alter habitats by moving cobbles and boulders and woody debris.

Increased flows may also increase erosion, modifying the channel and riparian zone in addition to delivering added "natural" pollutants (leaves, soil, animal droppings), road surface chemicals (metals, hydrocarbons, salts), lawn materials (grass and garden clippings, fertilizer nutrients, pesticides), and human litter. Increased erosion severely affects habitats by producing increased sedimentation of fine silt that fills the spaces between gravel and cobbles where aquatic invertebrates live and clogs their gills. Many streams and rivers in the U.S. have been severely impacted by flow modifications due to impoundment (creating dams) and channelization.

WOW. 2004. Water on the Web
(http://WaterOntheWeb.org)

Streamflow Measurement

DATA SHEET DETAIL

Estimation:
To estimate stream flow severity use previous observations as comparisons or note high water marks on stream banks, etc. This result is recorded in "Field Observations." Lake sites should record N/A.

Calculation:
To calculate stream flow in cubic feet per second (cfs), you can multiply width (feet) by depth (feet) by velocity (feet/second).

Use the following instructions for each section on the data sheet:

Width of stream: Measure across the stream where the riffle runs.

Depth of stream: Measure the depth at regular intervals across the stream at the riffle. Average the measurements.

Average velocity (in feet/second): Measure off 10 feet in the stream parallel to the current, including the sample area. Choose a spot where a float will not hit rocks or other obstructions. Have one person stand at the upstream end of the 10 feet and drop a floating object (you can use s ping-pong ball or an empty plastic film container) into the current. Another person should stand at the downstream end and note the time it takes the float to travel the 10 feet. If you are sampling by yourself, a small dry stick or orange peel may be used to note the float time. Repeat the process three times and average the times. Divide distance (10 feet) by the average time. Record velocity in feet per second.

Trial 1 time + Trial 2 time + Trial 3 time / 3 = Average time
Distance (10 feet) / Average time = Average velocity ft/sec

Insert findings for width, average depth and average velocity into the formula:

(Width) X (Avg. Depth) X (Avg. Velocity in feet per second) =
Flow in cubic feet per second

Q AND A:

Q: Monitor Billy Gravitt wrote: "One of the topics that always comes up with the folks that come and go during my river monitoring outings, is, ARE fish in the river safe to eat?"

A: The Texas Department of State Health Services is the state agency that issues fish consumption bans and advisories. Links to these documents can be found under "Fish Consumption Bans & Advisories" in the fishing regulations section of the Texas Parks and Wildlife website. For the most up-to-date information, check the TDSHS master list.

LCRA conducted a fish tissue study in 2005 at two locations, the Pedernales River arm of Lake Travis and the Colorado River at Webberville, but of the four constituents found in any measurable concentrations: mercury, the pesticide DDT, and DDE and DDD (both degradation products of DDT), none exceeded the concentrations recommended by TDSHS.

Stream Surveys Add Depth to Data

By Robin Berry, LCRA water quality coordinator

TECHNICAL CORNER

In addition to the physical and chemical data that volunteer water quality monitors collect, annual stream and watershed surveys provide background information about your monitoring site and provide a record of land use changes over time. You'll find a copy of the survey at the CRWN Web site. Not all monitoring sites are appropriate for the stream survey, so if you're unsure, contact your CRWN support staff.

Preferred Survey Time

This assessment of the watershed and stream, and though optional, should occur annually at a consistent time of year. The preferred time to survey is winter, during low flow conditions, and when vegetation is minimal and leaves have fallen from the trees. This is also the best time for lower basin sites to be surveyed because there are no irrigation releases during winter months.

The Value of a Stream Survey

The stream survey can help identify water quality concerns and provide a more complete picture of conditions at monitoring sites. For instance: You might describe land uses such as ranching, where cattle may drink at the creek where you monitor. Livestock might be contributing to the bacteria counts you are reporting. Or you may document that a section of the river is eroding due to road construction. This would likely decrease your transparency readings.

You will conduct the survey in two ways: First, make general observations about land use and conditions in the nearby watershed. Second, complete the stream reach section of the survey.

Compile background materials

You may find it helpful to review topographic maps and aerial photographs of the survey area. These may be found at http://crwn.lcra.org. Contact your CRWN support staff if you need help obtaining these materials. Outline the stream survey boundaries on the topographic map or aerial photograph print-out. This area does not need to include the entire watershed but should encompass an area around your site where you are familiar with the surrounding land use, within about a ¼ of a mile of your stream.

Compile materials for the field

- clipboard
- data sheet and survey
- pen or pencil
- watch with second hand

Optional

- camera in waterproof bag
- topographic maps and aerial photographs of area
- tape measure
- a partner for safety

You can conduct your stream survey when you do your regularly scheduled monitoring or at another convenient time during the winter months, between January and March. It is important to use consistent stream survey boundaries and to observe from the same location. If while conducting your survey, you are unable to determine the response to a question, just leave that space blank-but do not stop your survey. This is not a test; there are not right or wrong answers. The entire survey should take 1-2 hours.

Submit the completed survey electronically via email or provide a hard copy; crwn@lcra.org or LCRA Colorado River Watch Network P.O. Box 220 Austin, TX 78703. Contact your support staff person if you have questions or need a postage paid envelope. CRWN staff can review the survey with you at your annual side-by-side monitoring event.

MONITOR SPOTLIGHT: Connecting Learning and Life on the Llano river

By Lisa Benton, LCRA water quality coordinator

Philosophy and water quality – what do these seemingly unrelated topics have in common? That is an easy question for Sherra Theisen, a Colorado River Watch Network volunteer who monitors water quality on the scenic Llano River near Mason. Sherra and collaborator Jan Schultz established the Texas Nature Project (TNP), a non-profit organization that provides interdisciplinary nature education for college students from all backgrounds and institutions across Texas.

With a PhD in philosophy, Sherra integrates environmental ethics into the hands-on learning experiences she cultivates for students. Sherra said she was inspired to create Texas Nature Project when she realized how disconnected ethics students are from the natural world.

Texas Nature Project has provided hands-on nature learning experiences for tens of thousands of young Texans through outreach. In addition, TNP conducts dozens of youth and family programs each year at North Point Ranch, where TNP is based.

Sherra first learned about volunteer water quality monitoring through her neighbor, Keith Kaan, a former CRWN volunteer. Keith helped with TNP programs and invited Sherra on his monthly monitoring excursions. When Keith eventually decided to give up his Llano River monitoring location, Sherra was excited to become a certified monitor and take over at the site. She also began to more fully integrate water quality into her TNP curriculum.

In addition to her work with Texas Nature Project, Sherra is a visiting assistant professor in the Philosophy Department at St. Mary's University in San Antonio. Even with two full-time jobs, Sherra still schedules a few hours each month to monitor the health of the Llano River.

Volunteer monitor Sherra Theisen (bottom right) and Texas Nature Project students learn through hands-on nature education on the banks of the Llano River

Sherra values the water quality knowledge she has gained through the River Watch, and she is very grateful for the interesting, supportive and like-minded people she has met through the training process and at this year's Stewardship Workshop in Bastrop. Sherra said, "We really need a network to support our efforts and help us to sustain our patience, courage and hope. I am grateful to be a member of such a community through CRWN."

> *CRWN is a wonderful enrichment to TNP programs. By learning about and participating in the Colorado River Watch Network, students begin to appreciate just how important water is, and that changes who they are and how they live.*
>
> *–Sherra Theisen*

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MONITOR ACTIVITY REPORT

Between August 16, 2009 and November 15, 2009 97 monitors submitted 328 data points. Thanks for volunteering your time to protect our streams and reservoirs.

Cody Ackerman
John Ahrns
Jacob Apodaca
Erin Barker
Jeff Bauknecht
Don Beal
David Bennett
Jennifer Blossom
Donna Blumberg
Lenny Blumberg
David Boyd
Phil Bredfeldt
Michael Brewster
William Brock
Scott Brummer
Alison Bullington
Jay Bullington
Greg Busselman
Valerie Busselman
Barbara Caballero
John Cassidy
Ann Clift
Melissa Cole
Adam Comer
Nicholas Cowey
Sam Crowther
Douglas DeVidal
Bret Dingley
Terri Dingley
Mary Eastberg
David Edmondson
Wayne Foster
Robert Fuller
Crystal Funke
Meggan Georgas
Billy Gravitt
Marsha Hardy
Jeff Helser
Jeff Henke
Lynette Holtz
Jae Howard
Willow Howard
Michal Hubbard
Steven Hubbell
Brett Hulboy
Vera Janes
Russ Johnson
Meredith Keelan
Laura Kelly
Mike Kersey
Sue Kersey
Roger Kew
Susan Kleinman
Linda Lowenthal
Russell Lueders
Cindy Luongo Cassidy
Kathleen McCormack
Judy McCoy
Jim Miller
Joe Monahan
Casey Mulcihy
Jeff Noftz
Diane Nousanen
Charles O'Dell
Dan Opdyke
Kenny Pailes
RoxAnne Parker
Heather Podlipny
Jennifer Prihoda
Heather Rein
Betsy Roberts
Dan Rodgers
April Rose
Timothy Ryan
Diane Saltus
Winston Schroeder
Jeff Schwarz
Charlene Sefcik
Warren Sefcik
Russell Seguin
Sandy Shaw
Terri Siegenthaler
Jim Simmons
Therese Simmons
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