UPPER LLANO RIVER WATERSHED PROTECTION PLAN NEWSLETTER

ISSUE 2

APRIL 2013

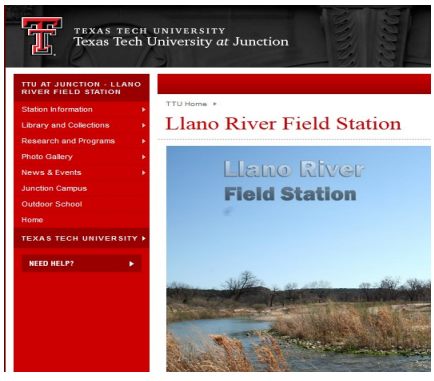
STATUS OF THE UPPER LLANO WATERSHED PROTECTION PLAN BY EMILY SELDOMRIDGE

Welcome to the second Upper Llano River Watershed Protection Plan (WPP) newsletter and thank you for your interest in preserving our valuable resource. The WPP is beginning to take shape.

Stakeholder attendance at the October 9 and December 11 meetings was great. The WPP mailing list continues to grow too, and now contains 437 members. At the December meeting, stakeholders voted to establish a Coordination Committee (see page 2 for the member list). Currently the Committee is working to identify and prioritize watershed issues. Top priority issues include: 1) water use: surface and ground water, 2) riparian habitat, and 3) incentive for brush management and land stewardship. The Committee will meet quarterly to review these issues and identify solutions to include in the implementation section of the WPP.

Other highlights of the WPP include completion of the third quarterly sampling for water quality, flow, and biological assessment. Data from the September and December samplings suggest the Upper Llano River remains in a healthy condition. A detailed explanation of water quality parameters can be found on page 5. Current data is shared at each Coordination Committee meeting. Previous water quality, flow, and biological assessment information are currently being compiled into a historic review. Upon completion and review, the document will be posted online.

For more information on the WPP, visit the South Llano Watershed Alliance at www.southllano.org, or contact Tom Arsuffi at the Llano River Field Station. Thank you again for your interest and I look forward to seeing you at upcoming events!



The Llano River Field Station is now online! Check us out at www.lrfs.junction.ttu.edu or like us on Facebook.

Inside this issue:

UPPER LLANO RIVER WPP COORDINATION COMMITTEE

On December 11, 2012 the first meeting of the Coordination Committee of the Upper Llano River Watershed Protection Plan (WPP) was held to discuss strategies to conserve and protect water quantity and quality in the North and South Llano Rivers. Coordination Committee members were appointed by local stakeholders at the October 9th public meeting, and confirmed at the December 11th meeting (list of Committee members below). In addition, Ground Rules were established by the Committee. The Committee is now responsible for identifying and prioritizing the Upper Llano River Watershed issues.

A second Committee meeting was held on February 21, 2013 to discuss the top priority issue of brush control and management. Dr. Ken Rainwater, Director of the Texas Tech University Water Resources Center and an expert in watershed hydrology, brush control and models, led the discussion on brush sculpting techniques and water relations, and application in the Upper Llano River Watershed. Dr. Rainwater is using EDYS, a hydrologic model, to prioritize BMP (best management practices) zones by proximity to the riparian area, relative distance to the outlet of the watershed, and soil classes relative to potential runoff. Dr. Rainwater acknowledged the difficulty of understanding and selecting the appropriate BMP for a particular ranch or area, but explained a role for the Conservation Demonstration Area on the Junction campus. An array of effective BMPs for the Upper Llano Watershed will be installed on campus for public viewing. Construction of the Conservation Demonstration Area will begin in the Fall (see page 4 for more information). Together with EDYS model projections, the demonstration area will provide examples of the potential benefits of various land management practices. This will be highlighted in the implementation portion of the WPP.

At the February meeting, the Committee voted unanimously to add two new members: Carl Teaff, a Sutton County Commissioner, and Bob Malone, a former member of the oil and gas industry and current president of Sonora Bank. The next Coordination Committee meeting will be held in early Summer. Details are forthcoming.

For more information on BMPs specific to Texas, visit: http://watershedbmps.com/, or for detailed meeting summaries visit: www.southllano.org.

Brush management and control techniques were ranked as a priority issue in the Upper Llano River Watershed. Coordination Committee members addressed this issue at the 2/21/2013 meeting held at the Llano River Field Station, Texas Tech University, Junction, TX. Pictured is an example of a rain water harvesting system located on Texas Tech Junction campus.

Coordination Committee Members

- **City of Junction:** Larry Maddux /Marvin Ivy
- **County Judges, Commissioners, and/or Water Districts:** Souli Shanklin (Edwards), Andrew Murr (Kimble), Gary Merritt (Real), John Wade (Sutton), Carl Teaff (Sutton-invited)
- **Soil Water Conservation Districts:** Bob Brockman (Edwards Plateau), Marty Graham (Upper Nueces-Frio), Ward Whitworth (Upper Llanos)
- **Outfitters– Texas Parks and Wildlife Department Paddling Trail**: Melissa Parker
- **Oil and Gas Industry**: Bob Malone (invited)
- **South Llano Watershed Alliance**: Znobia Wootan
- **South Llano River State Park :** Fred Gregg
- **Edwards Plateau Prescribed Burn Association**: Butch Taylor
- **Natural Resources Conservation Service (NRCS)**: Dandy Kothmann
- **Texas Wildlife Association**: Koy Coffer
- **Landowners**: Art & Debra Mudge, Tom Vandivier, Ruth Russell, Jerry Kirby, Brady Richardson/Daryl Stanley

TEXAS NATURAL RESOURCES/ENVIRONMENTAL LITERACY PLAN

Texas Parks and Wildlife Executive Director Carter Smith and Former First Lady Mrs. Bush share their views on the Texas Natural Resources/Environmental Literacy Plan during the unveiling summit held on 1/26/2103 in San Antonio, TX.

The core of who we are as Texans lies in the sustenance, history and culture built around our natural world. The future of Texas' natural and cultural resources depends on every one of us having a sense of place and our role in that place. To address this issue, a coalition of education, environmental, and natural resource leaders banded together to develop the Texas Natural Resources/Environmental Literacy Plan. The Plan was unveiled on January 25, 2013 with support from keynote speakers Former First Lady Mrs. Laura Bush and Texas Parks and Wildlife Executive Direction Carter Smith.

The Plan serves as a framework to coordinate statewide efforts of formal and informal educators to provide lifelong opportunities for all Texans, regardless of age, culture, and circumstances, to become stewards of our natural resources. "The Texas outdoors is being lost to children and to future generations," Bush said. "Nature and the natural world are like a foreign language to many of today's children in Texas and, indeed, around the nation. An elementary school child now spends less time outdoors than any other generation in human history." Smith continued "With the long-term challenges our state faces, such as how to provide water for people and the environment, we can't afford an illiterate citizenry when it comes to our natural resources."

The good news is that we can reverse this trend, and restore our relationship with Texas's rich natural and cultural heritage.

"If we make it a priority to conserve our own property and then to introduce the natural wonders of our state to our children, love for our land becomes a way of life," Bush said. "And by our example, we teach our children."

Motivation for the Plan stemmed from the federal No Child Left Inside Act (HR 2054), the Texas Children in Nature Partnership, and the following sobering statistics:

- Children ages 8-to-18 spend an average of 7.5 hours a day, over 50 hours per week, connected to a television, computer, video games and other electronic media.
- A child is six times more likely to play a video game than ride a bike.
- According to the Texas Education Agency's Fitnessgram©, less than a third of Texas youth are physically fit, and fitness levels decline in the upper grades. There is a strong correlation between a student's fitness and scholastic success.

The Plan has already gained support from over 25 organizations that indicated overall agreement with the content, strategy and alignment of the Plan with their mission.

For more information on the Plan, visit: http://taee.org/texas-natural-resource-environmental-literacy-plan.

Members of the Llano River Field Station and Outdoor School with Texas Parks and Wildlife Department Executive Director Carter Smith. Pictured from left to right Zack Thomas, Emily Seldomridge, Linda Edwards, Kim Baiza and Tom Arsuffi.

TEXAS WATER SYMPOSIUM: CONNECTING GROUNDWATER AND SURFACE WATER

Texas Springs: Making Connections between Groundwater, Surface Water, Science and Stewardship was the topic of the Texas Water Symposium held on March 8, 2013. Moderator Edwards County Judge Souli Shanklin was joined by Rural Land Steward Panelists David Langford, Ruthie Russell, and Tom Vandivier; Dr. Robert Mace (Texas Water Development Board); and Dr. Tom Arsuffi (Texas Tech University) to discuss the critical importance of land stewardship in the Hill Country to the protection of spring flow. The Hill Country contains the greatest concentration of springs in Texas, as well as the headwaters of 7 major rivers.

Panelists described ranch stewardship measures (such as brush control, controlled burns, controlling invasives, etc.) currently implemented with the goal of increasing spring flow. Land stewardship requires ongoing, often expensive efforts with the majority of benefits observed by downstream users; however, these dependent users are often unaware of the source springs. Dr. Arsuffi explained that education is essential to address this lack of awareness. He continued "I believe incentives need to be offered for upstream ranchers that absorb the cost of land stewardship because the practices provide significant benefits to downstream users." Although motivation for land stewardship varies, the Panelists unequivocally agreed their motivation stems from their love of the land.

The Texas Water Symposium broadcast is available for screening at http://www.tpr.org/post/where-water-comes. The Symposium is a partnership project between Schreiner University, Texas Tech University, Texas Public Radio, and the Hill Country Alliance. For more information visit: http://www.schreiner.edu/water/index.aspx

INTERPRETIVE TRAIL AND DEMONSTRATION AREAS

On June 6, 2012 and on January 16, 2013 stakeholders representing a variety of public and private partner organizations came together to discuss the proposed interpretive trail system and educational programming planned for the TTU-LRFS in Junction, Texas. Stakeholders produced twenty-seven creative and inspired ideas for future development and programming. Ideas included an interpretive trail system, observation tower, and conservation demonstration areas. The trail will consist of a network of interconnected paths that connect various natural resources and demonstration projects on the LRFS property. It will offer guided and self-guided opportunities using signage, printed materials and educational programs.

The observation tower, a bi-level structure, will demonstrate solar power, rainwater harvesting, integrative viewing of surrounding vistas, the Llano River, riparian zones, and upland restoration projects. It will serve as an outdoor gathering place for educational programs.

The conservation demonstration areas will consist of best management practices for land and water resource protection, conservation and restoration. Construction will begin in Fall of 2013. This effort was made possible through support by National Park Service Rivers, Trails and Conservation Assistance Program; Texas Parks and Wildlife Department Guadalupe Bass Restoration Initiative and Landowner Incentive Program; and the Dixon Water Foundation.

Members of the planning team assess a cutbank and a possible nearby location for the observation tower to overlook the South Llano River.

BEST MANAGEMENT PRACTICES FOR THE CONSERVATION OF TEXAS AQUATIC ECOSYSTEMS

BY: MEGAN BEAN, TEXAS PARKS AND WILDLIFE DEPARTMENT

Conservation best management practices (BMPs) are an important tool for developing and implementing plans and actions to conserve, protect, or restore natural resources. The Watershed Conservation Program at Texas Parks and Wildlife with the support of a regional habitat conservation partnership (Southeast Aquatic Resources Partnership) developed a website to disseminate conservation BMPs identified to address land use practices and impairments affecting the health of Texas watersheds: www.watershedbmps.com. Over 2,000 BMPs have been collected to address these state and regional threats to watershed health. Practices are organized by conservation objective, land use type, and large-scale watersheds. Individual BMP pages include: a description of the BMP, conservation benefits, and a scientific literature reference list. Species lists, conservation priorities, impairment issues, and watershed information (e.g. land use patterns, conservation initiatives, and current research) have also been compiled to more effectively facilitate conservation planning and habitat restoration and will be added to the website later this spring. If you have any questions or comments regarding the website, please contact Megan Bean: Megan.Bean@tpwd.state.tx.us

UNDERSTANDING WATER QUALITY STANDARDS

Water quality standards can be confusing. This guide was created as a reference for understanding water quality standards for the Upper Llano River. Water quality parameters are indicators of pollution. Standards are established for each water body type under the Texas Administrative Code 307.7. For the Upper Llano River, standards are established for dissolved oxygen (D.O.), *Escherichia coli*, pH, chloride, sulfate, total dissolved solids (TDS), and temperature. Of these standards, D.O., *E. coli*, and pH are of greatest importance because they are primary indicators for the health of the river.

Dissolved oxygen is a measure of the level of oxygen in the water and is essential for aquatic life. D.O. levels vary over 24 hours; levels increase during the day as plants photosynthesize, and decrease at night as plants and animals respire. Sufficient D.O. is essential for aquatic plants and animals to live; however, extreme spikes followed by extreme drops in D.O. levels may be an indicator of nutrient pollution (see nutrient standards). The standard for D.O. is >5 mg/L over a 24-hour period.

The **pH** is a measure of the acidity of the water and must remain near neutral to sustain aquatic life. The pH is measured on a scale from 0-14 with 7 being neutral, <7 is acidic, and >7 is basic. Waters of the Upper Llano tend to be slightly basic because of the limestone bedrock and soils. Extremes in pH can be toxic to aquatic life by causing physical damage to exoskeletons, eggs, fins, etc. In addition, changes in pH may increase the toxicity of other compounds in the water (e.g. acidic conditions can increase the solubility of mercury). The standard for pH is between 6.5 and 9.

Fecal coliform bacteria and/or ***E. coli*** is/are an indicator for the threat of harmful bacteria found in the feces of warm-blooded animals. Sources of *E. coli* include septic systems, wastewater treatment plants, livestock, and wildlife. The allowable limit for *E. coli* bacteria is a geometric mean of <126 colony forming units (cfu) per 100 milliliters and/or a single sample of <399 cfu per 100 milliliters.

Dr. Seldomridge takes a measurement of the dissolved oxygen level in the North Llano River.

Total dissolved solids are an indicator of ions in the water and may include **chloride** and **sulfate**. TDS are closely related to the conductivity, or the ability of the water to pass an electrical current. Similar to pH, the geology of the Upper Llano Watershed influences the total dissolved solids and conductivity. Limestone is highly soluble and can increase conductivity values. TDS and conductivity are also influenced by rainfall and temperature. Extended dry periods and low flow conditions contribute to higher TDS and conductivity values. In addition, chloride and sulfate can be indicators of saltwater intrusion. The standard for TDS is <350 mg/L, chloride is <50 mg/L, and sulfate is <50 mg/L.

Water temperature affects water chemistry and the functions of aquatic life. Temperature is of particular importance in the spring-fed Upper Llano. Springs originate as groundwater that maintains a very constant temperature as a result of insulation from the surrounding soil. Warm temperatures can decrease the solubility of oxygen in water, and increase rates of photosynthesis and metabolic rates of other organisms. Sources of temperature pollution may be from cooling tank outfalls from power plants or outfalls from wastewater treatment plants. Currently there are no power plants in the Upper Llano River Watershed and the wastewater treatment plant contributes a small amount of outfall (about 130,000 gallons per day). The standard for water temperature is <91°F.

Nutrient standards

Currently, there are no nutrient criteria for the Upper Llano. Together nitrogen and phosphorus are nutrients that are essential for aquatic life. Nitrogen is most commonly found in the form of nitrate, and phosphorus in the form of orthophosphate. Nitrates are used to build proteins and genetic material. Phosphorus is critical in the construction of cell membranes and the transfer of energy within all organisms. Nutrient pollution can be detrimental to aquatic ecosystems because in combination with organic matter they act as fertilizer to the river and stimulate algal and undesirable aquatic plant growth. The excess growth and subsequent decomposition of these organisms can deplete D.O. concentrations, which is deadly to other aquatic life, such as fish. This process is known as eutrophication. Sources of phosphorus and nitrogen include runoff of animal waste (such as livestock, feral hogs, and/or deer), fertilizers, and outfall from wastewater treatment plants.

Historically, the majority of water quality samples taken on the Upper Llano River have met the standards for all uses. Through the development of the WPP, water quality is measured quarterly. Current results are shared at the Coordination Committee meetings, as well as posted on the Watershed Alliance webpage: www.southllano.org.

TEXAS WELL OWNER NETWORK

Private well owners are independently responsible for monitoring the quality of their wells, operating their water systems, and ensuring that their drinking water is safe. On June 1, the Texas Well Owner Network (TWON) will teach private well owners about Texas's groundwater resources, water quality, water treatment, proper location, construction, and maintenance of water wells. The purpose of TWON is to train Texans regarding water quality and best management practices for protecting their wells and surface waters, which will avert off-site transport of contaminants (bacteria and nutrients) to surface waters, prevent contamination of underlying aquifers, and safeguard the health of landowners and their families.

As part of the well screening, TWON will test your well water for bacteria, nitrates, arsenic, and total dissolved solids. To participate in the screening, pick up sample bottles from the Texas Tech Junction campus in Building A beginning May 27 through May 31 between 8-5. Follow the included instructions on sample collection, and bring filled bottles to the June 1 workshop for well screening. The workshop will be held from 9:30-3:00 at the Texas Tech Junction campus cafeteria.

The TWON workshop is free with generous support from Texas A&M AgriLife Extension Service in cooperation with the Texas State Soil and Water Conservation Board. Additionally, as part of the Upper Llano WPP, the first 100 participants will receive free well screening. For more information visit http://twon.tamu.edu/ or call Emily Seldomridge at 325-446-2301.

Upcoming Events

- **Water is Life conference**: April 18, Texas A&M AgriLife Research Station in Sonora, Registration begins at 8AM
  For more information, call 325-387-3101
- **Water Conservation Workshop:** April 20, TTU-LRFS Junction campus cafeteria
  Join the South Llano Watershed Alliance at the Texas Tech campus to learn about water conservation measures
- **Texas Well Owner Network**: June 1, TTU-LRFS Junction campus cafeteria
  Private well owners can learn how to care for their well and septic systems to prevent contamination of underlying aquifers and safeguard the health of landowners and their families. Seminar includes water screening.

Contact us!

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