Coordinating Implementation of the Upper Llano River Watershed Protection Plan

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TSSWCB PROJECT 15-11 FINAL REPORT

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TEXAS STATE SOIL AND WATER CONSERVATION BOARD

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Acronyms

BMP – Best Management Practice

EPA – Environmental Protection Agency

IRNR – Institute of Renewable Natural Resources

LCRA – Lower Colorado River Authority

LSHS – Lone Star Healthy Streams

NRCS – Natural Resources Conservation Service

QPR – Quarterly Progress Report

SWCD – Soil & Water Conservation District

TCEQ – Texas Commission on Environmental Quality

TSSWCB – Texas State Soil & Water Conservation Board

TWON – Texas Well Owner's Network

TWRI – Texas Water Research Institute

TMDL – Total Maximum Daily Load

TTU-LRFS – Texas Tech Llano River Field Station

WQMP – Water Quality Management Plan

WC – Watershed Coordinator

WPP – Watershed Protection Plan

WSC – Watershed Steering Committee

Executive Summary

The Upper Llano River (North and South Llano rivers) is currently a healthy ecosystem supporting a variety of aquatic and terrestrial ecosystems, as well as numerous recreational opportunities. However, a number of threats to this critical resource do exist. To address these threats, local stakeholders, through the Upper Llano River Watershed Coordination Committee developed a watershed protection plan (WPP). A WPP for the Upper Llano River above Junction was completed in early 2016 and received final acceptance from the Environmental Protection Agency (EPA) in October, 2016. A full-time watershed coordinator position was considered critical in initiating and carrying out the implementation process by the watershed coordination committee. The watershed coordinator has provided technical assistance to stakeholders, acquired additional funding for implementation strategies, coordinated outreach and education efforts, and monitored water quality data to identify if implementation efforts have been successful. Over the last two years the watershed coordinator has requested over $4 million and has received over $2 million in program funds for implementation efforts in the Upper Llano WPP. Education and Outreach efforts over the last two years included more than 30 workshops, field days, and presentations. Watershed curricula created as part of the WPP implementation through the Llano River Field Station Outdoor School was delivered to 64 Independent School Districts across the region.

Introduction

Project Background

The Llano River is a large tributary of the Colorado River, flowing into Lake LBJ. In fact, this clear spring-fed perennial river dilutes dissolved solids and suspended sediment in the Colorado (2010 LCRA Basin Highlights Report), thus improving the water quality in Lake LBJ and other Highland Lakes. The Lake LBJ watershed, and other Highland Lakes for that matter, has experienced significant population growth in recent years. Pressure from this growing population will require rigorous stewardship of resources to ensure its sustainability (2009 LCRA Basin Highlights Report).

The Upper Llano is currently a healthy ecosystem supporting a variety of aquatic and terrestrial ecosystems, as well as numerous recreational opportunities. However, a number of threats to this critical resource do exist. According to "Land of the Living Waters: A Characterization of the South Llano River, Its Springs, and Its Watershed" prepared by the Environmental Defense Fund, the primary threat to the South Llano River is loss of spring flow. Subtle changes due to land fragmentation, loss of riparian habitat, and encroachment of juniper species on upland habitats also have the potential to decrease the water quality and quantity of the river. Additionally, there is potential for increased biological pollution and reduction in flows should what are now isolated pockets of invasive plants [giant reed (*Arundo donax*) and elephant ears (*Colocasia esculenta*)] continue to spread.

In 2013, the Upper Llano Watershed Coordination Committee (WCC) was established to provide local input into the Upper Llano Watershed Protection Plan (WPP) development. As part of Texas State Soil and Water Conservation Board (TSSWCB) project 11-04, Development of the Upper Llano River Watershed Protection Plan, land use / land cover data was updated, watershed modeling was conducted, and a WPP drafted to preserve the river and its flows. The development of the WPP was a stakeholder driven process facilitated by Texas Tech University Llano River Field Station (TTU-LRFS) and Texas Water Resources Institute (TWRI). The WCC includes local business owners, landowners, and municipal and county representatives. With technical assistance from TTU-LRFS, TWRI and other state and federal partners, the WCC identified water quality issues that are of particular importance to the surrounding communities. The WCC also contributed information on land uses and activities that were utilized in identifying potential sources of concern and in guiding the development of the WPP. The WPP identified responsible parties, implementation milestones and estimated financial costs for individual management measures and outreach and education activities. The plan also described the estimated load reductions and load preventions expected from full implementation of all management measures.

The WCC recommended establishing a permanent watershed coordinator in the WPP to facilitate

implementation of the Upper Llano River WPP. The WPP states, “In addition to technical and financial assistance required for implementation of management measures and outreach programs, it is recommended that a full-time Watershed Coordinator be employed to facilitate continued progress, throughout the 10-year implementation schedule. This position will oversee project activities, seek additional funding, organize and coordinate regular updates for the LRWP, maintain the website, and coordinate outreach and education efforts in the watershed.”

The Upper Llano River WPP was completed in early 2016 and approved in October 2016. As WPP implementation funding through CWA §319(h) nonpoint source grants for on-the-ground best management practices was not requested until the FY2017 funding cycle, a lapse was created in the facilitation of the WPP. Because of this lapse, this project was necessary to provide for interim facilitation during the approval of the WPP and coordination of the initiation of WPP implementation. It was imperative that stakeholder engagement continue among the community to bridge the gap between projects that developed the Upper Llano River WPP and beginning WPP implementation effort

Through a local presence in Upper Llano watershed (see map below), the watershed coordinator served as the primary conduit for interaction with landowners, citizens, and entities to facilitate the implementation of the WPP. The watershed coordinator coordinated meetings with the Upper Llano WCC and stakeholders, to update them, seek their input and recommendations on needed activities, and continued to support and facilitate implementation efforts of the plan. The watershed coordinator assisted the communities, counties, local boards and businesses to acquire resources to enable WPP implementation. The watershed coordinator worked with state and federal agencies, as appropriate, to bring technical and financial assistance to the watershed.

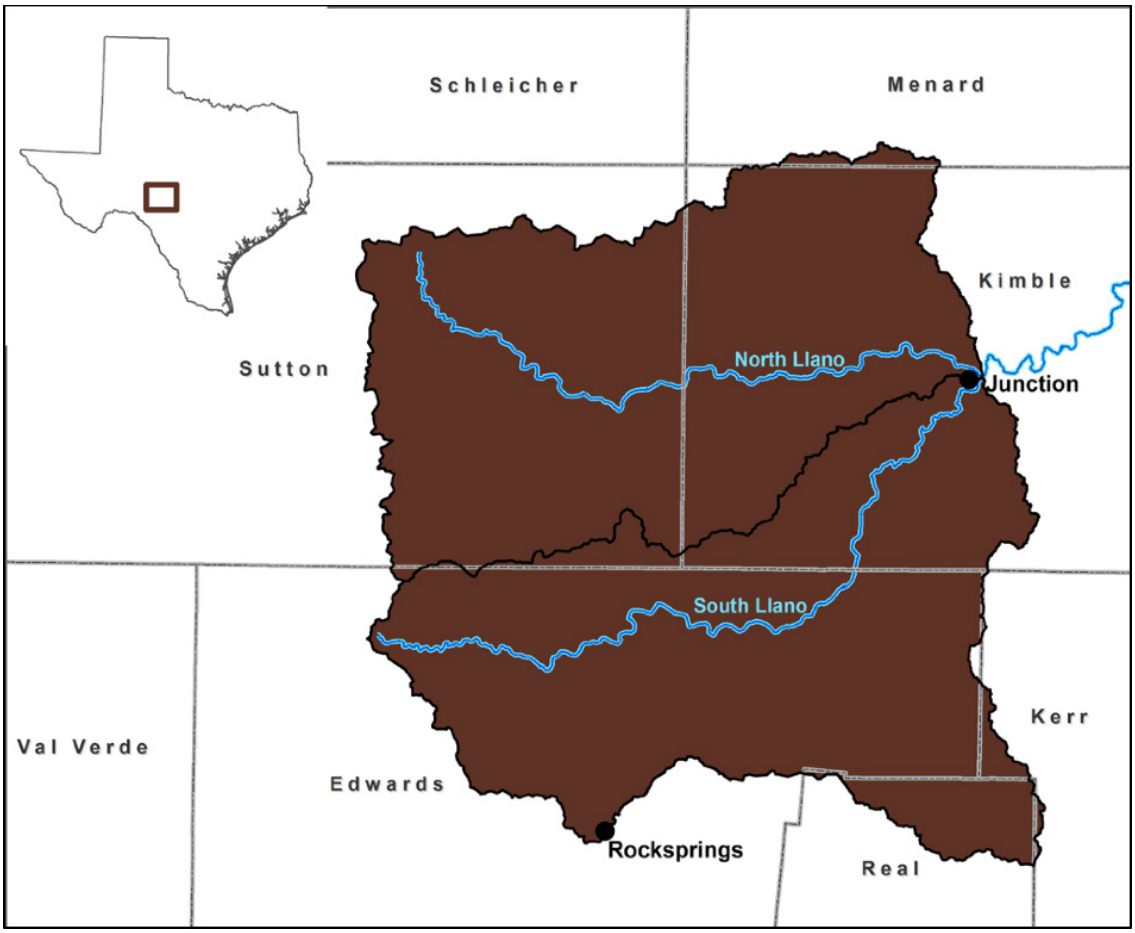

Figure 1. Location of the Upper Llano River Watershed, consisting of the North and South Llano rivers.

As part of an adaptive management approach embraced by stakeholders, the watershed coordinator evaluated progress toward achieving milestones established in the WPP and assessed water quality data in relation to maintaining healthy watershed conditions.

Coordination of outreach and education efforts by the watershed coordinator facilitated and supported public participation by private individuals and local officials in the implementation of the Upper Llano River WPP. The watershed coordinator developed publications (a semi-annual newsletter, factsheets, website content) to promote and communicate watershed pollution prevention efforts. Additionally, the watershed coordinator coordinated and conducted educational outreach efforts across the watershed by organizing training programs such as Lone Star Healthy Streams (feral hog, grazing cattle, and horse components) and Texas Watershed Stewards workshop.

Project Goals

The goal of this project was to continue to raise awareness and engage the local watershed communities about the WPP and actions to be taken to maintain and improve water quality in the Upper Llano watershed. Specific goals include:

1) Foster coordinated assistance activities for the Upper Llano River Watershed Protection Plan stakeholders.

2) Conduct regular stakeholder meetings to encourage citizen participation, provide partners with updates on progress, and seek stakeholder input and recommendations on needed activities.

3) Support and facilitate the Upper Llano River WPP stakeholders in identifying management measures to improve water quality, developing proposals to acquire funding for implementation of management measures, managing and tracking implementation projects as well as encourage adoption of BMPs.

4) Evaluate progress toward achieving milestones established in the WPP.

5) Coordinate and conduct water resources and related environmental outreach/education efforts across the watershed.

Tasks & Accomplishments

Task 1 – Project Administration

The Upper Llano River WC and TTU-LRFS prepared electronic quarterly progress reports (QPR), submitted Reimbursement Forms to TSSWCB and hosted coordination meetings and conference calls with Project Partners to discuss project activities, project schedule, communication needs, deliverables and other requirements.

Task 2 – Support and Facilitation of WPP Implementation

TTU-LRFS facilitated continued stakeholder involvement in the Upper Llano River Watershed to ensure successful implementation of the WPP and track implementation.

Website, Newsletters, & Social Media

Throughout the development and implementation of the WPP, TTU-LRFS has partnered with the Llano River Watershed Alliance, formerly South Llano Watershed Alliance, (www.llanoriver.org) to host website and social media content. The website serves as a public clearinghouse for project and watershed-related information. Meeting announcements, agendas, presentations, documents, and results are posted to this website along with press releases, newsletters, and links to social media outlets.

TTU-LRFS and LRWA distributed a weekly newsletter highlighting local water news and workshops in the region, as well as any policy relevant to water quality and/or quantity. Semi-annual newsletters focusing on the WPP were also distributed.

TWRI prepared a magazine article about the WPP for the Fall 2017, txH20: "Ahead of the Curve: Hill Country stakeholders proactively create Upper Llano River Watershed Protection Plan.

Finally, the Llano River Watershed Alliance also has an active Facebook page with 562 "Likes" and maintains an listserve with 342 subscribers. Water news, as well as education and outreach opportunities throughout the state, are highlighted through these social media platforms.

Acquisition of Financial and Technical Resources

The WC worked with various governmental and non-governmental organizations in the Upper Llano River watershed to identify and pursue financial and technical resources for WPP implementation as follows:

- Texas Parks and Wildlife Department – Landowner improvement grant awarded to LRFS to fund stream bank and riparian restoration - $55,000
- Southeast Aquatic Resources Partnership – LRFS submitted two grant proposals for $224,000 and $98,000 for riparian restoration and research along the North and South Llano. The proposals were not funded.
- Healthy Watershed Consortium – LRFS submitted two grant proposals for $200,000 and $85,000 to develop brush control/water supply enhancement demonstration area. The proposals were not funded.
- Texas Water Development Board – LRFS assisted City of Junction with submitting three applications for SWIFT loans for water conservation.
- NRCS Regional Conservation Partnership – LRFS partnered with several NGOs and governmental organizations through the Hill Country Network to submit a $10m proposal for brush control and conservation easements. $5.15m was awarded.
- TSSWCB Clean Water Act Non-Point Source – LRFS and TWRI submitted $216k grant to fund continued implementation of WPP. The proposal was not funded.
- NFWF Five Star and Urban Waters Restoration Program – LRFS submitted a grant application for $24,000 to fund riparian restoration in and around Junction City Lake and the South Llano River.
- US Bureau of Reclamation WaterSmart Cooperative Watershed Management – LRFS submitted grant application for $100,000 to fund WC position for two years. The proposal was not funded.

Task 3 – Outreach, Education, Community Support

TTU-LRFS and TWRI promoted involvement, provided information transfer, and encouraged participation in the Upper Llano River WPP through a variety of activities.

Public Presentations

The WC met with each City Council, County Commissioners Court, Groundwater District, and Regional Water Planning Group in the watershed to discuss opportunities through the WPP. In addition, the WC met with the local Prescribed Burn Association, Predator Control Board, Fly Fishing Groups, Service Organizations and Watershed Alliance. TTU-LRFS made formal presentations about the WPP as follows:

- South Central Texas Research Interest Group, San Antonio
- Hill Country Water Summit, New Braunfels
- Texas State Comptroller Freshwater Mussels Workgroup, Austin
- Texas Water Symposium, Fredericksburg
- University Council on Water Resources, Pensacola, Florida and Fort Collins, Colorado
- Ecological Society of America, Portland, Oregon
- Organization of Biological Field Stations, Itasca, Minnesota
- Southwest Stream and Wetland Restoration, San Antonio
- Texas Parks and Wildlife Foundation, Mason
- Texas Academy of Science, Junction
- LCRA Clean Rivers, Austin

Trainings and Professional Development

Texas Watershed Coordinator Roundtables are held biannually to provide a forum for establishing and maintaining dialogue between watershed coordinators, facilitate interactive solutions to common watershed issues faced throughout the state, and add to the fundamental knowledge conveyed at the short courses. TTU-LRFS and or TWRI attended all meetings and TTU-LRFS made a presentation about Exotics and Exclosures at the January 11, 2016 meeting.

Lone Star Healthy Streams

The goal of the Lone Star Healthy Streams (LSHS) program is the protection of Texas waterways from bacteria from livestock operations and feral hogs. The program's objective is the education of Texas landowners about proper grazing, feral hog management, and riparian area protection to reduce the levels of bacteria in streams and rivers. The framework for the LSHS program is five resource manuals that focus on bacterial runoff management for beef cattle, dairy cattle, horses, poultry, and feral hogs. As part of this educational program, both conventional and novel BMPs are discussed to provide important information on BMP effectiveness relative to implementation costs and load reductions. Through enhanced education on riparian protection and vegetation management on grazing lands, LSHS works to protect Texas waterways from sediment, nutrient, and bacteria runoff with the concomitant loss of water and topsoil. LRFS hosted a LSHS workshop on September 8, 2017 focusing on Feral Hogs, Grazing Cattle, and Horses. There were 9 attendees.

Streambank Restoration Workshop for Landowners

A free Streambank Restoration workshop was held in at the TTU-LRFS on June 3, 2016. Presentations focused on hydrology, river/floodplain function and mechanics, flood morphology, bank erosion, channel erosion/deposition, land use/management, and restoration design principles. Attendees learned how to identify the cause of instability and its effect on sediment imbalance, water quality, water supply, downstream landowners and aquatic habitat. Fifty-three landowners and agency personnel attended the workshop.

Texas Watershed Stewards

A Texas Watershed Steward (TWS) program was held at TTU-LRFS on May 6, 2017. There program had 28 attendees. The program is a statewide one-day educational program designed to improve the quality of Texas' water resources by educating and informing local stakeholders about their watershed, potential impairments, and steps that can be taken to help improve and protect water quality in their watershed.

Texas Well-Owner Network

A Texas Well-Owner Network (TWON) training was held in at TTU-LRFS on October 3, 2017. There were 19 participants in the workshop. TWON trains Texans who depend on private wells for their drinking water, on water quality and BMPs for protecting their wells and surface waters thus helping avert off-site transport of contaminants to surface waters, prevent contamination of underlying aquifers, and safeguard the health of landowners and their families. It is offered by AgriLife Extension in cooperation with the TSSWCB and other partner agencies and organizations. TWON delivers a science-based, community - responsive education curriculum focused on protecting ground water quality, aquifer integrity, and complements the TWS program by emphasizing BMPs. AgriLife Extension offers voluntary private water well screening events in conjunction with TWON trainings. As a result, participants have a better understanding of the relationships between practices in or near wells and the quality of water available for drinking and irrigation.

Rain Water Harvesting Workshop

AgriLife Extension and TTU-LRFS hosted a Rain Water Harvesting workshop for 19 area residents on June 9, 2018. The workshop focused on Rain Water Harvesting for irrigation and indoor use as well as livestock and firefighting.

TTU-LRFS Outdoor School

The Outdoor School hosted 64 Independent School Districts over the course of the Project. A K-12 Watershed Curriculum was created for these Districts as part of the WPP implementation. In addition, the Outdoor School hosted two K-12 STEM Teacher Professional Development workshops focusing on water, natural resources, and environmental literacy. TTU-LRFS utilized the Outdoor School's Stream Trailer for many of these events to educate teachers and students about stream processes, geomorphology and riparian protection.

Task 4– Volunteer Monitoring

In order to monitor any water quality changes or benefits arising from the implementation of the WPP, a volunteer water quality monitoring network was established.

Texas Stream Team

A total of 27 volunteers attended a full day water quality monitoring training in January of 2016. The training included both training in sampling of 'Core' parameters (temperature, pH) as well as 'Advanced' parameters, such as nitrates and bacteria.

The WC oversees volunteer monitoring for ten sites in the Upper Llano River Watershed. Observations are verified and entered into the Texas Stream Team database and dataviewer. Data are also shared with LCRA for their Basin Highlights Report. The WC attends the annual partner meeting for the Texas Stream Team.

Water Quality Data Assessment

In June of 2018, TWRI and TTU-LRFS prepared a water quality assessment to reveal trends in *E-coli* and Dissolved Oxygen in the Upper Llano River Watershed. The report is available at: http://twri.tamu.edu/publications/reports/2018/tr-511/.

Conclusions

Through this project, 1,006 individual were reached through program attendance, trainings, social media, or newsletters. Two significant barriers to adoption of on the ground practices that protect and improve water quality in the Upper Llano Watershed include limited funding and absentee landowners. TTU-LRFS will continue to fill the role of watershed coordinator in the near-term. Future work will include identifying and working with nonprofit organizations to establish funding mechanisms for projects in the watershed and exploring opportunities to better reach and educate landowners