

Clearwater Source

Clearwater Underground Water Conservation District

www.cuwcd.org

2016 Annual Newsletter

| October 2016

| Volume 12, Issue 1

A MESSAGE FROM THE PRESIDENT

Another year has passed and as the norm in Texas, it has been another unusual year for our rainfall that directly affects our underground water. The District continues to monitor the Trinity aquifer for drawdown and scientifically ascertain the issues and causes of excess drawdown in certain areas of the county. The Trinity aquifer does not respond to the excess rainfall to the same degree as the Edwards aquifer which responds quickly to both excess and lack of rainfall. Your elected board continues to manage our underground water and continues to obtain the science to further our knowledge of this valuable resource that we all depend on for life.

The District has been very active this year in the five-year water planning for Texas as required by law. We continue to expand our water education to area schools to educate our school children about our most valuable resource, water conservation and the value of water to their lives.

The annual water symposium is being held on Wednesday, November 16th. I would encourage you to attend this free symposium to be updated on the current status of underground water both here and across Texas and the challenges and opportunities that we are facing. I would also encourage you to go to our website, www.cuwcd.org, which, in my opinion, is one of the best in Texas in that it combines Bell-CAD, mapping, lake levels, rainfall, drought status and water issues.

Hopefully, I'll see you at our water symposium and if you have any underground water issues, please call our District office for assistance.



Leland Gersbach, President
Clearwater UWCD

WHAT WE NOW KNOW ABOUT THE NORTHERN SEGMENT OF THE BALCONES FAULT ZONE EDWARDS AQUIFER

Students and faculty from Baylor University have been actively conducting research in cooperation with the Clearwater Underground Water Conservation District and other stakeholders in Bell County for several years. Their efforts to learn more about the hydrologic processes in the Northern Segment of the Edwards Balcones Fault Zone aquifer revealed some important discoveries that will aid water management and help direct future research needs. Stephanie Wong and Dr. Joe Yelderman will present, "What We Now Know About the Northern Segment of the Balcones Fault Zone Edwards Aquifer" at the Bell County Water Symposium November 16th. Some of their discoveries are listed below with interpretations regarding their potential significance.

1. Synoptic water levels measured in 2013 included more wells than ever measured before (39) and revealed little change from 2010 synoptic levels. Overall aquifer levels, individual well levels, and general flow patterns remained similar to those previously measured. The synoptic water level data indicate that the aquifer weathered the epic drought of 2011 without large water level changes.
2. Data collected with multi-parameter data loggers in a cave/well and several springs indicated rapid groundwater responses to large rainfall events. The data also show slight water quality changes (Figure 1, below). Data from the multi-parameter data logger further refined the fracture system at the springs by indicating a slightly slower response to recharge at Doc Benedict Spring

than adjacent Anderson Spring. The responses to recharge captured by the data loggers also provide important timing information to aid in the development of future monitoring strategies.

3. The presently known spring orifices in downtown Salado, east of I-35 (excluding Robertson Spring west of I-35), appear to all be part of an integrated fracture system as documented by dye tracer tests. The connectivity of these springs through the fracture system implies that aquatic organisms such as the Salado Salamander should hypothetically be able to move about among the springs and can be managed as a group using the USGS stream gauge.
4. The dye tracer test conducted in 2015 under higher flow conditions confirmed flow directions and connectivity data from the 2013 tracer test and revealed groundwater flow velocities of approximately 350 feet/hour or almost 6 feet/minute in the immediate area of the springs. The fact that the same springs were all connected under both high and low flow conditions is important and indicates a well-developed fracture system with strong connectivity. The high groundwater flow velocities in the immediate area of the springs are important to consider in management decisions.
5. Specific conductance* (SC) and temperature (T) measurements in cross sections of Big Boiling Spring as well as upstream and downstream of the confluence between Big Boiling Spring discharge and Salado Creek confirm the mixing patterns of groundwater and surface water from Big Boiling Spring and also confirm Rock Spring as a groundwater discharge point. The cross section data are important to quantify groundwater/surface water mixing, aid in habitat assessments, and aid in sample location selection. *Specific conductance is the ability of water to conduct electricity and is directly related to the salinity of the water.
6. Nitrogen data from field and laboratory analysis showed values that are interpreted to be slightly above expected background levels, but no nitrate values were observed to be over the drinking water limit. There were no strong trends but some of the higher

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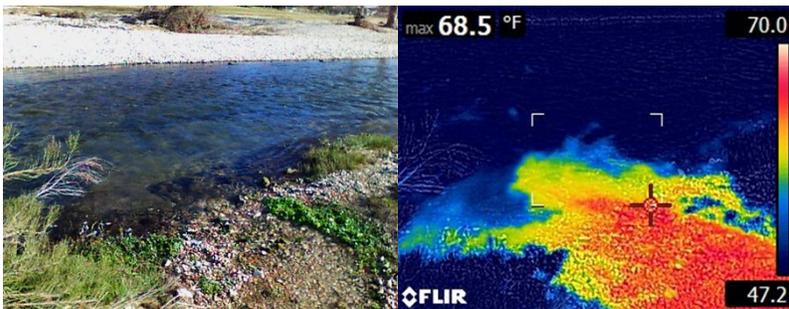


Figure 2. A digital photograph (left) and a thermal infrared image (right) of Side Spring discharging into Salado Creek.

Groundwater Cheat Sheet

- **GCD:** Groundwater Conservation Districts are political subdivisions of Texas created to protect and balance the use of groundwater. GCDs are granted specific legal authority in Chapter 36 of the Water Code to manage groundwater production through various methods, including well spacing and production limitations.
- **GMA:** Groundwater Management Areas are designated by the TWDB and generally match aquifer boundaries. GCDs within the GMA meet to develop DFCs for the aquifers in their jurisdiction.
- **DFC:** a Desired Future Condition is a quantifiable condition of an aquifer at a specified future time. The metric may be based on aquifer levels, spring flows, or volumes of water in the aquifer (example: average draw-down not to exceed 25 feet over 50 years). In setting DFCs, GCDs must balance the highest practicable groundwater production with conservation and protection of the aquifer. GCDs must then manage groundwater production on a long-term basis to achieve the DFC.
- **TWDB:** The Texas Water Development Board is the state agency responsible for overseeing state and regional water planning, providing financial assistance for local government water projects, and studies the state's surface water and groundwater resources.
- **MAG:** the Modeled Available Groundwater is calculated by the TWDB and is the amount of water that may be produced on an average annual basis to achieve a DFC. The MAG is a tool used by GCDs to ensure consistency with the DFC and by regional water planning groups for water planning.
- **Joint Planning:** the process by which GCDs in a GMA work together to develop DFCs, review groundwater management plans, and assess the accomplishments of the GMA.
- **GAM:** a Groundwater Availability Model is a regional groundwater flow model approved by TWDB.
- **TAGD:** the Texas Alliance of Groundwater Districts is a 501(c)(3) educational association made up of more than 80 GCDs and 30 associate members. TAGD assists GCDs, provides groundwater outreach and education, and facilitates communication among groundwater stakeholders.

texasgroundwater.org

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values were found in the more developed areas. The nitrogen data warrant further investigation and monitoring.

7. Progress using LiDAR data to detect recharge features has been slow and time consuming, but some progress has been made. The map interpretations may help delineate some important fractures that contribute to the springs.
8. Thermography studies using a FLIR infrared camera delineated interactions between groundwater (spring flow) and surface water (Salado Creek). The infrared images helped interpret the dynamics of the potential spring habitat affected by temperature and the results will be helpful in planning management strategies for the springs as habitat (Figure 2, below).

Stephanie S. Wong, Doctoral Student, Hydrogeology, Baylor University
Joe C. Yelderman Jr. Ph. D., P.G. #2941-Hydrogeology Professor, Baylor University

Join the District for the 16th Annual Bell County Water Symposium November 16, 2016 8:00 A.M. --- 4:00P.M. Texas A&M University - Central Texas

****This event is free but requires RSVP by November 10th****

Key Topics and Speakers

Understanding Groundwater Management Issues and Challenges in Texas?

Ty Embrey, Attorney, Lloyd Gosselink, Rochelle and Townsend
Sarah Rountree Schlessinger, Executive Director
 Texas Alliance of Groundwater Conservation Districts

State of the District

Leland Gersbach, President, Clearwater UWCD
Dirk Aaron, General Manager, Clearwater UWCD

Finding Balance Between Regulation, Management, and Property Rights in the Central Carrizo-Wilcox"

Gary Westbrook, General Manager, Post Oak Savannah GCD

Understanding the Geology of the Aquifers for ASR

James Beach, P.G., Senior Vice President, LBG-Guyton Associates

Aquifer Storage and Recovery - Reality for the Future of Central Texas

Matt Webb, Hydrologist, Texas Water Development Board

Case Study of an ASR Project

Dr. Hughbert Collier, Ph.D., P.G., Senior Vice President, Collier Consulting

Looking Closely at ASR for Central Texas

Dr. June Wolfe, Associate Research Scientist, Texas A&M AgriLife Research, Blackland Research and Extension Center

An Evolving Understanding of the Hosston Layer of the Trinity Aquifer

Mike Keester, Senior Hydrogeologist, LBG-Guyton Associates

What We Now Know About the Northern Segment of the Balcones Fault Zone Edwards Aquifer

Stephanie Wong, Graduate Student, Hydrogeology, Baylor University
Dr. Joe Yelderman, Professor (Hydrogeology), Baylor University

Status of the Salado Salamander

Pete Diaz, Texas Fish & Wildlife Conservation Office

----- Event Sponsors -----

Clearwater UWCD	Lloyd-Gosselink Attorneys at Law
LBG-Guyton Associates	Bell County Engineers Office
HALFF Associates	Texas AgriLife Extension Service
Texas A&M University - Central Texas	



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CLEARWATER UWCD ENCOURAGES ASR AS THEME OF 16TH ANNUAL BELL COUNTY WATER SYMPOSIUM

The 16th Annual Bell County Water Symposium, hosted by Clearwater UWCD will be held on November 16, 2016 at Texas A&M University - Central Texas in Killeen. The theme of this year's event is Aquifer Storage and Recovery (ASR).

Recently the House Research Organization of the Texas Legislature, reported in their interim news briefs, an update on the state's studies of surface water loss and the need for ASR. In their news brief, "ASR involves collecting water during wet periods and storing it underground in an aquifer through an injection well from which it can be drawn for use during periods of peak demand."

According to the Texas Water Development Board, about 7.2 million acre-feet of water that is currently stored in surface water reservoirs evaporates in an average year. While surface reservoirs continue to be prominently featured in the recently adopted 2017 state water plan, ASR has several advantages over reservoirs that justify its expanded use. In addition to resisting water loss through evaporation, ASR does not involve the acquisition and flooding of land above ground which can be expensive and result in destruction of wildlife habitat and private property.

Although a few Texas municipalities have used ASR for a number of years, some say a principal challenge to more widespread implementation of it is a

legal and regulatory framework for water policy that is not well adapted to the technology. In 2015, the 84th Legislature enacted HB 655 which resulted in several changes to the way ASR is regulated. The bill specified how ASR facilities must account for the water they inject and recover and the role of groundwater conservation districts in such projects. The new law establishes the same regulatory framework for all ASR projects, whether the source of the stored water is groundwater, surface water, or treated wastewater. The new law also prescribes measures designed to protect water quality in the receiving aquifer and modifies the requirement that water meet drinking water standards before being injected. CUWCD embraced this bill and believes that ASR is a critical strategy to help answer the regional question of "How can we meet the growing need for water in both Bell and Williamson Counties". Growth in the entire IH35 corridor is eminent and water is limited.

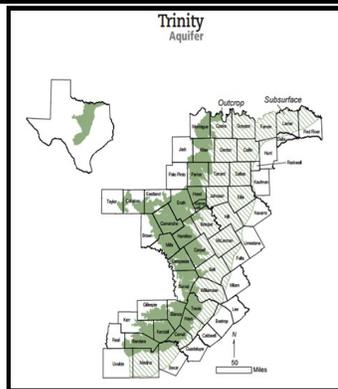


Learn more about ASR in Texas in the House Research Organization's focus report, Addressing water needs using aquifer storage and recovery. <http://www.hro.house.state.tx.us/pdf/focus/asr.pdf>

Dirk Aaron, General Manager
Clearwater UWCD

TRINITY AQUIFER BRACKISH GROUNDWATER STUDY

The Texas Water Development Board (TWDB) has initiated a study of the Trinity aquifer. The TWDB has hired the Southwest Research Institute to conduct a study of the brackish groundwater resources of the Trinity aquifer which encompasses 89 Texas counties. This study is taking place in order to fulfill part of the commitment of TWDB to identify and designate potential brackish groundwater production zones throughout the state as directed in House Bill 30 passed by the 84th Texas Legislature in 2015.



The TWDB staff is working to fulfill House Bill 30 commitments utilizing the Brackish Resources Aquifer Characterization System (BRACS) program. The

BRACS program uses information from existing water wells, oil and gas wells, and geological reports to identify the areal extent and thicknesses of brackish water-bearing geologic formations and to characterize the availability of groundwater in them.

Stakeholder meetings will be scheduled in the near future to disseminate the findings of the study concerning the availability of brackish groundwater from the Trinity aquifer and to field questions and concerns from stakeholders. The study completion deadline is August 31, 2017. Clearwater Underground Water Conservation District encourages all interested parties to stay informed on this effort by TWDB.

For more information on the Trinity BRACS study, please visit: http://www.twdb.texas.gov/innovativewater/bracs/projects/HB30_Trinity/index.asp

For more information on HB 30 please visit: <http://www.twdb.texas.gov/innovativewater/bracs/HB30.asp>

BOARD OF DIRECTORS

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MISSION STATEMENT

To implement an efficient, economical, and environmentally sound groundwater management program to protect and enhance the water resources of the District.

WATER QUALITY SCREENING

The District's in-house lab offers registered well owners free screening for common constituents and bacteria. Annual screening is recommended.