Clearwater Underground Water Conservation District

Every drop counts!

Annual Report

Fiscal Year 2011

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District Mission Statement

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

Clearwater Underground Water Conservation District

Annual Report-Fiscal Year 2011

The Annual Report for Fiscal Year 2011 (FY11) was approved by the Directors of the Clearwater Underground Water Conservation District (CUWCD or District) on (DATE). This report summarizes the activities and accomplishments of the District during FY11 focusing on administrative tasks, management plan requirements, and miscellaneous activities. Most activities are based on the District's fiscal year; however, information dealing with well registration, permitting, and production are based on the 2011 calendar year.

Wallace Biskup	Bill Bartlett	Leland Gersbach	Judy Parker	David Cole
Precinct 3	Precinct 2	Precinct 1	Precinct 4	At-Large

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1. INTRODUCTION

The Clearwater Underground Water Conservation District was created by the State legislature in 1989 to manage the groundwater resources of Bell County. The District was approved by the voters of Bell County in August 1999 and opened its doors for business in February 2002. Groundwater resources in Bell County include the following:

Edwards BFZ

Trinity

Others:

- Alluvium
- Austin Chalk
- Buda
- Edwards Equivalent
- Kemp
- Lake Waco
- Ozan
- Pecan Gap

Clearwater's fiscal year runs from October 1st through September 30th . This report summarizes the accomplishments and activities of the District during FY11; but reflects registration, permitting, and production figures for the calendar year 2011.

During FY10, the selected contractor began upgrading the District's stream flow gauge system in Salado Creek to automate the collection of data and the posting of the data on the District website. The upgrade also included a new file server system, automated processing and publication of rainfall data and website improvements to support the District's drought management plans. The Drought Management Plan for the Trinity aquifer was adopted and the Drought Management Plan for the Edwards BFZ was re-adopted with minor revisions. Data was collected for four Edwards BFZ aquifer recharge zone studies.

Unfortunately, the Stream Flow Gauge system was destroyed on September 18, 2010. The district Staff contracted with Hamson Consulting to repair the gauge system with the involvement of AECOM as the design and survey provider. System was back functioning October 2011. The Staff was then able in November and December of 2011 to focus on the drought status reports that reflected the need for user in the Edwards BFZ to take the Epic Drought of 2011 seriously.

The District proceeded with plans to become a stand alone entity thus separate from Central Texas Council of Governments (CTCOG), effective March 31, 2012. These activities and others are discussed in this report. The information in this report is presented in three categories as follows:

Administrative Tasks

Management Plan Requirements

Miscellaneous Activities

2. ADMINISTRATIVE TASK

A detailed discussion of each of these activities follows below.

Administrative tasks include internal administrative activities necessary for a groundwater district to function effectively. Management Plan requirements include the required tasks and activities identified in the District's Management Plan. Miscellaneous activities include other activities and programs that have been an integral part of the District but are not required by the Management Plan.

Major administrative tasks and activities during FY11 include the following:

A. Contracts/Agreements:

- Central Texas Council of Governments (ending March 31, 2012)
- Technical Consulting Services

(1) AECOM, Inc.

(2) Bar-W Groundwater Exploration, LLC.

(3) Halff Associates

(4) U. S. Geological Survey, Texas Water Science Survey

- Legal Services

(1) Lloyd, Gosselink, Blevins, Rochelle & Townsend, P.C.

- Other Service

(1) Hamson Consulting

(2) Village of Salado

(3) Keilla Group

(4) Larry Neal Architect / Construction Management

(5) USGS

B. Financial Items:

Budget and Tax Rate

Financial Audit

C. Miscellaneous Policies/Issues:

Administrative Fee Schedule Revised

Bylaws Revised

Onboard to 700 Kennedy Court

D. Board of Directors:

District Officers

Meetings

E. District Rules:

Expiration date on incomplete permit applications

F. Management Plan:

A detailed discussion of each of these activities follows below.

A. CONTRACTS/AGREEMENTS

1. Central Texas Council of Governments

The District originally contracted with CTCOG for administrative and planning services in March 2000. This contract includes the use of CTCOG staff, equipment, and facilities. While this contract has proven beneficial for both parties, the Clearwater Board has notified the CTCOG that the District will end their contractual agreement by March 31, 2012 and become a stand-alone entity at 700 Kennedy Court, Belton, Texas.

Clearwater did renew its contract with CTCOG, September 2011 for six months ending March 31, 2012. The 60 day termination notice was included to allow flexibility as the building construction progressed.

2. Technical Consulting Services

The District initiated a contract with AECOM, Inc. (previously TCB, Inc.) in March 2001 for technical consulting services and has continued a contractual relationship over the years. During FY09, the head geoscientist assigned to Clearwater left AECOM to establish a private consulting firm — BAR-W Groundwater Exploration, LLC (BAR- W). Clearwater has contracts with both AECOM and BAR-W. AECOM provides technical support with regard to the Salado Creek stream flow gauge system. BAR-W provides general technical consulting and various studies. High point of recommendations and strategies conducted during FY11 are identified below:

- Provide technical review of drilling and operating permits.
- Designate aquifers for exempt wells and provide estimate of production.
- Developed Drought Management Plan for the Trinity aquifer and revisions for and trained staff on applying the plan as pilot effort.
- Edwards BFZ aquifer Voluntary Drought Management Plan and its pilot implementation in the fall of 2011.
- Review system upgrade needs and preparation of bid documents.
- Review data from three continuous monitoring wells in the Trinity aquifer and compare with desired future conditions.
- Provide guidance to staff in collection of data from selected wells for use in the understanding the character of the Aquifers.
- Review data from Salado Creek stream flow gauges.
- Provided Technical training to new General Manager on stream flow system and its application to the voluntary drought management plan.
- Provided recommendations to get the gauge system back on line in September 2011.
- Research historic spring elevations in Salado Springs system to address concerns with data from steam flow gauges.
- Provide recommendations for replacement of damaged components of the stream flow gauge system in early 2011 and evaluated work of Hamson and AECOM personnel efforts to effectively assure the system is reliable.

Several of the items above are discussed in more detail throughout this report.

3. Legal Services

The District requests legal consulting services on an as-needed basis and utilizes two law firms. Lloyd, Gosselink, Blevins, Rochelle & Townsend, P.C. (LGBRT) for consultation regarding water-related issues. LGBRT was the District's primary advisor during FYl1 which included the following issues:

- Research and guidance on permitting issues, spacing issues, rule interpretation, puplic hearing notices, meeting cancellation notices, conservation easements and topics allowed for discussion in closed session.
- Review of documents to include contracts and bylaw revisions.
- Preparation of Board resolutions associated with the new legislation effective September 1, 2011; per legislative changes.
- Application of Professional Services Procurement Act in selecting Construction Management and RFQ to select design build contractor.
- Representation of groundwater districts at Texas Water Conservation Association Groundwater Sub-Committee on Desired Future Conditions.

4.Other Services

Hamson Consulting: The Board contracted with Hamson Consulting in December 2009 to provide information technology consulting services. The work was composed of improvements to the stream gauge network on Salado Creek to automate the collection and processing of gauge data to support the District's drought management plans. The collection and processing of NOAA. Nex-Rad rainfall intensity data was also automated.

Assisted the General Manager in preparing the new building for network by providing labor and design for hard wiring the offices for future network.

Managed the Website server and maintained the equipment off site until installation at the new office building in March of 2012.

Provided new staff members with limited content management of the website and provided additional content management as needed to the site as requested.

Village of Salado: The Board entered into an interlocal agreement with the Village of Salado (VOS) in April 2010 to allow VOS to use data from the District's Salado Creek stream gauge network to develop an early warning system of flood conditions in the Creek. Progress developing the system due to destruction from September 18, 2010 flood. 2011 the gauges were in place and operational with ATT cell connection but cost and reliability is still and issue due to weak signal and no signal during weather conditions necessary for the system to be reliable.

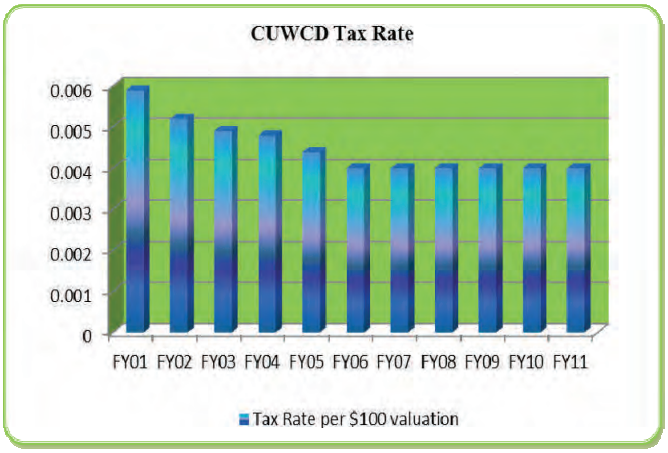
B. FINANCIAL ITEMS

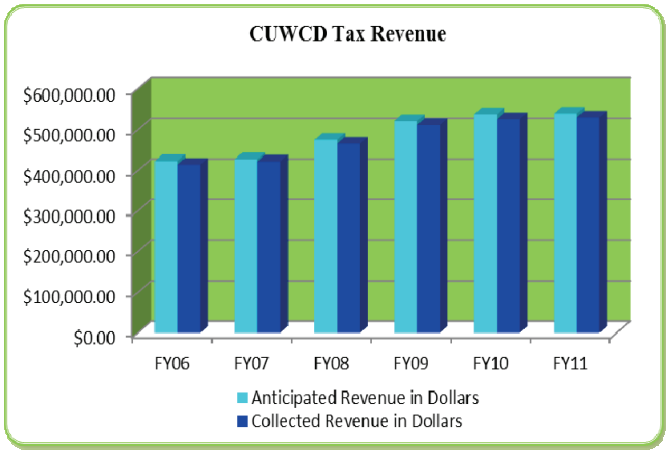
1. Budget and Tax Rate

The District held three workshops (June, July and August 2011) to develop an operating budget for the upcoming fiscal year (FY12) and to set the corresponding ad valorem tax rate. The District has consistently lowered or kept the same tax rate since it began assessing taxes. The adopted tax rate for FY10-11 was $0.0040/$100 valuation, the same rate as the previous three fiscal years. The approved budget for FY11-12 totaled $862,866 with $556,566.00 anticipated revenue from taxes. The additional funds will come from the reserves for the construction and on-boarding to the new facility.

Expenditures for FY10-11 totaled $471,943.46; $74,296.54 under budget. Total revenue (including interest and fees) collected during FY11 was lower than anticipated at $535,649.31 ($10,590.69 less); however, revenue exceeded expenditures by $63,705.85. The board thus was able to return $63,705.85 to the reserve account. The reserve account at the close of fiscal year 2010-12 was $684,801.70.

The approved budget for FY11, along with the ending schedule of revenues and expenditures for FY11, is attached as **Appendix A**. Appendix A also includes a chart that breaks down expenditures by category. The figures shown in the final report include a $584,801.70 reserve balance or carry over from years prior to FY11.





2. Financial Audit

An annual audit of the District's finances is required by Chapter 36.153 of the Texas Water Code. Clearwater's audit occurs in conjunction with CTOG's audit. The fiscal year for CTCOG runs from July 1st through June 30th of each year.

Patillo, Brown & Hill, LLP conducted the CTCOG audit, with Clearwater as a part of the CTCOG audit. There were no findings to report for the FY10 and FY11 audit.

C. MISCELLANEOUS POLICIES/ISSUES

1. Administrative Fee Schedule Revised

The Board revised the Administrative Fee Schedule in January 2010 to incorporate costs associated with the technical and legal review that occurs in processing permit applications. In the past, these expenses were paid by Clearwater; the revised fee schedule places this burden on the permit applicant.

In August 2011 the Fee Schedule was revised to remove the $100 drillers log deposit requirement due to new legislation requiring well drillers to provide the log to all GCD's and UWCD's.

A revised fee schedule is attached as **Appendix B**.

2. Bylaws Revised

In September 2010, the Board revised the District Bylaws as follows:

- Eliminated requirement specifying that Board meetings be held on a particular day and time.
- Eliminated requirement for an annual meeting and clarified that regular meetings will occur at least quarterly.
- Moved election date of officers to occur at beginning of calendar year.
- Corrected citation of enabling legislation, noted change of office location, and clarified terms of office and requirements for a quorum.

3. Plans to Separate from CTCOG

In March 2010, the Board renewed the CTCOG contract for a one year period with consideration for renewal to occur in September 2010. The District was in the process of purchasing property in the Belton Business Park. The property purchase would solidify plans to separate from CTCOG. As such, the Board began looking at building and staffing needs. Architectural Edge, Inc. was selected to lead the architectural/engineering team. The majority of the board wished to construct an energy and water efficient building not to exceed 2,800 sq. ft. in size incorporating LEED features if not cost prohibitive.

In May 2011, the Board hired a New General Manager, Dirk Aaron, to replace the Administrative Manager, Cheryl Maxwell. The new GM will lead the staff, while being trained by Mrs. Maxwell. She is being retained at 1/2 salary for the remainder of calendar year 2011. New GM will work toward a temporary staffing pattern of 2 FTE's and one part-time staffer (max 30 hours per week) to continue the operation of the District and on-boarding of the District to the new facility in the first three months of 2012. Staffing pattern in FY2012 will be revisited by the new GM and the board in the budgeting process for FY13.

The Board of Directors in May 2011, selected Keilla Group under a design build contract to construct the new facility at 700 Kennedy Court in Belton on the two lots purchased by the Board in FY10. The Board contracted with the Larry Neal Architecture Firm for construction management required as a part of the design building process.

The new facility is redesigned to not have a classroom facility but will have a board room, central work area, 3 offices, lab area, and open lobby. The square footage is at 2400 square feet with an open design and energy efficient. The structure is all brick with rainwater catchment for landscape water needs. The external and internal windows allow for great lighting and staff efficiency. Con-construction started in the summer of 2011 and anticipation that the facility will be turned to Clearwater Staff by the end of March 2012.

D. BOARD OF DIRECTORS

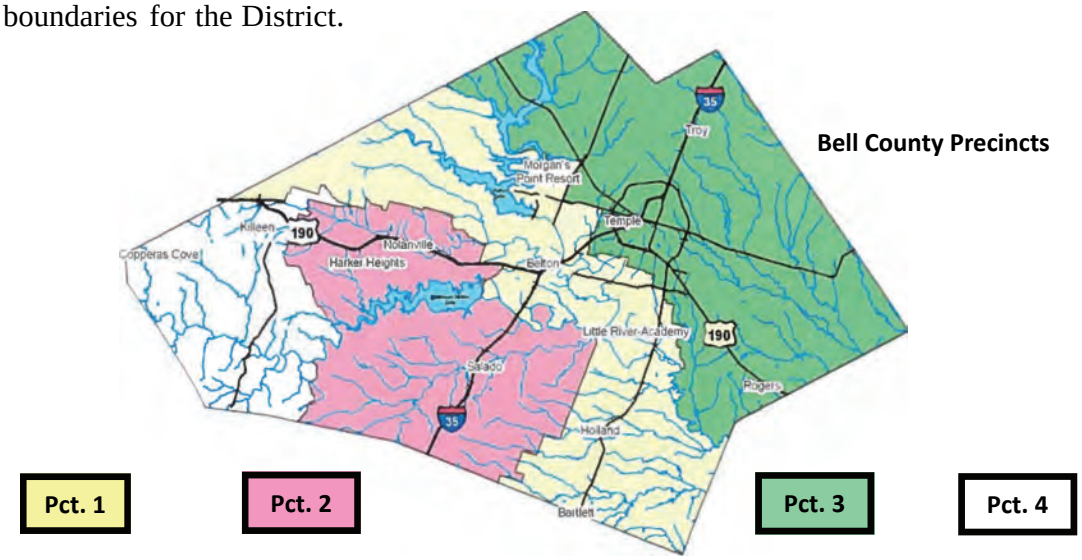
1. District Officers and District Board Meetings

District Officers for FY11 were designated at the meeting following the general election held on November 2, 2010. The FY 11 Officers are identified below, along with the office they held and precinct they represent. John Mayer, At-Large Director (elected November 2, 2010) resigned in September 2011. The board announced his intention to resign for personal reasons and took action to appoint a replacement in October 2011.

Applications were taken and the appointee, David Cole, was selected to the At-Large Directorship until a special election for the remaining two years of John Mayer's position to be held, November 6, 2012 at the General Election. Pre-clearance with the Secretary of State's office for the special election will need to be sent in August, 2012.

Leland Gersbach, President	(Precinct 1)
Wallace Biskup , Vice President	(Precinct 3)
Bill Bartlett , Director	(Precinct 2)
Judy Parker, Secretary	(Precinct 4)
David Cole, Director	(At-Large)

Following is a map of the Bell County Commissioner Precincts which also serves as the precinct boundaries for the District.



2. Meetings

The Board of Directors held 13 Board meetings and 13 workshops during FY11. The workshops included discussion of the following: CTCOG Contract; Outcome of Edwards BFZ aquifer recharge zone meeting; proposals for system upgrade; Design-Bid Construction RFQ process and selection of contractor and Construction Management, Selection of new General Manager, Strategy for on-boarding to the new facility and to separate from CTCOG; revisions to administrative fee schedule; plans for future office building; staffing issues with regard to new office building; FY11 budget; Staff positions, salaries and benefits for new office building. Board meetings are typically held on the second or third Tuesday of each month and the workshop is held just prior to or after the Board Meetings.

E. DISTRICT RULES

During FY11, on January 11, 2011, there were major amendments to the District Rules which were adopted and summarized below:

A) <u>Rule 10:</u> Reworking and Replacing a Well to address administrative approval of replacement wells. The amendment allows staff to approve requests where the new well may be located up to 50 feet from the existing well provided extenuating circumstances exist and other requirements are satisfied. Requests to locate a well beyond 50 feet of the existing well may only be granted by the Board. The amendment also clarifies that the applicant may appeal staff's decision.

B) <u>Rule 1.1:</u> Definitions of Terms, Rule 8.3 Permit Exclusions & Exemptions, and Rule 12.3 pollution of Groundwater to address the status and processing of geothermal wells. "Open Loop Geothermal Well" means any geothermal well designed to produce groundwater from any aquifer or groundwater source for geothermal use and where the produced water may subsequently be used for any other purpose or injected or re-circulated back into the original or any other aquifer or groundwater source.

During FY11, on August 9, 2011 the Board of Directors approved at the conclusion of the required public hearing and proper notification District Rules that reflect the following recommendations from Staff, Consultants and Legal Advisory

A) Rules that addresses the District's well log deposit and removes the deposit and requires Well Drillers to provide the log directly to the District Staff.

B) Rules that addresses the District's statutory requirements and procedures regarding the District's permitting process.

C) Rules that address the changes made to Chapter 36 of the Texas Water Code by the Texas Legislature during the 82nd Regular Session, including but not limited to language related to the ownership of groundwater, the process for adopting Desired Future Conditions, clarification of the language on permitting exemptions, the filing of well logs and geophysical logs with the District, the process for conducting permit hearings, clarification of language related to the District's Management Plan, the change from Managed Available Groundwater to Modeled Available Groundwater, and considerations in reviewing permit applications begin the five year update to the District Management Plan. Managed Available Groundwater (MAG) figures that were developed for the Edwards BFZ and Trinity aquifers through the joint planning process by Groundwater Management Area 8 were included in the District Management Plan after the update which occurred in FY11.

Groundwater districts may be audited by the State every seven years to determine if the District is actively engaged in achieving the objectives of its management plan. The Clearwater District has not yet been audited. A detailed discussion of the District's Management Plan activities based on the 2011 approved Plan is included later in this report.

F. MANAGEMENT PLAN

Texas Water Code, Chapter 36.1071--36.1073, the District Management Plan must be reviewed and readopted every 5 years. The plan is subject to approval by the Texas Water Development Board (TWDB). Clearwater's management plan was due to the TWDB by March 6, 2011. In September 2010, Clearwater approved a Task Order with Bar W Groundwater Exploration, LLC (Randy Williams), to update this plan.

Proposed revisions for the 5 year update to the District Management Plan have gone through two preliminary reviews by the Texas Water Development Board (TWDB). The revised Management Plan was accepted by the Board following the public hearing on the revised Management Plan, which was held at Tuesday February 8, 2011 meeting, after which the Board adopted the revised plan. The Management Plan was sent to TWDB for approval prior to the due date, March 6, 2011. The district received approval from TWDB on April 13, 2011.

The total Modeled Available Groundwater (Old MAG) as a whole is 6,489 ac-ft/year and for the Trinity Aquifer is 7,068 ac-ft/year. The Management Plan states that by the year 2050, exempt well use in the Trinity Aquifer as a whole may reach 1419 ac-ft/year, and the Edwards BFZ may reach 825 ac-ft/year. Thus, this leaves the District with 5,649 ac-ft/year in the Trinity and 5,644 ac-ft/year in the Edwards BFZ available for permitting. These two totals are known as the Managed Available Groundwater (New MAG).

3. MANAGEMENT PLAN REQUIREMENTS

The District Management Plan identifies the goals and objectives of the District and provides performance standards and tracking methods to measure the District's effectiveness in meeting these goals. The District goals are mandated by Texas Water Code Chapter 36, Section 36.1071. Although all groundwater conservation districts are subject to these goals, each district chooses how to best implement the goals within their district by establishing their own objectives and performance standards. The District goals are as follows:

- Providing the most efficient use of groundwater;
- Controlling and preventing waste of groundwater;
- Addressing conjunctive surface water management issues;
- Addressing natural resource issues which impact the use and availability of groundwater, and which are impacted by the use of groundwater;
- Addressing drought conditions;
- Addressing conservation, recharge enhancement, rainwater harvesting, precipitation enhancement, or brush control where appropriate and cost-effective; and
- Addressing in a quantitative manner the desired future conditions of the groundwater resources.

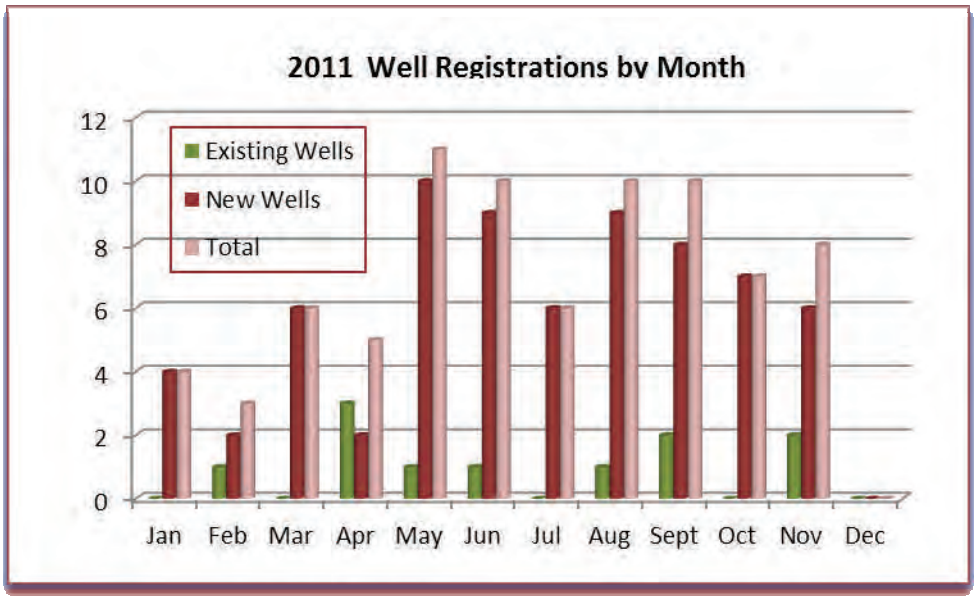
The following is a summary of the District's activities related to these goals.

A. PROVIDING THE MOST EFFICIENT USE OF GROUNDWATER

Objectives A.1 and A.2: Registration & Permitting of Wells.

Objective Satisfied

The registration and permitting of wells is an ongoing process. During calendar year 2011, **90 wells were registered**, and 7 of these wells were non-exempt. The tables below summarize the well registration and permitting activity through December 31, 2011.



Well Registration Summary
2002 through 2011

Year	Exempt Wells		Non-Exempt Wells*				Total
	Grandfathered	New	Grandfathered	New	New I	New II	
2002	3513	74	50	0	0	0	**3637**
2003	377	77	4	2	0	0	**460**
2004	18	81	15	1	1	1	**117**
2005	22	90	15	0	2	3	**132**
2006	16	80	6	0	0	2	**104**
2007	22	52	11	0	5	2	**92**
2008	11	45	4	0	2	4	**66**
2009	14	43	2	0	2	6	**67**
2010	17	66	0	0	1	7	**91**
2011	17	66	3	0	2	2	**90**
Grand Total	**4027**	**674**	**110**	**3**	**15**	**27**	**4856**

*Effective March 1, 2004, the District began designating new non-exempt wells as either Classification 1 or Classification 2 as follows:

Classification 1:

a. A well used for domestic purposes or for watering livestock or poultry.
b. A well drilled, equipped or completed so it is incapable of producing more than 25,000 gpd (17 gpm).
c. A well located on a tract of land less than 10 acres in size, created after March 1, 2004.

Classification 2:

a. A well used for purposes other than domestic, livestock or poultry, regardless of production.
b. A well drilled, equipped or completed so it is capable of producing more than 25,000 gpd (17 gpm) regardless of the use.

Well registration totals over time may no longer accurately reflect the number of wells actually drilled into the ground. This is because some of the registered wells are never drilled or have been plugged. Additionally, some exempt wells may be converted to a non-exempt well at a later date. The table below shows a more accurate reflection of the number of wells on the ground.

Well Registration Details

Type of Adjustment	Exempt Wells		Non-Exempt Wells				
	Grandfathered	New	Grandfathered	New	New I	New II	Accumulative Total
Total as of 2011	4027	674	110	3	15	27	4856
Never Drilled[2]	0	19	0	0	1	5	25
Plugged[3]	90	15	7	0	0	0	112
						TOTAL	4993

As we have seen in recent years, registration figures for 2011 show that the majority of exempt wells registered are new wells. With regard to non-exempt wells, 2011 was similar to past years in that the majority of wells registered were new wells.

The Table below summarizes the non-exempt wells that were registered during 2011 and the corresponding permits that were issued where applicable.

Non-Exempt Well Registration/Permitted During 2011 Calendar Year

File No.	Well Owner/ Land Owner	Ac-ft/ Year	Aquifer	Use	Permit Type
N1-11-001P	Roy Rodriguez	0.55	Edwards BFZ	Domestic	Drilling & Operating
N1-11-002P	Andrew Robertson	0.59	Trinity (Upper)	Domestic	Drilling & Operating
N2-11-001G	Bradley Ware	160.0	Alluvium	Ag/Irrigation	Operating
N2-11-002G	Bradley Ware	160.0	Alluvium	Ag/Irrigation	Operating
N2-11-003G	UMHB	7.5	Trinity (Middle)	Ag/Irrigation	Operatiing
N2-11-004P	Charles Broecker	.994	Edwards	Ag/Irrigation	Drilling & Operating
N2-11/005P	Jerry Boston	1.657	Edwards	Domestic	Drilling & Operating

During 2011, five entities in Bell County transported groundwater outside the District. A total transport of 44.56 ac-ft occurred from the Edwards BFZ aquifer and 98.74 ac-ft from the Trinity aquifer. This signified significant increase over a 3 year period. Consensus of Stakeholders, staff and Board agree that these increases are a result of the epic drought conditions of 2010 and 2011.

The Edwards BFZ transport for each respective year is: 2009 =12.54 acre feet; 2010 = 32.98 acre feet and 2011 = 44.56 acre feet.

The Trinity transport for each respective year is: 2009 = 34.72 acre feet, 2010 = 63.27 acre feet and 2011 = 98.74 acre feet.

The District is allowed by state law to charge a transport fee of $0.025/$1,000 gallons transported. This generated total revenue of $1,167.33 for 2011, $784.06 for 2010 and $385.00 in 2009. A summary of transport activity for 2010 is shown in the following table.

Summary of Groundwater Transport for 2011

Entity (Water Supply Corporation)	Well Number	Aquifer	Destination County	Gallons	Acre-Ft	Transport Fee
Jarrell Schwertner	N-02-042G	Edwards BFZ	Williamson	14,519,900	44.56	$363.00
Bell-Milam-Falls	N-02-038G N-02-046G	Lower Trinity	Falls, Milam, Williamson	28,280.000	86.79	$707.00
Little Elm Valley	N-02-039G	Lower Trinity	Falls	1,679,900	5.16	$42.00
East Bell	N-02-034G	Lower Trinity	Falls	1,294,644	3.97	$32.37
Oenavill & Bell Falls	N-02-017G	Lower Trinity	Falls	917,900	2.82	$22.95
Total				**46,692,340**	**143.30**	**$1,167.33**

Objective A.3: Maintain a Groundwater Database.

Objective Satisfied

The District's database is continually updated as new information is acquired.

1. Groundwater Production:

   The District continued collecting data from non-exempt wells during 2011. Monthly production reports are required by the 10th day of the following month for all wells with operating permits. The tables below show the total permitted amount for the non-exempt wells and their total production. In 2011, actual water production figures were significantly lower than the amount permitted. Part of this is due to the issuance of Historic and Existing Use Permits (HEUP). The HEUPs are issued for the full permit amount, regardless of whether the permittee will be using this amount during the year.

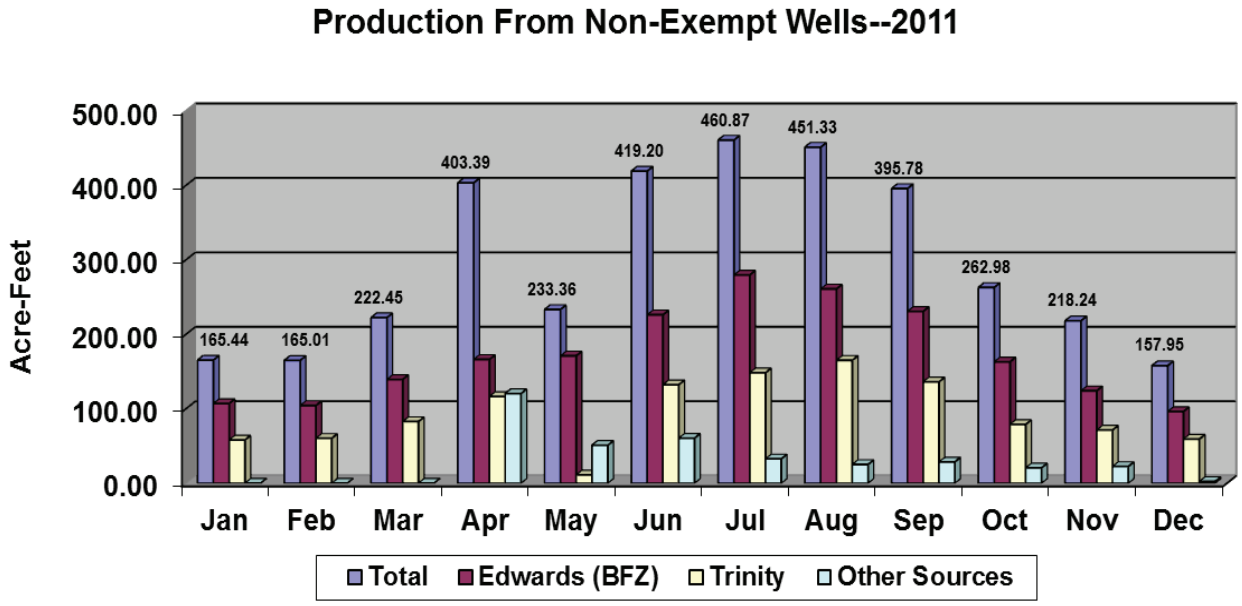
2011 Permitted Volume for Non-Exempt Wells

Edwards BFZ:	2,463.01 ac-ft (41 wells)
Trinity:	1,874.65 ac-ft (46 wells)
Other Aquifers:	472.00 ac-ft (18 wells)
TOTAL:	**4,829.66 ac-ft (105 wells)**

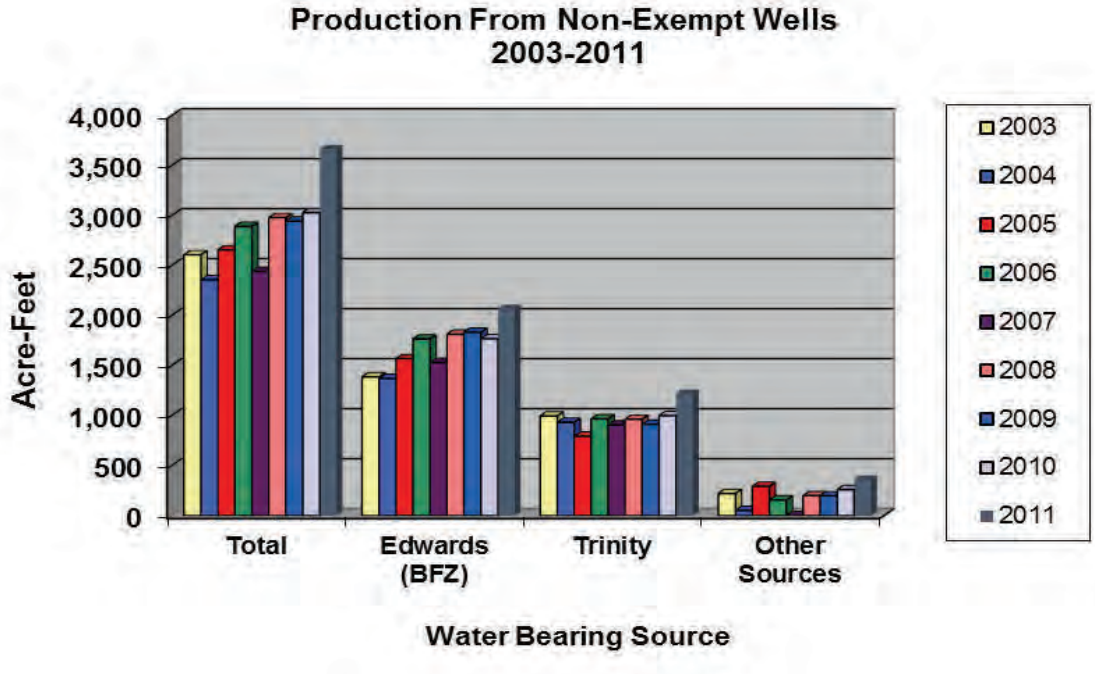
2011 Annual Production from Non-Exempt Wells

Edwards BFZ:	2,069.92 ac-ft (39 wells)
Trinity:	1,221.03 ac-ft (42 wells)
Other Aquifers:	364.90 ac-ft (18 wells)
TOTAL:	**3655.85 ac-ft (90 wells)**

The following chart shows 2011 production by month and aquifer. Production was at its highest level during the month of July with a monthly withdrawal of 460.87ac-ft. This is slightly up from the previous year which saw a peak in production of 423 ac-ft. during the month of June. Throughout the year, withdrawals from the Edwards BFZ were consistently higher than from the Trinity aquifer. Production from Other source aquifers was minimal throughout the year except for the months of May and June when it notably exceeded the monthly production for the Trinity aquifer, but reflects agricultural irrigation necessary at that time of year.

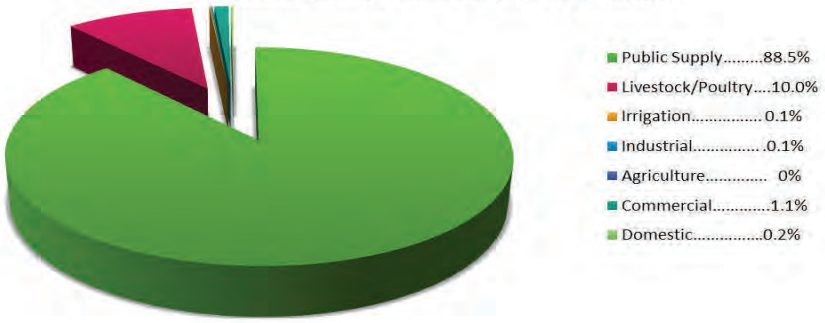


In the following graph, production from 2011 (90 wells) is shown compared to production in years 2003 through 2009. Production in 2011 was similar to the previous two years with production from the Edwards BFZ aquifer slightly higher during 2011 and production from the Trinity and Other sources slightly higher.



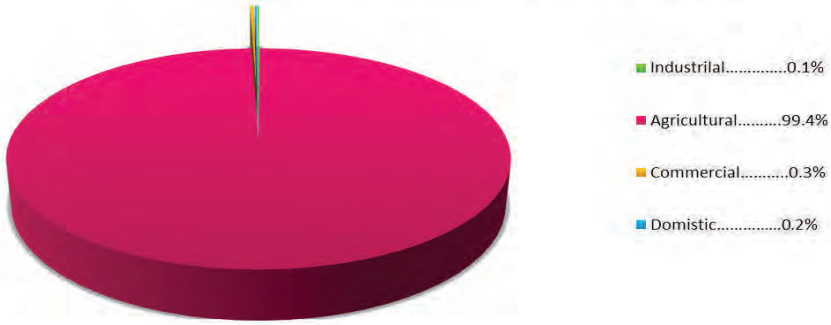
The following pie charts show how the groundwater from the different aquifers was used during 2011. In the Edwards BFZ and Trinity aquifers, water produced from non- exempt wells is used primarily for public supply purposes (88.5% and 76.2% respectively), while water produced from non-exempt wells in other formations was used primarily for agricultural use (99.4%).

2011 Use of Groundwater
By Non-Exempt Wells - Edwards BFZ Aquifer



2011 Use of Groundwater
By Non-Exempt Wells - Trinity Aquifer

2011 Use of Groundwater
By Non-Exempt Wells - Other Groundwater Sources



Each year, the exempt wells that have been registered are evaluated. The aquifer from which they are producing is determined and an estimate of their total annual production is provided. The results are shown below for exempt wells registered through December 31, 2011.

***Summary of Exempt Well Production**

Aquifer	Number of Wells	Estimated Use Acre-feet/Year
Edwards (BFZ	697	468
Trinity	1892	1271
Other Aquifers	1938	1303
TOTAL	**4527**	**3042**

**Calculations for exempt well production excluded wells that were plugged, moniotr wells, and wells that were never drilled.*

Combining the production from the non-exempt wells with the estimated production from the exempt wells, the following production figures result:

Production Summary for All Wells

Aquifer	Non-Exempt Well Production (Ac-Ft/Year)	% of Total	Estimated Exempt Well Production (Ac-Ft/Year)	% of Total	Total Production (Ac-Ft/Year)
Edwards (BFZ)	2070	82%	468	18%	2538
Trinity	1221	49%	1271	51%	2492
Other Aquifers	365	22%	1303	78%	1668
TOTAL	**3656**	**55%**	**3042**	**45%**	**6698**

The Chart above shows that overall, exempt wells account for 45% of all the groundwater produced in Bell County. In the Trinity, 51% of production is attributed to exempt wells; however, in the Edwards BFZ, exempt wells only account for 18% of groundwater production, with the vast majority coming from non-exempt wells. During 2011, 78% of the production from wells producing from other groundwater sources is attributed to exempt wells.

Overall, production from the Edwards BFZ aquifer accounts for 38% of total groundwater used in Bell County, with the Trinity aquifer accounting for 37%, and other aquifers accounting for 25%.

Managed Available Groundwater
Analysis of Permits and Exempt Use Reserves

Aquifer	** MAG Modeled	Reserved for Exempt	Managed	HEU Permit	Operating Permit	Total Production	Remaining MAG
Edwards (BFZ)	6469 ac-ft.	825 ac-ft.	5644 ac-ft.	2209.7 ac-ft.	291.3 ac-ft.	2501 ac-ft.	3143 ac-ft.
Trinity	7068 ac-ft.	1419 ac-ft.	5649 ac-ft	1204.8 ac-ft.	*761.06 ac-ft	2505.01 ac-ft	3143.99 ac-ft

* Drilling permits to Moffat WSC (55.24 ac-ft) and Armstong WSC (483.9 ac-ft), in the Lower Trinity are in place. Operating permits will be reviewed upon completion of the wells. Drilling permit does not guarantee production at these levels.

** MAG's are assigned by TWDB based on GMA8 approved DFC's.

2. Aquifer Monitoring:

The Texas Water Development Board (TWDB) typically measures water levels in selected wells in January each year. Clearwater measures water levels in selected wells twice annually (January and July).

The following pages are tables that provide a summary of the monitoring data. Refer to Appendix A for a map of the aquifer monitoring sites. NOTE: Larger numbers represent greater depth necessary to reach the surface of the aquifer, i.e. a decline in the aquifer level. Numbers in red were taken by the TWDB (or are continuous monitoring wells), whereas numbers in blue were taken by Clearwater. Comparing the water level measurements taken by the District with those taken by the TWDB is sometimes difficult due to differences in measurement procedures and equipment. Clearwater primarily uses an e-line; an airline is used if the well is equipped with one. Large producers are asked to turn the pump off at least one hour prior to the measurement to allow the aquifer levels time to stabilize. The TWDB typically uses a steel tape or an airline and does not request the pump to be turned off.

Edwards (BFZ) Aquifer

Water Level Depth Below Land Surface in Feet

Well Number	Date of Measurement: Other	Jan-Mar 03	Jul-03	Jan-Feb 04	Jul-04	Jan-05	Jul-05	Jan-Feb 06	Jul-06	Sep-06	Oct-06	Nov-06	Jan-Feb 07	Jul-07	Jan-08	Jul-08	Jan-09	Jul-09	Jan-10	Jul-10	Jan-11	Jul-11	Sep-11	Nov-11
58-04-627 (Salado ISD)	--	39.8	42.6	41.42	39.54	39.05	43.42	43.34	43.58	43.09	44.55	43.75	40.84	36.17	41.92	43.59	43.42	51.5	39.62	42.12	43.00	44.46	45.82	44.42
58-04-502 (Salado ISD)	(1985) 50.5	48.7	56.14	49.17	48.58	47.16	51.83	51.79	52.08	53.08	52.96	52.33	49.5	44.83	49.83	52.16	51.58	53.66	48.38	50.73	49.35	53.49	54.03	52.83
58 04 602 (Salado WSC)	(1981) 29.27	63.2	38.17[1]	29.5[1]	32.71[1]	27.17[1]	36.00[1]	36.5[1]	41.84[1]	34.39[1]	33.21[1]	30.09[1]	27.55[1]	21.50[1]	31.42[1]	40.17[1]	38.92[1]	34.92[1]	27.12[1]	31.53[1]	31.43[1]	36.52[1]	37.83[1]	32.53
58-13-502 (City of Bartlett)	--	--	--	--	--	42.62	40.13	50.29	52.29[1]	55.32[1]	60.37[1]	65.12[1]	60.79[1]	49.45[1]	46.62[1]	46.46[1]	61.04[1]	63.33[1]	NA	58.04[1]	58.8[1]	61.21[1]	68.59[1]	76.79
58-04-623 (Foster Stgch)	(1993) 85.39	85	89.58[1]	89.69	82.79[1]	86.3	87.17[1]	83.00[1]	95.25[1]	82.75[1]	85.75[1]	81.00[1]	80.30	72.34	86.51[4]	72.34[1]	88.75[1]	85.67[1]	67.671	81.67[1]	82.64[1]	87.21[1]	89.22[1]	83.62
58-04-628 (Cemetery)[2]		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	71.91[3]	83.61[2]	39.81[3]	72.83[3]	64.63[3]	81.51[3]	89.10[3]	80.97
58-04-702 (TxDOT)[2]	(1980) 71	78.25	71.96	72.72	71.84	72.2	72.17	72.83	72.73[5]	72.37[5]	72.95[5]	73.05[5]	72.06[5]	69.87[5]	72.07[3]	69.82[3]	72.88[3]	73.19[3]	70.43	NA	72.05[3]	71.05[3]	71.15[3]	72.08
58-04-816 (TxDOT)[2]		--	--	--	--	--	--	--	--	--	--	--	--	--	--	124.80[3]	125.47[3]	128.15[3]	118.18[3]	120.46[3]	121.76[3]	125.39[3]	126.41[3]	125.09
58-04-601 (Norwood)	(1966) 134.93	144.15	137.42	141.34	141.25	134.1	137.58	140.25	140.5	141.75	141.75	141.58	137.7	133.08	135.70	138.91	150.75	143.25	133.43	135.58	139.00	139.91	140.32	140.78

[1] Pump turned off at least 1-2 hours prior to measurement

TWDB measurement

CUWCD measurement

[2] Continuous monitor equipment installed (data available: http://hvper20.twdb.state.tx.us/twdbwells/twdbwells.html)

[3] Daily trend from continuous monitor site on date of water level measurements (November 2011)

[4] Pump in use less than one hour prior to measurement

** Well is no longer available

Trinity Aquifer

Water Level Depth Below Land Surface in Feet

Well Number	Date of Measurement: Other	03	Jul-03	Jan-Mar 04	Jul-04	Jan-05	Jul-05	Jan-Feb 06	Jul-06	Sep-06	Oct-06	Nov-06	Jan-Feb	Jul-07	Jan-08	Jul-08	Jan-09	Jul-09	Jan-10	Jul-10	Jan-11	Jul-11	Sep-11	Nov-11
E-02-721G (McCallum #1)	--	--	--	--	--	--	--	--	--	--	--	143.33	145.5	132.42	135.67	153.00	146.59	160.84	153.27	151.83	150.9	168.03	171.33	165.03
E-02-722G (McCallum #2)	--	--	--	--	--	--	--	--	--	--	--	143.25	145.00	131.92	135.17	152.25	145.83	160.25	152.83	152.07	150.8	166.5	171.67	165.1
E-02-804G (Dobson)	--	--	--	--	--	--	--	--	--	--	--	--	335.75	324.50	328.71	338.92	356.42	359.83	381.65	NA	382.4	375.31	385.35	381.65
40-58-201 (Central Texas College)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	87.59[4]	77.83[4]	79.64[4]	80.53[4]	81.01[4]	80.28
E-08-005P (Stephenson)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	369.54	378.46	372.54	378.38	381.225	405.56	412.08	413.38
E-02-1299G (Mayer)	--	--	--	182.1	189	180.38	201.72	200.62[2]	227.18[2]	208.7[2]	209.86[2]	187.91[2]	183.29[2]	217.94[2]	204.08[2]	229.49[2]	266.45[2]	201.77[2]	241.04[2]	192.53[2]	185.5[2]	197.15[2]	204.08[2]	204.8
N2-05-008G (River Ridge Ranch East Dam Well)	--	--	--	--	--	--	--	--	--	--	--	--	164.58	138.50	144.87	181.00	184.66	202.13	172.8	178.3	160.5	NA	NA	n/a
E-06-063P (Texas Veterans Land Board)	--	--	--	--	--	--	--	--	--	--	--	399.41	375.25	379.58	382.50	442.33	389.58	370.17	362.93	378.53	380.933	362.35	362.18	364.7
E-03-444P (Purnell)	--	--	--	--	--	--	--	--	--	--	--	418.58	411.92	400.58	411.58	434.42	429.67	446.58	430.58	437.38	437.7	469.16	NA	471.4
E-05-002P (Murphy)	--	--	--	--	--	--	--	--	--	--	--	313.83	282.63	288.42	291.92	334.42	323.76	368.58	326.54	345.24	335	403.38	404.7	385.04
N2-07-003G (Killeen Crushed Stone)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	344.42	376.17	377.92	377.25	383.5	375.55	381.225	414.48	424.33	415.48
40-53-102 (USCOE-Leona Park)	(1993) 55.14	68.35	70.42	71.28	71.92	72.6	73.33	74.16	74.5	74.66	75.00	75.25	75.35	--	75.55	77.66	78.98	78.71	79.28	79.98	80.58	81.12	85.21	81.98
58-05-901 (City of Holland)	(1995) +1.2 (flowing)	23.7	25.3	26.19	28.21	29.9	31.84	25.96	28.3	27.96	21.46	27.13	26.1	27.04	28.80	30.79	34.04	36.63	36.63	38.825	39.9	41.13	41.73	42.13
40-45-701 (USCOE-Winkler Park)	--	bad reading	--	bad reading	325.09	bad rding	--	333.29	335.54	337.04	339.13	339.63	ad readi	--	--	344.63	349.46	352.88	356.76	358.26	360.61	368.54	400.86	405.16
40-57-801 (Copperas Cove)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	306.94[4]	295.47[4]	308.1[4]	313.40[4]	319.94[4]	316.55
N2-05-010G (River Ridge Ranch Common Park)	--	--	--	--	--	--	--	--	--	--	--	219.33	266.88	256.25	261.92	280.17	284.25	293.58	281.48	287.33	286.783	312.02	325.18**	319.4
40-53-406 (Moffat WSC)	(1967) 243.55	335	417.83[1]	336	416.06[1]	340	not avail	not avail.	not avail	not avail	not avail	not avail	333	381.26	332.00	358.16	436.70	358.16	399.74	408.98	362.78	348.82	459.36*	457.05
N-04-010P (East Bell WSC)																								
40-63-501 (East Bell WSC)	(1962) +13.5 (flowing)	--	--	--	--	--	--	--																
40-57-802 (Copperas Cove)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	291.16[4]	292.71[4]	290.13[4]	290.25[4]	291.93[4]	292.44

[1] Pump turned off at least 1-2 hours prior to measurement

TWDB measurement

CUWCD measurement

[*] Method of measurement was airline

[3] Measurement was reported by East Bell WSC

Upper Trinity (Glen Rose)

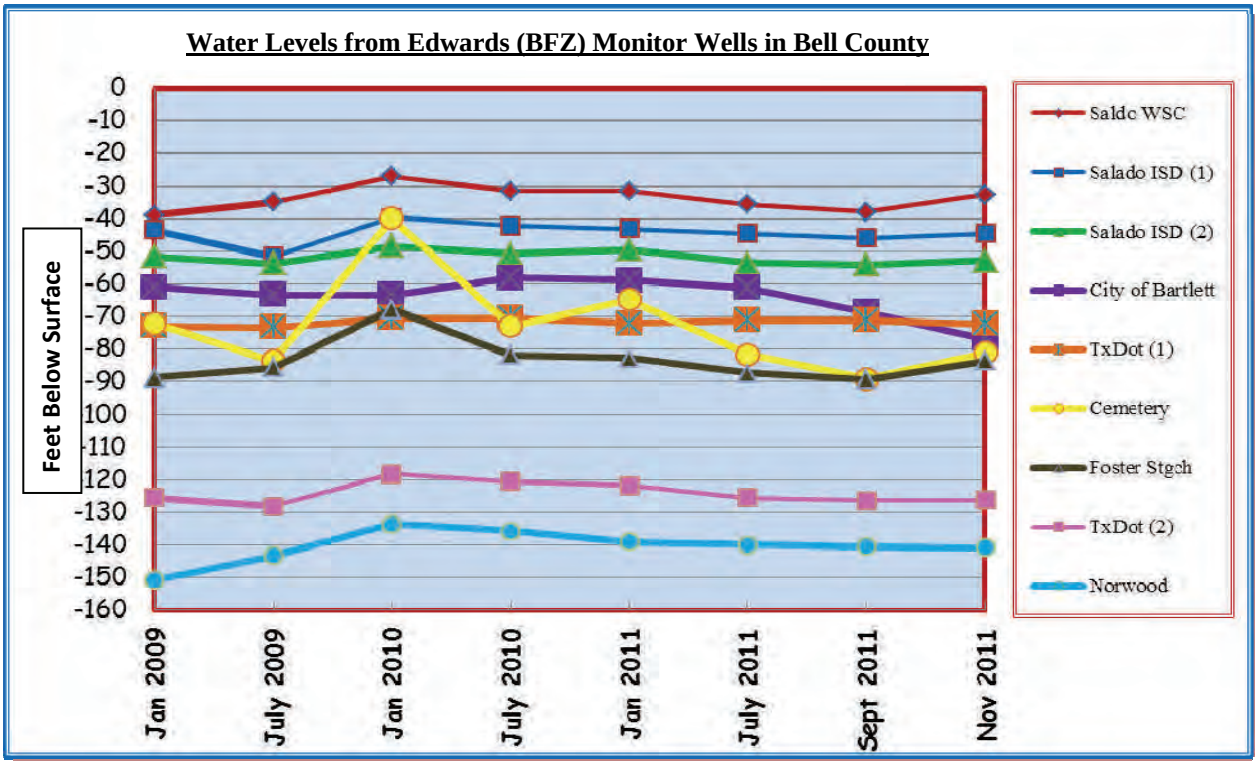
Middle Trinity (Hensell)

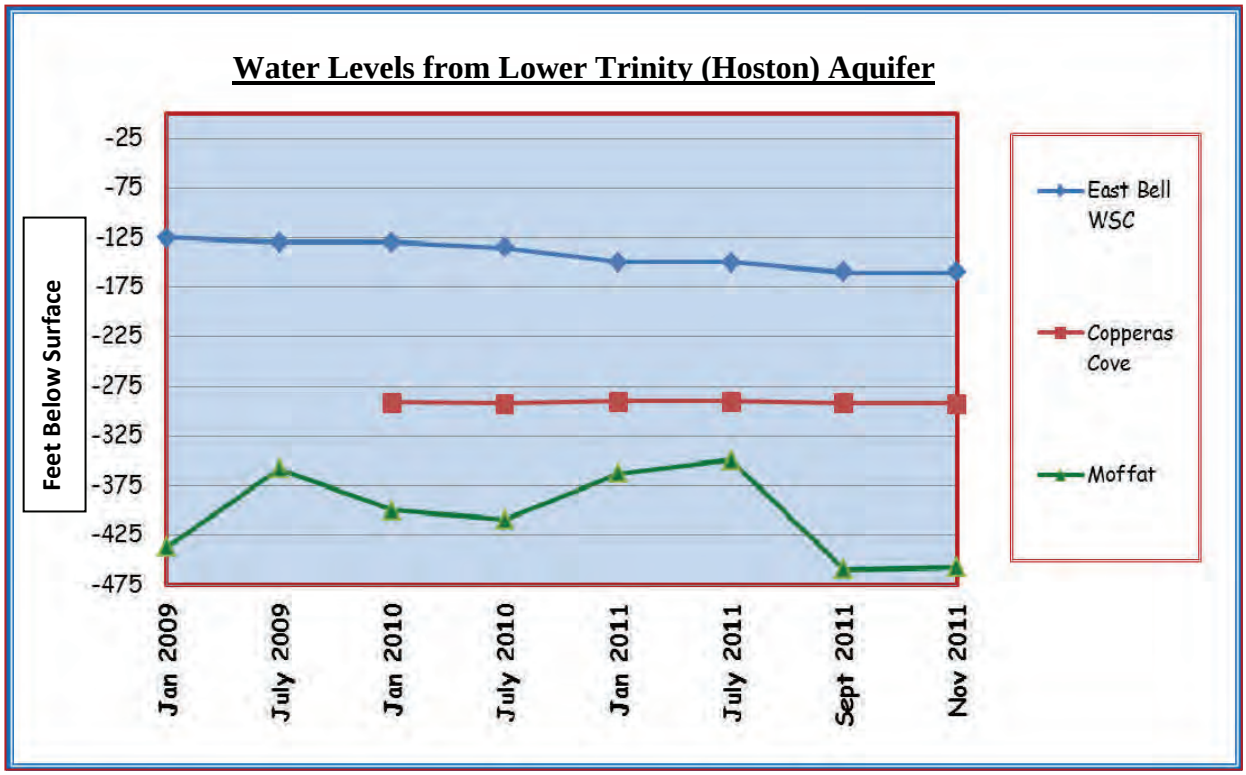
Lower Trinity (Hosston)

[4] Daily trend from continuous monitor site on date of water level mea

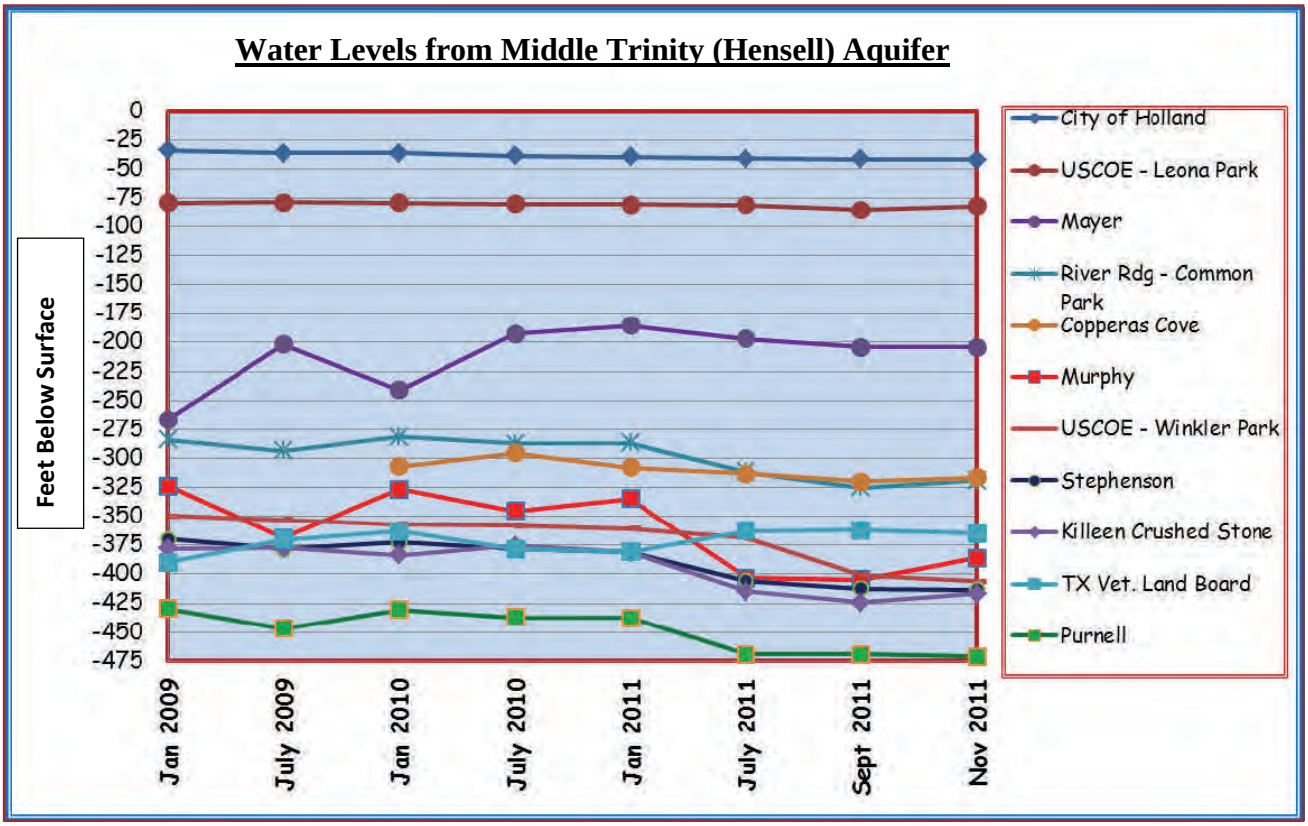
**This well is currently being reviewed to determine whether it is located in the Middle or Lower Trinity.

The date for some of the TWDB well sites and a few of the sites measured by the District for the Edwards BFZ and Trinity aquifers are shown in the following charts.

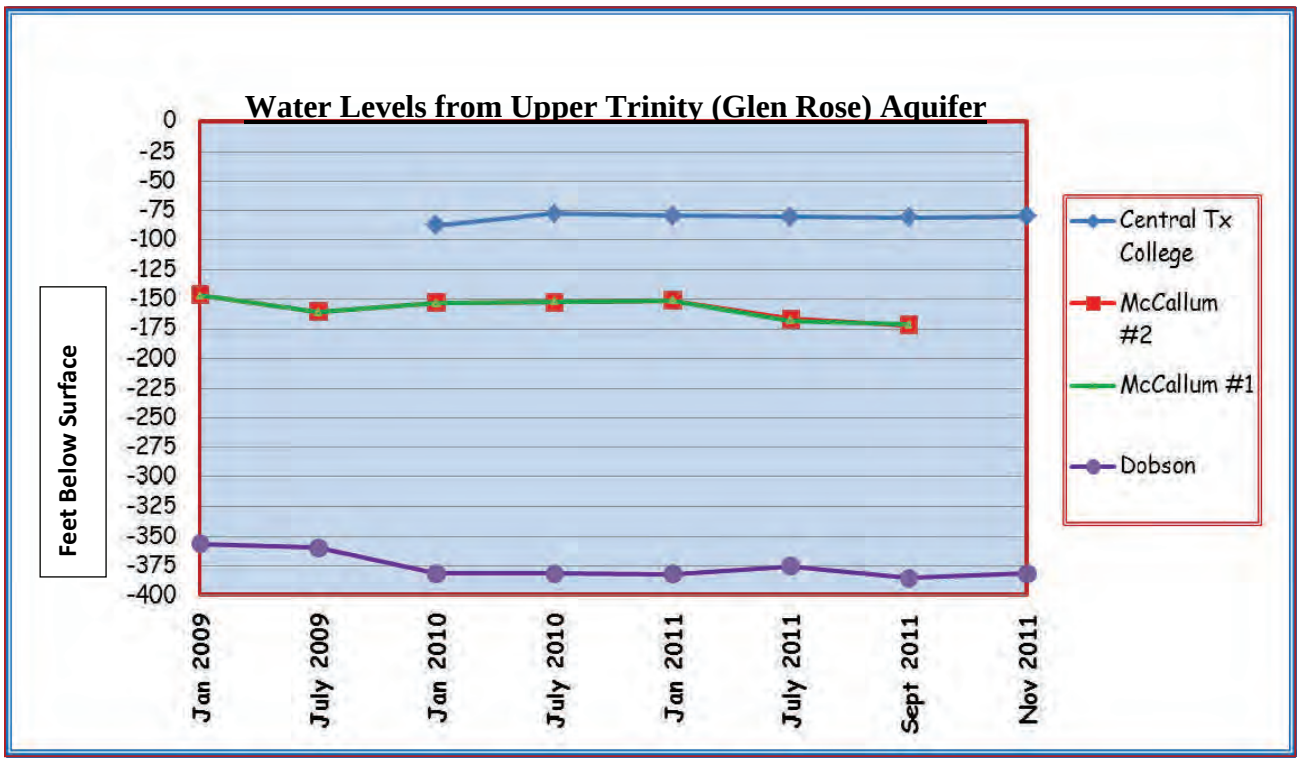




Water Levels from Middle Trinity (Hensell) Aquifer



Water Levels from Upper Trinity (Glen Rose) Aquifer



Objective A.4: Education—Water Cycle and Aquifer Status

Objective Satisfied

The District's Management Plan requires the dissemination of educational information regarding the water cycle and the status of the aquifers through at least two outreach methods/activities. During 2011, the District satisfied this requirement as follows:

1) The District published 46 newspaper articles in 2011 that included a summary of the epic drought conditions of 2011 and productively pursued well owner voluntary reduction in aquifer use. Drought status reports highlighted the fall and winter discussions. This articles were published in the following newspapers:

   Killeen Daily Herald

   Temple Daily Telegram

   Salado Village Voice

   A list of the articles is provided in Appendix C.

2) Splash Activity Books are geared toward 3rd grade level students and focus on the water cycle as well as water awareness and water conservation. 2011 was the fifth year the District distributed the Splash Activity Book. This book is published by the American Water Works Association. During the spring of 2011, orders were taken for 620 students in the Academy and Killeen school districts. The Splash books were delivered to the schools in May of 2011. A list of participating schools is provided in Appendix D, Activity Reports.

Aquifer Status:

1) The District publishes information on the status of Bell County's aquifers on the District's website. For 2011, this information included water level measurements for nine Edwards BFZ wells and nineteen Trinity wells. This information is continually updated as new measurements and wells are added. Rainfall data and springflow gauges are highlighted articles on the website and Facebook.

2) The District published its annual newsletter in September 2011 that included graphs depicting changes in the aquifer levels for the three Edwards BFZ aquifer wells and the three Trinity aquifer wells equipped with continuous monitoring systems.

B. CONTROLLING AND PREVENTING WASTE OF GROUNDWATER

Objective: Water Quality Protection.

Objective Satisfied

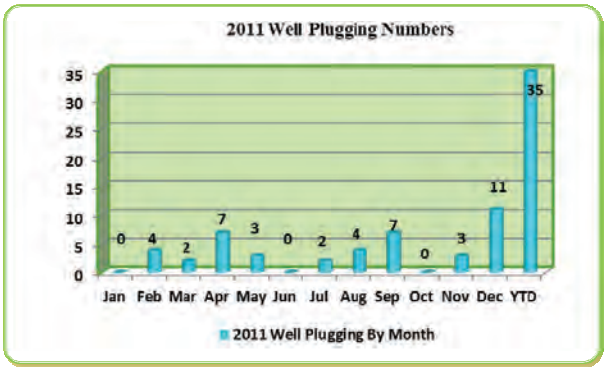
The District's Management Plan requires the dissemination of educational information on eliminating and reducing the wasteful use of groundwater. It focuses on water quality protection through at least two out-reach methods/activities. During FY10, the District satisfied this requirement as follows, but in 2011 the District was challenged to document well plugging efforts due to major highway expansion along IH-35. 2011 methods used: media, website and well drillers.

1) Well Plugging Demonstration:

The District sponsored a well plugging demonstrations during FY10. The demonstration well was a large diameter hand dug well located at 4950 Atkins Road in the Salado area. The event occurred on July 21, 2010. The Texas AgriLife Extension partnered with the District in this event. In 2011, due to staff budget cuts, this cost program was discontinued by Texas AgriLife Extension.

The demonstrations showed the proper way to plug a well and emphasized the importance of plugging abandoned wells to prevent groundwater contamination. In FY11, the collaborative effort to conduct on-site well plugging demonstrations with TAMU-Texas AgriLife Extension Service was no longer possible due to their budget constraints and reduction in staff.

Reports indicate 112 wells plugged between 2002—2011. 35 of those wells were plugged in 2011. The majority of plugged wells are a result of the IH-35 highway expansion by TxDot extending North and South throughout Bell County.



Well Plugging Demonstration - Hand Dug Well Atkins Road, Salado, Texas
July 21, 2010

2) Classroom Presentations

Clearwater staff conducted several classroom presentations during the year that included a segment on non-point source pollution. The presentation consisted of a PowerPoint presentation and a groundwater model to demonstrate groundwater basics and the impact of non-point source pollution on both groundwater and surface water. Presentations were given to the following schools:

Killeen ISD -	Nolanville Elementary
	West Ward Elementary
	KISD area Elementary Schools Earth Day at Ft. Hood
Salado ISD -	Salado Elementary
Belton ISD -	Leon Heights Elementary (3 visits)

Clearwater staff also conducted other presentation during the year within the Bell County community. Such presentations were given to the following clubs and organizations:

Killeen Lions Club
Belton Lions Club
Belton Rotary Club
Temple Area Chamber of Commerce
Morgan's Point TML Convention
Native Plant Society of Texas
Texas AgriLife Extension Annual Crops Clinic
Bell County Water Symposium

Refer to **Appendix D** for a complete list of items distributed during these events.

C. ADDRESSING CONJUNCTIVE SURFACE WATER MANAGEMENT ISSUES

Objective: Participate in Regional Water Planning Process.

Objective Satisfied

The District's Management Plan requires participation in the regional planning process by attending a minimum of two meetings of the Brazos G Regional Water Planning Group per fiscal year. During FY11, due to various conflicts, District representatives were only able to attend two meetings (June 15, 2011 & Sept. 14, 2011).

2011 Region G Meetings: January 11, 2011
January 19, 2011
March 30, 2011
June 15, 2011
September 14, 2011
September 29, 2011
November 09, 2011

D. ADDRESSING NATURAL RESOURCE ISSUES WHICH IMPACT THE USE AND AVAILABILITY OF GROUNDWATER, AND WHICH ARE IMPACTED BY THE USE OF GROUNDWATER

Objective: Monitor Water Quality.

Objective Satisfied

The District's Management Plan requires monitoring of water quality by obtaining and testing water samples from at least six wells within the District. The District has an in-house water quality lab and offers free testing service to registered well owners. Testing parameters include coliform bacteria; alkalinity; conductivity/total dissolved solids; fluoride; hardness; nitrate; nitrite; pH; phosphate; and sulfate. During FY11, the District satisfied this requirement as follows:

2011 Water Quality Testing

Aquifer	CUWCD Well #	Test Date
Edwards BFZ	E-02-1957G	1/18/2011
Edwards Equivalent	E-02-267G	6/14/2011
Edwards BFZ	E-02-382G	10/18/2011
Upper Trinity	E-02-001G	10/25/2011
Alluvium	E-02-3131G	11/9/2011
Alluvium	E-02-3131G	11/10/2011
Alluvium	E-02-3131G	11/11/2011
Upper Trinity	E-02-382G	11/22/2011
Middle Trinity	E-03-418P	12/6/2011
Edwards BFZ	E-02-382G	12/20/2011

Staff conducted 10 testing events on groundwater samples brought in by well owners. Two samples tested were from the Edwards BFZ aquifer; one sample from the Edwards Equivalent; two samples from the Upper Trinity; one sample from the Middle Trinity; and three samples were Alluvium. There were no samples brought in from the Lower Trinity for testing.

A summary of the well testing results and a location map of the well sites are shown in Appendix E

E. ADDRESSING DROUGHT CONDITIONS

Objective E.1: Edwards BFZ and Trinity Aquifer Rainfall Precipitation Deficit Index Reports and the Drought Status Reports from Clearwater UWCD Staff.

Objective Satisfied

The District's Management Plan requires that the General Manager, Staff and Board of Directors review the District's drought status on a monthly basis. The decisions to declare drought levels per the Districts Drought Management Plan approved December 17th, 2009, are reviewed weekly by the General Manager and an aggressive review and monitoring of the stream flow gage system was put at as a priority during the Epic Drought of 2011. The Drought Management plans are designed to reflect conditions of the Trinity and Edwards BFZ Aquifers independently of each other based on the specified triggers (PDI and/or Spring Flow).

The Board of Directors designated the General Manager as the designee to evaluate conditions and if triggers warrant, a declaration of any kind, the GM must base that decision on the facts that impact the triggers per DM Plan. Due to the epic drought of 2011 the District worked closely with the Water Supply Corporations in Bell County that have Historic and Existing Use Permits as well as Operating Permits.

Prior to hiring the new General Manager, the Board President, Leland Gersbach, declared on May 10, 2011, (per a press release) that Clearwater Underground Water Conservation District Board of Directors determined that current conditions were creating an adverse effect on the recharge of the Trinity Aquifer and the Edwards BFZ, thus triggering the initiation of Drought Management Stage 1. Clearwater Board President Leland Gersbach said, "It is imperative in this historical period of lack of winter and spring rainfall that the citizens of Bell County start to conserve water as we enter the high use and evaporation period of our year."

Under the Trinity Aquifer Drought Management Plan, a drought stage is only be triggered when the Precipitation Deficit Index (PDI) is less than a drought state trigger condition exceeding for a period of 28 consecutive days and shall be reduced or terminated when the PDI is greater than the trigger condition exceeding for a period of 42 consecutive days.

Under the Edwards BFZ Drought Management Plan, a drought stage is triggered when either the Precipitation Deficit Index (PDI) is less than a drought state trigger condition exceeding for a period of 28 consecutive days and shall be reduced or terminated when the PDI is greater than the trigger condition exceeding for a period of 42 consecutive days, or the average spring discharge measured via stream flow gauges in Salado Creek fall below the trigger level for the periods described time.

The PDI on May 10, 2011 for the Trinity was at 72%, which is within Stage 1 (70-79%): Awareness. The conservation goal of the District, under Stage 1, would be a voluntary 10% reduction using the suggested conservation measures. The Edwards BFZ Aquifer, at 79% PDI, has not reached the conditions to warrant initiation of a stage within the Edwards BFZ Drought Management Plan, but the Board continued to closely monitor the drought indices and took action at declared appropriate designation in July. The stream flow gage system was still not operational until the last week of September 2011, and upon that time the Edwards BFZ DMP was fully functioning per the two separate trigger measurement.

The Board instructed staff to inform the media of their action taken and justification for that action. The staff worked from this point on to the end of 2011 to weekly evaluate the rainfall data and monitor the spring flow estimates. In addition to the rainfall data the staff prepared (see attached appendix E) the drought status reports. The Board's designee, Dirk Aaron (New General Manager, effective June 1, 2011) was authorized to monitor the drought indices and to take appropriate action to initiate the drought stages as needed beginning June 1, 2011 and instructed to inform the Board President at the time the action is taken and to present monthly defense of this action at each monthly board meeting.

Public notification of the initiation or termination of drought stages was by the District's website, press releases to newspaper(s) of general circulation, radio announcement, or District mailing, fax, or email to owners/operators of permitted wells. This strategy was implemented each week starting in June of 2011. The General Manager subsequently coordinated a formal roundtable meeting on September 9, 2011 with all of the Water Supply Corporations permitted within the District for groundwater. The presentation; by Staff and District Consulting Geoscientist, Randy Williams (Bar-W Groundwater Exploration) focused on the drought conditions of the region and State and trigger mechanisms of the Clearwater UWCD Volunteer Drought Management Plan. The leadership of the Water Supply Corporations, responded by providing feedback on their Drought Management Plans that have significantly different triggers. Each agreed to utilize the District's recommendations as they make decisions on their own respective drought declarations for the remainder of the current drought.

The Precipitation Deficit Index (PDI), the daily maximum spring discharge, and average spring discharge values were monitored weekly (starting September 20) and presented to the District Board at all monthly Board meetings in the remainder of 2011.

Drought stage triggers continued to move the stages ultimately to Stage 4 by the end of calendar year 2011. The final trigger level for the Trinity (Appendix E: Trinity Drought Status Report December 31, 2011) was 15.3 inches of rainfall by the PDI which was 46% of annual rainfall in previous 365 days over the defined Trinity Aquifer Recharge area.

Drought stage triggers continued to move further to the Critical Stage 4 by the end of the calendar year for the Edwards BFZ. The final trigger levels for the PDI of the Edwards was 13.6 inches of rainfall which was 41% of annual rainfall in the previous 365 days over the defined Edwards BFZ recharge zone. This information defended the Districts aggressive recommendation to all well owners and users that reduction by 40% (Critical Stage 4 DMP) is necessary and was important to the health of both Aquifers to insure that draw down is stabilized and the spring flow of the Confluent of Springs in Salado Proper remain above 100 acre feet per month (1.679 cubic feet per second flow). The lowest the spring flow was measured in 2011 (last two weeks of December 2011) was 131 acre feet per month (2.20 CFS).

**The Edwards BFZ PDI described as: Monitored daily on a running-year basis over a defined area consisting generally of the area of the Edwards aquifer and contributing areas in Bell and portions of Williamson Counties and which is based on NEX-RAD rainfall data provided by the National Oceanic and Atmospheric Administration. The PDI trigger condition must be exceeded for a period of 28 consecutive days.*

The Edwards BFZ Spring Discharge described as: Spring Flow monitored daily for discharge values (averaged over a period of five consecutive days) on a running five day basis. Upper Gage located (FM 2483 Patterson's Crossing) above the confluent of Salado Springs Proper, and low gage located just below the springs at Inn on the Creek (owned by Will Lowery).

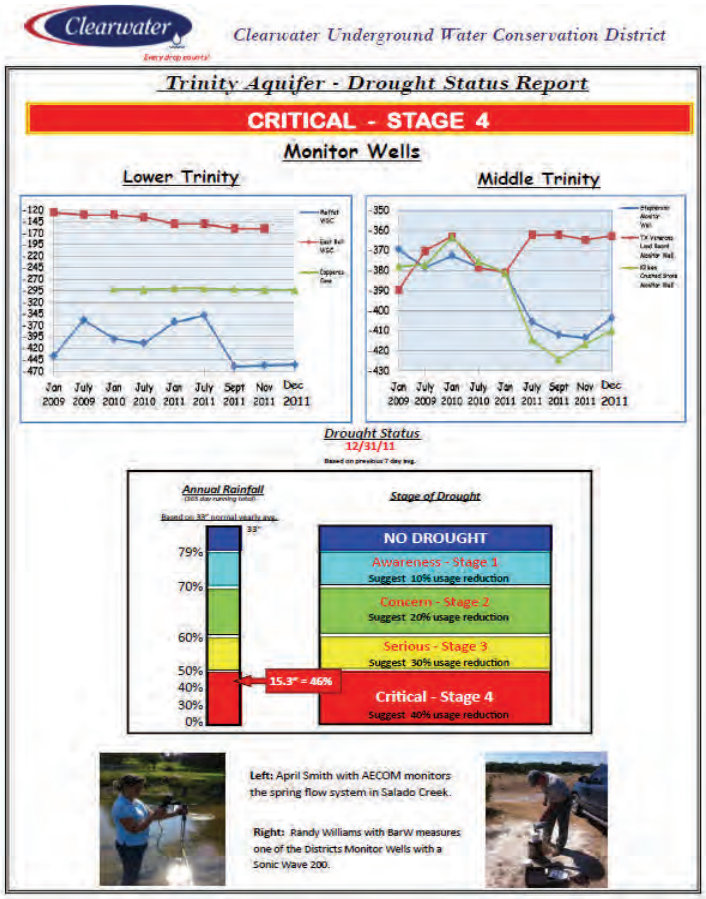
The Edwards BFZ Termination of Stages described as: If a drought stage is in effect it shall be reduced or terminated when both the PDI and the average spring discharge values are greater than the trigger conditions of the drought stage in effect for the periods of no less than 42 consecutive days.

**The Trinity Aquifer PDI trigger described as: Rainfall totals monitoring daily on a running-year basis over a defined area consisting generally of the area of the Trinity aquifer and contributing areas in Bell, Lampasas, Burnet, McLennan and portions of Williamson Counties and which is based on NEX-RAD rainfall data provided by the National Oceanic and Atmospheric Administration. The PDI trigger condition must be exceeded for a period of 28 consecutive days. If a drought stage is in effect it shall be reduced or terminated when both the PDI and the average spring discharge values are greater than the trigger conditions of the drought stage in effect for the periods of no less than 42 consecutive days.*

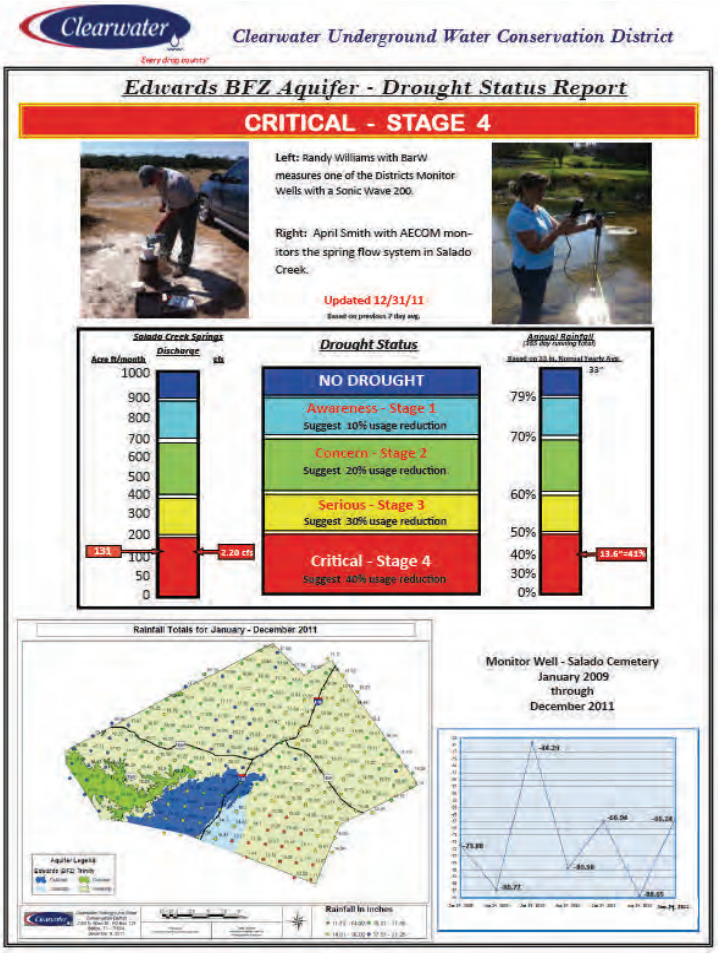
****references listed are posted on Clearwater's website and in Appendix F***

Drought Status Reports for the Trinity and Edwards BFZ aquifers are shown below. These reports are generated once a month, or as needed, and posted on the CUWCD Website. The information for the report is based on the Precipitation Deficit Indicator Report for each Aquifer.

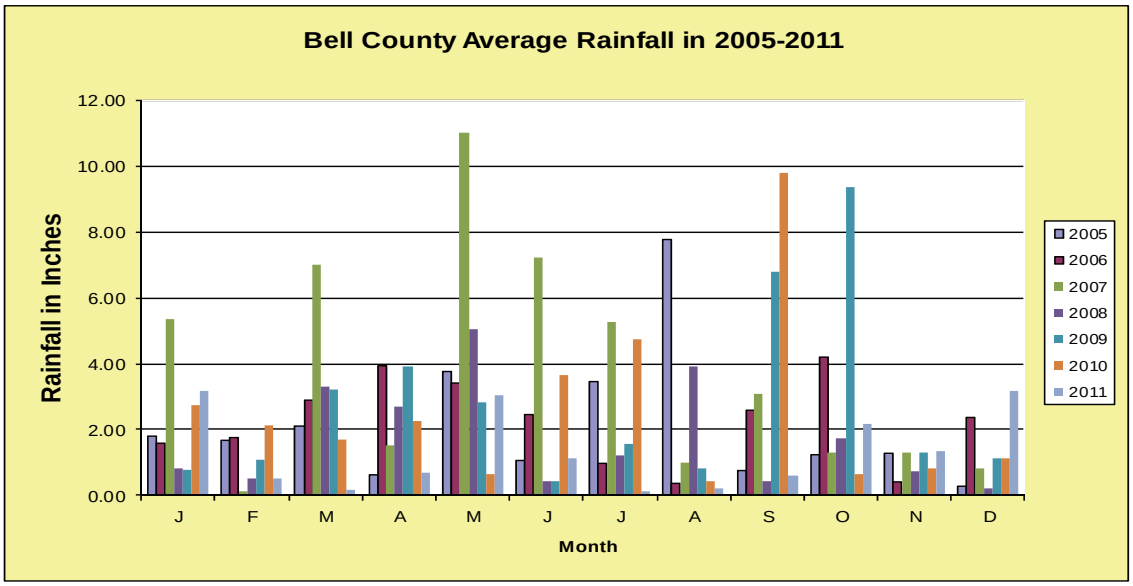
PDI Drought Data for Trinity Aquifer Recharge Zone								
Day	Daily Avg	Annual Total	% of Avg	Deficit	Stage	28 days	42 days	Declared
12/31/2011	0.0001	15.5363	47.0797	-17.4637	4	4	4	4
10/5/2011	0.0000	10.478	31.7515	-22.522	4	3	4	3
9/8/2011	0.0000	11.8231	38.8276	-21.1769	4	3	3	3
9/7/2011	0.0000	17.653	53.4939	-15.347	3	3	3	3
8/24/2011	0.0000	18.9974	57.5679	-14.0026	3	2	3	2
7/30/2011	0.0008	19.3569	58.6573	-13.6431	3	1	3	1
7/28/2011	0.0000	19.6523	59.5524	-13.3477	3	1	2	1
7/27/2011	0.0000	19.9605	60.4864	-13.0395	2	1	2	1
7/3/2011	0.0000	22.6979	68.7815	-10.3021	2	1	1	1
7/2/2011	0.0004	23.3672	70.8097	-9.6328	1	1	1	1
6/26/2011	0.0000	25.458	77.1455	-7.542	1	0	1	1
5/29/2011	0.0000	26.4069	80.0209	-6.5931	0	0	1	1
5/25/2011	0.1835	26.5067	80.3233	-6.4933	0	1	1	1
5/24/2011	0.0000	26.3249	79.7724	-6.6751	1	1	1	1
4/16/2011	0.0000	25.7113	77.913	-7.2887	1	0	1	0
3/20/2011	0.0000	26.3803	79.9403	-6.6197	1	0	0	0
3/19/2011	0.0000	26.6043	80.6191	-6.3957	0	0	0	0
1/1/2011	0.0000	30.804	93.3455	-2.196	0	0	0	0



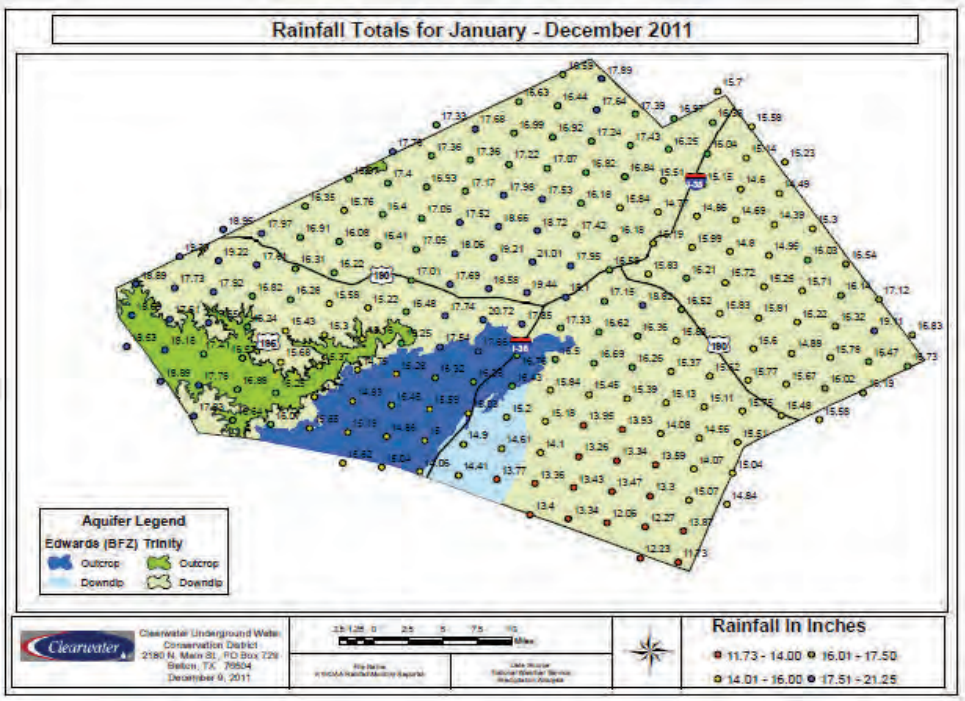
PDI Drought Data for Edwards BFZ Recharge Zone								
Day	Daily Avg	Annual Total	% of Avg	Deficit	Stage	28 days	42 days	Declared
12/31/11	0.0000	15.2244	46.1345	-17.7756	4	4	4	4
9/21/11	0.0000	10.1534	30.7679	-22.8466	4	2	4	2
9/8/11	0.0000	10.9984	33.3285	-22.016	4	2	2	2
9/7/11	0.0000	20.5718	62.3888	-12.4282	2	2	2	2
8/23/11	0.0000	22.0548	66.8327	-10.9452	2	1	2	1
7/27/11	0.0000	23.0422	69.8249	-9.9578	2	0	1	0
7/26/11	0.0000	23.5144	71.2558	-9.4856	1	0	1	0
6/30/11	0.0000	25.769	78.0879	-7.231	1	0	0	0
6/29/11	0.0000	27.1886	82.3897	-5.8114	0	0	0	0
6/22/11	0.8040	28.6022	86.6733	-4.3978	0	0	1	0
5/11/11	0.1580	26.3296	79.7867	-6.6704	1	0	1	0
4/24/11	0.0000	26.2142	79.437	-6.7858	1	0	0	0
4/23/11	0.0000	26.7722	81.1279	-6.2278	0	0	0	0
3/31/11	0.0000	27.489	83.2394	-5.531	0	0	0	0
2/27/11	0.0000	30.2608	91.6994	-2.7392	0	0	0	0
1/1/11	0.0000	33.6558	101.987	0.6558	0	0	0	0



The Chart below shows the average monthly rainfall for bell county from 2005-2011. Information obtained through the NOAA - National Weather Service site.



Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2005	1.81	1.69	2.10	0.64	3.78	1.06	3.45	7.79	0.77	1.23	1.30	0.27
2006	1.59	1.76	2.89	3.95	3.41	2.44	0.98	0.38	2.57	4.22	0.42	2.39
2007	5.35	0.11	7.03	1.53	11.04	7.22	5.26	1.00	3.09	1.28	1.31	0.82
2008	0.81	0.51	3.32	2.69	5.05	0.45	1.21	3.90	0.42	1.75	0.74	0.23
2009	0.76	1.09	3.20	3.90	2.81	0.43	1.56	0.84	6.80	9.38	1.30	1.11
2010	2.76	2.14	1.70	2.27	0.66	3.66	4.74	0.44	9.82	0.65	0.82	1.11
2011	3.16	0.50	0.18	0.70	3.05	1.12	0.13	0.23	0.59	2.16	1.35	3.18



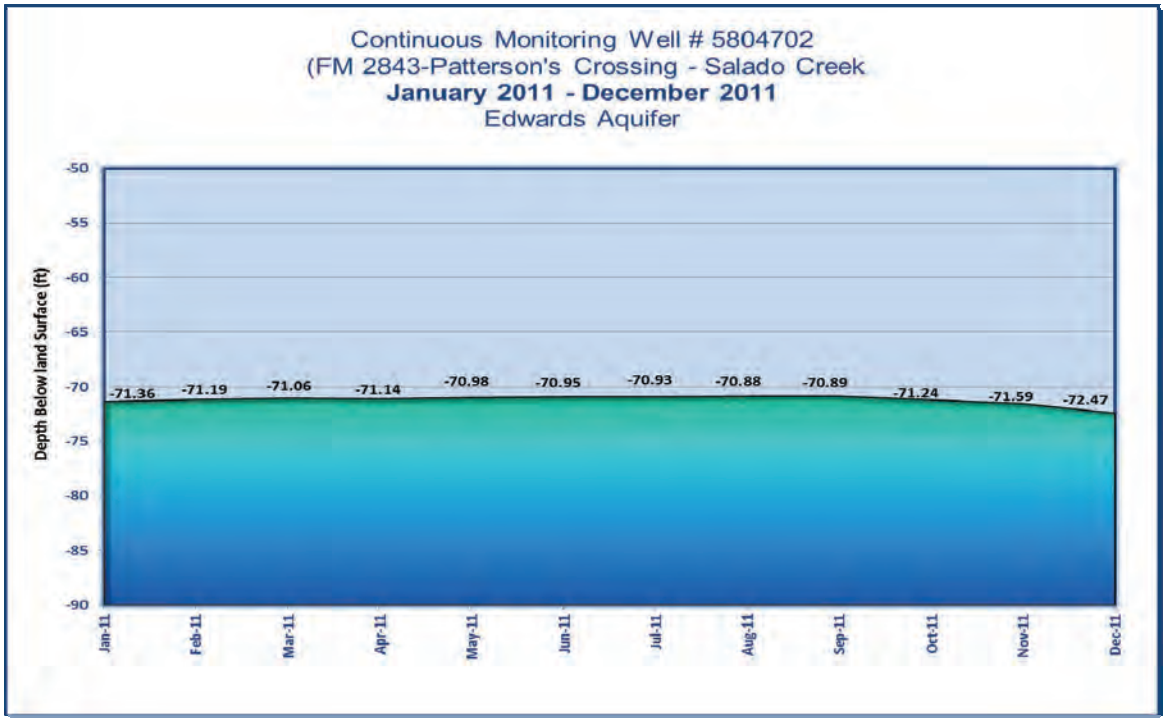
Objective E.2: TWDB Continuous Monitoring Wells.

Objective Satisfied

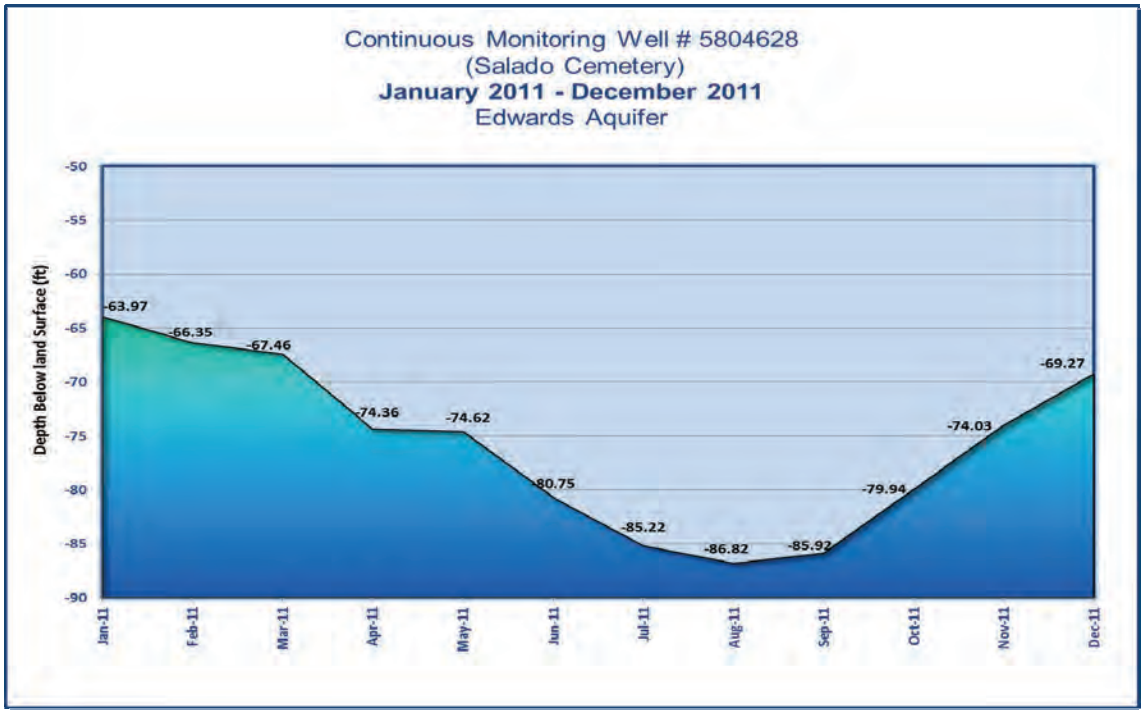
The District's Management Plan requires monitoring of drought conditions by reviewing data from the TWDB monitor wells in Bell County that are equipped with a continuous monitoring system. Three wells in the Edwards BFZ aquifer and three wells in the Trinity aquifer are equipped with continuous monitoring systems. Clearwater is considered a Cooperator with the TWDB in providing monitoring well data. Data from the wells is tied into the TWDB satellite system and is available for viewing on their website.

The graphs below show the data collected by the continuous monitor wells in the Edwards BFZ and Trinity Aquifers. Measurements are collected every hour.

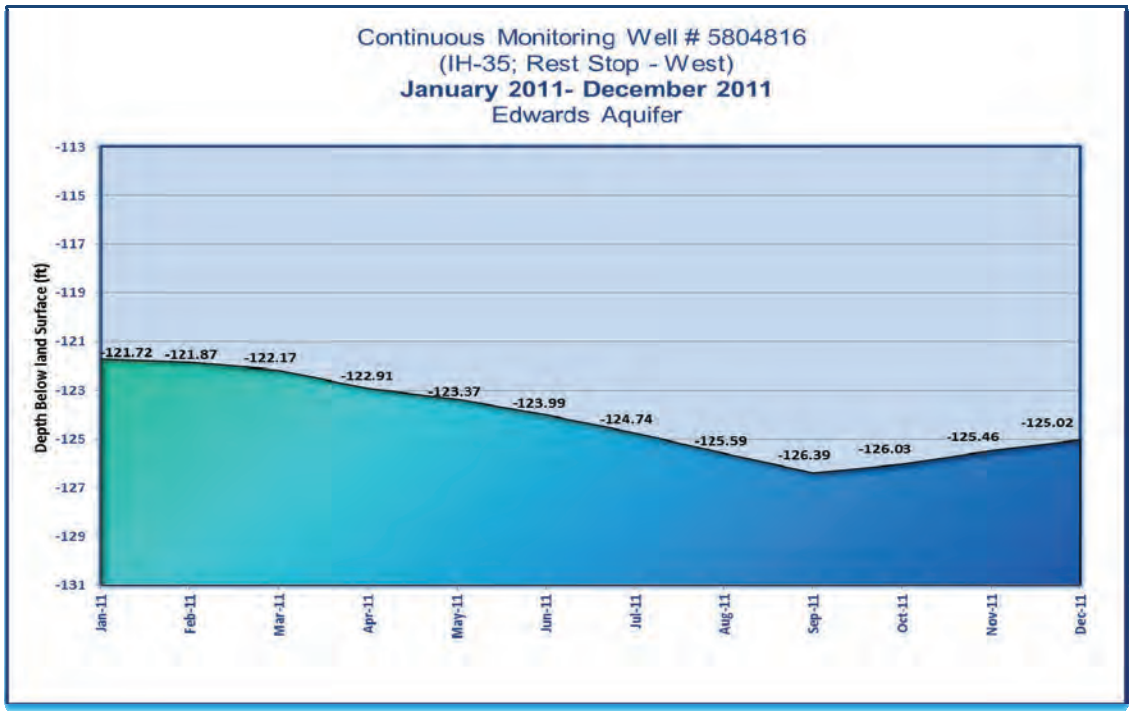
The graph below represents readings from the continuous monitor site at Patterson's Crossing - Salado Creek in the Edwards BFZ Aquifer. These readings illustrate leveling out of the water level from January 2011 until September 2011 when the water level begins to decrease. Water level readings ranged from –71.36 ft. below land surface (BLS) in January 2011 up to its highest level of –70.89 ft. BLS in September 2011 and back down to –72.47 ft. BLS in December



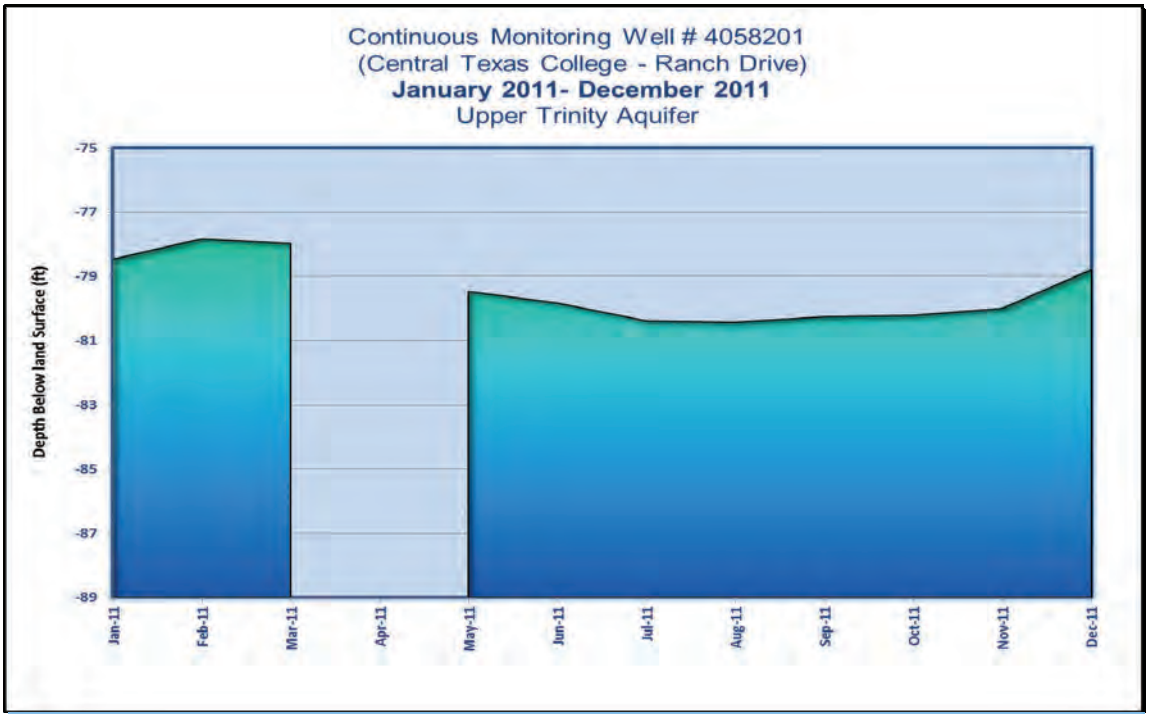
The next graph shows the data collected by the continuous monitor site located at the Salado Cemetery in the Edwards BFZ aquifer during calendar year 2011. These readings show a sharp decrease in the water level from January 2011 until August 2011. Water levels began to rise again in September 2011. Water level readings ranged from —63.97 ft. below land surface (BLS) in January 2011 down to its lowest level of –86.62 ft. BLS in August 2011 and back up to –69.27 ft. BLS in December 2011.



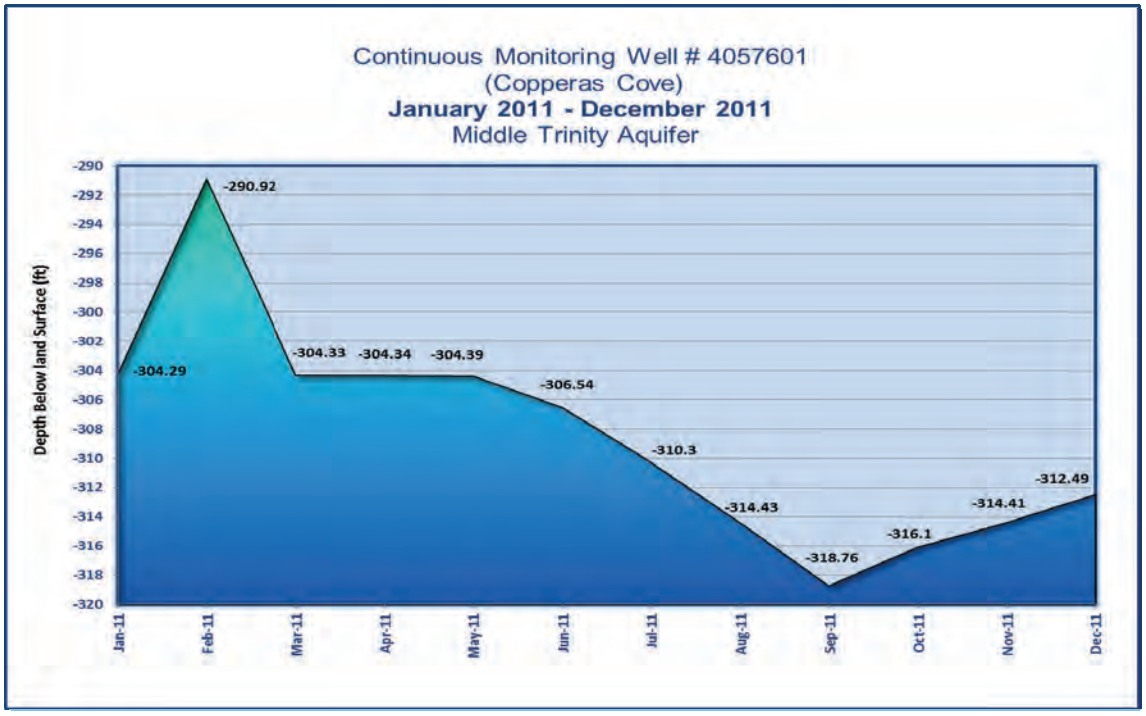
The graph below shows data collected by the continuous monitoring site located along the southbound lanes of I35 at the Salado rest stop during calendar year 2011. This Well is also located in the Edwards BFZ aquifer. These readings show a steady decrease in the water level from January 2011 until September 2011 when the water level begins to rise again. Water level readings ranged from –121.72 ft. below land surface (BLS) in January 2011 down to its lowest level of –126.39 ft. BLS in September 2011 and back up to –125.02 ft. BLS in December 2011.



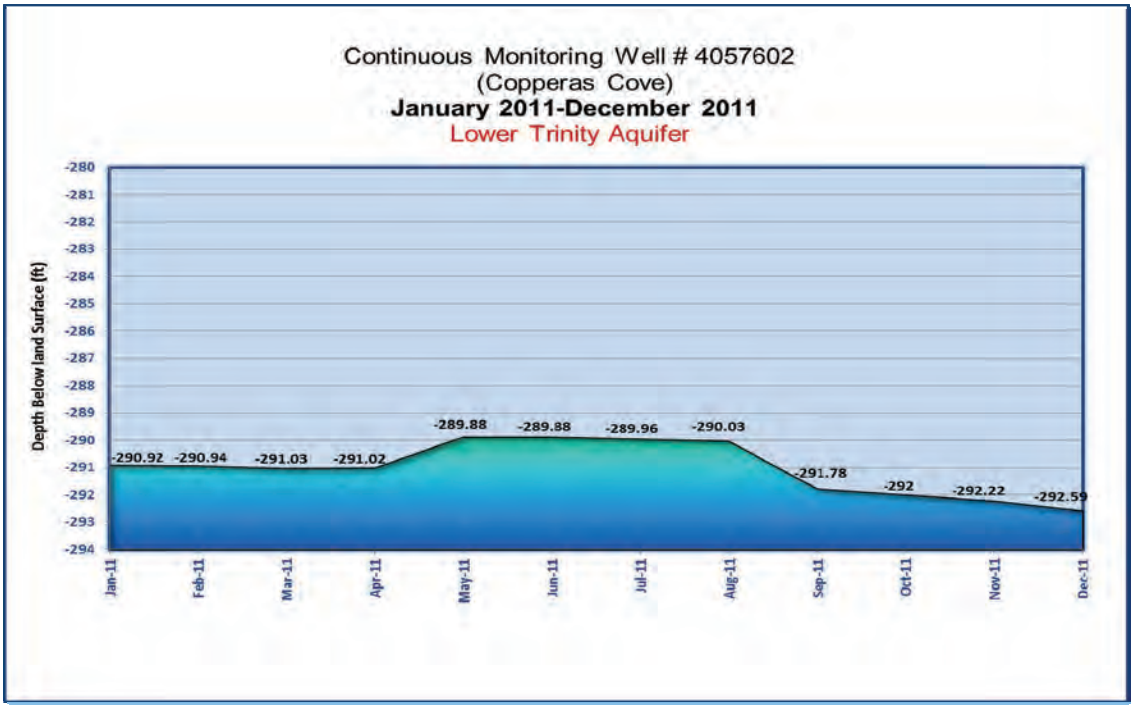
The graph below shows data collected by the continuous monitoring site located at the Central Texas College Campus during calendar year 2011. This well is in the Upper Trinity aquifer. As indicated by the graph, the water level remains relatively constant throughout 2011. In April, 2011, the equipment was down and we were unable to obtain a reading.



The next graph shows data collected by the continuous monitoring site located in Copperas Cove, in the Middle Trinity aquifer, during calendar year 2011. This Well is also located in the Middle Trinity aquifer. Readings on the levels from January 2011 to May 2011 show a constant level with readings form –304.29 ft. to –304.39 ft BLS. In February, there was a malfunction of the monitoring equipment. From May 2011 through September 2011 the well shows a continued decrease in the water level, but begins a steady increase through December 2011.



The final graph shows data collected by the continuous monitoring site also located in Copperas Cove, but in the Lower Trinity aquifer, during calendar year 2011. As indicated by the graph, the water level remains relatively constant throughout 2011. However, we do begin to see a slight decrease from August through December.



F. ADDRESSING CONSERVATION RECHARGE ENHANCEMENT, RAINWATER HARVESTING, PRECIPITATION ENHANCEMENT, OR BRUSH CONTROL, WHERE APPROPRIATE AND COST-EFFECTIVE

Objective F1: Promote Conservation.

Objective Satisfied

The District's Management Plan requires promotion of conservation by one outreach method/activity. During the epic drought of 2011, the District met this requirement by aggressive outreach through the CUWCD website, social media (Facebook), and public presentations.

Climatologist—Dr. John Nielson-Gammon speaks at the 11th Bell County Water Symposium - Nov 17, 2011

Objective F2: Promote Rainwater Harvesting.

Objective Satisfied

The District's Management Plan requires promotion of rainwater harvesting by posting information on the District website. The District satisfied this requirement by including a segment on rainwater harvesting on its website under the Education menu tab along with a link to the Texas AgriLife Extension website and their Rainwater Harvesting Manual. Also included are links to Rainwater Harvesting Contacts and Suppliers and to the Texas AgriLife Extension manual on Rainwater Harvesting Landscape Methods. The new facility will include rainwater harvesting and use upon staff being established in 2012.

A copy of the posted information is included under **Appendix G.**

Objective F3: Provide Information on Recharge Enhancement and Brush Control.

Objective Satisfied

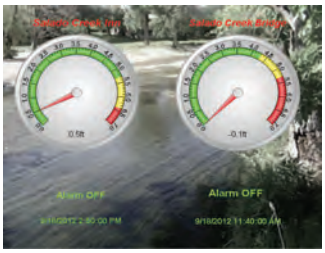
The District's Management Plan requires promotion of conservation by providing information relating to recharge enhancement and brush control on the District website. The District satisfied this requirement by including a segment on recharge enhancement and brush control on its website under the Education menu tab. For additional information on recharge enhancement and brush control, links to the Texas State Soil and Water Conservation website, the Leon River Restoration Project website, and the Texas AgriLife Extension website are provided. Also included is a link to the Brush Management Fact Sheet produced by Environmental Defense.

A copy of the posted information is included under **Appendix H**.

G. ADDRESSING IN A QUANTITATIVE MANNER THE DESIRED FUTURE CONDITIONS OF THE GROUNDWATER RESOURCES

Objective G1: Operate a gauge system on Salado Creek to estimate spring discharge.

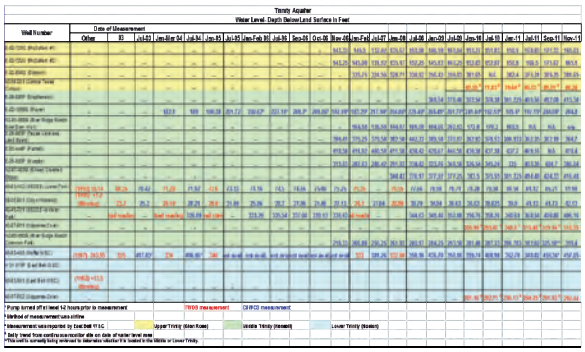
Objective Satisfied



The District contracted with AECOM, Bar-W Exploration and Hamson Consulting to reconstruct the system after the September 2010 flood. New General Manager put this system back on line by October 1, 2011 and was fully functioning at that time. The lowest measurement on record was December 31, 2011 at 130 ac-ft/month or 2.20 cfs. (see page 30 - system described on Drought Response.

Objective G2: Collection of at least 5 water level measurements from the Trinity Aquifer monitor wells located in the District.

Objective Satisfied



The following pages are tables that provide a summary of the monitoring data. Refer to Appendix A for a map of the aquifer monitoring sites. NOTE: Larger numbers represent greater depth necessary to reach the surface of the aquifer, i.e. a decline in the aquifer level. Numbers in red were taken by the TWDB (or are continuous monitoring wells), whereas numbers in blue were taken by Clearwater. Comparing the water level measurements taken by the District with those taken by the TWDB is sometimes difficult due to differences in measurement procedures and equipment. Clearwater primarily uses an e-line;and a sonic wave meter; an airline is used if the well is equipped with one. Large producers are asked to turn the pump off at least one hour prior to the measurement to allow the aquifer levels time to stabilize. The TWDB typically uses a steel tape or an airline and does not request the pump to be turned off.

G. ADDRESSING IN A QUANTITATIVE MANNER THE DESIRED FUTURE CONDITIONS OF THE GROUNDWATER RESOURCES

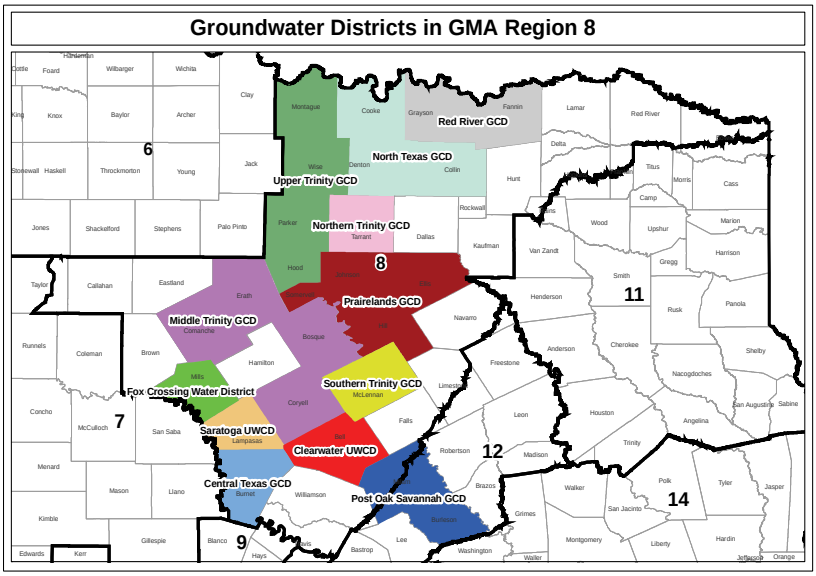
Clearwater has been working toward this management goal since November 2005 when the first meeting of Groundwater Management Area 8 (GMA8) was held. GMA8 is responsible for determining desired future conditions (DFC) for the nine major and minor aquifers within its 45 county boundary. These aquifers are as follows:

Edwards BFZ	Brazos River Alluvium	Ellenburger-San Saba
Trinity	Blossom	Hickory
Woodbine	Nacatoch	Marble Falls

DFCs for all of these aquifers were set by GMA8 before the September 2010 deadline. The TWDB prepares the resulting managed available groundwater (MAG) figures based on the DFC statements and then forwards these figures to the Regional Water Planning Groups. At the end of FY10 MAGs were provided by TWDB for all the aquifers except the Nacatoch. The MAG figures for the Edwards BFZ and Trinity aquifers are being used by the District and will be included in the next revision of the District management plan.

During FY11, fiscal and administrative responsibilities for GMA8 were turned over from Clearwater to the North Texas Groundwater Conservation District. Staff attended the following GMA8 meetings with District Director, Judy Parker:

January 11, 2011	April 12, 2011	July 12, 2011	November 8, 2011
February 24, 2011	May 4, 2011	September 7, 2011	December 7, 2011



4. MISCELLANEOUS ACTIVITIES

In addition to the Management Plan requirements, Clearwater is involved in several miscellaneous activities as follows:

A. Edwards BFZ Aquifer Recharge Zone Studies
B. Salado Creek Stream Flow Gauging Program
C. Strategic Plan Update
D. Abandoned Wells
E. Bell County Water Symposium
F. Newsletter
G. Major Rivers Water Education Program
E. Book Cover Distribution
F. Literature Packet Distribution
G. Water Conservation Kits
H. Presentations and Outreach
I. Public Advisory Committee
J. Internet Site

These activities are discussed in more detail below.

A. EDWARDS BFZ AQUIFER RECHARGE ZONE STUDIES

Discussions regarding the protection of the Edwards BFZ aquifer recharge zone began in FY08. In FY10, following a stakeholders meeting in September 2009, the Board authorized four studies to be conducted by BAR-W Groundwater Exploration, LLC with a completion target date of September 30, 2010. These studies are as follows:

- Identify geologic structures in the recharge zone and transition zones.
- Select wells for water level measurements; prepare contour map of the aquifer.
- Select wells for 3 pumping tests; evaluate results.
- Select 10 wells near eastern aquifer boundary for water quality testing; evaluate results.

The studies were not completed at the end of FY10 and have continued into FY11.

B. SALADO CREEK STREAM FLOW GAUGING PROGRAM

The District began collecting data from the Salado Creek stream flow gauges during FY08. During FY10, the Board contracted with Hamson Consulting to upgrade various aspects of the system which would include the automatic collection of data and posting of this data on the District website. In September 2010, following a major flooding event, both gauges were lost and the system was therefore incapacitated. As a result, the automation was temporarily placed on hold. Replacing the gauge system was ongoing into FY11. New General Manager, Hamson Consulting, and AECOM Staff completed the repairs. The gauges became a functioning key component of Drought monitoring in 2011

C. STRATEGIC PLAN

The District developed a Strategic Plan during FY08, to prioritize the District's activities and objectives. This Plan was reviewed and updated during FY10. The revised plan is provided in Appendix I.

D. ABANDONED WELLS

The District continues to coordinate with the Texas Department of Licensing and Regulation (TDLR) to identify and investigate reports of abandoned wells. After initial investigation, staff refers abandoned wells to TDLR for further investigation, determination of corrective action, and enforcement. The District did not refer any abandoned wells to TDLR during FY11.

The District continues to work with the Bell County Public Health District for assistance in locating abandoned wells when septic systems are inspected. The District promotes the plugging of abandoned wells by distributing educational information at various conferences and events and hosting well plugging demonstrations with the Texas AgriLife Extension. According to records from the Texas Department of Licensing and Regulation, during FY11 a total of 35 wells were plugged in Bell County.

E. BELL COUNTY WATER SYMPOSIUM

During FY11, Clearwater sponsored its eleventh annual water symposium on November 17, 2011 at the Central Texas Council of Governments Building. The District partnered with the Texas AgriLife Extension and was able to provide Continuing Education Units for Private and Commercial Pesticide Applicators. Other partners included Bell County, Bar-W Groundwater Exploration, LLC, AECOM, Inc., and Lloyd Gosselink Attorneys at Law.

General Manager, Dirk Aaron, welcomes guests to the 2011 Water Symposium.

Stacy A. Steinbach, Executive Director, TAGD, presents "Groundwater Issues Across Texas" at the 2011 Water Symposium.

Topics for the Symposium, included:

"**The Weather Forecast for 2011 and Beyond"**
Dr. John Nielson-Gammon, State Climatologist at Texas A&M University

"Status of Water Supply in Central Texas and Future Water Plans"
Brad Brunett, Water Service Manager, Brazos River Authority

"Legislative Challenges for Texas"
Jimmie Don Aycock, State Representative District 54

" Legislative Update"
Kristen Fancher, Lloyd Gosselink Attorneys at Law

"Groundwater Issues Across Texas"
Stacey Steinbach, Executive Director - Texas Alliance of Groundwater Districts

" Drought Status of Aquifers & Understanding Drought Contingency Plans"
Randy Williams, Bar-W Groundwater Exploration, LLC

"Rainwater Harvesting & Water Conservation in Landscapes"
BCMGA Rainwater Harvest Specialist & EarthKind Specialist

The District set up a display and distributed water conservation kits as well as other information on water conservation, water quality protection and information on the aquifers. Approximately 150 people attended the symposium.

Refer to **Appendix J** for an agenda of the meeting.
Appendix D contains the Activity Report that lists the items distributed during this event.

F. NEWSLETTER


THE CLEARWATER SOURCE

CLEARWATER PLANS STAND-ALONE FACILITY

The District published its seventh annual newsletter—*The Clearwater Source*—during the latter part of FY11. The newsletter was mailed in September to all registered well owners. Newsletter articles included an update on the District's plans to separate from CTCOG; water sources for Bell County; water conservation; water quality protection; District activities; well registration and production; data on rainfall, lake levels, and aquifer levels; and the president's message on Clearwater's progress.

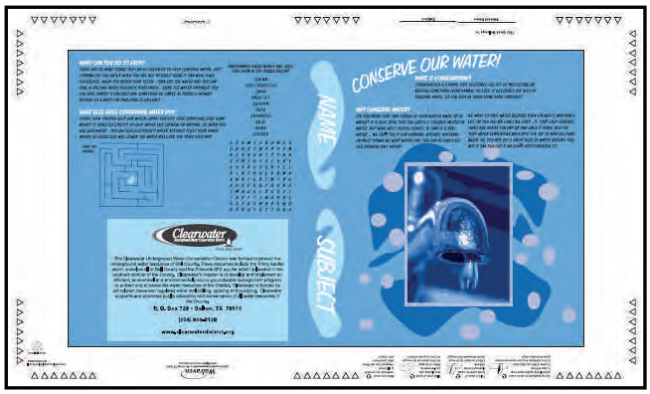
G. MAJOR RIVERS WATER EDUCATION PROGRAM

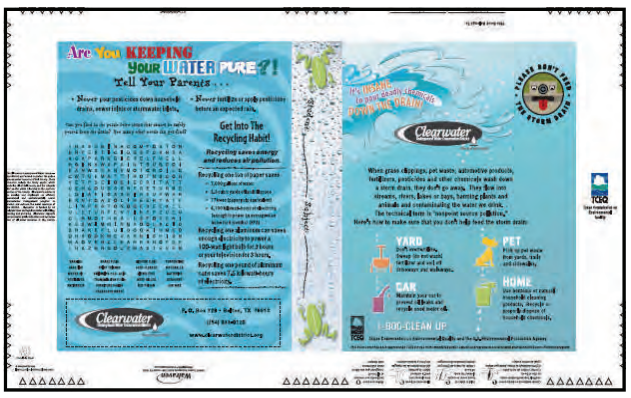
Each year the District sponsors the Major Rivers Water Education Program. This program is geared toward 4th and 5th grade students. During the spring of 2011, orders were taken for 122 students and 4 teachers in the Killeen ISD. The Major Rivers Program material was delivered to the schools in May 2011.

A list of participating schools is provided in Appendix D, Activity Reports.

H. BOOK COVER DISTRIBUTION

The District again participated in purchasing book covers during FY11 for all middle and high school students in Bell County with distribution to occur during the 2010/2011 school year. The book covers provide information on the importance of water and water conservation, and a brief overview of the District, including its goals and objectives. A total of 35,500 book covers were distributed to the students at the start of the school year during August and September 2011.





The book covers distributed are shown in **Appendix K**.

I. LITERATURE PACKET DISTRIBUTION

The District compiles literature packets containing a variety of information on water conservation, the water cycle, and water quality. The packets are distributed to Bell County schools—one per campus—for each fall semester. Packets were distributed during the month of September and included 106 packets.

A list of schools and the items distributed are found in **Appendix D**, Activity Reports.

J. WATER CONSERVATION KITS

To promote public awareness and encourage water conservation, the District distributes water conservation kits at special events. The water conservation kits include the following items: faucet aerator; one touch on/off tap saver; 7 spray water saving hose nozzle; toilet leak detector dye tablets; shower flow meter bag; and lawn and garden rain gauge. These items were available for distribution at the following events: Annual Bell County Water Symposium (11-17-11); and Annual Crops Clinic **(**1-25-11).

Refer to **Appendix D** for the Activity Report that lists the items distributed at these events.

K. PRESENTATIONS AND OUTREACH

Clearwater continues to promote public awareness of the District, water resources in Bell County and water conservation. Board members and staff have spoken to several groups and schools throughout the year and have attended various events and provided information for distribution regarding the District, groundwater resources, water cycle, water quality protection, and water conservation as identified below. (See **Appendix B** for the Activity Report that lists the material distributed.)

School Presentation		**Date**	**# Distributed**
Nolanville Elem.	5th Grade	11/3/2010	106
Salado Elem.	2nd Grade	11/29/2010	95
Leon Heights	5th Grade	1/9/2011	55
Leon Heights	K-1st Grade	2/4/2011	90
West Ward Elem.	Science Event	2/18/2011	50
Leon Heights	5th Grade	3/11/2011	89
Ft. Hood Earth Day	Area Elem. Schools	4/29/2011	900
TOTAL			**1385**

Other Events	**Date**	**# Distributed**
Bell County Water Symposium	10/21/2010	104
AgriLife Extension-Annual Crops Clinic	1/25/2011	500
Tonkawa Chapter-Native Plant Society	3/7/2011	12
Morgan's Point TML Convention	6/18/2011	80
Belton Lions Club	9/8/2011	30
Eco Lunch & Learn	9/21/2011	35
Belton Rotary Club	9/27/2011	16
Killeen Lions Club	9/27/2011	40
TOTAL		**817**

L. PUBLIC ADVISORY COMMITTEE

The PAC members for FY11 are as follows

Tom Madden	-	Precinct 1
Henry Bunke	-	Precinct 2
Marvin Green, PAC Chair	-	Precinct 3
Bradley Ware	-	Precinct 4
Bill Schumann	-	At-Large

The PAC meets on an as-needed basis; no meetings were held during FY11. Throughout FY11, PAC members have regularly attended the Clearwater Board meetings, providing representation at all but one of the regular monthly Board meetings. The PAC has provided valuable comments to the Board members at these meetings. The Board continues to value the input from the PAC and will assign tasks to them as needed.

M. INTERNET SITE

The District's web site (www.clearwaterdistrict.org) continues to grow since it was first developed in the spring of 2001. The web site contains general information about the District and Board of Directors; calendar of events; press releases; meeting agendas; District Management Plan; District Rules; links to water-related sites; District forms; an overview of the District including a summary of activities; aquifer data; and educational information including data on water use and water conservation tips. Information will be added to the website during the next year as needed.

5. SUMMARY

During FY11, Clearwater continued to acquire data for use in managing Bell County's groundwater resources. Data was collected regularly from the stream flow gauge sites in Salado Creek which are used to estimate spring discharge from the Edwards BFZ aquifer. The District continues to support TWDB monitor wells (six wells) financially as in years past.

Data acquisition also included ongoing projects like the aquifer monitoring program and monthly production reports from non-exempt wells, as well as estimates of exempt well use which are updated biannually. Samples from wells were also collected for testing at a certified lab to provide an example of water quality in a given area.

During FY10, Clearwater adopted a drought management plan for the Trinity aquifer and adopted a revised drought management plan for the Edwards BFZ aquifer. Four studies were authorized to gather more information on the Edwards BFZ aquifer. Staff assisted by collecting data from selected wells. The reports on both studies were not complete in FY11.

Clearwater contracted to automate the collection of data from the Salado Creek Stream Flow Gauging Program to monitor Salado Springs. The update was temporarily placed on hold when the gauges were lost in the September 2010 flooding event. The data became available to the public on the Clearwater website in September 2011. Rainfall data to support the District's drought management plans will also be automated and available on the website at all times.

Clearwater continued its participation in GMA 8. DFCs for all nine aquifers with the GMA8 boundary were set before the September 2010 deadline. At the end of FY10, the TWDB had prepared managed available groundwater (MAG) figures for all the aquifers except the Nacatoch and had forwarded these figures to the Regional Water Planning Groups. The MAG figures for the Edwards BFZ and Trinity aquifers are being used by Clearwater and will be included in the next revision of the District management plan.

Public education and service continued to be a focus of Clearwater during FY11. District staff visited several schools giving presentations focusing on Bell County's aquifers, water conservation, and non-point source pollution. In addition, the annual water symposium continued to be a major outreach opportunity.

The District selected Kiella Group to design/build the new facility in Belton's Business Park. Larry Neal Architect as the Construction Manager to over see Clearwater's investment during the construction phase. Projected cost is $324,000 and completion is expected by April 1, 2012.

During FY11, Clearwater proceeded with the process to separating from CTCOG. Data on the aquifers will continue to be acquired and the stream flow gauges on Salado Creek became fully automated of data collection which was completed and the data became available to the public on the Clearwater website. Rainfall data to support the District's drought management plans was also automated and available on the website as well. The District will complete and evaluate the four Edwards BFZ aquifer studies and determine the best way to proceed to protect the recharge zone. The District Management Plan was revised to incorporate the desired future condition statements and managed available groundwater figures established through the groundwater management area joint planning process.

Appendix

Clearwater Underground Water Conservation District

Adopted Budget FY11

REVENUE

*Bell County Tax Appraisal District	$	539,840
Application Fees	$	5,000
Transport Fees	$	400
Interest	$	1,000
Total	**$**	**546,240**

*Based on 2010 Certified values of $13,495,997,581
Tax rate per $100 valuation is $0.0040

EXPENDITURES

Contracts		
Administrative	$	299,100
Legal	$	30,000
Election Expenses	$	5,000
Professional/Technical Consulting	$	20,000
Appraisal District	$	6,300
Director's Compensation	$	15,000
Director Expenses	$	5,500
Furniture/Equipment	$	40,000
Supplies	$	1,000
Insurance	$	2,000
Printing	$	4,700
Communications	$	7,000
Contingency Fund	$	20,000
Reserves for Uncollected Taxes	$	19,390
Special Programs		
Education	$	14,250
Education Supplies	$	8,000
Other	$	4,500
Water Quality Grant	$	1,000
Studies	$	18,500
GMA 8	$	5,000
Loan Payment/Misc. Moving Exp.	$	20,000
Total	**$**	**546,240**

8/19/2010

Clearwater Underground Water Conservation District
P.O. Box 1989 Belton, Texas 76513
Phone:254-933-0120 Fax:254-933-8396

ADMINISTRATIVE FEE SCHEDULE

Effective September 01, 2011

DESCRIPTION	*FEE*
Well Registration	**No Fee**
Application for Permit[1]	**N1: $200** **N2 < 10 ac-ft/year: $700** **N2 from 10 to 37 ac-ft/year: $1,000** **N2 > 37 ac-ft/year: $1,500**
Transport Surcharge[2]	**$0.025/1,000 Gallons of Water**
District Documents[3]	**1st Copy—No Fee** Additional copies provided at cost See Miscellaneous Copying
Miscellaneous Copying	**Provided at Cost** $0.09/black & white; 1st ten—no fee $0.23/color; 1st four—no fee
Maps (Printing & Copying)	**$3.00 - $17.00 Based on Size**

1 Except for N1 wells, fees shown are for anticipated technical review costs and potential legal consultation over $100. If technical and legal expenses are higher than fees shown, N2 applicants pay additional cost; if less, N2 applicants are refunded. Full payment of all fees is required before permit may be issued. See back of this sheet for a description of N1 and N2 permits
No is required for a change in well ownership.

2 As allowed in Texas Water Code, Chapter 36.122.

3 Includes documents such as Rules, Management Plan, Bylaws, Annual Report, etc. This does not include studies such as *Groundwater Resources Management Information.* Studies are available at cost.
NOTE: Several documents are available on the District's web site—www.clearwaterdistrict.org.

Printing & Copying Fees
Maps

Map Size	Prices per Map Color	B&W
8.5" x 11"	$5	$3
11" x 17"	$7	$5
17" x 22"	$9	$7
22" x 34"	$11	$9
28" x 40"	$13	$11
34" x 44"	$15	$13
Larger—up to 36" wide	$17	$15

N1: A **NON-EXEMPT WELL, CLASSIFICATION 1**, is a well that satisfies the following conditions:

A water well used for domestic purposes or for watering livestock or poultry that is drilled, equipped or completed so that it is incapable of producing more than 25,000 gallons per day, and is located on a tract of land consisting of less than 10 acres as of March 1, 2004.

Any water well used for other purposes or that is capable of producing more than 25,000 gallons per day, is a Non-Exempt Well, Classification 2 (N2).

N1 wells meet all of the criteria for an exempt well except for the minimum tract size of 10 acres or more.

N2: A **NON-EXEMPT WELL, CLASSIFICATION 2** is a well that satisfies the following conditions:

1) A water well used for purposes other than domestic, livestock or poultry; or
2) A water well that is drilled, equipped or completed so that it is capable of producing more than 25,000 gallons/day.

Newpaper Articles on Clearwater year 2011

Newspaper	Date	Article Heading
Temple Daily Telegram	1/12/2011	Clearwater tables decision on its new office building
Killeen Daily Herald	1/12/2011	Clearwater drops plan for new HQ
Killeen Daily Herald	1/16/2011	Clearwater challenges permit for development's water use
Killeen Daily Herald	1/26/2011	Clearwater plans reception Friday
Salado Village Voice	1/20/2011	Horace Grace honored Jan. 28 at CUWCD
Killeen Daily Herald	1/23/2011	Clearwater Underground Water Conservation District
Temple Daily Telegram	2/9/2011	Clearwater board remains neutral on groundwater bill
Killeen Daily Herald	2/10/2011	Clearwater undecided on use for land
Killeen Daily Herald	2/10/2011	Clearwater learns more about proposed pond plan
Killeen Daily Herald	2/13/2011	Groundwater bill making waves in Texas
Killeen Daily Herald	3/2/2011	Clearwater discusses split for CTCOG
Temple Daily Telegram	3/9/2011	Clearwater board extends building contract
Temple Daily Telegram	3/18/2011	Japan quake shakes water level in Edwards Aquifer
Killeen Daily Herald	3/11/2011	Clearwater district eyes new home
Killeen Daily Herald	3/27/2011	Belton, Salado address flooding; upgrade infrastructure
Temple Daily Telegram	4/13/2011	Extension agent takes Clearwater job
Killeen Daily Herald	4/13/2011	Aaron new Clearwater general manager
Temple Daily Telegram	4/18/2011	Belton woman: Japan earthquake affected water level of area pond
Killeen Daily Herald	4/21/2011	Clearwater board moves forward with new building
Temple Daily Telegram	4/21/2011	Homewoners face hurdle in lake pump ban
Killeen Daily Herald	5/12/2011	Change in rules has property owners scrambling for water
Killeen Daily Herald	5/12/2011	Clearwater selects design-build firm
Killeen Daily Herald	5/11/2011	Youth needed for state water camp in July
Killeen Daily Herald	5/11/2011	Clearwater declares stage one drought
Temple Daily Telegram	5/11/2011	Clearwater district a step closer to building
Temple Daily Telegram	5/20/2011	City of Temple asking residents to conserve water
Killeen Daily Herald	6/8/2011	Clearwater Ok's contract for new building
Temple Daily Telegram	6/8/2011	A truly clear water board
Killeen Daily Herald	6/8/2011	Clearwater Ok's contract for new building
Temple Daily Telegram	7/15/2011	Watershed worries draw diverse crowd
Killeen Daily Herald	7/17/2011	Local water conservation effort intensifies
Temple Daily Telegram	7/18/2011	Stage 2 drought a looming possibility
Killeen Daily Herald	8/15/2011	Residents urged to conserve water
Temple Daily Telegram	8/13/2011	Clearwater initiates Stage 2 water conservation for Trinity Aquifer users
Temple Daily Telegram	8/14/2011	Water District Notice of Public Hearing on Tax Rate
Killeen Daily Herald	8/14/2011	Water District Notice of Public Hearing on Tax Rate
Temple Daily Telegram	8/24/2011	Clearwater holds tax rate steady
Killeen Daily Herald	8/27/2011	Officials urge energy conservation / Clearwater announces Stage 3 drought for Trinity Aquifer users
Temple Daily Telegram	9/14/2011	28 days away: Stage 4 water conservation
Temple Daily Telegram	9/16/2011	New Clearwater board member banks on experience
Killeen Daily Herald	10/8/2011	Clearwater enters Stage 4 water restrictions
Temple Daily Telegram	10/8/2011	Clearwater declares Stage 4 restrictions
Temple Daily Telegram	10/12/2011	Clearwater board retains right of eminent domain
Temple Daily Telegram	11/6/2011	Bell County Water Symposium (notice)
Temple Daily Telegram	12/15/2011	Water supply corp. request ok'd
Killeen Daily Herald	12/23/2011	Recent rain fails to ease drought

OUR TEXAS

www.kdhnews.com

Clearwater OKs contract for new building

By Andy Ross
Killeen Daily Herald

BELTON Bell County's groundwater conservation district took a definitive step this week toward building itself a new headquarters.

On Tuesday, Clearwater Underground Water Conservation District board members formally approved a design-build contract with Temple-based Kiella Commercial to construct a new office building and headquarters on a plot of Clearwater-owned land in the Belton Business Park.

With a price tag of $300,000 agreed upon in the contract, the proposed 2,200-square-foot building will be a scaled-down version of the originally planned headquarters, which the board voted down earlier this year due to cost concerns.

In Tuesday's meeting, board member Bill Bartlett — one of those opposed to the initial plan — told fellow board member Judy Parker he was pleased with the designs already brought forward.

"I think we are going in the right direction. I'm really excited about this," Bartlett said.

Parker noted that some features will be geared toward sustainability — one example being a water storage tank capable of harvesting rainwater that will placed in the front of the building.

"We got our sustainability. That was very important to me," Parker said.

Video equipment that can be used for educational lessons on water issues are also reportedly included in the plans.

In addition to approving the contract with Kiella, board members approved a contract with Larry Neal to act as the architectural representative/project manager during the building's construction.

Appendix C

CLEARWATER UNDERGROUND WATER CONSERVATION DISTRICT

11/29/2010

Activity Report

CUWCD Representative: Staff

Activity: Classroom Presentations

Date(s)/Location: 11-29-10 Salado Elementary School, Salado ISD; 2nd grade students

Information Distributed and Quantity: 95 of the following: TWDB Shower Flow bags; TWDB activity book; CUWCD frisbee; CUWCD pencils; CUWCD rulers; Water conservation Bookmark; TWDB Dillo Water Conservation dollars indoors and outdoors; TWDB Dillo Water Conservation brochure; Water Conservation sticker sheets.

Notes: Power Point presentation covering Clearwater information and water conservation/ pollution protection. Staff also conducted a demonstration on the non-point source pollution model.

CLEARWATER UNDERGROUND WATER CONSERVATION DISTRICT

11/03/2010

Activity Report

CUWCD Representative: Staff

Activity: Classroom Presentations

Date(s)/Location: 11-3-10 Nolanville Elementary School, Killeen ISD; 5 grade students

Information Distributed and Quantity: 105 of the following: TWDB Shower Flow bags; CUWCD activity cards; CUWCD frisbee; CUWCD pencils; CUWCD rulers; CUWCD water Wheel; Water cycle bookmark, TWDB Dillo Water Conservation brochure; stickers

Notes: Power Point presentation covering Clearwater information and water conservation/ pollution protection. Staff also conducted a demonstration on the non-point source pollution model.

CLEARWATER UNDERGROUND WATER CONSERVATION DISTRICT

04/27/2011

Activity Report

CUWCD Representative: Staff

Activity: Earth Day: 10 ten minute presentations to area elementary school students

Date(s)/Location: 04/29/2011, Fort Hood

Information Distributed and Quantity: 44 CUWCD Frisbees, 100 water cycle bookmarks, 200 "Top 10" bookmarks, 300 Pencils, 300 Water Measurement Bags, 256 Rulers.

Notes: Display and Teach the students about Groundwater through a crossword puzzle.

CLEARWATER UNDERGROUND WATER CONSERVATION DISTRICT

3/11/2011

Activity Report

CUWCD Representative: Staff

Activity: **5th Grade Presentations**

Date(s)/Location: 03/11/2011 Leon Heights Elementary School, Belton ISD; 5 grade students.

Information Distributed and Quantity: 40 CUWCD pencils; 60 CUWCD rulers; 89 Top 10 Ways to Protect and Conserve bookmark, 30 Sticker Sheets

Notes: Assisted 5th graders with teaching (3rd, 4th) students about pollution/groundwater/ and conservation.

CLEARWATER UNDERGROUND WATER CONSERVATION DISTRICT

Activity Report

CUWCD Representative: Staff

Activity: **Parent/Teacher Conference and Science Event**

Date(s): 02-18-11

Location: West Ward Elem.-Killeen

Information Distributed and Quantity: See attached.

Notes: Approximately 50 people attended the event.

Item	Quantity
CUWCD	
Water Wheels—Home Water Conservation	68
Rulers	100
Pencils	99
Ink Pens	100
Frisbees	100
Calendars—Magnetic	50
Brochure—Water: Vital Resource	11
Brochure—Water Conservation	9
Slide Guide—Protect Your Water	47
Slide Guide—Save Water	50
Know Your Water Coloring Book	100
Who We Are	18
Groundwater Foundation	
Groundwater Basics brochure	25
Bookmark—The Water Cycle	100
Bookmark—Top 10 Ways to Protect and Conserve Groundwater	100
Texas Groundwater Protection Committee	
Plugging Abandoned Water Wells Brochure	20
TWDB	
Dillo Dollars-Home	10
Dillo Dollars-Yard	0
Dillo Conservation Brochure	22
Water Education Foundation	
Auto Not Pollute Slide Card	36
Water Conservation Sticker Sheets	100
Miscellaneous:	
Water Conservation Shower Bag	87
TOTAL	**1,252**

CLEARWATER UNDERGROUND WATER CONSERVATION DISTRICT

02/04/2011

Activity Report

CUWCD Representative: _____ **Staff** _____

Activity: Student Presentations

Date(s)/Location: 02/4/2011 Leon Heights Elementary School, Belton ISD; KDG and 1st grade students.

Information Distributed and Quantity: 90 of the following: CTCOG You Can Make Recycling Work Handbook, TWDB Know Your Water coloring book, CUWCD frisbee; CUWCD pencils; CUWCD rulers; TWDB Dillo Water Conservation brochure; stickers; TWDB Dillo Dollars- Water Conservation at Home; TWDB Dillo Dollars- Conservation In Your Yard.

Notes: Delivered bags to Mrs. McCarty, 5th grade teacher

CLEARWATER UNDERGROUND WATER CONSERVATION DISTRICT

01/06/2011

Activity Report

CUWCD Representative: Staff

Activity: **Classroom Presentations**

Date(s)/Location: 01/06/2011 Leon Heights Elementary School, Belton ISD; 5 grade students.

Information Distributed and Quantity: 55 of the following: TWDB Shower Flow bags; CUWCD activity cards; CUWCD frisbee; CUWCD pencils; CUWCD rulers; CUWCD water wheel; Water cycle/Top 10 Ways to Protect and Conserve bookmark.

Notes: Power Point presentation covering Clearwater information and water conservation/ pollution protection. Staff also conducted a demonstration on the non-point source pollution model.

CLEARWATER UNDERGROUND WATER CONSERVATION DISTRICT

Activity Report

CUWCD Representative: Staff & Directors

Activity: Bell County Water Symposium

Date(s): 10-21-10

Location: CTCOG Building

Information Distributed and Quantity: See attached.

Notes: Approximately 104 people attended the event.

Item	Quantity
CUWCD	
CUWCD Brochure Folder	7
Clearwater District-Who We Are	12
CUWCD Fall 2008 Newsletter	34
Use Water Wisely Wheels	35
Cups	74
Rulers	71
Pencils	50
Ink Pens	75
Frisbees	49
Spray Bottles—Indoor Use	50
Spray Bottles—Outdoor Use	48
Balloons	18
Calendars	36
Protect Your Water Slide Guide	7
Save Your Water Slide Guide	4
Water Conservation	6
Water A Vital Resource	6
Groundwater Foundation	
Groundwater Basics brochure	14
Bookmark—The Water Cycle	14
Bookmark—Top 10 Ways to Protect and Conserve Groundwater	6
Texas Groundwater Protection Committee	
Landowners Guide to Plugging Abandoned Wells	7
TWDB	
Texas Lawn Watering Guide	7
Being Water Wise Indoors	5
Being Water Wise Outdoors	5
Miscellaneous	
Auto Not Pollute Slide Card	2
Water Conservation Items:	
Faucet Aerator	50
One Touch On/Off Tap Saver	50
Shower Flow Meter Bag	29
Toilet Leak Detector Dye Tablets	39
7 Spray Water Saving Hose Nozzle	50
Lawn & Garden Rain Gauge	50
Clearwater Blue Bags (given for evaluations)	40
TOTAL	**950**

Tuesday, July 31, 2012 Text Size

Clearwater District
700 Kennedy Court
P.O. BOX 1989
Belton, TX 76513
ph 254-933-0120
fax 254-933-8396

Events

No events

Calendar

July 2012

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Water Symposium November 17, 2011

Last Updated on Monday, 21 November 2011 17:04 PDF

11th Annual Bell County Water Symposium

Clearwater Underground Water Conservation District (CUWCD) held the 11th Annual Bell County Water Symposium on November 17, 2011. The event was a huge success with 135 people in attendance. Clearwater wishes to extend a big "thank you" to our guest speakers for their outstanding presentation. To view the speaker presentations see below.

To view full agenda click here

Lealand Gersbach - Clearwater District Board of Directors - President CLICK HERE

Dr. John Nielson-Gammon - State Climatologist - Texas A&M Univ. CLICK HERE

Brad Brunett - Water Services Manager - Brazos River Authority CLICK HERE

Kristen Fancher - Attorney - Lloyd Gosselink Attorneys at Law CLICK HERE

Stacey A. Steinbach - Executive Director - Texas Alliance of Groundwater Districts CLICK HERE

Randy Williams - Hydrologist - BarW Groundwater Exploration, LLC CLICK HERE

Linda Young - Rainwater Harvest Specialist - BCMGA CLICK HERE

Mary Ann Everett - Earthkind Specialist - BCMGA CLICK HERE

News - Latest

CLEARWATER UNDERGROUND WATER CONSERVATION DISTRICT

Activity Report

CUWCD Representative: Staff

Activity: Annual Crops Clinic

Date(s): 01-25-11

Location: Bell County Expo Center

Information Distributed and Quantity: See attached.

Notes: Approximately 500 people attended the event.

Item	Quantity
CUWCD	
CUWCD Brochure folder	10
CUWCD Fall 2010 Newsletter	5
Water Wheels—Home Water Conservation	50
Cups	100
Rulers	100
Pencils	100
Ink Pens	100
Frisbees	57
Spray Bottles—Indoor Use	50
Spray Bottles—Outdoor Use	50
Calendars—Magnetic	47
Brochure—Water: Vital Resource	4
Brochure—Water Conservation	7
Slide Guide—Protect Your Water	7
Slide Guide—Save Water	5
Recyclable Shopping Bag	50
Groundwater Foundation	
Groundwater Basics brochure	13
Bookmark—The Water Cycle	8
Bookmark—Top 10 Ways to Protect and Conserve Groundwater	4
Texas Groundwater Protection Committee	
Plugging Abandoned Water Wells Brochure	10
TWDB	
Texas Lawn Watering Guide	10
Water Wise Brochure-Outside	37
Miscellaneous	
Auto Not Pollute Slide Card	7
Water Conservation Sticker Sheets	13
Water Conservation Items:	
Faucet Aerator	50
One Touch On/Off Tap Saver	50
Shower Flow Meter Bag	7
Toilet Leak Detector Dye Tablets	44
7 Spray Water Saving Hose Nozzle	50
Lawn & Garden Rain Gauge	50
TOTAL	**1,095**

CLEARWATER UNDERGROUND WATER CONSERVATION DISTRICT

03/07/2011

Activity Report

CUWCD Representative: Staff

Activity: Tonkawa Chapter of the Native Plant Society of Texas March meeting

Date(s)/Location: 03-07-11 AgriLife Extension Office, Belton

Information Distributed and Quantity: 12 of the following: CUWCD rain gauge; CUWCD calendar; CUWCD "Who We Are" info card; CUWCD brochure: Water—A Vital Resource.

Notes: Staff distributed information and answered questions regarding Clearwater

CLEARWATER UNDERGROUND WATER CONSERVATION DISTRICT

Activity Report

CUWCD Representative: Dirk Aaron

Activity: **Morgan's Point TML Convention**

Date(s): 06-18-11

Location: Morgan's Point Convention Center

Information Distributed and Quantity:

Provided the City with pens, cups, frizzbees, and brochures for 75 attendees. Also provided 5 sets of conservation packets for door prizes

Notes: Approximately 80 people attended the event.

CLEARWATER UNDERGROUND WATER CONSERVATION DISTRICT

09/08/11

Activity Report

CUWCD Representative: Dirk Aaron

Activity: Belton Lions Club Interpretation of District presentation for 40 minutes

Date(s): 9-8-11

Location: Harris park community Center in Belton

Information Distributed and Quantity:

Provided the City with pens (40) and brochure "Who Are We"

Notes: Approximately 30 people attended the event.

Power Point presentation

CLEARWATER UNDERGROUND WATER CONSERVATION DISTRICT

09/21/2011

Activity Report

CUWCD Representative: Benae McFarland

Activity: Eco Lunch & Learn

Date(s)/Location: 09-21-2011/ Temple Chamber of Commerce

Information Distributed and Quantity: Top Water Smart Tips brochure – 35, Water Conservation brochure – 35, pens-35, plastic Clearwater Cups (blue, pink and green)-30, TWDP Shower Bags -35, Water Saving Garden Hose Sprayers – 5, Faucet Tips – 5, Moisture Meters – 5, and Mini Clearwater Frisbees – 30.

Notes: Benae McFarland gave a presentation on the District goals and missions. She also spoke on the current drought situation.

CLEARWATER UNDERGROUND WATER CONSERVATION DISTRICT

09/27/2011

Activity Report

CUWCD Representative Benae McFarland

Activity: Presentation

Belton Rotary Club

Date(s)/Location: September 27, 2011 ; Belton, Texas

Information Distributed and Quantity:

Clearwater UWCD Who We Are Brochures -16, Clearwater Pens – 16, Clearwater News Letter -16

Notes:

Gave a presentation to the Rotary Club about Clearwater UWCD, who we are, who mandates us and the current drought situation.

CLEARWATER UNDERGROUND WATER CONSERVATION DISTRICT

09/27/2011

Activity Report

CUWCD Representative Dirk Aaron

Activity: Presentation

Noon Lions Club

Date(s)/Location: September 27, 2011 ; Killeen, Texas

Information Distributed and Quantity:

Clearwater UWCD Who We Are Brochures -40 , Clearwater Pens – 20, Clearwater News Letters-40

Notes:

Gave a presentation to the Noon Lions Club about Clearwater UWCD, who we are, who mandates us and the current drought situation.

Results of Groundwater Samples Tested During 2011

Test Date	CUWCD #	Aqulfer[2]	Depth (ft)	Coliform Bacteria[3]	Fecal Matter	Alkalinity (mg/L)	Conductivity (µs/cm)	Total Dissolved Solids (mg/L)	Fluoride[4] (mg/L)	Hardness (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	pH	Phosphate (mg/L)	Sulfate[4] (mg/L)
12/20/2011	E-02-382G	Edwards BFZ	180	absence	negative	340	897	647	*2.3 (limit)	240	2.1	0.005	7.5	0.17	*80(limit)
12/6/2011	E-03-418P	Middle Trinity	760	Presence	negative	360	584	412	1.30	200	1.3	0.001	8.0	0.18	*80(limit)
11/22/2011	E-02-382G	Upper Trinity	0	Presence	negative	360	790	547	*2.3 (limit)	200	0.7	0.003	7.7	0.20	*80(limit)
11/8/2011	E-02-1957G	Edwards BFZ	212	absence	negative	380	1314	926	*2.3 (limit)	120	2.3	0.059	8.0	0.17	*80(limit)
10/25/2011	E-02-001G	Upper Trinity	615	absence	negative	460	2	1489	*2.3 (limit)	180	2.4	0.008	8.1	0.10	*80(limit)
10/18/2011	E-02-382G	Edwards BFZ	180	absence	negative	440	803	538	*2.3 (limit)	260	1.6	0.000	7.7	0.12	*80(limit)
6/14/2011	E-02-267G	Edwards Equiv.	430	Presence	negative	400	4	3	*2.3 (limit)	400	0.0	0.001	7.6	0.05	*80 (limit)
11/9/2010	E-02-3141G	Alluvium	30	absence	negative	60	51.20	33.10	0.00	2	2.80	0.000	6.5	0.04	0
11/9/2010	E-02-3141G	Alluvium	30	Presence	negative	260	249	0.30	40.00	3	3	0.002	6.8	0.18	16
11/9/2010	E-02-3141G	Alluvium	30	absence	negative	60	44.20	29.40	0.00	20	2.0	0.0	6.4	0.11	0

Results Summary					
	#of samples tested	(+) Collform	%	(+) Fecal Matter	%
Y2011 totals	10	4.0	40%	0	0%
FY2010 totals	9	4	44%	0	0%
FY2009totals	30	18	60%	4	13.3%
FY2008 totals	27	13	48%	0	0%
FY2007 totals	38	24.00	63%	8	21%
FY2006 totals	15	3	20%	0	0%
FY2005 totals	14	5	36%	0	0%

Notes:

1. Samples were collected by the well owner and tested by the Clearwater staff within 24 hours of collection. The well owner was given instructions on collecting the sample and was asked to draw the sample as close to the wellhead as possible. Laboratory results were not conducted by a certified lab, therefore, the data is provided for informational purposes only
2. The aquifer designation was determined by AECOM, Inc.
3. **The presence/absence test only indicates if total coliform is present. No distinction is made on the origin of the bacteria.**
4. The limit of the Fluoride test is 2.3 mg/L and the limit of the Sulfate test is 80 mg/L.
5. NT means not tested because the test was not requested or the test could not be performed because the equipment was under repair

Appendix E

Results of Groundwater Samples in CUWCD Lab

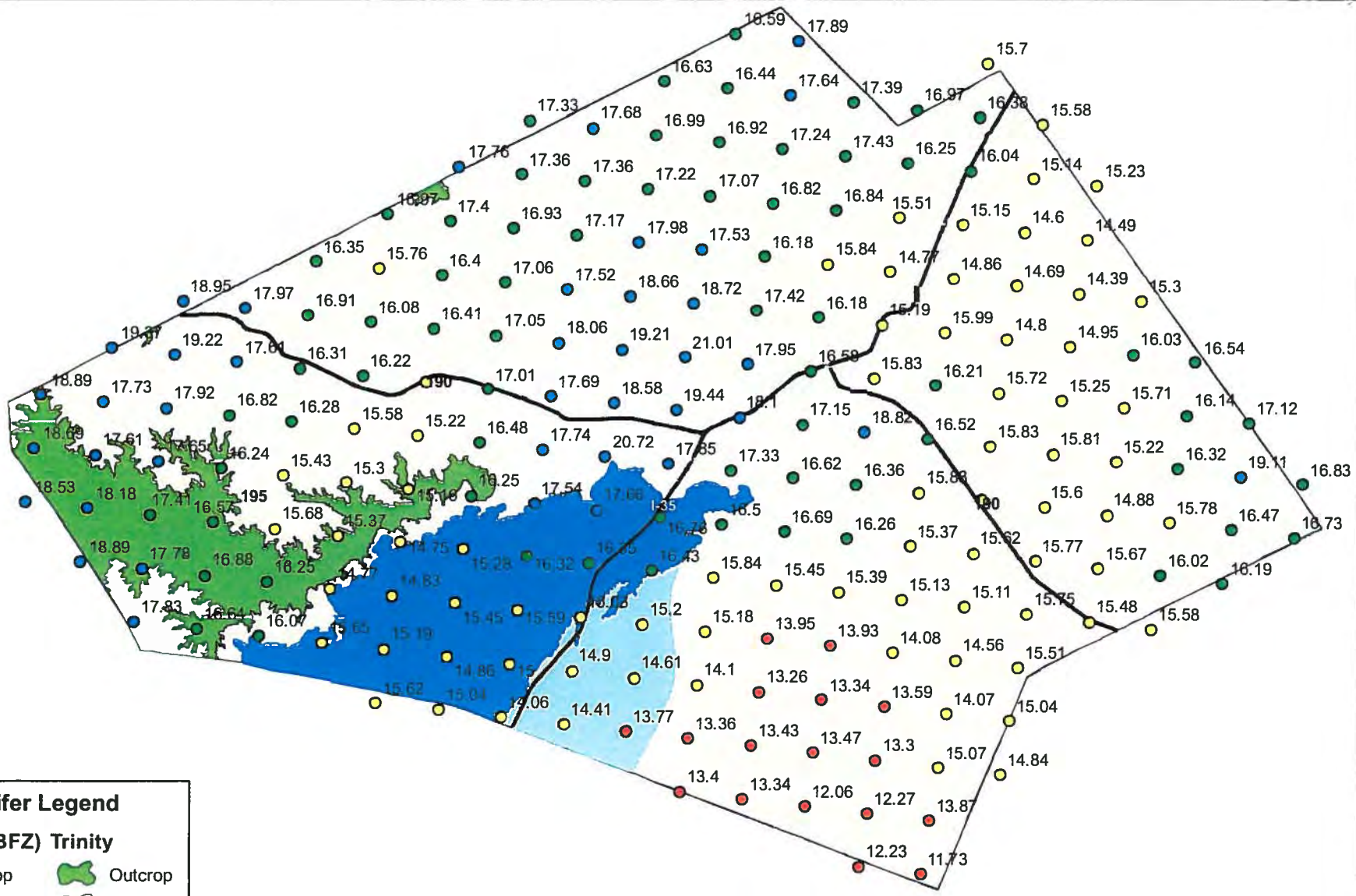
Test Date		Aquifer[2]	Depth (ft)	Coliform Bacteria[3]	Fecal Matter	Alkalinity (mg/L)	Conductivity (µs/cm)	Total Dissolved Solids (mg/L)	Fluoride[4] (mg/L)	Hardness (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	pH	Phosphate (mg/L)	Sulfate[4] (mg/L)
3/1/2005		Middle Trinity	470	**Present**		400	936	699	2.30	140	0	0	7.80	0.49	80
3/2/2005		Buda	26	**Present**		240	370	227	1.60	240	3.20	0.003	7.30	0.19	11
6/21/2005		Middle Trinity	910	**Present**		360	856	651	1.80	80	2.80	0.03	7.80	0.34	80
6/21/2005		Edwards (BFZ)	UNK[7]	**Present**		300	391	278	1.40	350	0.70	0.003	7.50	0.18	30
6/28/2005		Middle Trinity	910	Error[5]		NT[6]	NT	NT	NT	NT	NT	NT	NT	NT	NT
6/29/2005		Middle Trinity	755	Error		520	3550	2480	1.80	0	3.00	0.004	7.70	0.22	80
7/12/2005		Middle Trinity	910	Absent		380	995	652	1.90	80	2.50	0.09	7.60	0.22	80
8/2/2005		Middle Trinity	910	Absent		360	1003	661	2.30	80	2.60	0.001	7.70	0.31	80
8/9/2005		Edwards (BFZ)	200	Absent		280	420	289	1.00	300	2.70	0.022	7.60	Error	19
8/16/2005		Edwards (BFZ)	125	NT		310	574	293	0.50	210	3.20	0.005	7.00	0.18	13
8/16/2005		Edwards (BFZ)	105	NT		300	756	391	0.10	220	2.30	0.004	7.50	0.16	14
10/25/2005		Middle Trinity	880	**Present**		340	759	625	Error	100	3.20	0.05	7.70	Error	80
10/25/2005		Middle Trinity	880	**Present**		340	759	625	NT[6]	100	3.20	0.050	7.7	NT	80
11/8/2005		Middle Trinity	450	Absent		NT	1396	921	NT	NT	NT	NT	NT	NT	NT
11/8/2005		Middle Trinity	450	Absent		NT	1396	921	NT	NT	NT	NT	NT	NT	NT
11/22/2005		Middle Trinity	600	NT		400	789	590	2.30	60	2.30	0.002	7.60	0.30	80
11/22/2005		Middle Trinity	600	NT		400	789	590	2.30	60	2.30	0.002	7.6	0.30	80
1/17/2006		Middle Trinity	780	Absent		460	1692	1442	2.30	160	3.80	0.003	7.7	0.13	80
1/31/2006		Austin Chalk	30	Absent		300	368	287	0.60	290	3.70	0.003	7.2	0.22	22
2/6/2006		Upper Trinity	277	NT		560	3980	3100	2.30	440	6.83	0.001	7.6	0.00	80
2/6/2006		Edwards (BFZ)	57	NT		270	410	270	0.30	340	12.90	0.009	7.5	0.25	15
6/27/2006		Middle Trinity	880	Absent		380	920	686	2.00	80	3.60	0.004	7.9	0.37	80
6/27/2006		Middle Trinity	880	NT		480	2850	2190	2.10	320	1.90	0.005	7.8	0.14	80
7/6/2006		Middle Trinity	880	**Present**		470	3080	2040	1.97	310	4.00	0.003	7.8	0.15	80
7/6/2006		Middle Trinity	880	Absent		470	3150	2130	2.00	20	5.60	0.005	7.9	0.18	80
8/1/2006		Austin Chalk	30	**Present**		320	421	306	0.60	380	2.10	0.007	7.8	0.44	20
8/11/2006		Middle Trinity	880	NT		NT	2710	1316	NT	NT	NT	NT	NT	NT	NT
8/11/2006		Middle Trinity	880	NT		NT	2060	1086	NT	NT	NT	NT	NT	NT	NT
9/12/2006		Edwards (BFZ)	200	Absent		300	413	287	2.30	320	0.00	0.005	7.5	0.13	17
10/10/2006	E-02-2136G	Middle Trinity	450	Absent	Absent	320	1641	1147	*2.30	0	5.80	0.006	7.6	0.27	*80
1/9/2007	E-02-144G	Austin Chalk	30	**Present**	Absent	300	415	309	0.60	320	2.30	0.001	7.3	0.40	15
5/30/2007	E-02-203G	Edwards (BFZ)	150	**Present**	Absent	260	429	243	0.40	300	34.20	0.030	7.5	0.37	18
5/30/2007	E-04-070P	Edwards (BFZ)	60	Absent	Absent	400	1165	394	1.90	100	1.60	0.012	7.7	0.04	*80
6/12/2007	E-02-144G	Austin Chalk	30	Absent	Absent	Inconclusive	461	345	0.60	280	28.90	0.011	7.4	0.84	6
7/10/2007	E-02-1475G	Upper Trinity	380	Absent	Absent	420	1692	976	1.90	40	7.40	0.375	7.8	0.01	*80
7/11/2007	E-03-344P	Middle Trinity	540	Absent	Absent	360	2430	1210	2.10	760	2.30	0.001	7.6	0.11	*80
7/17/2007	E-02-240G	Upper Trinity	140	**Present**	**Present**	420	726	394	0.30	480	14.50	0.008	7.2	0.38	21
7/17/2007	E-02-049P	Edwards (BFZ)	120	**Present**	**Present**	360	557	338	0.20	460	20.10	0.008	7.5	0.51	19
7/17/2007	E-02-2847G	Edwards (BFZ)	200	**Present**	Absent	300	449	270	0.70	360	12.80	0.002	7.5	0.31	12
7/17/2007	E-02-2521P	Edwards (BFZ)	120	Absent	Absent	300	493	263	0.10	340	14.60	0.003	7.7	0.15	9
7/17/2007	E-02-2425G	Upper Trinity	Ukn	**Present**	Absent	420	1058	647	2.10	80	1.70	0.000	7.8	0.05	*80

7/17/2007	E-02-470G	Upper Trinity	120	**Present**	Absent	360	714	422	0.40	440	18.40	0.003	6.4	0.02	56
7/17/2007	E-02-1066G	Upper Trinity	350	**Present**	Absent	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
7/17/2007	E-02-757G	Edwards (BFZ)	Ukn	**Present**	**Present**	340	491	293	0.20	420	14.30	0.023	7.4	0.10	12
7/17/2007	E-02-1205G	Edwards (BFZ)	120	**Present**	Absent	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
7/17/2007	E-02-1475G	Upper Trinity	380	**Present**	Absent	400	1683	973	1.80	60	7.80	0.003	7.9	0.18	*80
7/24/2007	E-02-002G	Edwards Equivalent	85	Absent	Absent	300	442	283	1.30	340	6.70	0.004	7.7	0.11	22
7/24/2007	E-02-2848G	Upper Trinity	Ukn	**Present**	Absent	400	1110	717	1.90	240	1.20	0.006	7.8	0.08	*80
7/24/2007	E-02-2849G	Upper Trinity	Ukn	Absent	Absent	360	1441	926	2.20	480	12.80	0.005	7.5	0.24	*80
7/24/2007	E-02-757G	Edwards (BFZ)	Ukn	**Present**	Absent	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
7/24/2007	E-02-1483G	Alluvium	30	**Present**	**Present**	380	663	389	0.50	inconclusive	inconclusive	0.049	7.0	0.55	62
7/24/2007	E-02-313G	Edwards (BFZ)	200	Absent	Absent	320	458	294	1.10	320	16.30	0.004	7.5	0.09	21
7/24/2007	E-02-2715G	Middle Trinity	400	**Present**	Absent	400	995	643	2.20	60	5.40	0.002	7.8	0.15	*80
7/24/2007	E-06-047P (well)	Middle Trinity	870	Absent	Absent	360	1082	647	2.00	80	9.90	0.007	7.8	0.21	*80
7/24/2007	E-02-2781G	Edwards (BFZ)	137	**Present**	Absent	280	395	243	0.30	280	31.30	0.008	7.6	0.07	14
7/24/2007	E-02-3257G	Alluvium	30	**Present**	**Present**	360	483	305	0.00	400	1.40	0.079	7.2	0.10	21
7/24/2007	E-02-3583G	Upper Trinity	Ukn	**Present**	**Present**	400	676	436	0.20	400	75.00	0.008	7.0	0.13	23
7/24/2007	E-02-2736G	Upper Trinity	120	**Present**	**Present**	320	443	293	1.80	340	1.70	0.012	7.7	0.11	34
7/24/2007	E-02-537G	Upper Trinity	735	Absent	Absent	380	2260	1473	2.00	260	10.10	0.010	7.7	0.32	1
7/24/2007	E-02-3281G	Middle Trinity	700	NT	NT	360	1758	1175	2.10	260	6.70	0.192	7.6	0.21	*80
7/25/2007	E-02-1149G	Upper Trinity	520	**Present**	Absent	300	447	320	0.20	400	5.90	0.008	NT	0.05	26
7/25/2007	E-07-043G	Middle Trinity	550	**Present**	Absent	380	1285	806	2.10	220	1.10	0.005	7.7	0.05	*80
7/25/2007	E-06-047P (tank)	Middle Trinity	870	**Present**	Absent	400	1007	642	1.90	80	1.20	0.029	7.8	0.10	*80
7/25/2007	E-02-2641G	Alluvium	Ukn	**Present**	**Present**	280	540	338	0.00	300	5.70	0.002	NT	0.19	33
7/26/2007	E-02-1066G	Upper Trinity	350	Absent	Absent	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
7/31/2007	E-03-354G	Upper Trinity	150	Absent	Absent	220	629	394	0.50	300	1.90	0.000	7.5	0.13	*80
8/1/2007	E-02-2425G	Upper Trinity	Ukn	Absent	Absent	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
8/1/2007	E-02-049P	Edwards (BFZ)	120	**Present**	Absent	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
8/7/2007	E-03-430P	Middle Trinity	882	**Present**	Absent	440	1098	682	1.80	80	0.50	0.108	8.0	0.18	*80
8/7/2007	E-02-2035G	Upper Trinity	Ukn	**Present**	Absent	460	1430	990	2.20	300	1.50	0.003	7.6	0.09	*80
8/7/2007	E-02-3281G	Middle Trinity	700	**Absent**	Absent	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
8/14/2007	E-02-226G (house)	Upper Trinity	Ukn	**Present**	Absent	NT	437	268	1.80	340	1.10	0.001	7.8	0.03	12
8/14/2007	E-02-227G	Upper Trinity	Ukn	**Present**	Absent	420	431	274	1.90	320	0.00	0.004	7.8	0.07	11
8/14/2007	E-02-056P	Edwards (BFZ) (well)	140	**Present**	Absent	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
8/14/2007	E-02-056P	Edwards (BFZ) (house)	140	**Present**	Absent	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
8/28/2007	E-02-129G	Middle Trinity	470	Absent	Absent	460	1117	696	*2.3	40	0	0.270	8.1	0.06	*80
8/28/2007	E-03-430P	Middle Trinity	882	Absent	Absent	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
9/11/2007	E-02-1149G	Upper Trinity	520	**Present**	Absent	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
9/19/2007	E-02-144G	Austin Chalk	30	Inconclusive	Absent	Inconclusive	585	304	0.60	320	2	0.000	7.6	0.12	9
9/27/2007	E-02-129G	Middle Trinity	470	Absent	Absent	440	NT	NT	2.20	120	2	0.000	7.9	0.23	*80
9/27/2007	E-02-943G	Upper Trinity	460	Absent	Absent	460	NT	NT	*2.3	80	1	0.007	7.9	0.20	*80
9/27/2007	N2-07-002P	Edwards (BFZ)	200	Absent	Absent	320	NT	NT	0.20	360	5	0.002	7.3	0.14	9
9/28/2007	E-02-2807G	Edwards (BFZ)	100	Absent	Absent	360	NT	NT	1.10	400	1	0.008	7.4	0.02	25
9/28/2007	Salado Creek	Surface water	0	**Present**	**Present**	240	407	NT	0.10	260	1	0.003	7.9	0.01	4
10/3/2007	E-02-107G	Edwards(BFZ)	90	**Present**	Absent	400	517	302	0.10	420	0.50	0.006	7.9	0.14	4
10/3/2007	E-02-670G	Upper Trinity	550	**Present**	Absent	440	608	354	1.00	500	0.90	0.005	7.6	0.14	9.00
10/3/2007	E-05-075P	Middle Trinity	555	Absent	Absent	320	1986	1182	2.30	480	0.70	0.003	7.7	0.09	80
10/4/2007	E-02-1205G	Edwards(BFZ)	120	**Present**	Absent	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

10/9/2007	E-02-424G	Middle Trinity	790	Absent	Absent	480	2630	1660	2.30	440	2.50	0.003	7.8	0.07	80
10/9/2007	E-02-424G	Middle Trinity	790	Absent	Absent	460	2860	1803	2.30	440	1.20	0.000	7.7	0.05	80
10/9/2007	E-02-424G	Middle Trinity	790	Absent	Absent	520	2630	1714	2.30	440	1.80	0.003	7.8	0.11	80
10/9/2007	E-03-009G	Lower Trinity	890	Absent	Absent	N/A	6530	4400	2.30	340	35.00	0.375	7.8	0.04	80
10/9/2007	E-07-049G	Edwards(BFZ)	140	Absent	Absent	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
12/4/2007	E-02-670G	Upper Trinity	550	Absent	Absent	400	613	443	1.00	40	0.80	0.015	7.3	0.10	9
12/18/2007	E-02-3574G	Austin Chalk	30	Present	Absent	320	576	296	0.50	380	1.50	0.004	7.2	0.06	17
1/15/2008	E-02-1205G	Edwards(BFZ)	120	Present	Absent	400	417	329	1.80	420	0.90	0.003	7.3	0.06	31
1/15/2008	E-02-144G	Austin Chalk	30	Absent	Absent	320	376	297	0.70	320	0.00	0.000	7.3	0.19	12
1/29/2008	E-08-003P	Lower Trinity	750	Absent	Absent	540	1958	1408	2.30	80	1.10	0.000	7.9	0.05	80
1/29/2008	E-08-003P	Lower Trinity	750	Present	Absent	560	1953	1402	2.30	80	1.00	0.001	7.9	0.14	80
2/12/2008	E-08-003P	Lower Trinity	750	Absent	Absent	500	1870	1412	2.30	120	0.20	0.000	8.0	0.05	80
2/12/2008	E-08-003P	Lower Trinity	750	Present	Absent	520	1861	1413	2.30	120	0.10	0.001	8.0	0.10	80
2/13/2008	E-06-047P	Middle Trinity	870	N/A	NA	380	946	632	0.00	100	0.60	0.013	7.9	0.08	80
2/26/2008	E-06-047P	Middle Trinity	870	N/A	N/A	380	863	630	Unavailable	100	2.20	0.006	7.9	0.08	80
2/26/2008	E-08-001P	Alluvium	55	Absent	Absent	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5/20/2008	E-08-003P	Lower Trinity	750	Present	Absent	640	2620	1558	2.30	140	1.90	0.005	8.1	0.06	80
5/20/2008	E-08-003P	Lower Trinity	750	Present	Absent	540	2390	1416	2.30	100	0.90	0.000	8	0.03	80
6/10/2008	E-02-313G	Edwards(BFZ)	200	Absent	Absent	340	467	285	1.00	360	4.20	0.003	7.6	0.07	15
6/24/2008	N2-05-003P	Middle Trinity	615	Present	Absent	420	1646	1062	2.30	80	0.00	0.000	8.6	0.00	80
7/1/2008	E-02-1153P	Upper Trinity	340	Present	Absent	320	1072	763	2.30	140	2.50	0.000	7.7	0.07	80
7/29/2008	E-02-032G	Edwards(BFZ)	75	Present	Absent	440	1552	1032	2.30	100	1.20	0.001	7.9	0.07	80
7/29/2008	E-02-032G	Edwards(BFZ)	75	Present	Absent	440	1610	1027	2.30	120	1.40	0.024	7.9	0.11	80
1/30/2009	E-09-007G	Lower Trinity	94	N/A	N/A	100	19080	11970	1.40	960	0.00	0.002	8.3	0.00	80
1/30/2009	N1-08-001P	Lower Trinity	500	Absent	Absent	280	1943	1483	1.90	460	1.10	0.004	7.50	0.09	80
3/24/2009	E-05-092P(Master Bath)	Middle Trinity	880	Absent	Absent	340	1286	822	2.20	20	0.00	0.159	N/A	0.08	80
3/24/2009	E-05-092P(Well Faucet)	Middle Trinity	880	Present	Absent	340	1157	709	2.10	80	1.00	0.108	N/A	0.02	80
4/14/2009	N2-08-004P	Edwards BFZ	430	Present	Present	320	921	648	2.30	160	1.50	0.011	7.7	0.08	80
4/14/2009	E-05-092P (outside faucet)	Middle Trinity	880	Present	Present	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4/14/2009	E-05-092P (inside kitchen)	Middle Trinity	880	N/A	N/A	360	1307	795	2.20	0	0.80	0.061	8.1	0.07	80
4/20/2009	E-05-092P (#1 Well)	Middle Trinity	880	Present	Absent	N/A	N/A	N/A	N/A	N/A	N/A	N/a	N/A	N/A	N/A
4/20/2009	E-05-092P (#1Well w/star)	Middle Trinity	880	Present	Absent	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4/20/2009	E-05-092P (#3Inside)	Middle Trinity	880	Present	Absent	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4/20/2009	E-05-092P(Outside Faucet)	Middle Trinity	880	Present	Absent	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5/5/2009	N2-09-001P	Middle Trinity	1000	Present	Present	480	3670	2870	2.20	440	0.00	0.000	7.8	0.03	80
5/26/2009	E-05-092P(Well Faucet #1)	Middle Trinity	880	Absent	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5/26/2009	E-05-092P(Well Faucet #2)	Middle Trinity	880	Absent	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6/4/2009	E-09-023G (#1 Inside)	Upper Trinity		Present	Absent	340	2760	1945	2.30	260	1.10	0.006	7.8	0.10	80
6/4/2009	E-09-023G (#7Outside)	Upper Trinity		Present	Absent	340	2930	1987	2.30	220	0.50	0.004	7.9	0.22	80
6/5/2009	E-09-023G(#5 Outside)	Upper Trinity		Present	Absent	360	2700	1868	2.30	320	1.00	0.000	7.7	0.17	80
8/10/2009	N2-09-008P	Lower Trinity	629	N/A	N/A	280	5040	2950	1.60	320	0.00	0.080	8.1	0.29	80
8/10/2009	N2-09-007P	Middle Trinity	469	N/A	N/A	160	2830	1667	2.30	100	1.00	0.012	8.7	0.14	80
8/10/2009	N2-09-006P	Upper Trinity	450	N/A	N/A	300	2490	1441	2.20	740	0.00	0.000	7.6	0.05	80
8/18/2009	E-09-036G	Alluvium	39	Present	Absent	280	2210	1589	N/A	1480	8.40	0.000	7.2	0.03	80
8/25/2009	E-02-537G	Upper Trinity	735	Present	Absent	340	1865	1425	N/A	280	1.10	0.017	8.0	0.22	80

8/25/2009	E-02-832G	Upper Trinity	192	**Present**	**Present**	220	413	235	N/A	280	0.00	0.006	7.3	0.09	47
8/25/2009	E-09-038G			Absent	Absent	400	1585	1202	N/A	100	0.40	0.001	7.9	0.14	80
9/8/2009	E-02-016G	Alluvium	45	**Present**	Absent	340	445	276	N/A	400	4.30	0.003	7.2	0.08	9
9/8/2009	E-02-144G	Austin Chalk	30	**Present**	Absent	320	300	253	0.51	320	1.10	0.003	7.2	0.15	11
9/23/2009	E-02-3141G	Alluvium	30	**Present**	Absent	420	724	477	0.30	200	7.30	0.008	7.1	0.3	17
9/23/2009	E-02-3141G	Alluvium	30	Absent	Absent	420	685	469	0.30	160	8.60	0.004	7.2	0.51	17
9/23/2009	E-02-144G	Austin Chalk	30	**Present**	Absent	240	410	284	0.70	320	1.20	0.006	7.3	0.45	10
9/23/2009	E-02-1364G	Lower Trinity	800	Absent	Absent	320	1718	1262	2.30	400	1.50	0.015	7.7	0.39	80
10/20/2009	E-02-144G	Austin Chalk	30	Absent	negative	320	386	284	0.60	320	0.10	0.000	7.0	0.14	10
10/20/2009	E-02-728G	Edwards BFZ	unk	Absent	negative	300	356	274	0.50	340	2.20	0.002	7.5	0.11	10
12/22/2009	E-02-3415G	Upper Trinity	unk	Absent	negative	420	537	377	0.50	420	4.50	0.000	7.10	0.29	18
7/13/2010	E-02-612G	Lower Trinity	860	Present	negative	340	587	357	0.30	400	0.50	0.010	7.6	0.04	N/A
8/31/2010	E-09-057P		892	Absent	negative	540	3290	2200	2.30	460	0.90	N/A	7.6	0.11	N/A
9/15/2010	E-02-1984G	Upper Trinity	260	Present	negative	440	3080	2070	2.30	420	6.80	N/A	8.1	0.28	N/A
9/15/2010	E-02-670G outside	Upper Trinity	550	Present	negative	120	124	81	0.30	100	0.70	0.004	7.5	0.10	23
9/15/2010	E-02-670G inside (treated)	Upper Trinity	550	Absent	negative	160	109	44	0.30	20	0.20	0.000	7.9	0.16	17
9/29/2010	E-03-411P	Edwards BFZ	160	Present	negative	320	772	546	2.30	140	0.70	N/A	7.5	0.09	N/A
11/9/2010	E-02-3141G	Alluvium	30	absence	negative	60	51.20	33.10	0.00	2	2.80	0.000	6.5	0.04	0
11/9/2010	E-02-3141G	Alluvium	30	Presence	negative	260	249	0.30	40.00	3	3	0.002	6.8	0.18	16
11/9/2010	E-02-3141G	Alluvium	30	absence	negative	60	44.20	29.40	0.00	20	2.0	0.0	6.4	0.11	0
6/14/2011	E-02-267G	Edwards Equiv.	430	Presence	negative	400	4	3	*2.3 (limit)	400	0.0	0.001	7.6	0.05	*80 (limit)
10/18/2011	E-02-382G	Edwards BFZ	180	absence	negative	440	803	538	*2.3 (limit)	260	1.6	0.000	7.7	0.12	*80(limit)
10/25/2011	E-02-001G	Upper Trinity	615	absence	negative	460	2	1489	*2.3 (limit)	180	2.4	0.008	8.1	0.10	*80(limit)
11/8/2011	E-02-1957G	Edwards BFZ	212	absence	negative	380	1314	926	*2.3 (limit)	120	2.3	0.059	8.0	0.17	*80(limit)
11/22/2011	E-02-382G	Upper Trinity	0	Presence	negative	360	790	547	*2.3 (limit)	200	0.7	0.003	7.7	0.20	*80(limit)
12/6/2011	E-03-418P	Middle Trinity	760	Presence	negative	360	584	412	1.30	200	1.3	0.001	8.0	0.18	*80(limit)
12/20/2011	E-02-382G	Edwards BFZ	180	absence	negative	340	897	647	*2.3 (limit)	240	2.1	0.005	7.5	0.17	*80(limit)

Rainfall Totals for January - December 2011



Clearwater

Clearwater Underground Water Conservation District
2180 N. Main St., PO Box 729
Belton, TX 76504
December 9, 2011

2.5 1.25 0 2.5 5 7.5 10 Miles

File Name
K:\NOAA Rainfall\Monthly Reports\

Data Source: National Weather Service Precipitation Analysis

Appendix F

Clearwater

Every drop counts

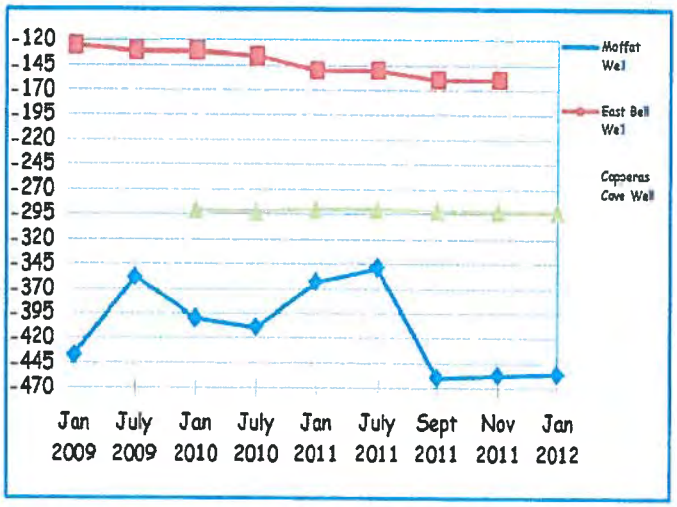
Clearwater Underground Water Conservation District

Trinity Aquifer - Drought Status Report

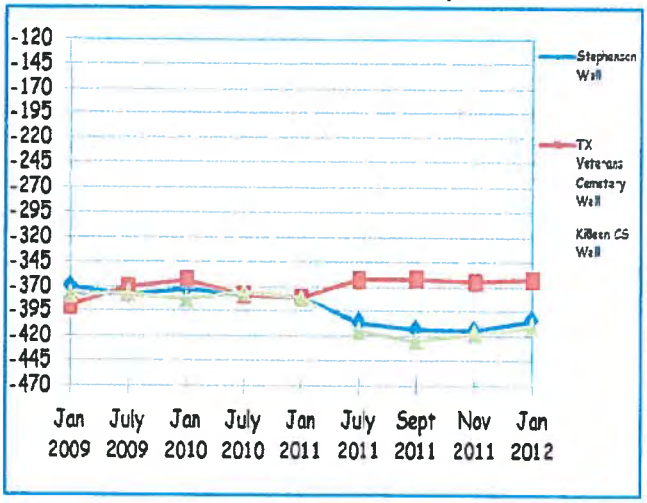
CRITICAL - STAGE 4

Monitor Wells

Lower Trinity



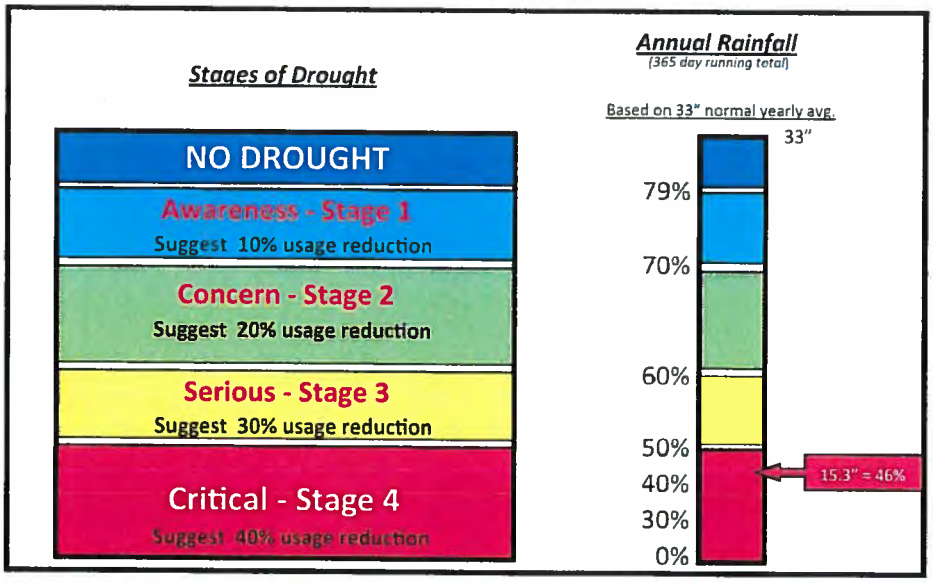
Middle Trinity



Drought Status

Updated 12/31/11

Based on previous 7 day avg.



Left: April Smith with AECOM monitors the spring flow system in Salado Creek.

Right: Randy Williams with BarW measures one of the Districts Monitor Wells with a Sonic Wave 200.

Clearwater Underground Water Conservation District
Trinity Aquifer
Drought Management Plan

Initiation and Termination of Drought Stages
The District Board or the Board's designee shall determine when conditions warrant initiation or termination of each stage of the plan and shall take appropriate action.

The Board's designee is authorized to monitor the drought indices and take appropriate action to initiate or terminate the drought stages as needed and inform the Board President at the time the action is considered. The Board shall be informed of the action taken and justification for such action at the monthly Board meeting at which time the Board may confirm or revise the action taken.

Public notification of the initiation or termination of drought stages shall be by means of either notification on the District's website, in a newspaper(s) of general circulation, radio announcement, or District mailing, fax, or email to owners/operators of permitted wells.

Initiation of Stages: The Precipitation Deficit Index (PDI) shall be monitored and presented to the District Board at the monthly Board meeting. Drought stages shall be triggered when the PDI value is less than a drought stage trigger condition for the period described below:

PDI: Monitored daily on a running-year basis over a defined area consisting generally of the area of Bell County with a buffer zone of approximately 10 miles around the County-line as truncated by the down-dip extent of the Trinity aquifer and based on NEX-RAD rainfall data provided by the National Oceanic and Atmospheric Administration. The PDI trigger condition must be exceeded for a period of 28 consecutive days.

Termination of Stages: Drought stage in effect shall be reduced or terminated when the PDI is greater than the trigger conditions of the drought stage in effect for the periods described below:

PDI: Monitored daily on a running-year basis over a defined area consisting generally of the area of Bell County with a buffer zone of approximately 10 miles around the County-line as truncated by the down-dip extent of the Trinity aquifer and based on NEX-RAD rainfall data provided by the National Oceanic and Atmospheric Administration. The PDI trigger condition must be exceeded for a period of 42 consecutive days.

Drought Stage Response

The water conservation goals and usage reduction measures assigned to each drought stage are voluntary. The District encourages voluntary compliance during each drought stage as outlined in this plan. Such voluntary compliance will contribute to the achievement of the desired level of conservation and reduce the impact of drought conditions and restrictions. However, nothing in this section excludes the District from exercising authority under District Rules regarding wasteful use of water.

A. Stage 1: Awareness—PDI 70 to 79%

Conservation Goal: 10% reduction

Usage Reduction Measures:

- Continue or increase voluntary reduction in various uses.
- Check for and correct all plumbing leaks.
- Re-use or re-circulate water whenever possible.
- No filling of ponds, lakes, tanks, reservoirs, swimming pools or other surface impoundments for holding water that have a total capacity of more than 50,000 gallons, except for public water supply systems. Public water supply systems are encouraged to implement measures to achieve a 10% reduction in water usage.

B. Stage 2: Concern—PDI 60 to 69%

Conservation Goal: 20% reduction

Usage Reduction Measures:

- Continue or increase voluntary reduction in various uses.
- Check for and correct all plumbing leaks.
- Re-use or re-circulate water whenever possible.
- No filling of ponds, lakes, tanks, reservoirs, swimming pools or other surface impoundments for holding water that have a total capacity of more than 50,000 gallons, except for public water supply systems. Public water supply systems are encouraged to implement measures to achieve a 20% reduction in water usage.
- Limit watering of landscape (lawns, trees, shrubs, etc.) to only once every 5 to 7 days. Agriculture and horticulture operations are exempted from this measure but are encouraged to reduce tree, plant, and crop watering by 20%.
- Only water landscape at night between the hours of 7 pm and 7 am.
- Keep swimming pools, landscape or decorative ponds and fountains covered (where possible), re-circulate water, and wait 5 to 7 days to refill.
- Wash vehicles at car wash only as needed.
- Do not wash buildings, driveways, streets, patios, or other outdoor surfaces except as required for human or animal health and safety needs, or for fire prevention.
- Water livestock in leak-proof troughs as much as practical.

C. Stage 3: Serious—PDI 50 to 59%

Conservation Goal: 30% reduction

Usage Reduction Measures:

- Continue or increase voluntary reduction in various uses.
- Check for and correct all plumbing leaks.
- Re-use or re-circulate water whenever possible.
- Limit watering of landscape (lawns, trees, shrubs, etc.) to only once every 5 to 7 days. Agriculture and horticulture operations are exempted from this measure but are encouraged to reduce tree, plant, and crop watering by 30%.
- Wash vehicles at car wash only as needed.
- No washing of buildings, driveways, streets, patios, or other outdoor surfaces except as required for human or animal health and safety needs, or for fire prevention.
- No filling of ponds, lakes, tanks, reservoirs, swimming pools or other surface impoundments for holding water that have a total capacity of more than 50,000 gallons, except for public water supply systems. Public water supply systems are encouraged to implement measures to achieve a 30% reduction in water usage.
- Filling of ponds, lakes, tanks, reservoirs, swimming pools or other surface impoundments for holding water that have a total capacity of less than 50,000 gallons is discouraged.
- Only water landscape at night between the hours of 7 pm and 7 am.
- Keep swimming pools, landscape or decorative ponds and fountains covered (where possible), re-circulate water, and do not fill except to support aquatic life.
- Water livestock in leak-proof troughs—pumping water into ponds is discouraged.
- Water for dust control only when required by law.

D. Stage 4: Critical—PDI < 50%

Conservation Goal: 40% reduction

Usage Reduction Measures:

- Continue or increase voluntary reduction in various uses.
- Check for and correct all plumbing leaks.
- Re-use or re-circulate water whenever possible.
- No washing of buildings, driveways, streets, patios, or other outdoor surfaces except as required for human or animal health and safety needs, or for fire prevention.
- Water livestock in leak-proof troughs only—do not pump water into ponds.
- Water for dust control only when required by law.
- No watering of landscape (lawns, trees, shrubs, etc.). Agriculture and horticulture operations are exempted from this measure but are encouraged to reduce tree, plant, and crop watering by 40%.
- No vehicle washing.
- No filling of ponds, lakes, tanks, reservoirs, swimming pools or other surface impoundments for holding water regardless of capacity, except to support aquatic life and for public water supply systems. Public water supply systems are encouraged to implement measures to achieve a 40% reduction in water usage.

Public Water Supply Corporations

The District recognizes that Water Suppliers of Bell County have current Water Conservation and Drought Contingency Plans that accomplish the intent of this Drought Management Plan within their service areas. The District leaves it up to the discretion of the water supply corporations as to how the desired usage reduction is to be accomplished.

Enforcement

As previously stated, the water conservation goals and usage reduction measures assigned to each drought stage are voluntary. The District intends to implement mandatory measures applicable to permitted well owners/operators when additional data to support the plan has been acquired. The District encourages all groundwater users, exempt and non-exempt, to comply with the voluntary measures to reduce the impact of drought conditions on all aquifer users. Feedback regarding the drought stages, conservation goals, and usage reduction measures is important to the District during this voluntary stage so that necessary adjustments may be made when mandatory measures are implemented.

Trinity Aquifer
Drought Management Plan - Conservation Schedule

Drought Mgt Stage	Precipitation Deficit Index for Bell County % of Average Rainfall *	Percent Pumping Reduction	Compliance Status
Stage 1 Awareness	70 – 79% (mild drought)	10	Voluntary
Stage 2 Concern	60 – 69% (moderate drought)	20	Voluntary
Stage 3 Serious	50 – 59% (severe drought)	30	Voluntary
Stage 4 Critical	< 50% (extreme drought)	40	Voluntary

*Based on 12 consecutive month period as compared to average annual rainfall of 33 inches.

Clearwater
Every drop counts.

Clearwater Underground Water Conservation District

Edwards BFZ Aquifer - Drought Status Report

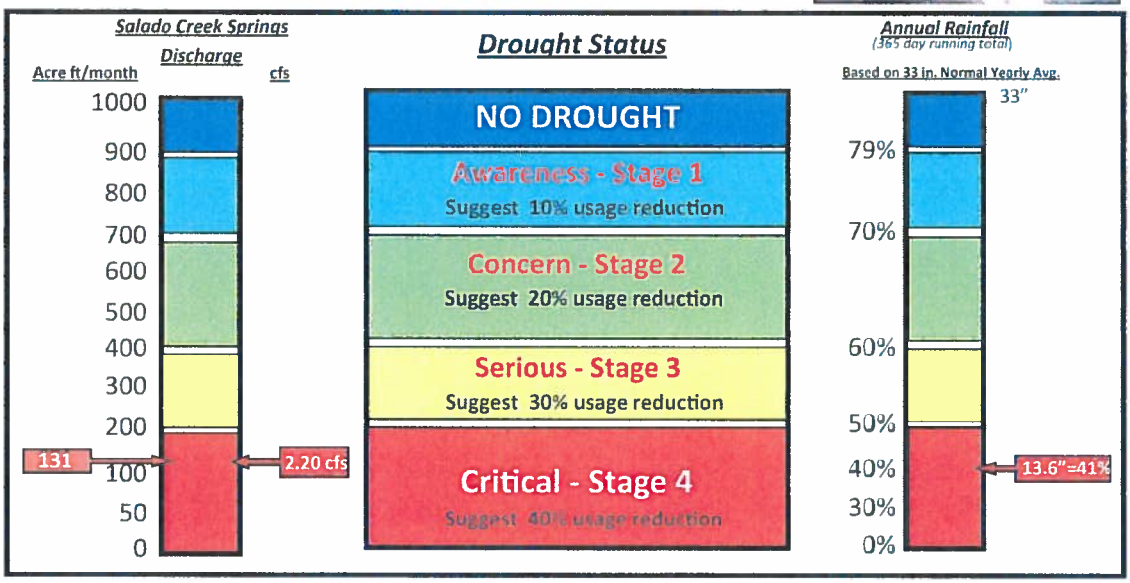
CRITICAL - STAGE 4

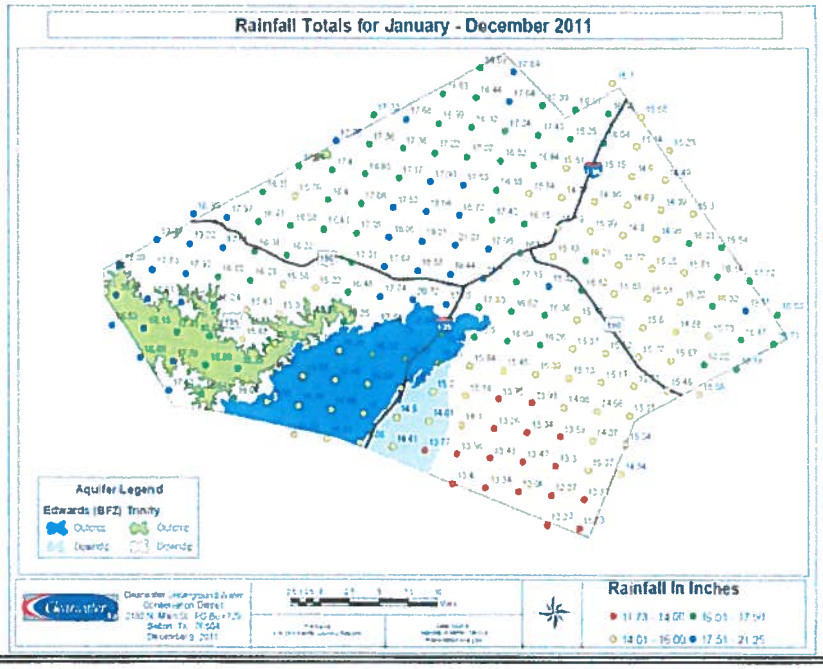
Left: Randy Williams with BarW measures one of the Districts Monitor Wells with a Sonic Wave 200.

Right: April Smith with AECOM monitors the spring flow system in Salado Creek.

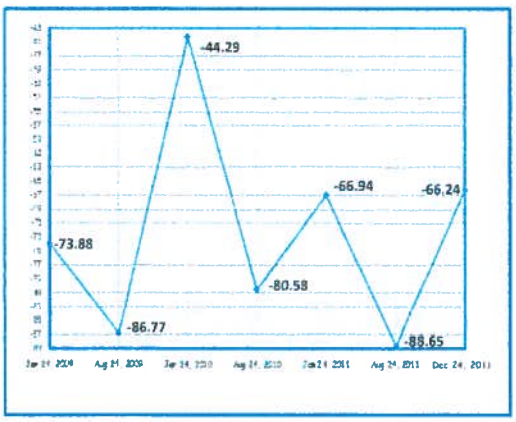
Updated 12/31/11

Based on previous 7 day avg.





Monitor Well - Salado Cemetery
January 2009
through
December 2011



Clearwater Underground Water Conservation District
Edwards BFZ Aquifer
Drought Management Plan

Initiation and Termination of Drought Stages
The District Board or the Board's designee shall determine when conditions warrant initiation or termination of each stage of the plan and shall take appropriate action.

The Board's designee is authorized to monitor the drought indices and take appropriate action to initiate or terminate the drought stages as needed and inform the Board President at the time the action is considered. The Board shall be informed of the action taken and justification for such action at the monthly Board meeting at which time the Board may confirm or revise the action taken.

Public notification of the initiation or termination of drought stages shall be by means of either notification on the District's website, in a newspaper(s) of general circulation, radio announcement, or District mailing, fax, or email to owners/operators of permitted wells.

Initiation of Stages: The Precipitation Deficit Index (PDI), the daily maximum spring discharge, and average spring discharge values shall be monitored and presented to the District Board at the monthly Board meeting. Drought stages shall be triggered when either the PDI or the average spring discharge measured via stream flow gauges in Salado Creek fall below the trigger level for the periods described below:

PDI: Monitored daily on a running-year basis over a defined area consisting generally of the area of the Edwards aquifer and contributing areas in Bell and portions of Williamson Counties and which is based on NEX-RAD rainfall data provided by the National Oceanic and Atmospheric Administration. The PDI trigger condition must be exceeded for a period of 28 consecutive days.

Spring Discharge: Monitored daily with the daily maximum discharge values averaged over a period of five consecutive days on a running five day basis.

Termination of Stages: Drought stage in effect shall be reduced or terminated when both the PDI and the average spring discharge values are greater than the trigger conditions of the drought stage in effect for the periods described below:

PDI: Monitored daily on a running-year basis over a defined area consisting generally of the area of the Edwards aquifer and contributing areas in Bell and portions of Williamson Counties and which is based on NEX-RAD rainfall data provided by the National Oceanic and Atmospheric Administration. The PDI trigger condition must be exceeded for a period of 42 consecutive days.

Spring Discharge: Monitored daily with the daily maximum discharge values averaged over a period of seven consecutive days on a running seven day basis.

Drought Stage Response

The water conservation goals and usage reduction measures assigned to each drought stage are voluntary. The District encourages voluntary compliance during each drought stage as outlined in this plan. Such voluntary compliance will contribute to the achievement of the desired level of conservation and reduce the impact of drought conditions and restrictions. However, nothing in this section excludes the District from exercising authority under District Rules regarding wasteful use of water.

A. Stage 1: Awareness—PDI 70 to 79%; Spring Discharge 900 to 701 ac-ft/month

Conservation Goal: 10% reduction

Usage Reduction Measures:

- Continue or increase voluntary reduction in various uses.
- Check for and correct all plumbing leaks.
- Re-use or re-circulate water whenever possible.
- No filling of ponds, lakes, tanks, reservoirs, swimming pools or other surface impoundments for holding water that have a total capacity of more than 50,000 gallons, except for public water supply systems. Public water supply systems are encouraged to implement measures to achieve a 10% reduction in water usage.

B. Stage 2: Concern—PDI 60 to 69%; Spring Discharge 700 to 401 ac-ft/month

Conservation Goal: 20% reduction

Usage Reduction Measures:

- Continue or increase voluntary reduction in various uses.
- Check for and correct all plumbing leaks.
- Re-use or re-circulate water whenever possible.
- No filling of ponds, lakes, tanks, reservoirs, swimming pools or other surface impoundments for holding water that have a total capacity of more than 50,000 gallons, except for public water supply systems. Public water supply systems are encouraged to implement measures to achieve a 20% reduction in water usage.
- Limit watering of landscape (lawns, trees, shrubs, etc.) to only once every 5 to 7 days. Agriculture and horticulture operations are exempted from this measure but are encouraged to reduce tree, plant, and crop watering by 20%.
- Only water landscape at night between the hours of 7 pm and 7 am.
- Keep swimming pools, landscape or decorative ponds and fountains covered (where possible), re-circulate water, and wait 5 to 7 days to refill.
- Wash vehicles at car wash only as needed.
- Do not wash buildings, driveways, streets, patios, or other outdoor surfaces except as required for human or animal health and safety needs, or for fire prevention.
- Water livestock in leak-proof troughs as much as practical.

C. Stage 3: Serious—PDI 50 to 59%; Spring Discharge 400 to 201 ac-ft/month

Conservation Goal: 30% reduction

Usage Reduction Measures:

- Continue or increase voluntary reduction in various uses.
- Check for and correct all plumbing leaks.
- Re-use or re-circulate water whenever possible.
- Limit watering of landscape (lawns, trees, shrubs, etc.) to only once every 5 to 7 days. Agriculture and horticulture operations are exempted from this measure but are encouraged to reduce tree, plant, and crop watering by 30%.
- Wash vehicles at car wash only as needed.
- No washing of buildings, driveways, streets, patios, or other outdoor surfaces except as required for human or animal health and safety needs, or for fire prevention.
- No filling of ponds, lakes, tanks, reservoirs, swimming pools or other surface impoundments for holding water that have a total capacity of more than 50,000 gallons, except for public water supply systems. Public water supply systems are encouraged to implement measures to achieve a 30% reduction in water usage.
- Filling of ponds, lakes, tanks, reservoirs, swimming pools or other surface impoundments for holding water that have a total capacity of less than 50,000 gallons is discouraged.
- Only water landscape at night between the hours of 7 pm and 7 am.
- Keep swimming pools, landscape or decorative ponds and fountains covered (where possible), re-circulate water, and do not fill except to support aquatic life.
- Water livestock in leak-proof troughs—pumping water into ponds is discouraged.
- Water for dust control only when required by law.

D. Stage 4: Critical—PDI < 50%; Spring Discharge 200 ac-ft/month or less

Conservation Goal: 40% reduction

Usage Reduction Measures:

- Continue or increase voluntary reduction in various uses.
- Check for and correct all plumbing leaks.
- Re-use or re-circulate water whenever possible.
- No washing of buildings, driveways, streets, patios, or other outdoor surfaces except as required for human or animal health and safety needs, or for fire prevention.
- Water livestock in leak-proof troughs only—do not pump water into ponds.
- Water for dust control only when required by law.
- No watering of landscape (lawns, trees, shrubs, etc.). Agriculture and horticulture operations are exempted from this measure but are encouraged to reduce tree, plant, and crop watering by 40%.
- No vehicle washing.
- No filling of ponds, lakes, tanks, reservoirs, swimming pools or other surface impoundments for holding water regardless of capacity, except to support aquatic life and for public water supply systems. Public water supply systems are encouraged to implement measures to achieve a 40% reduction in water usage.

Public Water Supply Corporations

The District recognizes that Jarrell-Schwertner Water Supply Corporation and Salado Water Supply Corporation have current Water Conservation and Drought Contingency Plans that accomplish the intent of this Drought Management Plan within their service areas. The District leaves it up to the discretion of the water supply corporations as to how the desired usage reduction is to be accomplished.

Enforcement

As previously stated, the water conservation goals and usage reduction measures assigned to each drought stage are voluntary. The District intends to implement mandatory measures applicable to permitted well owners/operators when additional data to support the plan has been acquired. The District encourages all groundwater users, exempt and non-exempt, to comply with the voluntary measures to reduce the impact of drought conditions on all aquifer users. Feedback regarding the drought stages, conservation goals, and usage reduction measures is important to the District during this voluntary stage so that necessary adjustments may be made when mandatory measures are implemented.

Edwards BFZ Aquifer
Drought Management Plan

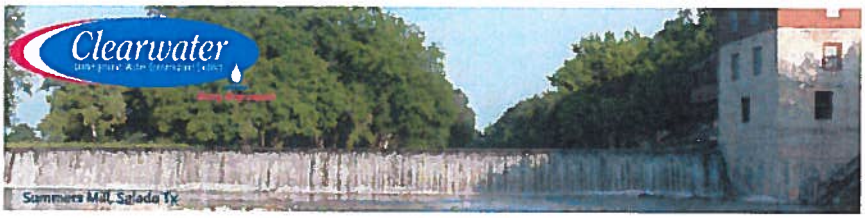
Proposed Conservation Schedule

Clearwater Drought Management Stage	Precipitation Deficit Index for Edwards Aquifer Region in Bell County % of Average Rainfall*	Salado Springs Discharge in ac-ft/month	Percent Pumping Reduction	Compliance Status
Stage 1 Awareness	70 – 79% (mild drought)	900	10	Voluntary
Stage 2 Concern	60 – 69% (moderate drought)	700	20	Voluntary
Stage 3 Serious	50 – 59% (severe drought)	400	30	Voluntary
Stage 4 Critical	<50% (extreme drought)	200	40	Voluntary

*Based on 12 consecutive month period as compared to average annual rainfall of 33 inches.

Monday, September 10, 2012

Text Size



Clearwater District
700 Kennedy Court
P.O. BOX 1989
Belton, TX 76513
ph 254-933-0120
fax 254-933-8396

Rainwater Harvesting

Collecting rainwater from roofs and storing it for future use is a practical way to maximize the benefits of precipitation in Central Texas. In fact, cisterns that captured rainwater were a common way for early settlers to store water for everyday use. This old practice has now become modernized in Central Texas as several builders are installing rainwater harvesting systems to supply most or all of the water demands for homes and businesses.

One famous example is the Lady Bird Johnson Wildflower Research Center in Austin. Typical rainwater harvesting systems include a large catchments area such as the roof of a home, gutters to transport rainfall, and screens which filter leaves and debris. A roof washer (with a 30 micron filter) is installed just before storage in large tanks (50 to 15,000 gallon fiberglass). The storage tank may be buried underground or hidden among landscape. One estimate by the Texas Cooperative Extension said that 0.6 gallons of water can be harvested for each square foot of roof per inch of rain received, depending on collection efficiency. For example, if an inch of rain falls on a 2,000 square foot roof surface, then 1,200 gallons of water can be harvested. An average rainfall year of 35 inches in Bell County would result in as much as 42,000 gallons of water harvested from rain. With appropriate conservation measures, this may be sufficient to supply household needs.

Rainwater harvesting can also be done by simply placing barrels or buckets outside prior to a rain event. Harvested water could be used for watering plants, however, this water would not be suitable for human consumption unless it is filtered and kept in a closed container.

To best determine whether rainwater harvesting would be a practical way for your family to supply all or some of your water demands, we recommend calculating a water budget using the online calculator found on the Texas Agrilife Extension Service website. This website includes a detailed description of rainwater harvesting systems.

Also, check out the extensive rainwater harvesting manual developed by the Texas Water Development Board. It includes everything from rainwater harvesting system components, water treatment, design guidelines, water demand calculations, and cost estimates.

Title Filter Display # 10

#	Article Title
1	Rainwater Harvesting Contacts & Suppliers
2	TCE Rainwater Harvesting Landscape Methods
3	Rainwater Harvesting Manual

Events

No events

Calendar

September 2012

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

RAINWATER HARVESTING CONTACTS AND SUPPLIERS

09/05

Austin Gutterman, Inc.—Benny Knight
12229 Roxie Dr., Austin, TX 78729
(512) 450-1821 *gutters, complete systems*
www.austingutterman.com

Austin Pump & Supply
3803 Todd Ln, Austin, TX 78744
(512) 442-2348 *wholesale supplier*

Barrel City USA—Phillip Orr
21681 S IH-35, Kyle, TX 78640
(512) 292-3269 *recycled 55-gallon drums*

Barley & Pfeiffer Architects—Peter Pfeiffer
1800 West 6th St, Austin, TX 78703
(512) 476-8580 *system design, building, consulting*
www.barleypfeiffer.com

Bowerbird Construction—Keith Miller
PO Box 1141, Dripping Springs, TX 78620
(512) 858-5395, BowerbirdConst@aol.com
ferrocement tanks, systems

Captured Rainwater Company LC—Curtis Chubb
830 County Road 330, Milano, Texas 76556
(512) 455-9180 *consultation, supplies, & installation*

John Dorn Tank Building, Inc.
155 Lakeview Rd, Vidor, TX 77662
PO Box 2052, Vidor, TX 77670
(409) 769-5129 *bolted, galvanized, coated tanks*

Innovative Water Solutions LLC
PO Box 9963, Austin, Texas 78766
(512) 490-0932 *design and installation of systems*
www.watercache.com

Lakota Water Company – Alan Rossing
10006 Longhorn Skyway, Dripping Springs, TX 78620
Phone (512) 217-3051 Fax (512) 264-2681
www.lakotawatercompany.com
Complete design, installation and maintenance

Red Ewald, Inc.
2669 South Hwy 181, Karnes City, TX
PO Box 519, Karnes City, TX 78118
(800) 242-3524 *fiberglass reinforced tanks*
www.redewald.com

Farm & Ranch Service Supply Company
12296 Hwy 181 South, San Antonio 78223
PO Box 10165, San Antonio, TX 78210
(800) 292-0007
concrete tanks, roof washers, floating filters

L & F Manufacturing
Hwy 290 E at CR 296, Giddings, TX
PO Box 578, Giddings, TX 78942
(800) 237-5791 *fiberglass tanks*
www.lfm-frp.com

Preload, Inc.
800 E Campbell, Ste 221, Richardson, TX 75081
(972) 994-0550, (800) 645-3195
concrete tanks

Spec-All Products, Inc.—Carolyn & Jack Hall
10608 Hwy 290 West, Austin, TX 78736
(512) 301-0869 *plastic and corrugated galvanized metal tanks; wood tanks (TimberTanks)*
www.timbertanks.com

Sustainable Homesteads—Mark Licklider
8607 Swanson Ln, Austin, TX 78748
(512) 282-6629
design, installation, consultation, service

Sweetwater Filtration (Rainsoft products)
1321 Rutherford Ln, Ste 180, Austin, TX 78753
(512) 837-2488, (888) 877-2488
treatment systems

Tank Town—Richard Heinichen, Mayor
2770 Hwy 290 W, Dripping Springs, TX 78620
(512) 894-0861 *tanks, complete systems, how-to book: Rainwater Harvesting for the Mechanically Challenged*
www.rainwatercollection.com

Texas Water Development Board
PO Box 13231, Austin, TX 78711
(512) 463-7955
book: Texas Guide to Rainwater Harvesting

Triple S Feed 11407 FM 1625, Austin, TX 78747
(Creedmore) (512) 243-0679
2111 Hwy 290 W, Dripping Springs, TX 78620
(512) 894-0344 *polyethylene tanks*

Two Ninety Fence & Ranch Supply: Jerry Yeaman
2110 Hwy 290 W, Dripping Springs, TX 78620
(512) 858-7876 *tanks, PVC pipe & Fittings*

Waterspirit Inc.—Stephen Bell
5504 Wagon Train Rd, Austin, TX 78749
(512) 899-8888, waterspirit2000@hotmail.com
design, installation systems, consultation

AgriLIFE EXTENSION
Texas A&M System

L-5498
5/08

Rainwater Harvesting | Landscape Methods

Bruce Lesikar, Professor and Extension Program Leader for Biological and Agricultural Engineering; Justin Mechell, Extension Assistant; and Rachel Alexander, Texas Water Resources Institute Research Assistant; The Texas A&M University System

Efficient water use is increasing in importance. With the state's growing population and limited supply of groundwater and surface water, Texans must use water wisely. Rainwater harvesting can help them as an innovative approach that anyone can use to capture rainfall.

The easiest way to use stored rainwater is for landscaping. In many Texas communities, 40-60 percent of the total water use during peak summer months is for landscape irrigation. If that demand for a limited natural resource can be reduced, everyone benefits.

Rainwater harvesting utilizes water management strategies to capture a greater quantity of the rain falling on a site. Typically, people envision a rainwater harvesting system as a container holding water. While container systems are popular methods for harvesting water, some landscaping practices also can increase the volume of rain held on the site.

Benefits of Rainwater Harvesting

The following are ways that rainwater harvesting can help:

• **Saves you money.** Rainwater can reduce the quantity of water you purchase to meet your water needs. The money saved from not purchasing water can offset the cost of implementing a rainwater harvesting system.

• **Reduces potable water demand.** Municipal systems provide potable water for residential use. Harvesting rainwater can reduce the quantity of water used from the municipal supplier. As a result, this reduces the demand for potable water and the need to develop additional water infrastructure.

• **Uses a valuable resource efficiently.** Rainwater is high quality water that can be captured for direct use in the landscape. Stormwater leaving your site enters the surface water system that goes downstream in a river or lake, where it can enter a water supply system. Holding the water on the site uses the water directly or can assist in recharging local groundwater supplies.

• **Reduces flooding, erosion and surface water contamination.** As land is developed for new houses and businesses, more land is covered with impervious surfaces like parking lots, buildings and roads that cannot absorb water. Instead, rainwater runs off into storm drains, streams and rivers. Impervious surfaces increase the rate and volume of stormwater runoff which increases urban flooding, and erodes

the banks of rivers and streams. Urban runoff also carries many pollutants, including sediments, fertilizers, pesticides and fecal coliform bacteria into streams and rivers.

Harvesting Methods

Rainwater capture and storage systems, raingardens, and soil storage and infiltration systems are three approaches to rainwater harvesting that can prevent flooding and erosion. They also turn stormwater problems into water supply assets by slowing runoff and allowing it to soak into the ground.

Rainwater Capture and Storage Tank Systems

Rainwater capture and storage tank systems collect rainfall from roofs and other impervious surfaces, storing it for later use. Storage tanks range in capacity from 5 gallons to 50,000 gallons, depending on water needs. Their main function is to store water for use during periods of limited rainfall. This stored water helps balance the supply-demand equation.

A typical rainwater capture and storage system consists of a catchment surface, gutters, downspouts and piping, filtration, a storage tank, and a distribution method. The catchment surface sheds rainwater, while the gutters, downspouts and piping divert the rainwater to the storage tank. Many home systems use existing gutters and downspouts, requiring minimal tools and equipment for installation.

Systems intended solely for surface landscape use will typically only require a roof washer and filter basket to keep leaves and debris clear of the tank. They also need to have screens over any other opening to prevent mosquitoes from entering the system. Garden hoses, pipes or drip irrigation systems are commonly used to move the water from the storage tanks to where it is needed.

Raingardens

A raingarden is an artificial depression in the landscape that collects and stores stormwater runoff until it can infiltrate the soil. The soil stores the water for use by vegetation. The water may also move through the soil, recharging groundwater or surface water systems.

Raingardens are not ponds. When correctly designed, water should not stand for more than a few hours after most storms. They are usually planted with native vegetation that is hardy and attractive.

Besides being functional, a raingarden can be a beautiful and creative addition to a new or existing landscape. Plants in a raingarden can give color to the landscape throughout the year. Raingardens can be designed for an individual yard or a neighborhood, providing a habitat for birds, butterflies and other insects, for example.

A 2,500 gallon collection tank.

A recently constructed raingarden.

Soil Storage and Infiltration Systems

A soil storage and infiltration system collects rainfall runoff from the roofs of buildings. It then directs runoff underground, where it infiltrates into the soil. This system, which also provides water for vegetation and recharge, consists of the following: gutters and downspouts to collect roof runoff, a catch basin to capture trash and fine particles, underground trenches that store the water while it soaks slowly into the soil, and an observation port to aid in maintenance.

When the trench is filled with water during a storm, excess water flows from the gutter and onto the ground surface. A soil storage and infiltration system decreases the volume of runoff, contains potential pollutants and increases the amount of water entering the ground to recharge our groundwater systems.

A soil storage and infiltration system can be installed fairly easily at numerous homes and businesses. Most buildings already have gutters and downspouts. At many sites the storage and infiltration trench can be located relatively close to buildings. This system is typically not used in areas with expansive soils due to soil saturation and soil shifting issues.

Installation of a soil storage and infiltration system.

Final landscaping over a soil storage and infiltration system.

Resources

Rainwater Harvesting (*http://rainwaterharvesting.tamu.edu/*)

Texas AgriLife Extension Service Bookstore (*http://agrilifebookstore.org*)

- *Rainwater Harvesting* (B-6153)
- *Harvesting Rainwater for Wildlife* (B-6182)
- *Rainwater Harvesting: Raingardens* (L-5482)
- *Rainwater Harvesting: Soil Storage and Infiltrations System* (B-6195)

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Produced by Agricultural Communications, The Texas A&M System
Extension publications can be found on the Web at: http://agrilifebookstore.org

Visit the Texas AgriLife Extension Service at http://agrilifeextension.tamu.edu

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20M, Reprint

Monday, September 10, 2012

Text Size

Clearwater District
700 Kennedy Court
P.O. BOX 1989
Belton, TX 76513
ph 254-933-0120
fax 254-933-8396

Events

No events

Calendar

September 2012

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

Recharge Enhancement and Brush Control

The Clearwater District's motto is ***"Every drop counts!"*** This statement becomes even more poignant as water supplies shrink because of drought and water demand increases with the predicted doubling of our State's population by 2050. As water planners and landowners grapple with lower flows in streams and the potential for declining water levels in aquifers, solutions such as enhancing recharge of groundwater and educating the public to conserve water must be realized.

Brush control has been studied to quantify the amount of water that can be saved through the elimination of unwanted brush such as mesquite, juniper, and saltcedars. These studies have generally shown that elimination and control of regrowth can enhance the recharge of groundwater and conserve water resources. The Texas State Soil and Water Conservation Board has implemented several brush control programs in watersheds across the State. More about these programs can be found by clicking here.

In our area, the Leon River Restoration Project is attempting to quantify the effects of removal of ashejuniper on water yield in Hamilton and Coryell counties. The project is currently in phase one, however, updates can be found by clicking here.

According to the Texas Cooperative Extension (TCE), unwanted brush can have negative effects on land resources such as "depleting groundwater, reducing stream flow, drying up lakes and reservoirs, increasing the salinity of the soil surface, competing with forage grasses and native plants, and degrading wildlife habitat."[1] As a result, private landowners may wish to learn more about the methods to control and manage brush. These may include mechanical, chemical, prescribed burning or biological methods. These are described in detail in the TCE publication, Brush Management Methods.

As always, a landowner should weigh the positives and negatives before implementing brush control measures. There are some desirable uses for brush such as food and cover for wildlife, atheistic appeal, and harvesting for wood burning and crafting. Environmental Defense has prepared a fact sheet to help inform the public about the effectiveness of brush management and the related environmental impacts. This fact sheet can be found by clicking here.
To learn more about brush control measures, visit the TCE bookstore, http://tcebookstore.org/pubsearch.cfm, which has many publications viewable in .pdf form or available for purchase.

[1] Source: Texas Cooperative Extension, Biological Control of Salteedar, October 21, 2006, Publication number L-5444.

Title Filter Display # 10

#	Article Title
1	Brush Management Fact Sheet
2	Brush Control Manual

2008 – 2013 STRATEGIC PLAN OBJECTIVES
Status Update—December 2011

"A" Level Objectives

Goal #1: Monitor and manage groundwater in Bell County

- Ensure spring flow gauges in Salado Creek are fully functioning
- Establish 4 additional continuous monitor stations in aquifers
- Enhance water quality monitoring program and data availability
- Identify abandoned wells
- Cooperate with other groups on importance of well registration

Goal #2: Maintain financial and organizational stability and effectiveness

- Develop policy for Board approval establishing goals and future uses for reserve funds in following areas:
  - Legal defense
  - Implementing science-related projects
  - Future building and relocation
  - Operating expenses
- Pursue options to develop a stand-alone facility for the District

Goal #3: Educate and inform citizens

- Develop aquifer information specific to Bell County
- Educate real estate community on groundwater use and availability
- Place more articles in local media on status of groundwater
- Use Community-In-Schools to disseminate information in local school districts
- Promote educational information on water quality testing
- Provide speaker program and identify target groups
- Promote water quality protection and water conservation
- Upgrade Salado Creek gauging system, file-server system, and website
- Promote awareness and protection of recharge zones and watersheds

Goal #4: Protect and advance the District's interest with governmental bodies and agencies

- Educate/inform local elected officials and government agency representatives about groundwater issues in Bell County

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STATUS

Blue – Completed or "in progress"

Red – Proposed for action in 2012

Green – Proposed for action in 2013

"B" Level Objectives

Goal #1: Monitor and manage groundwater in Bell County

- Compare GAM (groundwater availability model) spatial distribution to actual pumping distribution in the aquifers—Trinity first, then Edwards
- Refine vertical limits of Trinity aquifer using the Clearwater well database
- Investigate and identify brackish water interfaces in Bell County (Edwards BFZ, middle Trinity, and lower Trinity)
- Consider policy options for amending terms of operating permits
- Publish and publicize water level data and maps (Edwards BFZ and Trinity)
- Identify aquifer "sweet spots" by establishing aquifer parameter value distribution in the Edwards and Trinity aquifers
- Inform citizens about importance of managing by layers
- Promote and support conversion to surface water in Bell County
- Characterize the geologic structure of the recharge zone in the Edwards BFZ aquifer

Goal #3: Educate and inform citizens

- Increase presentations to schools and other organizations
- Create and produce videos on Clearwater District and groundwater resources
- Hire expert to help develop education program

Goal #4: Protect and advance the District's interest with governmental bodies and agencies

- Create awareness on ad valorem tax reform to allow lowering of taxes not subject to roll back

"C" Level Objectives

Goal #1: Monitor and manage groundwater in Bell County

- Consider policy options for facilitating surface water supply implementation

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STATUS

Blue - Completed or "in progress"

Red - Proposed for action in 2012

Green - Proposed for action in 2013

11th Annual

Bell County Water Symposium

November 17, 2011

8:30 a.m.—3:30 p.m.

Location: Central Texas Council of Governments, 2180 N Main, Belton, TX

AGENDA

8:30 a.m. Registration

9:00 a.m. Welcome & Overview of Clearwater Activities
Leland Gersbach—Clearwater District

9:30 a.m. The Weather Forecast for 2011 and Beyond?
Dr. John Nielson-Gammon, State Climatologist at Texas A&M University

10:30 a.m. Break

10:45 a.m. Status of Water Supply in Central Texas and Future Water Plans
Brad Brunett— Water Services Manager, Brazos River Authority

11:15 a.m. Legislative Challenges for Texas
Jimmie Don Aycock, State Representative District 54

11:45 a.m. Lunch—Legislative Update
Kristen Fancher, Lloyd Gosselink Attorneys at Law

12:45 p.m. Ground Water Issues Across Texas
Stacey A. Steinbach, Executive Director,
Texas Alliance of Groundwater Districts

1:30 p.m. Break

1:45 p.m. What is the Drought Status of our Aquifers & Understanding Drought Contingency Plans for Each
Randy Williams, BarW Groundwater Exploration, LLC

2:30 p.m. Rain Water Harvesting & Water Conservation in Landscapes
BCMGA Rainwater Harvest Specialist and EarthKind Specialist (TBD)

3:30 p.m. Closing Remarks

Three CEUs available for Licensed Private and Commercial Pesticide Applicators
($10 fee by Texas AgriLife Extension Service for CEU's)

Symposium sponsored by the following:

Clearwater Underground Water Conservation District
Texas AgriLife Extension
Bell County

BarW Groundwater Exploration, LLC
Lloyd Gosselink Attorneys at Law
AECOM

For more information or to RSVP please contact Clearwater at 254-933-0120

Are You KEEPING YOUR WATER PURE?!

Tell Your Parents . . .

- **Never** pour pesticides down household drains, sewer inlets or stormwater inlets.
- **Never** fertilize or apply pesticides before an expected rain.

Can you find in the puzzle below items that cannot be safely poured down the drain? How many other words can you find?

T R A S H B I N A G O M P O S T O N
E R P E S T I C I D E S P O A N S A
A G A P A R K B R I E S E L F U E L L
N G I N K W A P A I N T B U G S O I
E A N W S E A N V M O T O R O I L G
C W T U E M R I I N O T N S C O H
Y E T P B E I O E I E E R I T A T
C E H O O U D S S H F R E T U R B E
L D I A P I G A S E I R E U P W A R
E R N I G A S O L I N E E R Y A T F
L I N P E S T O N O O E B E E X T L
U L E T U R P E N T I N E P Z U E U
G L R M O T H B A L L S F O E E R I
K E S W I M M I N G P O O L A C I D
B R A K E F L U I D O G A T U M E O
O R B O O K W E V A R N I S H I S N
W A O V E N C L E A N E R R H O P D E
L H A Z A R D O U S W A S T E V E N

VARNISH	BRAKE FLUID	LIGHTER FLUID	TURPENTINE		
GASOLINE	PAINT THINNER	OVEN CLEANER	MOTHBALLS		
MOTOR OIL	SWIMMING POOL ACID	DIESEL FUEL	BATTERIES		
PESTICIDES	TRANSMISSION FLUID	WEED KILLER	KEROSENE		
ANTIFREEZE	FURNITURE POLISH	RAT POISON	CAR WAX		
HAZARDOUS WASTE					

Recycling saves energy and reduces air pollution.

Recycling one ton of paper saves
- 7,000 gallons of water
- 3.3 cubic yards of landfill space
- 17 trees (paper pulp equivalent)
- 4,100 kilowatt-hours of electricity (enough to power an average-size home for 6 months) (EPA)

Recycling one aluminum can saves enough electricity to power a 100-watt light bulb for 3 hours or your television for 3 hours.

Recycling one pound of aluminum cans saves 7.5 kilowatt-hours of electricity.

Clearwater
Underground Water Conservation District

P. O. Box 729 • Belton, TX 76513
(254) 933-0120
www.clearwaterdistrict.org

Student: _____ Subject: _____

When grass clippings, pet waste, automotive products, fertilizers, pesticides and other chemicals wash down a storm drain, they don't go away. They flow into streams, rivers, lakes or bays, harming plants and animals and contaminating the water we drink. The technical term is "nonpoint source pollution." Here's how to make sure that you don't help feed the storm drain:

YARD
Don't overfertilize. Sweep (do not wash) fertilizer and soil off driveways and walkways.

PET
Pick up pet waste from yards, trails and sidewalks.

CAR
Maintain your car to prevent oil leaks and recycle used motor oil.

HOME
Use nontoxic or natural household cleaning products. Recycle or properly dispose of household chemicals.

1-800-CLEAN UP

TCEQ

Texas Commission on Environmental Quality

This book cover has been approved by TCEQ for use in the mandated public education programs associated with your Nonpoint Source Pollution program.

Center textbook on book cover and fold top and bottom ends to size of book.

Fold in sides to create sleeves for ends of book.

Slide ends of book into sleeves and you're covered at all times!

Make sure your textbooks are covered at all times!

This Book Belongs To:

Student Name _____ Subject _____

211-560-004-I

Walraven

WHAT CAN YOU DO TO HELP?

THERE ARE SO MANY THINGS YOU CAN DO EVERYDAY TO HELP CONSERVE WATER. JUST TURNING OFF THE WATER WHEN YOU ARE NOT ACTUALLY USING IT CAN MAKE A BIG DIFFERENCE. WHEN YOU BRUSH YOUR TEETH - TURN OFF THE WATER AND YOU CAN SAVE 8 GALLONS! WHEN YOU WASH YOUR HANDS - USING THE WATER SPARINGLY YOU CAN SAVE ALMOST 2 GALLONS! AND SOMETHING SO SIMPLE AS TAKING A SHOWER INSTEAD OF A BATH CAN SAVE OVER 15 GALLONS!

WHAT ELSE DOES CONSERVING WATER DO?

OTHER THAN HELPING KEEP OUR WATER SUPPLY HEALTHY, YOUR FAMILY WILL SAVE SOME MONEY. IT TAKES ELECTRICITY TO HEAT WATER FOR COOKING OR BATHING, SO WHEN YOU USE LESS WATER - YOU USE LESS ELECTRICITY! WATER ACTUALLY COSTS YOUR FAMILY MONEY, SO USING LESS WILL LOWER THE WATER BILL AND THE TAXES THEY PAY!

SAVE THE WATER!

UNSCRAMBLE THESE WORDS AND THEN FIND THEM IN THE PUZZLE BELOW!

TERWA
VAIOTNERSCON
TBAH
PROCTET
LGALON
VEAS
EVERPRESR
KEAL
IRVRE
GYENER

The Clearwater Underground Water Conservation District was formed to protect the underground water resources of Bell County. These resources include the Trinity aquifer which underlies all of Bell County and the Edwards BFZ aquifer which is located in the southern portion of the County. Clearwater's mission is to develop and implement an efficient, economical and environmentally sound groundwater management program to protect and enhance the water resources of the District. Clearwater is funded by ad valorem taxes and regulates water well drilling, spacing and pumping. Clearwater supports and promotes public education and conservation of all water resources in the County.

P. O. Box 729 • Belton, TX 76513

(254) 933-0120

www.clearwaterdistrict.org

NAME

SUBJECT

CONSERVE OUR WATER!

WHAT IS CONSERVATION?

CONSERVATION IS A WORD THAT DESCRIBES THE ACT OF PROTECTING OR KEEPING SOMETHING FROM DAMAGE OR LOSS. IT DESCRIBES THE IDEA OF AVOIDING WASTE, OR THE IDEA OF USING SOMETHING CAREFULLY.

WHY CONSERVE WATER?

DID YOU KNOW THAT TWO-THIRDS OF YOUR BODY IS MADE UP OF WATER? IT IS ALSO TRUE THAT THE EARTH IS COVERED MOSTLY IN WATER. BUT WHAT MOST PEOPLE FORGET IS THAT IT IS SALT WATER ... WE CAN'T USE IT FOR DRINKING, BATHING, WATERING OR MOST THINGS WE WANT WATER FOR. YOU CAN ACTUALLY GET SICK DRINKING SALT WATER!

WE WANT TO SAVE WATER BECAUSE EVEN THOUGH IT MAY RAIN A LOT, OR YOU SEE BIG LAKES ALL OVER - IT CAN'T LAST FOREVER. LAKES AND RIVERS CAN DRY UP AND ONCE IT RAINS, ALOT OF THAT WATER EVAPORATES BACK INTO THE SKY TO RAIN ALL OVER AGAIN. SO, YOU MAY SEE A GREAT DEAL OF WATER AROUND YOU BUT IT CAN RUN OUT IF WE DON'T HELP CONSERVE IT!

211-560-004-2