Lone Star Groundwater Conservation District

Annual Report 2008

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Lone Star Groundwater Conservation District Annual Report 2008

December 2009

Prepared by Marjie Risk

District Information:

Creation:

In 2001, the creation of the District was authorized by the 77th Texas Legislature through House Bill 2362. The creation of the District was confirmed by the voters of Montgomery County on November 6, 2001, with 73.85 percent of the voters casting favorable ballots.

Location and Extent:

The District is located within Montgomery County in southeastern Texas. The boundaries of the District are coterminous with the boundaries of Montgomery County, Texas. The District is bordered by Walker County on the north, San Jacinto and Liberty Counties on the east, Harris County on the South, and Caller and Grimes Counties on the west.

Peach Creek is the boundary with San Jacinto County, and Spring Creek forms most of the boundary with Harris County. The District comprises an area of approximately 1,090 square miles.

District Mission:

The Lone Star Groundwater Conservation District (District) is committed to managing and protecting the groundwater resources of Montgomery County and to working with others to ensure a sustainable, adequate, high quality and cost effective supply of water.

The District will strive to develop, promote, and implement water conservation, augmentation, and management strategies to protect water resources for the benefit of the citizens, economy, and environment of Montgomery County. The preservation of this most valuable resource can be managed in a prudent and cost-effective manner through conservation, education, management, and permitting.

District Offices:

207 W. Phillips, Suite 300

Conroe, Texas 77305

Phone: 936-494-3436

FAX: 936-494-3438

Visit us at:
www.lonestargcd.org

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District Staff

Kathy Turner Jones, General Manager

In 2002, Kathy was named General Manager of the newly formed Lone Star Groundwater Conservation District serving Montgomery County bringing 12 years of groundwater experience and knowledge with her. Under her direction, the District has established its offices in Conroe, built a core staff and office operation, established a well permitting and registration system, and approved District Rules. In addition, Kathy has led the District through the process of compiling hydrologic information on the characteristics of the Upper Gulf Coast Aquifer, engineering planning, information on water usage and water supply in Montgomery County, and implementing regulatory procedures associated with the District's Groundwater Regulatory Plan.

Debbie Dixon, Receptionist/Staff Assistant

Ms. Dixon is the first point of contact for the District and can direct your call as needed. She serves as the liaison between the public and the District staff. Ms. Dixon prepares and compiles information for each monthly Board Meeting. Ms. Dixon also oversees the exempt well registration program.

Cori Stallings, Permitting Director

Ms. Stallings is the Permitting Director for the District and oversees all permitting activities for the Lone Star Groundwater Conservation District. Ms. Stallings has worked for the District for several years and also oversees the District web site to ensure that information is current and available to the public.

District Staff

Darlene Milstead, Permitting/Technical Support

Ms. Milstead has worked for the District for nearly a year and a half year and is responsible for processing incoming well permits and application amendments. Legal notices are also prepared within the permitting section.

Dawn Havran, Permitting/Technical Support

Ms. Havran has worked for the Lone Star Groundwater Conservation district for over a year and has various responsibilities dealing with incoming well permits and permit renewals.

Mel Lonon, Field Operations Coordinator

Mr. Lonon is responsible for inspecting wells to ensure that each well is in compliance with District rules and regulations. Mr. Lonon is out in the community conducting these inspections and speaking with permittees.

District Staff

Daphne Walker, Bookkeeper

Ms. Walker has been with the Lone Star Groundwater Conservation District for 2 years and oversees the financial aspects of the District under the supervision of the General Manager and the Board of Directors.

Education should be the cornerstone of any sound water conservation program. Many people in the water industry feel that the greatest impact can be achieved through educating young people who are our water stewards of the future. The Lone Star Groundwater Conservation District continued its commitment in 2008 to educating students within Montgomery County.

Board of Directors

The Lone Star Groundwater Conservation District was created to develop, promote, and implement water conservation, augmentation and management strategies to protect water resources for the benefit of the citizens, economy and environment of Montgomery County, Texas. To fulfill this directive, the Board of Directors adopted rules on August 26, 2002, to regulate the drilling and operation of water wells in Montgomery County and to set fees for the production of groundwater.

- Richard J. Tramm-President/Represents Montgomery County, Term Expires 1/31/09
- Orval R. Love, PE-Vice President/Represents MUD's East of I-45, Term Expires 1/31/11
- Sam W. Baker-Secretary/Represents Montgomery County, Term Expires 1/31/11
- Jim Stinson, PE-Treasurer/Represents Woodlands Joint Power Authority, Term Expires 1/31/11
- Reed Eichelberger, PE/Represents San Jacinto River Authority, Term Expires 1/31/09
- Roy McCoy, Jr/Represents MUD's West of I-45, Term Expires 1/31/11
- M. Scott Weisinger, PG/Represents all areas except Conroe, Term Expires 1/31/09
- Rigby Owen, Jr./Represents City of Conroe, Term Expires 1/31/09
- W.B. Wood/Represents Soil and Water Conservation District, Term Expires 1/31/11

The Board of Directors of the Lone Star Groundwater Conservation District represent the various water interests of Montgomery County. The Board meets every month at the District Offices to dispense with District business to include the approval of well permits, decisions on rules an by-laws and provide reports on progress of District Water Committees.

General Manager's Statement

By Kathy Turner Jones

Great strides were taken in **2008** to protect groundwater resources.

Stewardship

The District has asked that Montgomery County residents adopt a water conserving lifestyle in an effort to reinforce an ethic of stewardship for our groundwater resources. Water quality remains an issue for this year and the District remains vigilant in the protection of this resource. Development and use of alternative water sources were encouraged in 2008.

Leadership

The District adopted the next phase of its District Regulatory Plan (DRP), Phase II (A), which requires certain large groundwater users in Montgomery County to conduct a long-term self-assessment of water demands and supplies for their system needs over the next 40 years. Single-family residences, agricultural users, and other users of less than 10 million gallons per year are exempt from the planning requirement. In 2008, the Board of Directors voted to allow an incentive for the development and use of reclaimed water from wastewater treatment plants to replace local groundwater for purposes outside the home, namely irrigation and cooling tower and other consumptive uses. This incentive is in the form of credits that would accrue in the same way that money deposited in a bank can be withdrawn and spent.

Addressing Challenges

Managing and protecting the groundwater resources of Montgomery County is a serious mission and has brought the District various challenges.

The Lone Star Groundwater Conservation District consistently meets with stakeholders throughout Montgomery County to discuss various water issues and the critical dependence on groundwater resources.

The District remains committed to serving as a active participant is tough discussions and water supply challenges faced by Montgomery County.

Outlook

The District will strive to fulfill its overall mission while looking to form effective partnerships with entities that have the same goal of preserving and protecting the groundwater resources of Montgomery County. We know that successful partnerships are the key to securing our water supply and are encouraging water conservation as a part of the solution for the future.

Evidence of the District's Progress in Achieving Management Goals

The 75th Texas Legislature in 1997 enacted Senate Bill 1 ("SB1") to establish a comprehensive statewide water planning process. In particular, SB1 contained provisions that required groundwater conservation districts to prepare management plans to identify the water supply resources and water demands that will shape the decisions of each district. SB1 designed the management plans to include management goals for each district to manage and conserve the groundwater resources within their boundaries.

Each year the District is charged with providing the evidence of the District's progress in achieving the Management Goals set forth in the District's Groundwater Management Plan. The evidence of the District's Progress toward each goal is included in the Annual Report to the District Board of Directors. The Annual Report is made available to the public after adoption by the Board of Directors. This report is intended to fulfill the requirement of the District Groundwater Management Plan of complying with the achievement of management goals as outlined herein.

Photo of Lake Conroe built in 1973 as a public water supply reservoir for the San Jacinto River Authority and City of Houston

A. Providing the Most Effective Use of Groundwater 2008

A.1. Objective—Each year, the District will require all new exempt permitted wells that are constructed within the boundaries of the District to be registered or permitted in accordance with the District Rules.

A.1. Performance Standard—The number of exempt wells registered or permitted by the District for the year will be incorporated into the Annual report submitted to the Board of Directors of the District.

To demonstrate completion of Performance Standard A.1, the number of exempt and permit-

Table 1, Number of Exempt and Permitted Wells registered or permitted by the District for the year, 2008

Number of Exempt Wells registered	445
Number of Non-Exempt Wells Permitted	113
TOTAL	558

A.2. Objective-Each year, the District will regulate the production of groundwater by maintaining a system of permitting the use and production of groundwater within the boundaries of the District in accordance with the District Rules.

A. 2. Performance Standard– Each year, the District will accept and process applications for the permitted use of groundwater in the District in accordance with the permitting process established by the District Rules. The number and type of applications made for the permitted use of groundwater in the District, and the number and type of permits issued by the District, will be included in the Annual Report given to the Board of Directors.

This USGS photograph shows the effects of subsidence as flooding occurred in an area of roadway that sank. Subsidence can cause extensive damage to existing infrastructure.

Table 2 provides the number and types of applications made to the Director for the permitted use of groundwater in 2008. Table 3 provides the number of applications for Operating Permits or Permit Amendments issued or other administrative disposition of applications made by the District in 2008. Table 4 provides the primary use of water listed on the permit applications approved by the District in 2008.

Table 2, the Number and Type of Applications for the Permitted use of Groundwater Received in 2008

Application Type	Number Submitted
Amendment to an Existing Operating Permit or Historical Use Permit Application*	141
New Operating Permits**	130
TOTAL	271

* Applications for Permit Amendments may not reference a specific well

**Applications for new operating permits may include more than one well

The Lone Star Groundwater District provides groundwater permits for a variety of uses and water users

Table 3, the Number of Operating Permits or Permit Amendments Issued and Administrative Disposition of Applications/ Permits made by the District in 2008

Application or Permit Disposition	Number
Applications Approved as Submitted	65
Applications Approved as Amended	118
Applications or Permits Expired due to inaction by Applicant or Permittee	9
Applications Approved w/Conditions	38
Applications Denied	0
Applications Pending at end of 2007	33
Applications Voided or Merged	8
Applications Withdrawn by Applicant	0
***TOTAL**	271

* Reflects Board Action on Applications in 2008. This total includes applications submitted in late 2007 but with Board action on the application occurring in 2008. The total excludes applications submitted in late 2008 which could not be set for Board action until 2009.

The photo below is a catchment for water from an artesian source. Water from artesian wells has been an important source of water to communities in Texas historically.

Table 4, Primary Use of Water on Permits Approved in 2008

Water Use	Number of Applications
Industrial	22
Irrigation	52
Irrigation (Agriculture)	3
Public Supply/Commercial	194
Other	0
TOTAL	**271**

B. Controlling and Preventing Waste of Groundwater 2008

B.1. Objective – Each year, the District will make an evaluation of the District Rules to determine whether any amendments are recommended to decrease the amount of waste of groundwater within the District.

B.1. Performance Standard – The District will include a discussion of the annual evaluation of the District Rules and the determination of whether any amendments to the rules are recommended to prevent the waste of groundwater in the Annual Report of the District provided to the Board of Directors.

The Lone Star Groundwater Conservation District is taking an important next step in the implementation of its District Regulatory Plan ("DRP") with the adoption of Phase II(A) of the DRP. The District's General Manager reported in December of 2007 that staff had been working with the San Jacinto River Authority (SJRA), District Engineers, and District Attorneys on the DRP. General Council also outlined a tentative timeline for completion and discussed preliminary requirements for Phase II(A) of the DRP.

Phase I established a benchmark for the reduction of total production within Montgomery County by requiring the total groundwater production to be equal to 64,000 acre-feet or less by January 1, 2015. Currently, total demand for groundwater is greater than 80,000 acre-feet. The District is projecting that with the population growth the groundwater demand in Montgomery County will be in excess of 88,000 acre-feet by the 2015 deadline.

Because of the impending groundwater reduction deadline of January 1, 2015, this Phase II (A) of the DRP requires certain specified groundwater users to demonstrate incremental progress towards conversion to alternate water supplies. The District's significant water users will be required to conduct a simple water resources planning assessment plan (WRAP) over the course of the next year to identify their anticipated future growth and water demand, what supplies they are going to use to satisfy those demands, how much each of those supplies will cost, and how they anticipate financing that cost. Planning and technical information gathered through the WRAP process will be used to determine the most appropriate regulatory approach for groundwater reductions by new and historic users when it adopts Phase II (B) of the DRP, which may include additional management zones.

B. 2. Objective – Each year, the District will apply a water use fee structure to the permitted use of groundwater in the District to encourage the elimination and reduction of waste of groundwater.

B. 2. Performance Standard – Each year, with the exception of wells exempt from permitting, the District will apply a water use fee to the permitted use of groundwater in the District pursuant to District rules. The amount of fees generated by the water use fee structure and the amount of water used for each type of permitted use of groundwater will be included in a section of the Annual Report given to the Board of Directors of the District. The amount and type of fees generated by the LSGCD water use fee structure in 2008 is given in Table 5. The amounts of water used for each type of groundwater use permitted by the District are outlined in Table 6.

Windmills are still used today as a means for withdrawing water from underground for domestic/household purposes. Many cities use industrial size pumps to withdraw water as water depths require more powerful systems to bring the much needed water to the surface.

Many states charge a fee for pumping and using groundwater and these users must report the quantities of water that are used each year. Groundwater pumping at rates that exceed water replenishment is called groundwater overdraft. Continued overdraft of groundwater resources can cause the ground surface to subside.

Table 5, The Amount of Water Use Fees Generated by the District in 2008.

Water Use Type	Permitted Amount	Fee Rate	Fee Amount
HUP Applications/ operating Permits*	24,994,210,356	$.07/1,000 gallons	$1,911,645.59
Water subject to Transportation Fee	793,681,529	$.105/1,000 gallons	$81,781.71
AG Permits/ Applications	487,930,059	$1.00 acre-foot	$1,600.13
TOTAL	**26,275,821,944**		

* May include water transported out of the District but not subject to Transportation

Table 6, The Amount of Water Reported to the District as Pumped for Each Type of Permitted Groundwater Use

Type of Use	**Gallons**
Commercial	41,577,671
Industrial	473,840,607
Irrigation	1,094,146,329
Irrigation (Agriculture)	154,705,964
Public Supply	1,335,076,503
Public Supply (Commercial)	131,048,202
Public Supply (PWS)	20,396,350,563
* **GRAND TOTAL**	**23,626,745,839**

*The reported pumping for 2008 is incomplete due to incomplete reporting by a small number of permittees. The District is currently pushing enforcement action to ensure compliance with reporting requirements.

B.3. Objective – Each year, the District will provide information to the public on eliminating and reducing wasteful practices in the use of groundwater by including information on groundwater waste reduction on the District's website.

B.3. Performance Standard – Each year, a copy of the information provided on the groundwater waste reduction page of District's website will be included in the District's Annual Report to be given to the District's Board of Directors. A copy of the information provided on the groundwater waste reduction page of District's website is presented in Appendix A of this report.

C. Controlling and Preventing Subsidence 2008

C.1. Objective – Each year, the District will hold a joint conference with the Harris-Galveston Coastal Subsidence District and the Fort Bend Subsidence District focused on sharing information regarding subsidence and the control and prevention of subsidence through the regulation of groundwater.

C.1. Performance Standard – Each year, a summary of the joint conference on subsidence issues will be included in the Annual Report submitted to the Board of Directors of the District. A summary of the joint conference on subsidence issues follows:

Subsidence Joint Conference:

April 22, 2008 at Lone Star Groundwater Conservation District, Conroe, Texas

Present: Tom Michel, Fort Bend Subsidence District; Kathy Turner Jones, Lone Star Groundwater Conservation District: Greg Ellis, Texas Alliance of Groundwater Districts; Robert Bradley, Texas Water Development Board.

In 2008, Land subsidence continues to be a concern due to the over pumping of the Gulf Cost Aquifer. When rates of replenishment are exceeded by groundwater pumping subsidence can occur. For unpopulated areas, the affects of subsidence may go unnoticed for long periods of time. The dangerous consequences of subsidence and fissuring can be devastating to roads, and water supply infrastructure. Repairs are costly and could cause disruption of critical services.

This historic photograph from the early 1900's was taken near some Texas oilfields and shows a ground subsidence of about sixteen inches due to fissuring in the area. Ground fissures are quite common in areas that are prone to the effects of subsidence due to groundwater overdraft.

In the Lone Star Groundwater Conservation District within Montgomery County, groundwater pumping continues to exceed natural replenishment. This rate of pumping is accelerating and the need for oversight and regulation is aggressively being pursued. While the use of satellite imagery can detect cones of depression and areas at risk for further subsidence, pumping must be reduced, replenishment increased or alternate sources found.

The continued coordination of efforts between Groundwater Conservation Districts and other agencies is paramount in managing the groundwater resources of the region. Strategies for reducing groundwater pumping to ease the affects of the growing overdraft were discussed. The Districts are working together and share the findings of research and various studies on subsidence in an effort to aid future planning efforts. Partnerships for water conservation are being explored to reduce the growing reliance on groundwater as well as the development and feasibility of alternative supplies.

C.2 .Objective – Each year, the District will provide one article annually on the District's website to educate the public on the subject of subsidence.

C.2. Performance Standard – The Annual Report submitted to the Board of Directors will include a copy of the article posted on the District's website. A copy of the article posted for 2008 is listed in the appendices of this report.

D. Conjunctive Surface Water Management Issues 2008

D.1. Objective – Each year, the District will participate in the regional planning process by attending at least 75 percent of the Region H – Regional Water Planning Group meetings to encourage the development of surface water supplies to meet the needs of water user groups in the District.

D.1. Performance Standard – The attendance of a District representative at each Region H Regional Water Planning Group will be noted in the Annual Report presented to the District Board of Directors and included in the Appendices.

A record of attendance of a District Representatives at each Region H Regional Water Planning Group is noted in Table 7:

Table 7, Record District representative attendance at Region H Regional Water Planning Meetings Performance Standard D.1. Note: Attendance can be verified by meet-

2008	**(Total of 4 Meetings were held with 100% attendance)**
February 6, 2008	Reed Eichelberger, Matt Tindall
May 28, 2008	Reed Eichelberger, Kathy Turner Jones
August 6, 2008	Roy McCoy, Kathy Turner Jones
November 5, 2008	Reed Eichelberger, Kathy Turner Jones, Roy McCoy

E. Drought Conditions

E.1. Objective – Each month, the District will download the updated Palmer Drought Severity Index (PDSI) map and check for the periodic updates to the Drought Preparedness Council Situation Report (Situation Report) posted on the Texas Water Information Network website www.txwin.net.

E.1. Performance Standard – Quarterly, the District will make an assessment of the status of drought in the District and prepare a quarterly briefing to the Board of Directors. The downloaded PDSI maps and Situation Reports will be included with copies of the quarterly briefing in the District Annual Report to the Board of Directors.

Quarterly Drought Briefings for 2008:

Quarterly Drought Briefing– 1st Quarter 2008

The first three months of 2008 were really dry for the Southern Region which moved from moderate drought to extreme drought by the end of the month of February. The continuation of the dry conditions prompted the United States Drought Monitor (USDM) to classify parts of South Central Texas as having exceptional drought conditions. The past three months were the third driest September through November stretch in the South Central Texas Climate Division (CD) Seven since 1895. A greater than equal chance of below normal precipitation covers drought stricken South Central Texas. In addition, development of drought conditions to the south of regions already in extreme to exceptional droughts is possible in the short term.

Quarterly Report Briefing– 2nd Quarter of 2008

The month of May produced below-normal precipitation for the State of Texas, and the first ten days of June have been dry as well. As a result, almost the entire state is abnormally dry, and many parts of the state are in or are approaching serious drought conditions.

Areas with particularly severe precipitation deficits include the extreme northwest corner of the state, the area from Midland to Del Rio, areas east of San Antonio, and parts of Deep South Texas. Drought conditions encompass this entire area, from Houston to El Paso as well as the northwest Panhandle. Except for a few isolated areas, most of the rest of the State is in the midst of abnormal dry weather.

An absence of normal precipitation is especially problematic during this time of year. May and early June is climatologically the wettest period of the year through most of the State. For this reason, it is difficult to recover from below-normal precipitation in May with above-normal precipitation during other periods of the year. Furthermore, with the onset of the hot temperatures of summertime, demands on water usage are approaching their peak. This leaves much of the State extremely vulnerable to additional periods of low rainfall.

Quarterly Drought Briefings for 3rd Quarter of 2008:

The September weather headlines were dominated by Hurricane Ike, which brought heavy

precipitation to the Upper Texas coast. Though many reporting stations sustained damage that rendered precipitation measurements useless, radar estimates indicated much of the Houston/Galveston area received 10-15 inches of precipitation from Ike. Much of East Texas north of Houston received 3-6 inches of rain from Hurricane Ike, but monthly rainfall totals were near normal in many locations since precipitation was sparse outside of Hurricane Ike.

Hurricane Ike Storm damage at Lake Conroe boat ramps

Quarterly Drought Briefings for 4th Quarter of 2008:

South Central Texas, the area of greatest concern for long-term drought, received less than half of its climatologically expected precipitation for the fourth consecutive month. Most areas in South Central Texas climate division 7 received between 0.25" to 0.50" of precipitation. San Antonio received 0.25" of precipitation and Austin/Mabry received 0.40" of precipitation. As a result of this dryness, the United States Drought Monitor named an "Exceptional Drought" classification (D4) for 14 counties in the Austin/San Antonio region. The percent of Texas with this status rose from 1.25% at the beginning of December to 4.15% by the end of the month.

F. Addressing Conservation, Recharge Enhancement, Rainwater harvesting, Precipitation Enhancement, or Brush Control Where Appropriate and Cost Effective

The Lone Star Groundwater Conservation District remains committed to educating the residents of Montgomery County about the need for water conservation as an alternative to groundwater pumping. The cost for recharge enhancement is high due to the need for land acquisition for the use of spreading basins or through injection wells which is also cost prohibitive. To promote the use of alternative sources of water, the Lone Star Groundwater Conservation District continues to encourage the use of rainwater harvesting collection systems. Water conservation messaging specifically tied to the water resources of Montgomery County is being conducted through the Water IQ Campaign.

Altering precipitation patterns through artificial means is not a cost effective or feasible program for the District at this point in time. Brush control is not being considered as a viable program for the District at this time due to the lack of cost effectiveness for this type of program.

F.1 Objective— The District will annually submit an article regarding water conservation for publication to at least one newspaper of general circulation in Montgomery County.

F.1 Performance Standard— A copy of the article submitted by the District for publication to a newspaper of general circulation in Montgomery County regarding water conservation will be included in the Annual Report to the Board of Directors.

The Lone Star Groundwater Conservation District has provided articles and press releases to general circulation publications in 2008 to keep the citizens of Montgomery County better informed about their water resources and the rates of groundwater decline. The Conroe Courier is one such newspaper that is distributed throughout Montgomery County. Another vehicle used to disseminate information to the public is through the Dock Line magazine which is published monthly and has a circulation of 18,000. Examples of these efforts are provided in the Appendices of this report.

F.2. Objective— The District will develop or implement a pre-existing educational program for use in public or private schools will be included in the Annual Report to the Board of Directors for the year 2008.

F.2. Performance Standard—A description of the educational program developed or implemented by the District for use in Montgomery County public or private schools will be included in the Annual Report to the Board of Directors for the year 2008.

LONE STAR GCD CONSERVATION EDUCATION PROGRAMS – 2008

Major Rivers: A Texas Water Education Program

Classroom curriculum geared towards educating 4th and 5th graders about conservation of water resources. The District sponsors the curriculum in conjunction with SJRA. Through this joint partnership with SJRA, we have been able to provide over 300 teacher kits to schools in Montgomery County. Major Rivers' lesson objectives not only define important knowledge and skills related to water, but they also support many of the Texas Education Agency's TEKS and TAKS objectives for social studies, science, language arts and math. Each year we cost share with SJRA to replenish the individual student pamphlets.

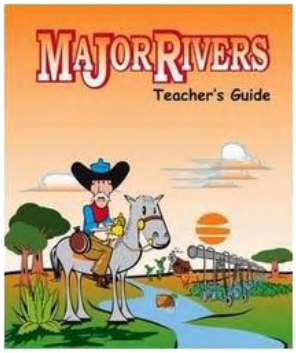
2008 we spent **$4,148.75** (our part):

51 Educational Packages

197 Electronic Educational Packages

28 Replacement Packages – English

29 Replacement Packages – Spanish



Major River Teacher Educational Workshop(s):

In addition to providing the curriculum to the schools, the District participated with SJRA and sponsored two (2) Major River Teacher Workshops during the summer to educate the teaching facility. During the workshop, the District staff presents information on groundwater and LSGCD's role in regulatory plan development. SJRA has received great response from Conroe and Klein last year and the workshops were well attended. Conroe ISD has notified TWDB that every 5th grade teacher has been trained on Major Rivers. The District co-sponsored breaks, meals, and door prizes for the workshop.

Walraven – Book Cover Program

In 2004, the District jointly with SJRA initiated a program providing book covers with water conservation messages to Montgomery County Schools. In 2008, over 52,000 book covers were distributed in six (6) school districts within the county to assist in meeting the Texas Education Agency's requirement that all text books be covered.

2008 we spent **$4,105.05** (Lone Star contribution)

School Districts Included:

Conroe ISD	Splendora ISD
Montgomery ISD	Willis ISD
New Caney ISD	

State Youth Water Camp:

In pursuit of providing education programs for Montgomery County students, the District sponsors annually one – three students to attend the Texas State Youth Water Camp in Monahans. The objective of the week-long event is to help older youth throughout the state to become aware of the water issues and appreciate the implications of agricultural, industrial, municipal, and hone water use on water quality and supply.

Cost to attend is $150/student plus travel.

Montgomery County Fair & Rodeo:

Montgomery County Fair and Rodeo... as in the past, the District provided the aquifer display provided to us by the San Antonio Water System for public exhibit during the fair and rodeo. Cori Stalling help set up and monitored the District's exhibit during the fair. The exhibit illustrates the dynamics of a typical aquifer which remained on display throughout the fair. Along with the exhibit, the District provides a visual display of information regarding Rainwater Harvesting with handout brochures for the public.

The Woodlands Earth Day:

The Woodlands Earth Day Festival returned to The Woodlands High School Saturday, April 12, from 10 a.m. to 3 p.m. to celebrate the environment with new booths, entertainment and children's activities. A community tradition since 1990, The Woodlands' Festival is the longest running Earth Day event in the greater Houston area. This year's theme, *It's all Connected*, focused attention on small actions that make a big difference.

The Event attracts over 5,000 annually and offers environmental exploration in a "street fair" atmosphere! District staff manned the booth for the event. We used the District's display on "Rainwater Harvesting" as the major focal point of the display. In addition this year, we added the new sand-tank table groundwater flow model to help educate the children and adults that groundwater is contained underground in spaces or pores between sand grains and other soils. In addition, they were able to see that underground water flows from upland areas to low areas, or from areas of high hydraulic head to areas of lower hydraulic head. We also provided rulers with conservation tips and water conservation activity books for the children and water efficient spray nozzles, moisture meters, and leak tubes for the adults to promote water conservation within the community. Conservation coloring books and brochures were also available to the public. More than 70 booths, wildlife displays and hands-on activities to explore current trends in energy-saving technology, revealing the delicate balance of nature and sharing tips to conserve precious resources were available for the public. Just for kids, the Ecology Carnival offered free games, crafts and interactive fun with nature and conservation themes.

Southwest Grounds Maintenance Fair:

15th Annual Southeast Texas Grounds Maintenance Conference in Conroe – 2008 had approximately 400 people in attendance at the conference. Attendees were individuals associated with maintenance of golf courses, schools, landscape, parks & recreation. Lone Star Groundwater Conservation District sponsored a booth an educational display booth. Many visitors come by for information on harvesting rainwater. Rainwater harvesting manuals and other conservation educational information were made available.

Other Activities:

The District accepts every opportunity to educate the public on water conservation. Outside the many efforts already highlighted above, in 2008 the District participated in many and numerous events. The Districts goal at these events is to present water conservation concepts in an entertaining and educational format. The events include:

- Southwest Grounds Maintenance Fair
- Spring Fling at Montgomery County College
- The Montgomery County Fair
- Classroom presentations:
- Presentations to the First Bank of Conroe Junior Board of Directors

- Rotary, Kiwanis, and Lions Club presentations
- Lake Conroe Community Network (LCCN)
- Chamber of Commerce Presentations
- Presentation to the North Houston Association Environmental Committee
- Region H Presentation
- Presentation to Men of Bentwater
- Presentation to SWCD/NRCS meeting
- TCEQ Cluster Course II training held at LSGCD
- Presentation to Montgomery County Restaurant Association
- Presentation to various City Councils as requested
- LCCN meeting and presentation with Water Logic

Water Conservation Kits:

The District provides complimentary water conservation kits. Each conservation kit contains the following items with a detailed description of the water benefit saving of each:

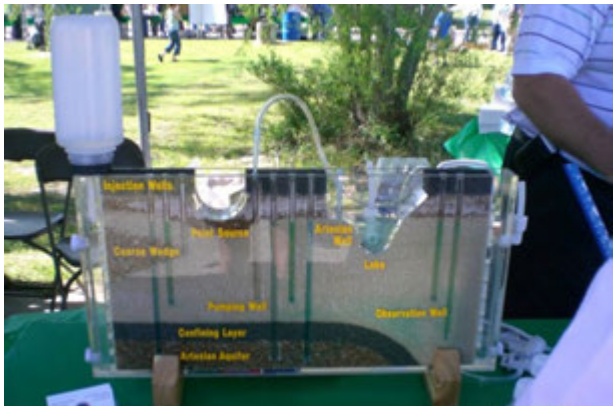
Toilet Tummy	5 Spray Water Saving Hose Nozzle
Aerator	Leak Detection Dye Tablets
Rain Gauge	Shower Flow Meter Bag
Moisture Meter	

Staff estimates that approximately 200 bags were distributed in 2008 at various events and presentations throughout the County. In addition, the conservation kits are available to the walk-in public on request. **$4,000** spent on supplies and reorder of items in 2008.

District Library:

The District has created and established an in-house reference library of educational information available for all ages. Books, games, coloring books, videos, and other factual information is included in the library to be checked out for a period of time or depending on the specific resource, to be kept. The District offers and encourages educators to take advantage of the District's water resource information material. A new item added in 2008 is a desktop Groundwater Flow Model which serves as an interactive classroom tool designed to show the flow of water and toxins through differing gradients. It can be used in front of the classroom and is easily used by students themselves. It may demonstrate flowage through confined and unconfined aquifers as well as the effects of pumping on these aquifers.

In 2008, the District spent **$914.74** on educational material for the Library, of which the Groundwater Flow Model cost $625.



Groundwater Flow Model Classroom Tool

Articles/Publications/Press Releases:

Throughout 2008 the District has strived to keep the citizens of Montgomery County updated with the latest news and information concerning groundwater. The District submitted many articles through many sources during the year in hopes to keep the communication lines open with the public.

Below is a summary list of press releases distributed to area newspapers, including The Houston Chronicle, Montgomery County News, and Conroe Courier, as well as being distributed electronically by District staff via an email distribution list:

Press Release: December 29, 2008
December 29, 2008, Conroe, Texas – The Lone Star Groundwater Conservation District at its November 11, 2008, Board of Directors meeting voted to allow an incentive for the development and use of reclaimed water from wastewater treatment plants to replace local groundwater for purposes outside the home, namely irrigation and cooling tower and other consumptive uses.

Press Release: August 26, 2008
August 26, 2008, Conroe, Texas – The Lone Star Groundwater Conservation District is the

Press Release: July 15, 2008
July 15, 2008, Conroe, Texas – The Lone Star Groundwater Conservation District author-

Press Release: May 20, 2008
The State Office of Administrative Hearings (SOAH) have issued their recommendations

Press Release: April 24, 2008
For the fourth consecutive year, the Lone Star Groundwater Conservation District is planning to sponsor 2 local high school students to attend the State Youth Water Camp, to be

Press Release: February 13, 2008
The Lone Star Groundwater Conservation District (LSGCD) yesterday adopted the next phase of its District Regulatory Plan (DRP), Phase II (A). View **District Regulatory Plan (DRP), Phase**

The Dock Line Magazine

The "Dock Line" Magazine is published monthly and the District authors an article for each issue which is printed at no cost to the District. In 2008, 12 articles were published with a circulation distribution of 65,000. Copies of each published article are included in the Appendices.

Water IQ Campaign.

The Water IQ campaign was developed by the Texas Water Development Board to educate the citizens throughout Texas about the water resources within the state. The campaign can be tailored to fit the needs of a specific community or agency and offers a variety of media options to disseminate a water conservation message. The Lone Star Groundwater Conservation District developed its own specific program in 2008 and evaluated the best means to get a conservation message out to the residents of Montgomery County.

The Water IQ campaign for 2008 included print ads, and a total of 11 billboards located throughout Montgomery County. Samples of the promotional materials are included in this document as a measure of the Performance Standard. The following are copies of the print ads produced for the District are seen below:

Cut 5 minutes off your shower

Save 12 gallons a day

Turn off water while brushing teeth

Save 6 gallons a day

An inch a week:

All your lawn really needs

Water early or late

Save 1,200 gallons a year

WATER IQ

Know your water.

Every day is a chance to save.

Even though water is a finite resource, there are infinite ways to save. When overuse drains the Gulf Coast Aquifer, our underground water supply, the land that sits on top has nowhere to go but down. Just one more reason to make smart choices every day wherever you use water, inside or out. Find new ways to make it last at WaterIQ.org.

LONE STAR GROUNDWATER CONSERVATION DISTRICT

WATER IQ

Know your water.

Every day is a chance to save.

Even though water is a finite resource, there are infinite ways to save. When overuse drains the Gulf Coast Aquifer, our underground water supply, the land that sits on top has nowhere to go but down. Just one more reason to make smart choices every day wherever you use water, inside or out. Find new ways to make it last at WaterIQ.org.

LONE STAR GROUNDWATER CONSERVATION DISTRICT

Billboard ads were also utilized for the 2008 campaign:

F. 3. Objective: Each year, the District will include an informative flier on water conservation within at least one mail out to groundwater use permit holders distributed in the normal course of business for the District.

F. 3. Performance Standard— The District's Annual Report will include a copy of the informative flier distributed to groundwater use permit holders regarding water conservation and the number of fliers distributed.

Informational/Educational Brochures:

Annually the District is required to include an informative flier on water conservation within at least one mail out to groundwater use permit holders to be distributed in the normal course of business for the District.

A brochure titled "Water Issues: Montgomery County" developed by EnviroMedia within the Water IQ campaign was mailed to every permit holding in September of 2008. In addition to the District's mail out – the brochures is made available to all public water systems and/or organizations in the County for inclusion in their mailings upon request at no cost. Outside the District mailings, this brochure and others purchased from the TWDB are made available as display offers at board meetings and other public events the District participates in.

A total of 20,000 brochures were ordered and printed in 2008 with 12,000 being distributed. Printing cost to the District totaled **$3,000.**

Informational brochure produced by the Lone Star Groundwater Conservation District describing water resource issues within Montgomery County and done in coordination with the Water IQ Campaign.

F. 4. Objective– Each year, the District will promote rainwater harvesting by posting at least one informative article on rainwater harvesting on the District website. The District will also consider sponsoring rainwater harvesting activities when the project offers opportunities to advertise and promote the technology.

F. 4. Performance Standard– Each year, the annual report will include a copy of the article that has been provided on the District web site in rainwater harvesting.

The following information was placed on the District's website in 2008 to educate the residents of Montgomery County about rainwater harvesting.

What is Rainfall Harvesting and Why is it Important?

Water is our most precious natural resource and something that most of us take for granted.

We are now increasingly becoming aware of the importance of water to our survival and its limited supply.

The harvesting of rainwater simply involves the collection of water from surfaces on which rain falls, and subsequently storing this water for later use. Normally water is collected from the roofs of buildings and stored in rainwater tanks. Water can also be collected in dams from rain falling on the ground and producing runoff. Either way, the water collected can be considered to be precious.

The collection of rainwater from the roofs of buildings can easily take place within our cities

and towns, not just in rural areas. All that is necessary to capture this water is to direct the flow of rainwater from roof gutters to a rainwater storage tank. By doing this, water can be collected and used for various uses. If you are from the city, it is possible to replace a substantial portion of your fresh water requirements by the capture and storage of rainwater from your roof.

<u>Youth Rainwater Harvesting Presentation:</u>

The District sponsored a half day seminar/program with Montgomery County Master Gardeners at the Extension Service Center to students from the Academy of Science and Technology. In addition to learning more about Montgomery's water resources and the need to conserve, the students participated in a hand-on demonstration project with the Gardeners.

The District supports rainwater harvesting and consistently speaks to the benefits of this water conserving practice. The District participated in the Memory Park Project in 2008.

General Manager Kathy Turner Jones and Mel Lonon of the Lone Star Groundwater Conservation District were on hand for the dedication of a rainwater harvesting project at Memory Park.

Rainwater Harvesting Demonstration Sponsorship:

The District provided grant funding support to two Rainwater Harvesting Demonstration projects in the County in 2008.

Lake Conroe Rotary Club community project - Memory Park located at the library in Montgomery. **$8,000.00**

The Woodlands Community Service Corporation-Parks and Recreation Department (WCSC-PARD) - Rainwater Harvesting Demonstration. **$3,610.00**

Appendix A:

Groundwater Waste Reduction

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For Immediate Release
August 26, 2008

Media Contact:
Melanie Fish, 512-476-4368
mfish@enviromedia.com
EnviroMedia Social Marketing

Half of Montgomery County Residents Don't Know Where Their Water Comes From

Lone Star Groundwater Conservation District is first in East Texas to adopt state's official water conservation campaign

(MONTGOMERY COUNTY, Texas)—New research shows 49 percent of people in Montgomery County think they get their water from lakes and reservoirs. In fact, their water comes from the Gulf Coast Aquifer — an underground water supply that can't keep up with the demands of the rapidly growing population of Montgomery County.

The urgent need to conserve the aquifer and make it last prompted the Lone Star Groundwater Conservation District to implement Water IQ: Know Your Water, the state's official public education campaign.

Lone Star GCD is the first water district in East Texas to adopt Water IQ, which offers simple tips to help consumers save water and educates them about their water source. "It's part of a bigger plan to make sure Montgomery County has enough water for the future," said Kathy Turner Jones, general manager of Lone Star GCD. "Demand is expected to more than double by 2040, so we are also working on accessing additional water supplies to make sure we don't over tap the aquifer. Obviously that takes time and money, but this campaign shows everyone what they can do today to extend our water supply."

Sinking Ground
Lone Star GCD is trying to avoid problems created by taking too much water from the aquifer. One of those problems is subsidence, or sinking ground caused by pumping out the water beneath it. Subsidence can make areas more susceptible to flooding and can cause damage to infrastructure and wetland habitat. One location in the Woodlands monitored by the U.S. Geological Survey measured a quarter inch drop in elevation from 2002-2006.

Preventing further sinking is necessary to prevent flooding, yet the new research shows 83 percent of people surveyed in Montgomery County don't think subsidence is a problem in their area. Other research findings include:

- 92 percent believe there is enough or more than enough water in Montgomery County.
- 81 percent believe they can do more to conserve.
- While nearly all people surveyed believe conservation is important, fewer than half (43 percent) say they conserve "most of the time."

Water IQ
The Water IQ campaign provides easy-to-implement ways for people to conserve all the time at www.WaterIQ.org. The site also has a Water IQ quiz to test peoples' knowledge of where their water comes from and the best ways to save it. "Research shows people are more willing to conserve water if they know where their water comes from, so we are getting the word out with Water IQ that our source is the Gulf Coast Aquifer," said Billy Wood, Chairman of the District's Water Awareness and Conservation Committee. "Combining that message with promoting easy ways to conserve should result in less water waste in Montgomery County." The tips now appearing in print ads, on billboards and on the Web site include:

- Turn off water while brushing teeth — *Save 6 gallons a day.*
- Cut 5 minutes off your shower — *Save 12 gallons a day.*
- Avoid sprinkler runoff — *Save thousands of gallons a year.*
- Water early or late — *Save 25 gallons a day.*
- Water an inch a week — *All your lawn really needs.*

About Lone Star Groundwater Conservation District
Lone Star GCD is one of nearly 94 groundwater conservation districts statewide created by the state legislature to conserve, protect and enhance groundwater resources. Lone Star GCD is the first entity in East Texas to utilize Water IQ.

Other entities that use Water IQ to educate their citizens include the City of Austin, Cedar Park, High Plains Underground Water Conservation District No. 1, Lower Colorado River Authority, Lubbock, North Texas Municipal Water District, Panhandle Groundwater Conservation District, San Angelo and Tyler.

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Appendix B:

Articles Submitted by the District in 2008

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DOWN THE DRAIN

Wastewater could prove to be pipeline for a thirsty region.

By: Matthew R. Tindall

Benjamin Franklin once said "When the well's dry, we know the worth of water." He could have been talking about Texas.

Water is a critical issue facing our region and the lifeblood of Texas as it supports the economic growth of our future. However, the Texas 2007 Water Plan has suggested that supplies will not meet demands within five decades. With population growth expected to more than double by the year 2060, a demand for Texas water is anticipated to increase by 27 percent, from almost 17 million acre-feet of water in 2000, to 21.6 million acre-feet, in 2060.

As urban populations explode and sources dry up, water could take a dominant role in political debate, say some experts on the subject. Looking back at the decades preceding our current situation, authors of a 1965 report for the Texas Water Development Board were so convinced that reuse of effluent water would be common in 50 years that they toyed with titling their report "The 21st Century: an Effluent Society."

These days, municipalities across the state are rethinking their wastewater disposal and are realizing that water recycling is becoming an important element for managing water resources.

"I think water reuse will serve as a key component to any long term water management strategy that this state adopts," said State Representative Bill Callegari. According to the new water plan being developed by the Texas Water Development Board, water re-use will account for as much as 15 percent of Texas' future water supply. "In order to make this happen in the future, we need to remove the legal hurdles now," he stated.

Texas' water resources are unpredictable. Like many areas of the South, Texas is prone to heavy droughts. The statewide drought of 1957 lasted almost eight years and resulted in 244 of 254 counties declared disaster areas. Prior to 1940, groundwater provided less than 1 million acre-feet of water per year to Texans. Since that drought, groundwater production has been about 10 million acre-feet per year. In 2003, groundwater provided 59 percent of the 15.6 million acre-feet of water used in the state.

Dock Line article from February of 2008

Like many environmental problems, awareness and action taken by residents, water utilities, and government agencies can all help to relieve the impacts of drought and water shortages. The effective adoption of water efficiency measures requires public education, business commitment, and government will.

The average American citizen uses about 100 gallons of water each day, almost double the amount used by Europeans, who consume about 53 gallons daily.

Is there an alternative to expensive surface water? According to printed studies, the answer is no, but the expense can be delayed through conservation and use of reclaimed water.

"I support the need for surface water," said W.B. "Billy" Wood, representing the Montgomery County Soil and Water Conservation District on their Board of Directors. "But I also think that we need to encourage the use of conservation and reuse through incentive programs so that we minimize the need for surface water."

According to the Texas Cooperative Extension at Texas A&M, an average bathroom showerhead can pump as many as thirty gallons of water down the drain in ten minutes. Likewise, a toilet flushes away 1.6 gallons per use, and a single washing machine cycle could swirl 57 gallons around its drum. These numbers could even be higher when considering older, less efficient equipment.

If this is the future, then bad water practices will become increasingly costly. Those small sins that everyone indulges in: ten extra minutes in the shower, a single stained pair of pants in the washing machine, or a bug flushed down the toilet may come to an end.

Reuse will eventually play a big role in conservation. As municipal populations continue to grow and concentrate, the recycling of water for different uses will become much more common. Ken Rainwater, Director of Texas Tech's Water Resources Center believes that irrigation will play the biggest part for effluent water use. "There's what we call the 'yuck' factor that people will have to get past," he said.

Concern for human health and the environment are the most important constraints in the reuse of wastewater. While the risks do need to be carefully considered, the importance of this practice for the livelihoods of countless smallholders must also be taken into account. With a growing population, it is important for all Montgomery County residents to use our precious water resources as efficiently as possible. "We can no longer afford to use our water once and throw it away," said Kathy Turner Jones, General Manager of the Lone Star Groundwater Conservation District.

The District is proud that it is able to do its part for the public, and to help the residents in becoming aware of the importance of using water wisely. Through education and public involvement, the District hopes to help maintain the quantity and quality of water resources for current and future generations. ◆

For more information contact:
Kathy Turner Jones, General Manager
Lone Star Groundwater Conservation District
936/494-3436, www.lonestargcd.org

Water Conservation Spotlight: River Plantation MUD; Reuse of Effluent/Reclaimed Water

By Kathy Turner Jones, Lone Star GCD

Reclaimed water is anticipated to be a component of the future supply in Montgomery County. In combination with surface water and water conservation methods, reclaimed water will help to make up the projected 90,000 acre-foot deficit in water supply over the next 40 year planning period.

The current technology of reclaimed water limits its use to non-potable use. However, as the cost of water supply increases with the implementation of surface water, reclaimed water is anticipated to be a cost-effective alternative in some cases.

In May of 2006, the Lone Star GCD (District) authorized a study to determine the extent to which effluent reuse can be used to supplant the need for groundwater. Because reuse solutions are localized, they offer the ability to be implemented comparatively quickly compared to a surface water system.

The first phase of this study focused on identifying the extent of which effluent reuse is currently being implemented in Montgomery County. Only a limited number of entities reported back that either they currently use reuse as a non-potable water supply or would consider using reuse in the future. Based on the responses to the questionnaire and the data received, the responses indicate that there is potential for increased reuse in the County.

From this information, the District has selected River Plantation MUD to "spotlight" for their aggressive conservation efforts to use "reclaimed effluent" as a non-potable water supply.

The wastewater treatment plant at River Plantation Municipal Utility District processes an average of 140 million gallons a year. The effluent from the plant would normally flow to the San Jacinto River. In 1980, the district made a decision to divert a portion of this effluent to irrigate the 135 acre golf course. A pump was installed at the wastewater treatment plant to take water from chlorine contact chamber and pipe it one mile to the golf course holding pond. An irrigation pumping station then distributes the water from the holding pond to the sprinkler system on the golf course. In 2007, RPMUD pumped 197,914,700

Continued on next page ⇨

gallons from the districts water wells and recycled 51,194,595 gallons of effluent back to the golf course for irrigation. As a result of this supply, the aquifer is under no further strain by the golf course, and RPMUD has reused 26% of the total amount withdrawn from the aquifer. (Information provided by Richard Ramirez, District Manager, RPMUD).

Photo 1: Treatment Plant #1. First stage of wastewater processing. Raw sewage enters plant and aeration chambers.

Photo 4: Effluent pumps deliver water from the contact chamber to the holding pond.

Photo 2: Once primary treatment is complete – water enters secondary treatment at the final clarifier.

Photo 5: The holding pond serves as storage for the irrigation system.

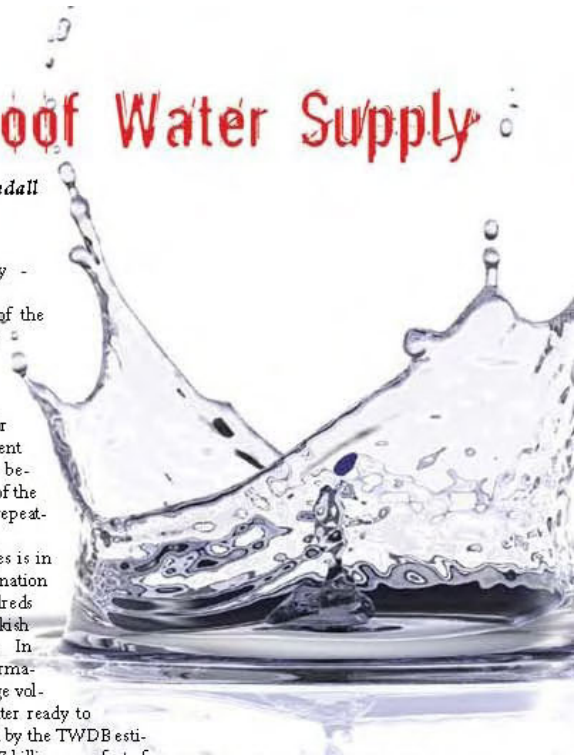
Photo 3: Next, the effluent flows into the contact chamber. It is at this stage that chlorine is injected to kill any bacteria.

Photo 6: Application. Treated water is pumped from the holding pond by high pressure pumps to the sprinkler system.

Photos taken by Dave Clements, dwcphotography

A Drought-Proof Water Supply

By: Matthew R. Tindall



Certainly, desalted seawater is no secret. The desalination or distillation process is one of mankind's earliest forms of water treatment. There are more than 10,000 desalination plants, mostly small ones, in operation worldwide. About two-thirds are located in the Middle East, and others are scattered across islands in the Caribbean and elsewhere. In the United States, almost all seawater desalination facilities are small systems used for high-valued industrial and commercial needs. This may be changing. Despite the major barriers to desalination, interest has recently mushroomed as technology has improved, demands for water have grown, and prices have dropped.

So what happens when the well goes dry? In the United States, you just build another well – a short term fix to avoid a painful long-term solution. In Texas, like many other areas around the world, the future solution may be desalination. In fact, among the many sources of water that Texans will rely upon in the future for human consumption: rivers, streams, rain, groundwater, and seawater, only seawater has the unique potential to provide an uninterruptible and limitless supply.

Governor Rick Perry directed the Texas Water Development Board (TWDB) to pursue the development of drought-proof water supplies from seawater desalination in April 2002. His initiative called for implementing Texas' first large-scale demonstration seawater desalination project. The following year, the Texas Legislature passed House Bill 1370 directing the agency to undertake or participate in research, feasibility and facility planning studies, investigations, and surveys as needed to advance the development of cost-effective water supplies from seawater desalination in the state.

"To me, it is not a matter of whether saltwater will one day be used as an abundant source for public use, but when and where," said Governor Perry in 2004, two years after first proposing the construction of the large-scale demonstration desalination plant along the Texas Gulf Coast. "Large desalination projects require large investments that are forward-looking. Why wait until the need is greatest? Leadership is about getting ahead of problems, and that's what we must do when it comes to water."

Since Governor Perry's proclamation, desalination of seawater has become a top priority to satisfy the water needs of a growing population. On a small site alongside a string of shrimp boats docked on the Brownsville ship channel stands a $2.2 million assembly of pipes, sheds, and humming machinery - Texas' pilot plant.

Desalination is "part of the tools in the toolbox" of 4,500 water management strategies in the state's water plan, said Carla Daws, a spokeswoman for the Texas Water Development Board. "We should never become complacent because of the history of our state having repeated droughts," she said.

While the United States is in its infancy on the desalination of saltier seawater, hundreds of plants to purify brackish groundwater already exist. In fact, many water-bearing formations in Texas contain a large volume of brackish groundwater ready to be utilized. A study funded by the TWDB estimates that there is almost 2.7 billion acre-feet of brackish groundwater that may be available for use in the state. About one-fifth of this volume is located in the Gulf Coast aquifer, the largest of any aquifer in Texas. Such waters typically have only one-tenth the salinity of sea water, so desalination can be accomplished more easily and transportation is less of an issue.

A key component of the brackish groundwater desalination equation is the management of the concentrated salt solutions produced by the desalination process. Where the salty concentrate can be discharged directed to surface waters, the process is economically viable. For inland locations, the cost of disposal of the concentrate tends to drive the process.

Eco-friendly process?

In addition to enhancing the water quality through state-of-the-art treatment processes, the use of desalinated water would free up other water supplies contributing to ecosystem restoration and reducing the dependence on groundwater. In addition, the water obtained through this process is characterized as very high quality. Since the reverse osmosis membranes are designed such that only water passes through it, they are capable of a high degree of removal of dissolved material.

Critics of desalination contend that large-scale desalination plants as the sole or even a major answer to replenishing rapidly disappearing fresh water supplies is yet another high-tech fix that is going to do more harm than good. They argue that the desalination process concentrates trace components of the raw seawater, such as boron, to levels that may be of concern in the environments where the concentrate will be discharged.

Expensive water.

Several factors may make the use of brackish water an attractive water supply alternative, including decreasing supplies of fresh groundwater and surface water, improvements in treatment technology, stricter drinking water standards, increased cost of water rights, increased competition for surface-water resources, and changes in population/demand. Water planners are optimistic that, with greater efficiencies offered by modern desalination technologies and continued support from the State, brackish groundwater desalination will play an important role as a source of water supply in the future.

Is desalination the ultimate solution to our water problems? No. Is it likely to be a piece of our water management puzzle? Yes. The potential of desalination is great, but the economic

March 2008 Dock Line Article

cultural, and environmental costs of wide commercialization remain high. In many parts of the world, alternatives can provide the same freshwater benefits of desalination at far lower economic and environmental costs. In the end, decisions about desalination will have to be made regionally. Local circumstances, needs, economics, and environmental impacts will all have to be factored together.

For more information contact:
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General Manager
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www.lonestargcd.org ◆

SMART LANDSCAPE WATERING
can protect your plants – and your drinking water

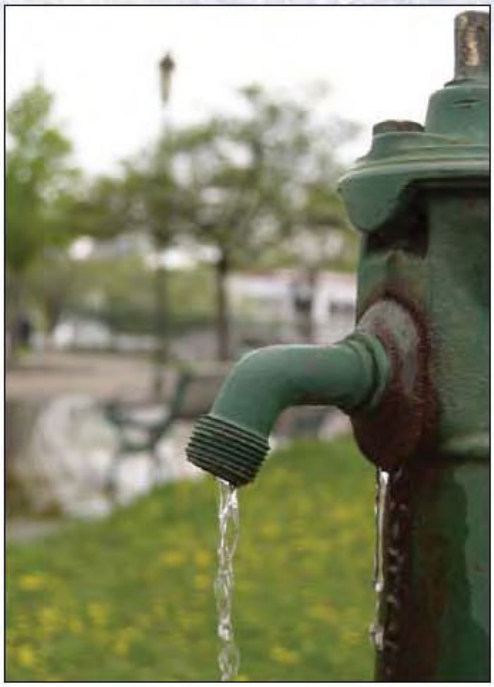
By: Matthew R. Tindall

Summer is on its way and with it the relentless summer sun. On hot summer days, it's commonplace to see sprinklers spraying graceful arcs of water on local lawns and gardens. When they hit the ground, their fate depends on how much is applied. Water is important to nourish garden plants. But too much water can harm the health of your plants, your drinking water and local streams.

As with groundwater, excess irrigation can carry fertilizers and pesticides into storm drains, streams and lakes. The amount of groundwater used also affects how much water is available in surface water. About 40 percent of the flow in rivers and streams comes from groundwater. By using (or withdrawing) more groundwater, we limit how much groundwater makes its way to our streams. The water you use on your landscape affects how much water is left for salmon, frogs, birds and other wildlife.

A dripping water faucet inside or outside the house can waste up to 33 gallons per day. A total of 3,000 gallons per quarter or 12,000 gallons per year.

A leaking toilet tank can waste up to 200 gallons of water per day. A total of 18,000 gallons per quarter or 72,000 gallons per year.



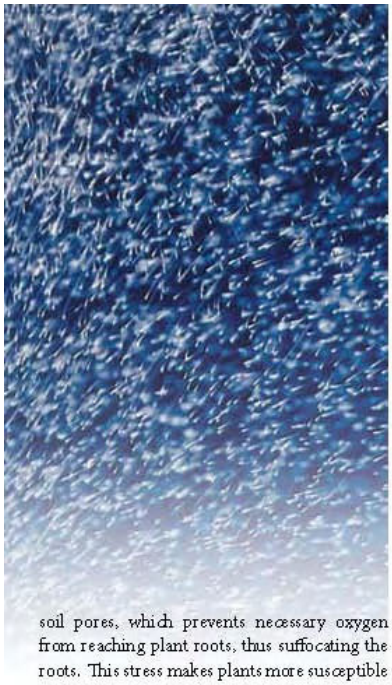
So what's a gardener to do? Here are some tips.

Many people ask how much water is enough. The simple answer is you only need to water when plants need water. Many lawns receive twice as much water as they need for a healthy appearance. Your lawn only needs one inch of water a week to stay green. The key is to water infrequently yet thoroughly. This creates a deep, well-rooted lawn that can withstand drought. Shallow, frequent watering encourages shallow roots that are prone to drought stress.

How do you know if you've watered deeply enough? Several hours after watering, push a long screwdriver or metal rod into the ground. It will pass easily through moist soil and stop or slow down when it reaches dry soil. Because most of us don't water thoroughly the first time, the soil will probably still be dry. Ideally, the soil should be moist 4 inches down.

On the other hand, overwatering clogs

April 2008 Dock Line Article



soil pores, which prevents necessary oxygen from reaching plant roots, thus suffocating the roots. This stress makes plants more susceptible to diseases and insects. Wilting, yellowing and leaf drop are all signs of overwatering. Let your plants dry out between waterings to let their roots breathe.

Remember not to cut the grass too short. Longer blades of grass will reduce evaporation and root stress since shaded soil will not dry out as quickly. Grass is mostly water. Leave the clippings on the lawn instead of taking that water away.

Water your trees and shrubs slowly and deeply. Deep watering helps your plants grow deep, healthy roots. All new plantings, even drought-tolerant plants, need regular water until roots are established, usually at least two growing seasons. Once established, you can reduce the watering frequency. Moisten the entire root zone, then let the soil dry out before you water again. The root zone for trees, shrubs and perennials extends as wide as the plant or beyond. Always water below the outer branches of the plant, not at the trunk.

The best way to conserve moisture in the landscape is by mulching. Pine bark, pine needles, cypress bark, composted grass clippings and shredded leaves are among the materials suitable for mulch. A three to four inch layer over the root zone retains moisture, keeps the soil cooler and helps prevent weed seeds from germinating under your shrubs, trees and flowers. Studies have shown that a one-inch layer of

Continued on page 54 ⇨

organic mulch can reduce soil surface temperatures by as much as 15 degrees on a 90-degree day. It's best to apply mulch when the soil is damp to help retain moisture.

One of the most important rules of landscaping is to group plants with similar light and water needs together. This avoids giving some plants too much and others not enough in the same landscape area. Grouping plants together can also help increase humidity. If the relative humidity is too low, plants may lose water faster through the tiny openings in their leaves than they can replace it through their roots.

Water when it's cool. Watering in the middle of the day, especially when it's sunny, will cause you to lose half the water to evaporation.

Water plants in the morning or early evening. Watering late in the evening leaves foliage wet longer, which helps diseases develop. Watering during the day and wetting the foliage can also cause leaf burn.

Check your irrigation system. Many people with irrigation systems actually use more water because they set them once and forget them. If possible, use a timer as part of your irrigation system. Work with a landscape professional to check, repair and update your system to make it more efficient.

For more watering tips, visit www.lonestargcd.org. ◆

Turning off the tap while brushing your teeth in the morning and at bedtime can save up to 8 gallons of water per day, which equals 240 gallons a month!

Drip irrigation systems use between 20 to 50 percent less water than conventional in-ground sprinkler systems. They are also much more efficient than conventional sprinklers because no water is lost to wind, runoff, and evaporation.

KEEP CHEMICALS OUT OF LAKE CONROE

1. Use alternatives to chemicals
2. Sweep paved areas after applying chemicals and dispose.
3. Don't spray on windy or rainy days.
4. Avoid spraying near surface waters (streams, lakes, etc.)
5. When cleaning equipment, keep the rinse water on your lawn, not on paved areas or down drains.
6. Read the label and follow directions for use.

Water on Request Only:
That should be a way of dining out.

By: Kathy Turner Jones, General Manager

"While the residents of Montgomery County are not under water restrictions at the present time, it is important to do our part to encourage our residents and visitors to be aware of the importance of saving water," explained Kathy Turner Jones, General Manager.

The Lone Star Groundwater Conservation District (District) is encouraging area restaurant owners and managers to participate in a "Water on Request Only" awareness campaign whereby restaurants would serve water to customers only on request.

> *"For every glass of water provided a restaurant guest, it takes two more glasses of water to wash that glass..."*

For every glass of water provided a guest, it takes two more glasses of water to wash that glass. Restaurants can save almost a quart of water by just asking if a guest would like a glass of water. Many times, guests will order another beverage and never touch the water.

"The point of the 'Water on Request Only' campaign," said LSGCD Board of Director Billy Wood, "is to eliminate the unnecessary waste of water, and not to make people thirsty." "It's really an awareness-raising tool," he says. "If you have to ask for the water, it makes you think about water use."

Traditionally, a practice of such consisted of regulations or mandates applied or enforced by city officials or public utility districts and usually only during droughts - and then later lifted when rain began falling again. But this water awareness approach would become a permanent way of business for all restaurant and dining establishments in Montgomery County.

The District is hopeful that local cities and utility districts will take the lead and met with restaurant owners and managers to encourage their support and participation.

One area restaurant owner commented that, "at least 30 percent of the water served, customers never drank." A large portion of restaurant customers order pre-meal cocktails, which may eliminate the need for water too.

Preventive Medicine. The campaign is part of a larger water awareness and conservation effort - a form of preventive medicine.

In early April the District, for the first time, approved a $250,000 water awareness public education campaign – "Water IQ: Know Your Water", to promote water awareness and conservation in Montgomery County. The District hired Envormedia Social Marketing to develop the awareness campaign that will include billboards, newspaper print, and brochure mailers to help spread its message of saving water to the public. The company was successful in a similar campaign to reduce the amount of water produced in North Texas, despite a 20 percent growth in population. The campaign is expected to begin in late April.

Water IQ is designed to educate utility customers and businesses about their water sources and provides simple tips on how to be more efficient with water. The campaign is intended to reduce peak day consumption, to raise awareness of water as a finite source, to educate consumers about issues related to water supply and planning in the county, and to establish a benchmark for measuring results.

The campaign provides quick, easy everyday tips to save water, like limiting shower times and turning off faucets while brushing teeth. In addition to the advertising message, the campaign will include a community survey to gauge if residents know the source of their water. It also will include a measurement of the effect on water use. For more information on "Water IQ: Know You Water" please visit their website at: http://www.wateriq.org

Montgomery County, which relies solely on underground aquifers for its water supply, is currently permitted to withdraw more water annually than can be recharged by the aquifer. The aquifer replenished about 64,000 acre feet a year through rainfall and runoff; currently, Montgomery County permit holders are authorized to produce 78,000 acre feet annually.

The District in December 2006 adopted a Groundwater Regulatory Plan (GRP) which essentially puts all permitted groundwater users on notice that they must reduce their groundwater usage to approximately 70 percent of their permitted amount by 2015 and is requiring "large volume groundwater users" to submit "Water Resources Assessment Plans" (WRAP) to the District by early 2009 on how they plan to meet that goal.

Lower Your Water Use. Raise Your Water IQ.

Water IQ: Know Your Water.
Do you know where your water comes from? Nearly three out of four Texans don't. It's important to know because water - and having enough of it - is a critical issue for the state of Texas.

You can do it! Visit www.wateriq.org/tips.php for more water saving tips.

For more information please contact the Lone Star Groundwater Conservation District (936.494.3436), or visit our website, www.lonestargcd.org. ◆

May 2008 Dock Line Article

Why Save Water?

With many parts of Texas facing the worst drought in 50 years, saving water now is more important than ever. By knowing your Facts from your Myths you'll not only raise your Water IQ, you'll make our water last.

Myth: If it rains, the drought will be over.
Fact: While the recent rainfalls help, they won't end the drought. The ground is so dry it acts like a sponge, absorbing rain and preventing crucial runoff into streams and lakes. It's going to take steady rainfall over a sustained period of time to catch up. Heavy rains over a short period of time won't solve the problem.

Myth: To really make a difference, everyone must drastically reduce their water use.
Fact: Using just 5, 10 or 15 percent less water will make a big difference. If everyone does their part, we can extend Texas' water supplies and survive the drought. You don't have to be a math wizard to figure out how to cut back by 5, 10 or 15 percent. Just read your latest utility bill and note how many gallons you consumed. Then multiply the number of gallons by .05. For example, if you used 8,000 gallons, multiply 8,000 by .05, .10 or .15. The result of this equation is your goal savings for the month. Don't worry, you can easily reach this goal and still have plenty leftover to brush your teeth and wash behind your ears.

Myth: It's more effective to save water inside your home rather than to cut back on outdoor watering.
Fact: You can make the biggest difference saving water by reducing your use outdoors. Little things make a big difference. Check for leaks in taps, pipes and hoses. One slow drip can waste 20 gallons of water daily (7,000 gallons per year). Operate sprinklers manually—don't rely on timers. If you must use a timer, learn to operate it correctly. Check sprinkler systems frequently for directional aim and broken heads to prevent watering driveways, sidewalks and streets. Have a professional inspect your system annually for leaks. Pay close attention to your pool's water level. If the level varies drastically from day to day, you probably have a leak and need it serviced immediately.

Myth: Watering daily is the only way to maintain a healthy, green lawn, especially during the summer.
Fact: Water your lawn to the depth recommended by your local water authority. Over-watering is just as bad for landscapes and can cause wasteful (and harmful) run-off. Experts recommend watering your lawn deeply and infrequently to promote a strong root system.

Myth: The best sprinklers shoot high, fine sprays, which mist your landscape without wasting water.
Fact: Just the opposite. The best sprinklers throw large drops of water low to the ground rather than misty sprays that allow water to evaporate quickly. Try a pressure-regulated spray head, which keeps the pressure constant. Use soaker hoses instead of sprinklers to water trees, shrubs and beds more efficiently. If you have an automatic sprinkler system, you'll really impress your neighbors by replacing your timer with an evapotranspiration (ET) controller. These smart controllers monitor information about soil moisture, rain, wind and evaporation so your system only waters when it's truly needed. Traditional timers require manual adjustments every time the weather changes. ET controllers use real-time data from local weather stations to make adjustments automatically and can reduce water use by about 30 percent.

Myth: Keep your lawn short. Shorter grass uses less water, so you don't need to water as much.
Fact: Let your hair down and let your grass grow. Raise your lawnmower blade to a height of at least 3 inches. A taller lawn will help shade your soil so it requires less water. When you let your grass grow taller, its roots grow deeper, and you'll have a healthier lawn.

Myth: The best way to fill your pool is to drop a hose directly into the water.
Fact: You should never submerge a watering hose into the pool to refill it. You won't hear the hose running underwater and could forget that you left it on. Not only is it wasteful, but you might flood your yard—or the neighborhood. Plus, unless you have an anti-siphon device installed, your chemically treated water could back flow into the City's water supply. Position the hose above the water surface so you hear the hose water running. That way you'll remember the water is on.

Lower Your Water Use. Raise Your Water IQ.

Save Water – Save Money… I Challenge You

By: Kathy Turner Jones, General Manager

Water – with the turn of a faucet, you get as much as you want, whenever you want it. So it's easy to forget that water is a carefully prepared product that has to be purchased like any other product. And whether it's used or wasted, you pay for every drop of water that flows through your meter.

Across the country, our growing population is putting stress on available water supplies. Between 1950 and 2000, the U.S. population nearly doubled. However, in that same period, public demand for water more than tripled! Americans now use an average of 100 gallons of water each day—enough to fill 1,600 drinking glasses! This increased demand has put additional stress on water supplies and distribution systems, threatening both human health and the environment.

There's a reason that water has become a national priority. A recent government survey showed at least 36 states are anticipating local, regional, or statewide water shortages by 2013. But by using water more efficiently, we can help preserve water supplies for future generations, save money, and protect the environment. Every drop counts!

While you can't control the amount of water your truly need – you can control the amount of water you waste. And there are many ways to reduce water waste if you are willing to make a few simple changes in your lifestyles.

Save Water, Save Money

Water conservation is the common-sense solution home-owners are looking for. The average household spends as much as $500 per year on its water and sewer bill. By making just a few simple changes to use water more efficiently, you could save about $170 per year. If all U.S. households installed water-efficient appliances, the country would save more than 3 trillion gallons of water and more than $18 billion dollars per year! Also, when we use water more efficiently, we reduce the need for costly water supply infrastructure investments and new wastewater treatment facilities.

Save Water, Save Energy

It takes a considerable amount of energy to deliver and treat the water you use everyday. American public water supply and treatment facilities consume about 56 billion kilowatt-hours (kWh) per year—enough electricity to power more than 5 million homes for an entire year. For example, letting your faucet run for five minutes uses about as much energy as letting a 60-watt light bulb run for 14 hours.

Water Efficiency, Human Health, and the Environment

Depleting reservoirs and groundwater aquifers can put water supplies, human health, and the environment at serious risk. Lower water levels can lead to higher concentrations of natural contaminants, such as radon and arsenic, or human pollutants, such as agricultural and chemical wastes. Using water more efficiently helps maintain supplies at safe levels, thus protecting human health and the environment.

Take the Conservation Challenge

Conservation by the homeowner provides the only solution to high water bills and excessive water demands, especially during our hot, dry Texas summers. Along with using water efficient appliances and fixtures, adopt the following water efficient practices to save money and protect out water supplies. WE DARE YOU!

➢ FIX THAT LEAK!

Challenge: Leaky faucets that drip at the rate of one drip per second can waste more than 3,000 gallons of water each year.

Solution: If you're unsure whether you have a leak, read your water meter before and after a two-hour period when no water is being used. If the meter does not read exactly the same, you probably have a leak.

Challenge: A leaky toilet can waste about 200 gallons of water every day.

Solution: To tell if your toilet has a leak, place a drop of food coloring in the tank; if the color shows in the bowl without flushing, you have a leak.

➢ SHOWER POWER

Challenge: A full bath tub requires about 70 gallons of water, while taking a five-minute shower uses 10 to 25 gallons.

Solution: If you take a bath, stopper the drain immediately and adjust the temperature as you fill the tub.

➢ TURN IT OFF!

Challenge: The average bathroom faucet flows at a rate of two gallons per minute.

Solution: Turning off the tap while brushing your teeth in the morning and at bedtime can save up to 8 gallons of water per day, which equals 240 gallons a month!

➢ WATER WISELY

Challenge: The typical single-family suburban household uses at least 30 percent of their water outdoors for irrigation. Some experts estimate that more than 50 percent of landscape water use goes to waste due to evaporation or runoff caused by overwatering.

Solution: Drip irrigation systems use between 20 to 50 percent less water than conventional in-ground sprinkler systems. They are also much more efficient than conventional sprinklers because no water is lost to wind, runoff, and evaporation. If your in-ground system uses 100,000 gallons annually, you could potentially save more than 200,000 gallons over the lifetime of a drip irrigation should you choose to install it. That adds up to savings of at least $1,150!

➢ MAKE IT A FULL LOAD

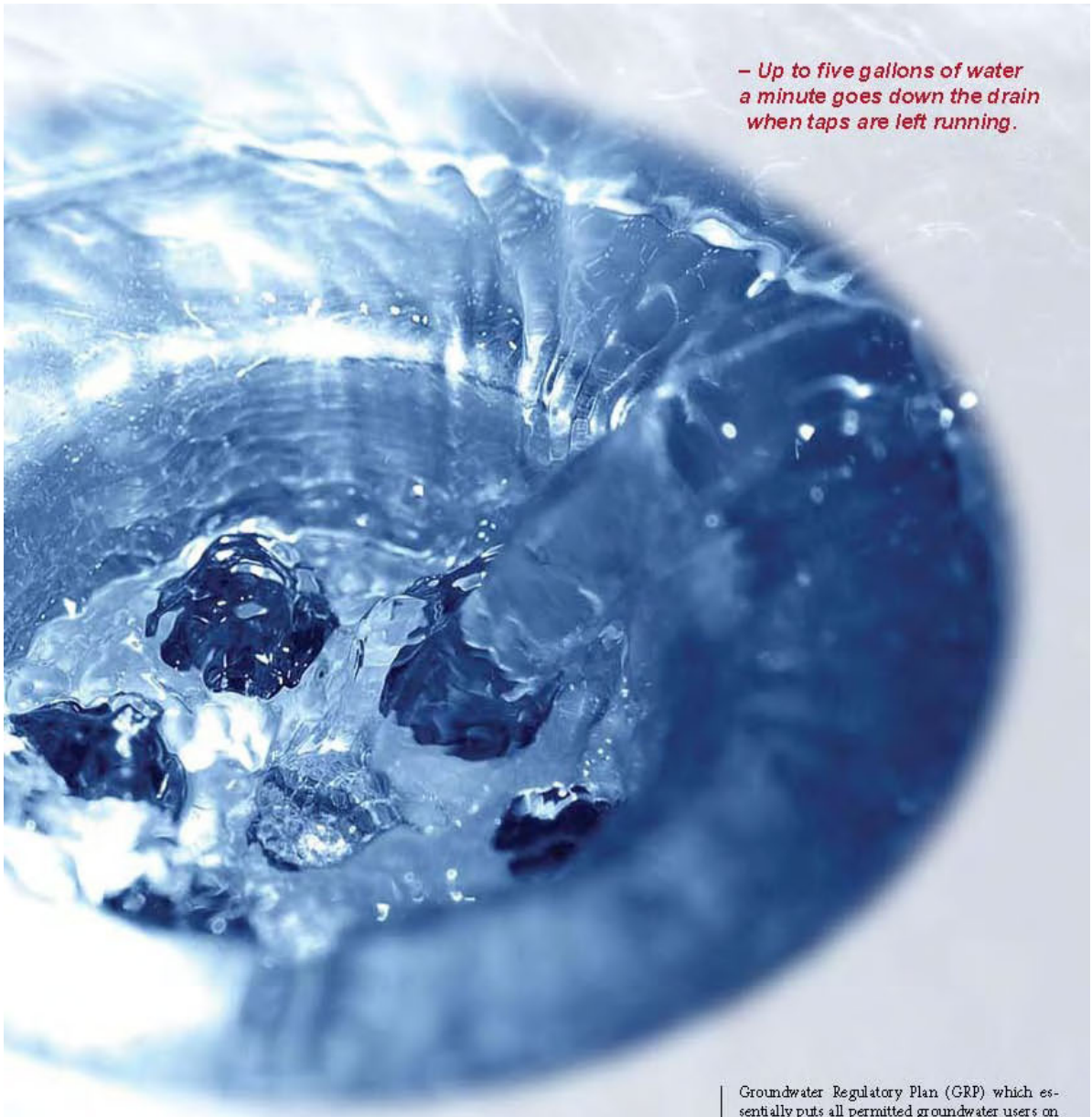
Challenge: The average washing machine uses about 41 gallons of water per load.

Solution: High-efficiency washing machines use less than 28 gallons of water per load. To achieve even greater savings, wash only full loads of laundry or use the appropriate load size selection on the washing machine.

➢ DON'T FLUSH YOUR MONEY DOWN THE DRAIN!

Challenge: If your toilet is from 1992 or earlier, you probably have an inefficient model that

June Dock Line Article



uses at least 3.5 gallons per flush.

Solution: New and improved high-efficiency models use less than 1.3 gallons per flush – that's at least 60 percent less than their older, less efficient counterparts. Compared to a 3.5 gallons per flush toilet, a water efficient toilet could save a family of four more than $90 annually on their water bill, and $2,000 over the lifetime of the toilet.

With a growing population, it is important for all Montgomery County residents to use our precious water resources as efficiently as possible. "We can no longer afford to use our water once and throw it away," said Kathy Turner Jones, General Manager of the Lone Star Groundwater Conservation District.

Montgomery County, which relies solely on underground aquifers for its water supply, is currently permitted to withdraw more water annually than can be recharged by the aquifer. The aquifer replenished about 64,000 acre feet a year through rainfall and runoff; currently, Montgomery County permit holders are authorized to produce 78,000 acre feet annually.

The District in December 2006 adopted a Groundwater Regulatory Plan (GRP) which essentially puts all permitted groundwater users on notice that they must reduce their groundwater usage to approximately 70 percent of their permitted amount by 2015 and is requiring "large volume groundwater users" to submit "Water Resources Assessment Plans" (WRAP) to the District by early 2009 on how they plan to meet that goal.

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Groundwater: Our Buried Treasurer

By: Kathy Turner Jones, General Manager

Getting a glass of water isn't as easy as turning on the tap!

Most of us are aware that our actions on land have an impact on surface water systems. We can read almost daily about pollution of our major rivers, lakes and oceans. Yet, however, of all the water we use in Texas, about 60 percent is groundwater; the other 40 percent is surface water.

Statewide, groundwater comes from some 32 Texas aquifers. According to the Texas Water Development Board (TWDB), nine aquifers supply about 97 percent of the groundwater we use.

Aquifer which is just a fancy name for spongy underground soil and rocks saturated with water. Unlike above ground surface water, underground water mostly can't be seen. These geological formations can store, transmit and yield water to a well or spring.

Not all Texas Aquifers are alike. These geologic structures are remarkably diverse in the amount of water they store, the amount of the water taken from them can be replenished, and the rate at which water moves through the aquifer.

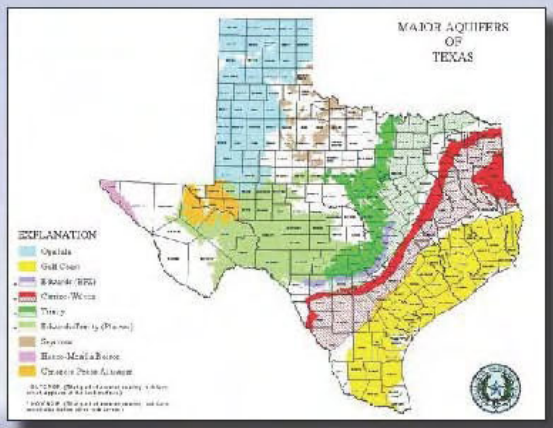
How does water get into an aquifer? How is an aquifer replenished? Generally, water percolates from the ground surface through an aquifer's recharge area. Surface water may come from rain of other precipitation. This water enters the aquifer by percolating down from the soil surface or through the permeable soil in the stream or river bed.

The rate at which an aquifer recharges varies greatly, depending on the size of soil and rocks that are on and under the ground surface. Recharge also depends on the amount of rainfall and other precipitation in and near the area.

Some may ask, "If aquifers recharge, why is there a problem with pumping?" It is fairly simple, if more water is being pumped than is being recharged, or if the water is being pumped faster than it is moving into the well area, you and your neighbor's wells can be affected by a lower water table or a decrease in well water levels. The consequences of overdrafting include progressively higher water costs, land subsidence, water quality degradation and possible water depletion. Overdrafting also affects springs and spring flows into natural areas.

With these facts in mind, it is important to understand our underground treasurer – "groundwater aquifers"; how and why groundwater aquifers exist, how they are affected by land surface activities, and how we can effectively use them.

Montgomery County, which relies solely on underground water from the Gulf Coast Aquifer for its water supply, is currently permitted to withdraw more water annually than can be recharged by the aquifer. The aquifer replenished about 64,000 acre feet a year through rainfall and runoff; currently, Montgomery County permit holders are authorized to produce 78,000 acre feet annually.



Threats to groundwater

Rising concerns are coming to the attention of local citizens and state government. These emerging issues include the potential for pharmaceuticals, pathogens and viruses to contaminate public or private wells. You name it – gasoline, fertilizer, paint thinner, antibiotics – if it's used or abused by humans and dissolves in water or soaks through soil, it may show up in our groundwater.

A new area of research examines the combined effects of many contaminants that can occur in an aquifer. For example: What are the health effects of drinking water with very low levels of both pesticides and nitrate.

Activities in urban areas that pose significant threats to groundwater quality include industrial and municipal waste disposal, road salting, and petroleum and hazardous material storage.

In rural areas, different threats to groundwater quality exist; animal waste, onsite sewage systems, fertilizers and pesticides are primary pollution sources.

Quality is quantity

It isn't just the amount of water that is at stake but the quality too. In some areas, the resulting drop in the groundwater level means water is now drawn from our deeper aquifers which may contain high concentrations of naturally occurring minerals – must be treated to protect the health of citizens. The cost of treatment is borne by the ratepayers.

We're beginning to realize that stewardship of groundwater has to be more than just keeping it clean. We have to conserve. The Texas Legislature first created in 1949 groundwater conservation districts to conserve and protect groundwater resources. Regional efforts requiring groundwater conservation districts to participate in joint planning processes with a primary goal to create desired future conditions for area aquifers is underway.

Open Water Wells pose threats to groundwater and public safety

Imagine your child, grandchild or favorite pet playing in a vacant field in the middle of a new subdivision. Located near the alleyway is a sheet of particle board. At first, it seems innocent enough – until you realize that the particle board is covering an open abandoned water well. Aside from the obvious safety issues, open wells can also provide a direct conduit from contaminants to enter groundwater stored in our aquifers.

Thousands of old wells that are no longer used, but still open at the soil surface threaten our groundwater. As continued growth and development occurs in Montgomery County and subdivisions reach further out into formally rural areas,

July Dock Line Article

the likelihood of finding open or abandoned irrigation and household wells increases.

Whenever you see an old windmill in the country, it's likely there's an unused well underneath. Licensed well drillers and pump installers are routinely hired to properly abandoned or fill old wells.

Examine your own habits

With a growing population, it is important for all Montgomery County residents to use our precious groundwater resources as efficiently as possible. Think about the ways you use water at home. If you've always considered pure, clean water to be a cheap, unlimited resource, chances are you're accustomed to wasting water and haven't been concerned about what you pour down the drain.

Common sense goes a long way toward keeping Montgomery County's groundwater clean and plentiful. Here are some ways to cut back on water use and protect groundwater:

Conservation is wise use

Use water-saving devices and appliances: Since 1992, new toilets manufactured in the U.S. use only 1.6 gallons of water – much less than the six gallons each flush used to consume. If you have an older toilet, toilet dams or inserts placed in the toilet tank retain water during flushing and can save up to three gallons per flush. A plastic bottle weighted with washed pebbles makes a good insert. Low-flow faucet aerators (for either inside- or outside-threaded faucets) mix water with air and can reduce the amount of water flowing from your sinks.

Look for and fix leaks: A dripping faucet can waste 20 or more gallons of water a day; a leaking toilet, several thousand gallons a year. An inexpensive washer is usually all you need to fix a leaky faucet. Adjusting or replacing the inexpensive float arm or plunger ball can often stop toilet leaks.

Drinking water: Keep a pitcher of drinking water in the refrigerator to quench your thirst without running the tap.

Bathing and showering: A water-saving showerhead can cut the amount of water used to about three gallons per minute without sacrificing the feeling of a good drenching. Turn off the water while soaping up during a shower to save extra gallons. New water saving shower heads come with a button to shut off the flow without changing the mix of hot and cold water. Bathers should put the stopper in the drain before running the water, then mix cold and hot for the right temperature. Turn off the tap while shaving or brushing your teeth.

Dish washing: If you wash dishes by hand, don't leave the water running while washing them. Make sure the dishwasher is full before you turn it on; it takes as much water and energy to wash a half-load as it does to wash a full load. And scrape dishes into a compost bucket rather than rinse before loading the dishwasher.

Laundry: Always set the fill level to match the size load you are washing. Remember: Full loads save water because fewer loads are neces-

Continued on page 54

sary. Front-loading washers use less detergent, electricity and water.

Lawn care: A rain barrel is a great way to save on water and it's not chlorinated, fluoridated or loaded with dissolved salt so it's better for your grass and plants. Consider reducing the size of your lawn by planting trees, shrubs and ground covers. Rain gardens are attractive, low maintenance, and they reduce runoff to lakes and streams.

Waste minimization

Household toxic wastes: Don't use household drains as ashtrays, wastebaskets or garbage disposals! Toilets (and kitchen sinks, garage drains and basement washtubs) are not places to discard varnish, paint stripper, fats, oil, antifreeze, leftover crabgrass killer or any other household chemicals. Just because it's down the drain doesn't mean it's gone! These products may end up in your water supply, especially if you have an onsite sewage system. Store your toxic products in tightly sealed containers in a safe, dry spot, share them with others who can use them, or bring them to safe disposal events in your community; call your County Extension office for details.

Lawns: Reduce or eliminate the use of lawn pesticides and fertilizers. A significant amount of these chemicals can leach into the groundwater. Test your soil first to determine if it needs additional nutrients. If you do fertilize, do it in the first week of May or after September 15.

Recycle! Reuse or recycle plastic bags and containers, aluminum cans, tin cans, glass, cardboard, newspaper, paper bags and other paper products. Don't dump waste oil down the drain or on the ground -- bring it to commu-

Conservation Tip

Consider drought resistant plant varieties in your landscape this spring and summer. Shown clockwise from far left are: Red Yucca, Purple Heart, Lambs Ears, and Red Hot Poker.

Water efficient landscapes do not have to be "concrete and cactus." Many drought resistant plant varieties have a reduced need for water and provide a beautiful accent to your landscape.

Consult your local landscape and garden center, Montgomery County Master Gardeners, or visit the SmartScape web site at www.txsmartscape.com

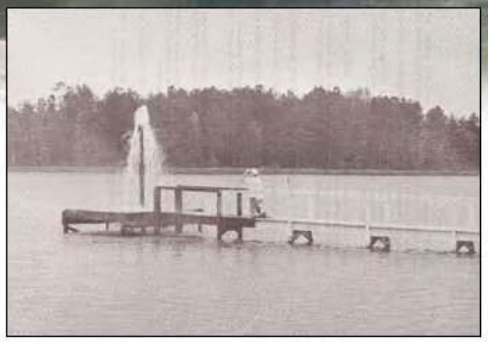
Cool, Clear Water . . . Texas Springs

By: Kathy Turner Jones, General Manager

Springs have played a major cultural, historical, ecological, and spiritual role in shaping Texas. Many Texans do not realize that many of our streams and rivers are fed by waters from springs, rather than directly from rainfall and subsequent surface runoff. In many instances, springs provide flows of better quality than would be found in other sources of surface water.

While today we may not realize the importance springs have played in our lives, we don't have to look very hard to find classic illustrations of the historically importance given to spring water.

Who doesn't remember the famous Coors beer commercial? Coors Brewery up until the 90's used to boast that its beer was brewed with pure Rocky Mountain spring water. Or, how about country western singer Marty Robbins' hit song, "Where the water's runnin' free and it's waitin' there for me and you? Cool, clear, water."



Largest Capacity Flowing Well in Montgomery County. (460 gallons per minute from end of casing 8 feet above land surface, August 19, 1966)

Historically springs were vital to the survival of Texas' earliest inhabitants. Early Americans always made their campgrounds near water, whether it was a spring, spring-fed stream, a river, or a lake. But one thing was certain, they preferred clear and pure water just as we do today.

In Montgomery County the principal source of groundwater is rainfall within the county and in adjoining area to the north – while the occurrence or evidence of groundwater in the County occurs under two conditions. Water table and artesian (spring).

Although images of springs and spring flow sometimes evoke mystery, the water flowing from a spring is actually part of the hydrologic cycle. Artesian springs happen where impermeable rocks overlie most of the aquifer, and thus confine the aquifer under pressure. A fracture in the confining layer allows the pressurized water in the aquifer to rise to the surface and flow somewhat like a fountain. These natural discharges from our underground aquifers to the surface as springs can manifest as either a visible outlet in the landscape or as one or more hidden openings along the sides or bottom of a water body.

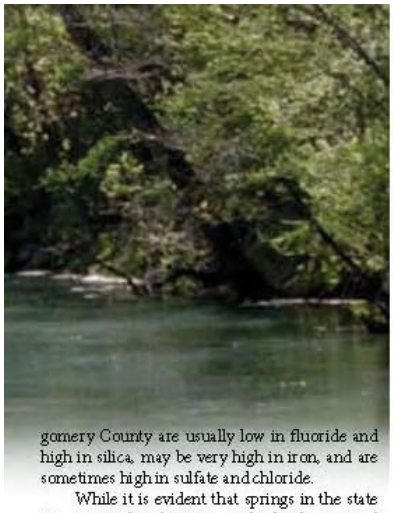
Water table conditions exist where the water is under atmospheric pressure only and the water table is free to rise or fall in response to changes in the volume of water stored.

The flow and quality of springs can vary greatly. Some springs have remarkably constant flow, while others fluctuate widely – flowing only after rains or during a certain season.

One of the distinguishing characteristics of springs is the more/less constant temperature of the water at the spring outlet. Whether hot or cold, water emerging from springs has a relatively consistent temperature because of its groundwater origin.

Because underground water dissolves minerals from the rocks through which it moves, its chemical quality generally reflects the nature of the rock materials and also the length of time the water has been contained in the rocks. Spring flows arising from the Gulf Coast Aquifer here in Mont-

August Dock Line Article



gomery County are usually low in fluoride and high in silica, may be very high in iron, and are sometimes high in sulfate and chloride.

While it is evident that springs in the state are as varied and unique as the landscape, and are an important resource for all Texans. Many of our springs are disappearing while the quality, integrity, and existence of many more are being threatened. Natural changes occur from shifts in climatic patterns, erosion, and faulting. Other changes can happen through urbanization, fragmentation of large farming/ranching areas, and excessive pumping of groundwater.

The certainty of decreasing springs can be attributed primarily to human activity, it is going to take action and the awareness of all Texans to make a difference. Through our efforts, we can protect one of our state's most fragile resources.

So, why did Coors Brewery drop the "pure" spring water from their well known slogan? It was in the 90's, after Coors set up shop in Virginia, Anheuser Busch and the ATF insisted they change the slogan. Coors labels and ads still refer to the Rockies and its water, but they don't mention "pure" or "spring". This came as no surprise at the time…any springs left in the Denver/Golden region have been contaminated beyond recovery.

For more information please contact the Lone Star Groundwater Conservation District (936.494.3436), or visit our website, www.lonestargcd.org.

Lower Your Water Use. Raise Your Water IQ. You can do it! Visit www.wateriq.org/tips.php for more water saving tips. ◆

At one time in Texas springs flowed all over the state. From the dense forests of East Texas, to the vast deserts of the Trans-Pecos in the west, springs meant the very essence of life. As humans adopted Texas as a home, springs were never far away. (Walter Cronkite)

Rainwater Collection Systems

By: Jim Bundscho

How many of us have seen rain barrels or concrete cisterns near houses that appear to be from a prior era? Can you remember your parents or grandparents dipping rainwater from a barrel to water the plants? Rainwater collection is coming back into use, and it's going hi-tech! What was old is now new again!

As the need for groundwater conservation increases and our limited municipal water supplies are stretched by increasing population growth, many of us are looking at rainwater collection more closely. In November 2006, the Texas Water Development Board along with The Texas Commission on Environmental Quality issued a report to the governor creating guidelines for rainwater harvesting, and even recommended that all new state buildings over 10,000 square feet consider rainwater systems in their design. Other recommendations included support for the incorporation of rainwater harvesting systems into the design and construction of new residential, commercial, and industrial facilities in the state. Certainly the interest is there, and we are being encouraged to make changes. The primary concern must be conservation, and using rainwater for the non-potable uses such as watering flower beds, flushing toilets, washing cars or washing clothes means that we are putting less strain on our private wells or public water supplies.

The United States is fortunate to have many large supplies of fresh water, in both underground aquifers and surface lakes and rivers. However, there are limits to these resources, and the costs associated with providing fresh water to our expanding population are growing. Can we rely on rainwater for all our needs? That is a question based on local conditions, and of course your personal needs and habits. Here in Texas we have many climate conditions ranging from the piney-wood "rainforests" of East Texas, to the "tropical" gulf coast, to near "desert" conditions of the west and panhandle regions. Our ability to design rainwater systems to match those varying conditions is certainly possible.

October Dock Line Article

Rainwater systems can be used for many purposes. Irrigation of landscape beds is probably the most common use, while other more sophisticated systems can incorporate toilet flushing, water for clothes washing, and even drinking water or "potable" water systems are possible with proper filtration and disinfection. The type of system someone installs may often be guided by access to public water, or the quality of the well water on their property. Depending on individual conditions, the cost of installing a whole house rainwater system could be comparable to the cost of drilling a well. In general however, if you have access to public water, or a reliable well, the rainwater system will be used as a backup water source, or a source of untreated water for non-potable uses.

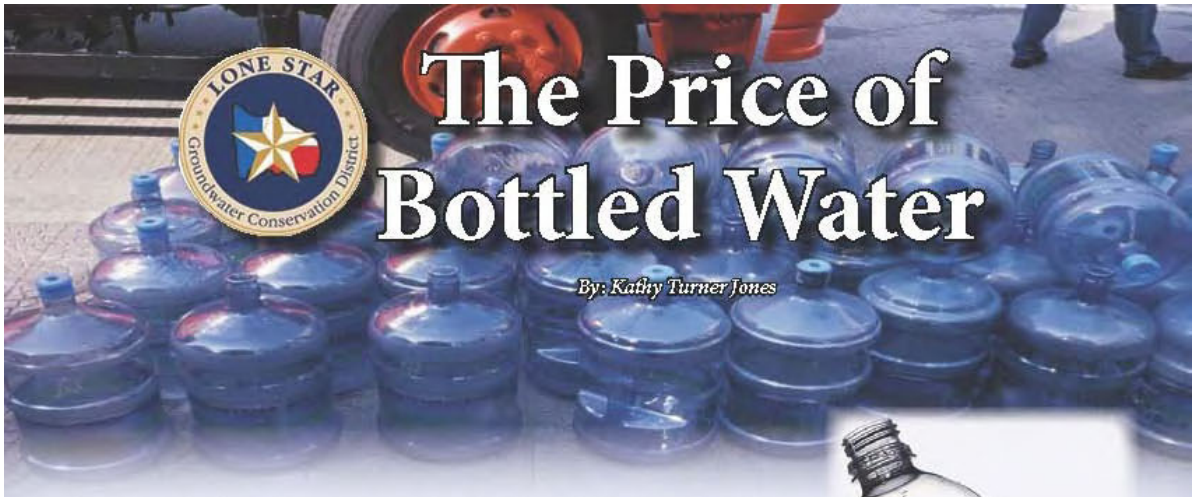
A basic rainwater collection system is composed of a collection surface such as a roof, gutter systems and collection pipes, a leaf screen or "first flush" filter, and a rainwater storage tank. The type of roof is important for the overall quality of the rainwater. Typically metal roofs are preferred because of the smooth non porous surface that is less likely to pick up debris and contaminants in the surface and seams. The rainwater storage tank can be above ground or below ground and may be made of many materials such as metal, plastic, fiberglass or concrete. Cost, capacity and location play an important part in deciding the type of storage tank you may use. The storage tank is plumbed to a distribution system from an outlet on the side of the tank, at or near the bottom. Through a series of shut off valves, pipe fittings and inline particle filter(s), and perhaps pressure pumps, the water is ready for distribution.

The distribution will vary depending on the type of system installed and whether it is gravity fed or pressurized. In a typical pressurized system, the pressure pump has an internal pressure switch which controls the operation of the pump. The pump will come on when the switch senses a drop in pressure and shuts off when the water flow stops and the high pressure set point is reached. This "constant on" mode allows an irrigation controller to cycle normally, or if the rainwater collection system is being used to provide water to a home, the "constant on" mode will act just as though a connection to a well or public water existed.

Rainwater collection systems do require maintenance. Valves need to be opened and closed, filters need to be cleaned, and a periodic check for leaks is important. Water quality is also very important, and understanding the ph and mineral content of the rainwater is something that should be tested to verify suitable usage. Potable water systems have a higher degree of maintenance, and testing for water quality and contamination is required.

Is rainwater harvesting for everyone? That is a personal choice, but certainly we can all use a rain barrel to water our house plants, and with a little more effort or expense, we can even take a little pressure off our public water systems. Remember, "Rethink, Reduce, Reuse, and Recycle" applies to water also.

For more information contact Jim Bundscho at 281-435-9634 or visit www.homesteadservices.org. You can also find information and other resources at http://rainwaterharvesting.tamu.edu/ ◆



The Price of Bottled Water

By: Kathy Turner Jones

Bottled water is the food phenomenon of our times. We--a generation raised on tap water and water fountains--drink a billion bottles of water a week, and we're raising a generation that views tap water with disdain and water fountains with suspicion. We've come to pay good money--two or three or four times the cost of gasoline--for a product we have always gotten, and can still get, for free, from taps in our homes.

Bottled water, which despite being past its peak, consumes roughly 17 million barrels of oil every year, not including transportation. The worst part of it is that that's not even half the problem.

In addition, to the 17 million barrels of oil used in production, and more importantly from a groundwater perspective, bottled water consumes gallons and gallons of water.

Three gallons of the wet stuff is required to produce one gallon of what you will happily pay a dollar for, largely because of the length and complexity of the various "purification" processes and the evaporation loss that takes place while the water is in the plant. This is quite an ugly statistic,

If the water we use at home cost what even cheap bottled water costs, our monthly water bills would run $9,000.

when we consider that less than one percent of the water on our planet is both accessible and potable.

Besides the extravagant amount of oil used to make the bottles and large volumes of water used in the bottling process, there are of course, several other considerations. Firstly, there are the transport costs - by the time you transport every bottle by rail or truck and keep it cool, you may as well have filled it one-fourth of the way with oil. Let's also not forget the operating costs of the factories themselves and the profit the bottled water companies have to make for their shareholders.

Beyond that, there is also an environmental impact from production. Many may or may not be aware that for every ton of plastic produced for the bottles produces 3 tons of carbon-adding 2.5 million tons of carbon dioxide emissions to the 17 million barrels of oil. That doesn't even begin to touch on the negative impact to our waste stream. Americans pitch into landfills 38 billion water bottles a year--in excess of $1 billion worth of plastic.

The largest bottled-water factory in North America is located on the outskirts of Hollis, Maine. In the back of the plant stretches the staging area for finished product: 24 million bottles of Poland Spring water. As far as the eye can see, there are double-stacked pallets packed with half-pint bottles, half-liters, liters, "Aquapods" for school lunches, and 2.5-gallon jugs for the refrigerator.

Looking at the piles of water, you can have only one thought: Americans sure are thirsty.

Bottled water has become the indispensable prop in our lives and our culture. It starts the day in lunch boxes; it goes to every meeting, lecture hall, and soccer match; it's in our cubicles at work; in the cup holder of the treadmill at the gym; and it's rattling around half-finished on the floor of every minivan in America.

Every hotel room offers bottled water for sale, alongside the increasingly ignored ice bucket and drinking glasses. At Whole Foods, the upscale emporium of the organic and exotic, bottled water is the number-one item by units sold.

Thirty years ago, bottled water barely existed as a business in the United States. Last year, we spent more on bottled water than we spent on iPods or movie tickets--$15 billion. It will be $16 billion this year.

Americans pitch into landfills 38 billion water bottles a year--in excess of $1 billion worth of plastic.

Americans spent more money last year on bottled water than on iPods or movie tickets

Continued on page 38

November Dock Line Article

When we buy a bottle of water, what we're often buying is the bottle itself, as much as the water. We're buying the convenience--a bottle at the 7-Eleven isn't the same product as tap water, any more than a cup of coffee at Starbucks is the same as a cup of coffee from the coffee maker on your kitchen counter. And we're buying the artful story the water companies tell us about the water: where it comes from, how healthy it is, what it says about us.

Bottled water is simply an indulgence, and despite the stories we tell ourselves, it is not a benign indulgence. We're moving 1 billion bottles of water around a week in ships, trains, and trucks in the United States alone. That's a weekly convoy equivalent to 37,800 18-wheelers delivering water. (Water weighs 8 1/3 pounds a gallon. It's so heavy you can't fill an 18-wheeler with bottled water--you have to leave empty space.)

Meanwhile, one out of six people in the world has no dependable, safe drinking water.

For more information please contact the Lone Star Groundwater Conservation District (936.494.3436), or visit our website, www.lonestargcd.org.

Lower Your Water Use. Raise Your Water IQ. You can do it! Visit www.waterIQ.org/tips.php for more water saving tips. ◆

If we pollute it, we can't drink it.

If we don't conserve it, we'll run out of it.

Because the truth is, we cannot make more water.

Deep Subjects – Water Wells and Groundwater

By: Kathy Turner Jones

When rain falls to the ground, the water does not stop moving. Some of it flows along the surface in streams or lakes, some of it is used by plants, some evaporates and returns to the atmosphere, and some seeps into the ground. Imagine pouring a glass of water onto a pile of sand. Where does the water go? The water moves into the spaces between the particles of the sand.

Groundwater is water that is found underground in the cracks and spaces in soil, sand, and rocks. The area where water fills these spaces is called the saturated zone. The top of this zone is called the water table... just remember the top of the water is the table. The water table may be only a foot below the ground's surface or it may be hundreds of feet down.

There's a good chance that the average Joe who had to dig a well in ancient Egypt probably did the work with his hands, a shovel, and a bucket. He would have kept digging until he reached the water table and water filled the bottom of the hole. Some wells are still dug by hand today, but more modern methods are available.

Wells are extremely important to all societies. In many places wells provide a reliable and ample supply of water for home uses, irrigation, and industries. Where surface water is scarce, such as in deserts, people couldn't survive and thrive without groundwater.

Today, more than 17 million households in the United States use individual domestic or household wells to supply water for their families. It takes a lot of energy to get water out of the ground and into cities, homes, and farms.

What is a Water Well?

Basically, a well is a hole drilled in the ground – by digging, driving, boring or drilling to access water in an underground aquifer. A pipe and a pump are used to pull water out of the ground, and a screen filters out unwanted particles that could clog the pipe. Wells come in different shapes and sizes, depending on the type of material the well is drilled into and how

December Dock Line Article

much water is being pumped out.

Most modern wells are drilled by truck-mounted percussion (cable-tool) or rotary (air or hydraulic) drill rigs. Dug wells are still constructed in some areas, either by power equipment or by hand, but most hand-dug wells are the "relics" of older homes and were dug before drilling equipment was readily available or because drilling was considered too expensive. Driven wells, installed by hand or with power equipment, are still common and widely used where geologic conditions permit. Jetted and bored (augered) wells are less common types.

Three Basic Types of Wells

- Bored or shallow wells are usually bored into an unconfined water source, generally found at depths of 100 feet or less.
- Consolidated or rock wells are drilled into a formation consisting entirely of a natural rock formation that contains no soil and does not collapse. Their average depth is about 250 feet.
- Unconsolidated or sand wells are drilled into a formation consisting of soil, sand, gravel or clay material that collapses upon itself.

Well Construction

All private or domestic well construction is based on establishing the right location for the well, sizing the system correctly and choosing the proper construction techniques. Only a professional water well installer or contractor should install wells. They are familiar with the hydrology in an area and all local and state codes and regulations. Proper well construction is essential to operating and maintaining a well.

A well is composed of many compo-

Continued on page 38 ⇨

nents; the following is a list of the most important materials used:

• Casing is used to maintain an open access in the earth while not allowing any entrance or leakage into the well from the surrounding formations. The most popular materials used for casing are black steel, galvanized steel, PVC pipe and concrete pipe.

• Grout is a sealant that is used to fill in the spaces around the outside of the well. It protects the well against the intrusion of contaminants. A grout mixture can be made of cement, bentonite, or concrete (each used separately).

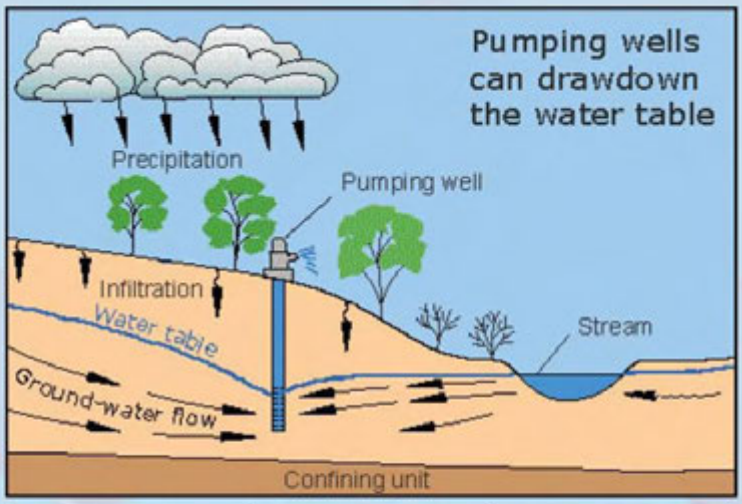
• Screen keeps sand and gravel out of the well while allowing groundwater and water from formations to enter into the well. Screen is available in many materials, the most popular being stainless steel and slotted PVC pipe. Screen is used when wells are drilled into unconsolidated materials.

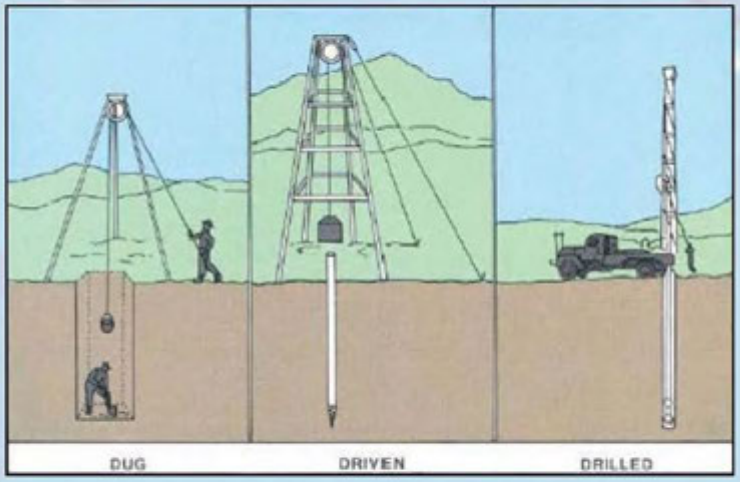
• Gravel pack is placed around the outside of the screen to prevent sand from entering the well or clogging the screen and to stabilize the well assembly.

Wells and Pumpage

Even though water is present at some depth at almost any location, the success of obtaining an adequate domestic supply (usually 5 gallons per minute) of water from a well depends upon the permeability of the rock. Where permeable materials are near land surface, a shallow well may be adequate. Elsewhere, such as where clayey material directly overlies bedrock, a deep well extending into bedrock may be needed.

Pumping a well lowers the water level around the well to form a cone of depression in the water table. If the cone of depression extends to other nearby wells, the water level in those wells will be lowered. The cone develops in both shallow water-table and deeper confined-aquifer systems. In the deeper confined-aquifer system, the cone of depression is indicated by a decline in the pressure and the cone spreads over a much larger area than in a water-table system. For a given rate of withdrawal, the cone of depression extends deeper in low-yielding aquifers than in high-yielding ones.





Cone of depression caused by pumping

Water-Level Declines

The old saying that you "never miss the water until the well runs dry" remains true; however, few drilled wells ever actually go dry.

Rather, what occurs most often is that the water table has dropped to near or below the pump intake because the pump intake is not set deep enough to allow for a potential decline in water levels. Alternatively, the small strainer that covers the end of the pump intake could be partly clogged so that it takes longer to pump the same amount of water. In either case, when the pumping rate exceeds inflow to the well, air is pumped and no more water is produced until the pump is shut off and the well recovers.

Shallow wells

The most common "dry well" problem has been with dug wells. Most dug wells are shallow and excavated in poorly permeable material; consequently they are readily affected by drought or by seasonal declines in the water table. The following figure shows the effect of declining water levels on two adjacent wells that are drilled to different depths on either side of a water-table pond. If the depth to water in the well on the left were, say, 10 feet during spring, it might decline to 15 feet during late summer or during a severe drought. If the pump normally causes the water level in the well to decline 5 feet or more during a pumping cycle, pumping during the drought would cause the water to decline to or below the pump intake. Excavating this well deeper to match the well on the right would solve this problem. Dug wells should be constructed during seasonal or climatically low-water-level periods.

Many dug wells extend only to the bedrock surface and tap the perched water (unconfined groundwater separated from an underlying main body of groundwater (aquifer) by an unsaturated (impermeable) zone) on top of the bedrock. These wells cannot be easily deepened. In such cases a new drilled well is the only long-term solution.

How does a well go dry?

Solving a drought-related water shortage by deepening the well.

Some drilled wells that tap shallow bedrock will yield only 1 or 2 gallons of water per minute. These wells are not deep enough to provide adequate storage of water for short-term pumping cycles. Such a well may contain only 50 feet of water above the pump intake. As an example, when the water table declines 10 feet because of drought conditions, only 40 feet of water is available in the well for one pumping cycle, and the well seems to "go dry." In that situation, deepening the well may solve the problem as long as the deeper water is of good quality. If usable water is not available at a greater depth, the

Continued on page 40 ⇨

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Appendix C:

Book Covers Distribution Lists for 2008

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The following school districts received book covers in 2008 as a joint effort between the Lone Star Groundwater Conservation District and the San Jacinto River Authority:

- Conroe ISD
- Montgomery ISD
- Magnolia ISD
- New Caney ISD
- Splendora ISD
- Willis ISD

Book Cover Artwork:

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Appendix D:

Article on Subsidence

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Land Subsidence From Ground-Water Pumping

S. A. Leake
U.S. Geological Survey

CAUSE OF LAND SUBSIDENCE FROM GROUND-WATER PUMPING

Land subsidence is the lowering of the land-surface elevation from changes that take place underground. Common causes of land subsidence from human activity are pumping water, oil, and gas from underground reservoirs; dissolution of limestone aquifers (sinkholes); collapse of underground mines; drainage of organic soils; and initial wetting of dry soils (hydrocompaction). Land subsidence occurs in nearly every state of the United States **(figure 1)**.

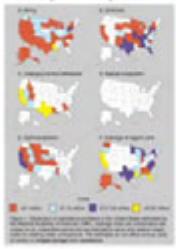

Figure 1. *Click on image to view full size.*

Overdrafting of aquifers is the major cause of subsidence in the southwestern United States, and as ground-water pumping increases, land subsidence also will increase. In many aquifers, ground water is pumped from pore spaces between grains of sand and gravel. If an aquifer has beds of clay or silt within or next to it **(figure 2)**, the lowered water pressure in the sand and gravel causes slow drainage of water from the clay and silt beds. The reduced water pressure is a loss of support for the clay and silt beds. Because these beds are compressible, they compact (become thinner), and the effects are seen as a lowering of the land surface. The lowering of land surface elevation from this process is permanent. For example, if lowered ground-water levels caused land subsidence, recharging the aquifer until ground water returned to the original levels would not result in an appreciable recovery of the land-surface elevation.

S.R. Anderson/U.S. Geological Survey

Sign warning motorists of subsidence hazard was erected after an earth fissure damaged Snyder Hill Road in Pima County, Arizona, 1981.

DAMAGE CAUSED BY LAND SUBSIDENCE

Land subsidence causes many problems including: (1) changes in elevation and slope of streams, canals, and drains; (2) damage to bridges, roads, railroads, storm drains, sanitary sewers, canals, and levees; (3) damage to private and public buildings; and (4) failure of well casings from forces generated by compaction of fine-grained materials in aquifer systems. In some coastal

areas, subsidence has resulted in tides moving into low-lying areas that were previously above high-tide levels. An example of damage caused by land subsidence can be seen in **figure 3**. The concrete base at the top of the well is above ground level because the land surface has lowered and the rigid well casing has not sunk.

Figure 2. *Click on Image to view full size.*

Figure 3. *Click on Image for full size with explanation.*

In many areas of the arid Southwest, earth fissures are associated with land subsidence. Earth fissures can be more than 100 feet deep and several hundred feet in length. One extraordinary fissure in central Arizona is 10 miles long. These features start out as narrow cracks, an inch or less in width. They intercept surface drainage and can erode to widths of tens of feet at the surface. Examples of earth cracks are shown in **figures 4, 5, 6, and** 7. Earth fissures are caused by horizontal movement of sediments that occurs when ground-water is pumped.

Figure 4. *Click for full size and explanation.*

Figure 5. *Click for full size and explanation.*

Figure 6. *Click for full size and explanation.* ***Figure 7.*** *Click for full size and explanation.*

AMOUNTS OF SUBSIDENCE IN SELECTED AREAS IN THE SOUTHWEST

After large-scale development of ground-water resources began in the Southwest after World War II, land subsidence has occurred in many areas. The following table lists approximate maximum subsidence amounts as of 1997 for selected locations in the Southwest:

Arizona		Nevada		California		Texas	
Eloy	15 feet	Las Vegas	6 feet	Lancaster	6 feet	El Paso	1 foot
West of Phoenix	18 feet	**New Mexico**		Southwest of Mendota	29 feet	Houston	9 feet
Tucson	<1 foot	Albuquerque	"<" 1 foot	Davis	4 feet		
		Mimbres Basin	2 feet	Santa Clara Valley	12 feet		
				Ventura	2 feet		

RELATION OF LAND SUBSIDENCE TO CLIMATE CHANGE AND POPULATION INCREASE IN THE SOUTHWEST

In areas where climate change results in less precipitation and reduced surface-water supplies, communities will pump more ground water. In the southern part of the United States from states on the Gulf Coast and westward including states of New Mexico, Colorado, Arizona, Utah, Nevada and California, major aquifers include compressible clay and silt that can compact when ground-water is pumped. Also, increased population in the Southwest will increase demands on ground-water supplies, causing more land subsidence in areas already subsiding and new

subsidence in areas where subsidence has not yet occurred. In the past, major subsidence areas have been in agricultural settings where ground-water has been pumped for irrigation. In the future, however, increasing population may result in subsidence problems in metropolitan areas where damage from subsidence will be great.

MONITORING LAND SUBSIDENCE

Several methods are available to monitor land subsidence. The most basic approaches use repeated surveys with conventional or GPS leveling. Another approach is to use permanent compaction recorders, or vertical extensometers **(figure 8)**. These devices use a pipe or a cable inside a well casing. The pipe inside the casing extends from land surface to some depth through compressible sediments. A table at land surface holds instruments that monitor change in distance between the top of the pipe and the table. If the inner pipe and casing go through the entire thickness of compressible sediments, then the device measures actual land subsidence. If both ground-water levels and compaction of sediments are measured, then the data can be analyzed to determine properties that can be used to predict future subsidence. About 19 of these installations are operated in Southern Arizona and additional stations are operated in California, Nevada, New Mexico, and Texas. Another subsidence monitoring method under development and testing uses Interferometric Synthetic Aperture Radar (INSAR). With this method, individual radar images from satellites are compared and interferograms are produced. Under the best conditions, land-surface elevation changes on the order of 1 inch or less can be determined.

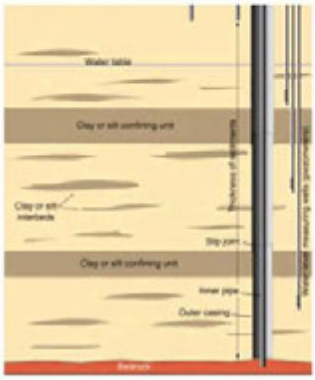

Figure 8. *Click on image for full size and explanation*

REDUCING FUTURE SUBSIDENCE

In some areas where ground-water pumping has caused subsidence, the subsidence has been stopped by switching from ground-water to surface-water supplies. If surface water is not available, then other means must be taken to reduce subsidence. Possible measures include reducing water use and determining locations for pumping and artificial recharge that will minimize subsidence. Optimization models coupled with ground-water flow models can be used to develop such strategies.

Appendix E:

Region H Regional Water Planning Group Attendance Sheets for 2008

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REGION H MEMBER ATTENDANCE February 6, 2008

PLEASE PRINT NAME

NAME	SIGNATURE	ALTERNATE	SIGNATURE
ROOSEVELT ALEXANDER			
JOHN BAKER			
JOHN R. BARTOS			
JOHN BLOUNT			
ROBERT BRUNER			
REED EICHELBERGER			
MARK EVANS			
JASON FLUHARTY			
JACK HARRIS			
BOB HEBERT			
JOHN HOWARD			
ROBERT ISTRE			
MARVIN MARCELL			
JAMES MORRISON			
JAMES MURRAY			
RONALD J. NEIGHBORS			
JIMMIE SCHINDEWOLF			
JEFF TAYLOR			
WILLIAM TEER			
STEVE TYLER			
MIKE UHL			
DANNY VANCE			
C. HAROLD WALLACE			
PUDGE WILLCOX			
WAYNE AHRENS			
DAVID ALDERS			
JENNIFER BAILEY			
RICK GANGLUFF			
LARRY JACOBS			
TEMPLE MCKINNON			
ROBERT STRODER			
WAYNE WILSON			
WOODY WOODROW			

Attendance Sheets from Region H Meeting held on February 6, 2008 (page 1)

REGION H REGIONAL WATER PLANNING GROUP

MEETING ATTENDANCE PUBLIC MEETING

February 6, 2008

NAME	AFFILIATION	ADDRESS	CITY	STATE	ZIP	TELEPHONE	FAX NO.
[illegible]	[illegible]	[illegible] Clinton Dr.	[illegible]	TX	[illegible]	713 [illegible]	[illegible]
[illegible]	[illegible]	[illegible]	Austin	TX	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	TX	[illegible]	[illegible]	
LLOYD BEHM	BGCD	PO Box 266	NAVASOTA	TX	77868	936 825-7303	
DAVE SCHULLER	BROWN & GAY						
Jim Wieczorek	TDA	5425 Polk	Houston	TX	77023	(713) 921-8200	(713) 921-8005
MATT TINDALL	LSGCD		CONROE	TX		936-494-3436	
BOB STOUT	Stout Gov. Rel.						

Page __ of __

Attendance Sheets from Region H Meeting held on February 6, 2008 (page 2)

PUBLIC OFFICIALS

REGION H REGIONAL WATER PLANNING GROUP
MEETING ATTENDANCE PUBLIC MEETING
February 6, 2008

NAME	AFFILIATION	ADDRESS	CITY	STATE	ZIP	TELEPHONE	FAX NO.
[illegible]	KBR	505 E. Huntland Dr. Ste 100	Austin	TX	78752	(512) 483-9377	
[illegible]	E.C.	"	"	"	"	"	"
[illegible]	TPWD	[illegible]	Dickinson		77539	281-534-0165	[illegible]
[illegible]	Houston [illegible] club	54 ? [illegible] 77096	Houston	Tx	77096	713 [illegible]	
Pris Weeks	HARC	4800 Research Forest	Woodlands			281 364 [illegible]	
[illegible] Chance Sr	MC WCID #1	PO Box 7690	The Woodlands	Texas	77387	281 367 [illegible]	
[illegible]	[illegible] Office	2018 N Loop 336 W	Conroe, TX		77304	936-756-[illegible]	
Mike Jackson	SJRA		Conroe, TX		77305		
Kay Willcox	Guest	Box 1014	Anahuac, TX		77514		

Attendance Sheets from Region H Meeting held on February 6, 2008 (page3)

REGION H MEMBER ATTENDANCE May 28, 2008

NAME	SIGNATURE	PLEASE PRINT NAME ALTERNATE	SIGNATURE
ROOSEVELT ALEXANDER			
JOHN BAKER			
JOHN R. BARTOS			
JOHN BLOUNT	✓		
ROBERT BRUNER			
REED EICHELBERGER	✓		
MARK EVANS			
JASON FLUHARTY	✓		
JACK HARRIS	✓		
BOB HEBERT	✓		
JOHN HOWARD			
ROBERT ISTRE			
MARVIN MARCELL		Tom M. Del	
JAMES MORRISON			
JAMES MURRAY		Glynn D. Leiper	
RONALD J. NEIGHBORS			
JIMMIE SCHINDEWOLF			
JEFF TAYLOR			
WILLIAM TEER			
STEVE TYLER			
MIKE UHL			
DANNY VANCE			
C. HAROLD WALLACE			
PUDGE WILLCOX			
WAYNE AHRENS			
DAVID ALDERS			
JENNIFER BAILEY			
RICK GANGLUFF			
LARRY JACOBS			
TEMPLE MCKINNON			
ROBERT STRODER			
WAYNE WILSON		Rebecca Hendry	

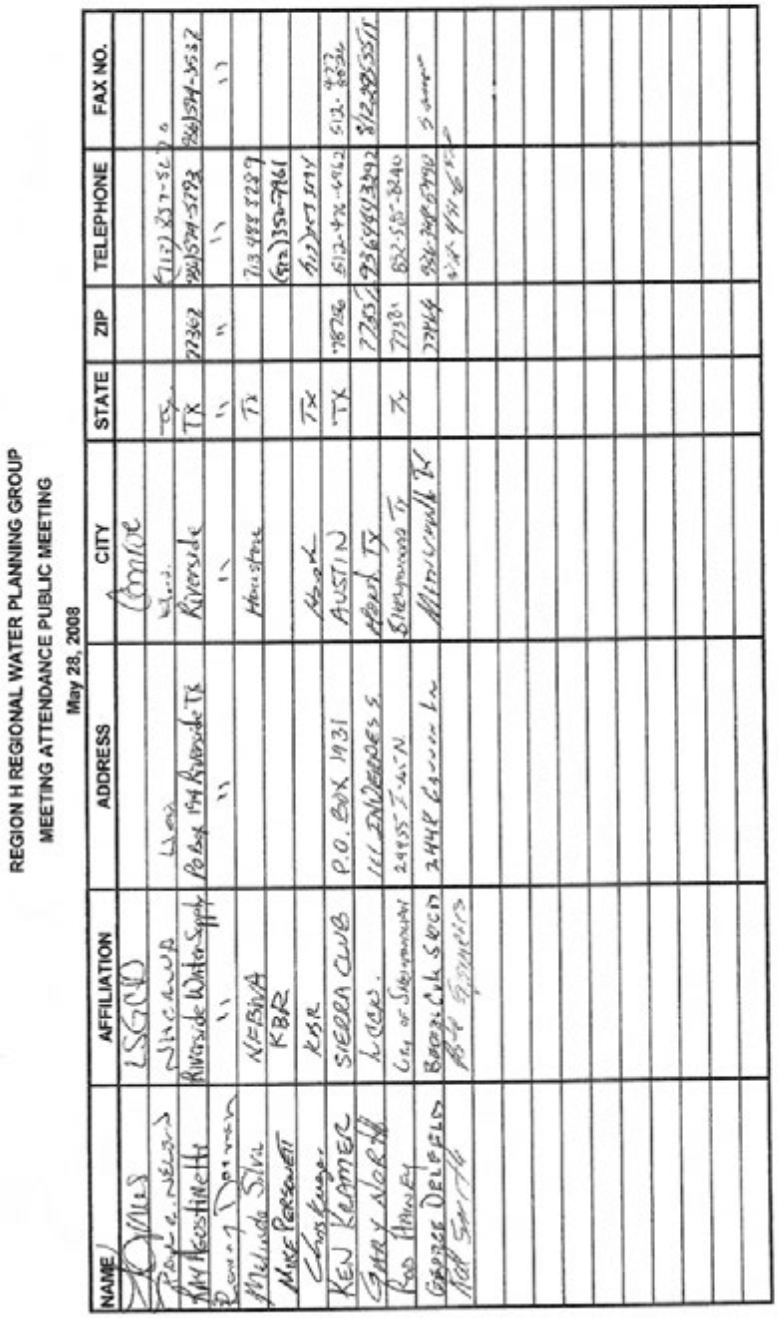
Attendance sheets form Region H meeting held on May 28,2008 (page 1)

REGION H MEMBER ATTENDANCE May 28, 2008

PLEASE PRINT NAME

NAME	SIGNATURE	ALTERNATE	SIGNATURE
ROOSEVELT ALEXANDER			
JOHN BAKER			
JOHN R. BARTOS			
JOHN BLOUNT			
ROBERT BRUNER			
REED EICHELBERGER			
MARK EVANS			
JASON FLUHARTY		Ted Long	
JACK HARRIS			
BOB HEBERT			
JOHN HOWARD			
ROBERT ISTRE			
MARVIN MARCELL			
JAMES MORRISON			
JAMES MURRAY			
RONALD J. NEIGHBORS			
JIMMIE SCHINDEWOLF			
JEFF TAYLOR			
WILLIAM TEER			
STEVE TYLER			
MIKE UHL			
DANNY VANCE			
C. HAROLD WALLACE			
PUDGE WILLCOX			
WAYNE AHRENS			
DAVID ALDERS			
JENNIFER BAILEY			
RICK GANGLUFF			
LARRY JACOBS			
TEMPLE MCKINNON			
ROBERT STRODER			
WAYNE WILSON			
WOODY WOODROW			

Attendance sheets form Region H meeting held on May 28,2008 (page 2)



REGION H REGIONAL WATER PLANNING GROUP
MEETING ATTENDANCE PUBLIC MEETING
May 28, 2008

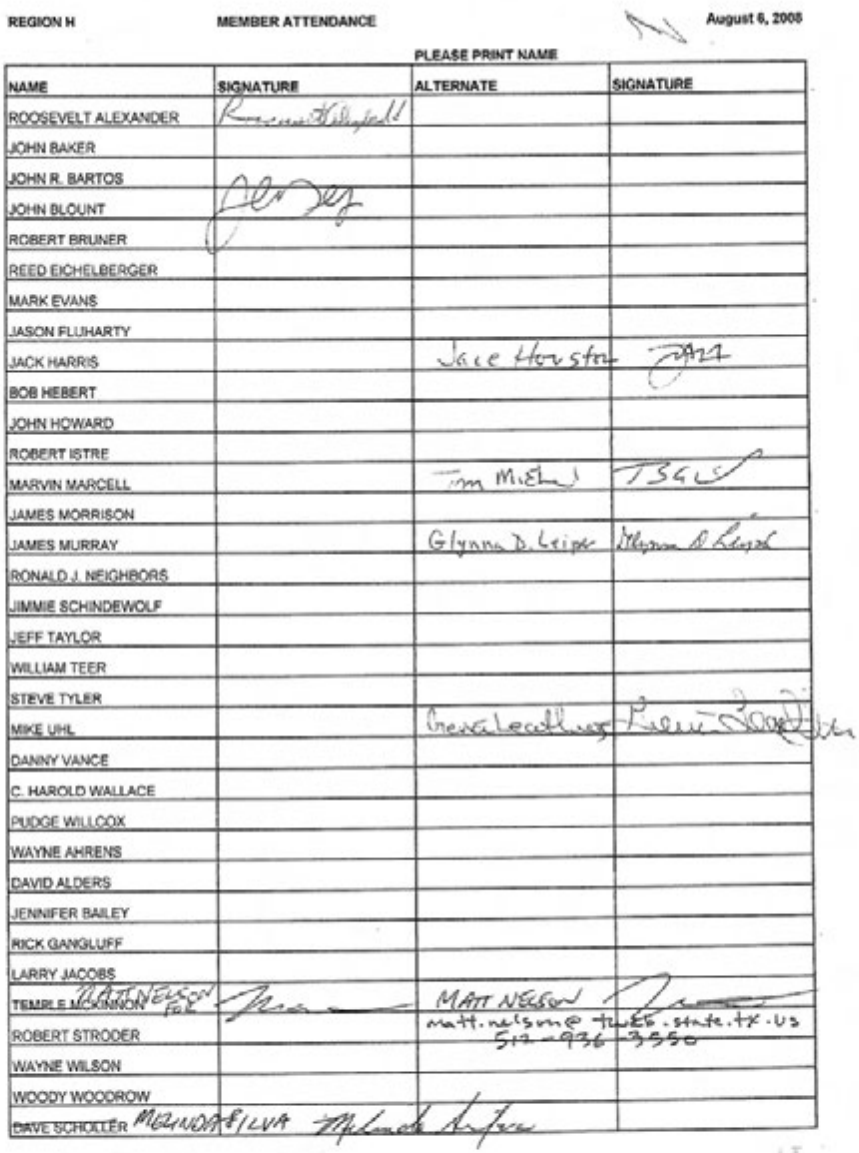
NAME	AFFILIATION	ADDRESS	CITY	STATE	ZIP	TELEPHONE	FAX NO.
[illegible]	LSGCD		Conroe				
[illegible]	SJRCWA	[illegible]	[illegible]	Tx		(713) 837-[illegible]	
Kay Agostinelli	Riverside Water Supply	Po Box 194 Riverside TX	Riverside	TX	77367	(936)594-5793	(936)594-3537
[illegible]	"	"	"	"	"	"	"
Melinda Silva	NEBWA		Houston	Tx		713 488 8289	
MIKE PERSONETT	KBR					(972)350-7961	
[illegible]	KBR		[illegible]	Tx		[illegible]	
KEN KRAMER	SIERRA CLUB	P.O. BOX 1931	AUSTIN	TX	78736	512-476-6962	512-[illegible]
GARY NORTH	[illegible]	111 INDEPENDENCE [illegible]	[illegible] Tx		77351	936[illegible]	[illegible]
ROD HANEY	City of [illegible]	24955 I-45 N.	[illegible] Tx	Tx	77381	832-585-8240	
GEORGE DEITFELD	[illegible]	2448 [illegible] Ln	[illegible] Tx		77464	936-[illegible]	Same
[illegible]	[illegible]					[illegible]	

Attendance sheets form Region H meeting held on May 28,2008 (page 3)

REGION H REGIONAL WATER PLANNING GROUP
MEETING ATTENDANCE PUBLIC MEETING
May 28, 2008

NAME	AFFILIATION	ADDRESS	CITY	STATE	ZIP	TELEPHONE	FAX NO.
Lucia Lee	CDM	3040 Post Oak Blvd	Houston	TX		713-423-7300	
Bob Smith	Kings Manor MUD	+ SEVERN TRENT	Kingwood	TX	77339	2) 646-2383	✓

Attendance sheets form Region H meeting held on May 28,2008 (page 4)



REGION H MEMBER ATTENDANCE August 6, 2008

NAME	SIGNATURE	PLEASE PRINT NAME ALTERNATE	SIGNATURE
ROOSEVELT ALEXANDER			
JOHN BAKER			
JOHN R. BARTOS			
JOHN BLOUNT			
ROBERT BRUNER			
REED EICHELBERGER			
MARK EVANS			
JASON FLUHARTY			
JACK HARRIS		Jace Houston	
BOB HEBERT			
JOHN HOWARD			
ROBERT ISTRE			
MARVIN MARCELL		Tim Mitchell	
JAMES MORRISON			
JAMES MURRAY		Glynna D. Leiper	
RONALD J. NEIGHBORS			
JIMMIE SCHINDEWOLF			
JEFF TAYLOR			
WILLIAM TEER			
STEVE TYLER			
MIKE UHL		Greta Leadbetter	
DANNY VANCE			
C. HAROLD WALLACE			
PUDGE WILLCOX			
WAYNE AHRENS			
DAVID ALDERS			
JENNIFER BAILEY			
RICK GANGLUFF			
LARRY JACOBS			
TEMPLE MCKINNON MATT NELSON FOR		MATT NELSON matt.nelson@tlee.state.tx.us 512-936-3550	
ROBERT STRODER			
WAYNE WILSON			
WOODY WOODROW			
DAVE SCHOLLER MELINDA SILVA			

Attendance sheets from Region H meeting held on August 6, 2008 (page 1)

REGION H MEMBER ATTENDANCE August 6, 2008

NAME	SIGNATURE	PLEASE PRINT NAME ALTERNATE	SIGNATURE
ROOSEVELT ALEXANDER			
JOHN BAKER			
JOHN R. BARTOS			
JOHN BLOUNT			
ROBERT BRUNER			
REED EICHELBERGER			
MARK EVANS			
JASON FLUHARTY			
JACK HARRIS			
BOB HEBERT			
JOHN HOWARD			
ROBERT ISTRE			
MARVIN MARCELL			
JAMES MORRISON			
JAMES MURRAY			
RONALD J. NEIGHBORS			
JIMMIE SCHINDEWOLF			
JEFF TAYLOR			
WILLIAM TEER			
STEVE TYLER			
MIKE UHL			
DANNY VANCE			
C. HAROLD WALLACE			
PUDGE WILLCOX			
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DAVID ALDERS			
JENNIFER BAILEY			
RICK GANGLUFF			
LARRY JACOBS			
TEMPLE MCKINNON			
ROBERT STRODER			
WAYNE WILSON			
WOODY WOODROW			
DAVE SCHOLLER			

Attendance sheets from Region H meeting held on August 6, 2008 (page 2)

PUBLIC OFFICIALS

REGION H REGIONAL WATER PLANNING GROUP
MEETING ATTENDANCE PUBLIC MEETING
August 6, 2008

NAME	AFFILIATION	ADDRESS	CITY	STATE	ZIP	TELEPHONE	FAX NO.
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Kim Wilcox			Anahuac	TX	77514		
Jim Sims	TRA					936/295-5485	
Don Davis	MUD 8						
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Karim El-Kheiashy	KBR	–	Houston	TX		713 753 3698	
Glenn Clingenpeel	TRA		Arlington	TX		817 493 5117	
Lloyd A. Behm	BGCD	PO Box 269	Navasota	TX	77868	936-825-7303	936-825-7331
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John [illegible]	LBG Guyton		Huntsville, TX			713-468 8600	
Kathy Jones	LSGCD	Box 2467	Conroe	TX			
Ken Kramer	Sierra Club	P.O. Box 1931	Austin	TX	78767	512-476-6482	512-477-8526
Beth Whitehead	CHP						

Attendance sheets from Region H meeting held on August 6, 2008 (page 3)

REGION H REGIONAL WATER PLANNING GROUP

MEETING ATTENDANCE PUBLIC MEETING

August 6, 2008

NAME	AFFILIATION	ADDRESS	CITY	STATE	ZIP	TELEPHONE	FAX NO.
Cathy Dominguez	BRA	4600 Cobbs	WACO	TX	76710	254 761 3176	254 761 3205
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David Harkhill	TCB	401 W 15th St Ste 500	Austin	TX	78701	512/[illegible]	
Roy McCoy	MUD FR	3023 [illegible]	Montgomery	TX	77356	281/731-9469	936/321-6001
DAVE SCHOLLER	BROWN & GAY						
GLENDA CALLAWAY	ERICTION	✓	✓	✓	✓	—	
Melinda Silva	Brown & Gay					713 488 8287	
Jackie Chance	WCWCID#1	PO Box 7690	The Woodlands	TX	77387	713 553 5906	281 298 1609
Art Henson	Madison County	101 W Main Ste 101	Madisonville	TX	77864	936 348 2670	936 348 2094
Lisa Lattu	COH	611 Walker	Houston	TX	77002	7.837.0521	? 〃
Jeremy Pryor	TNC	4702 Hwy 146 North	Texas City	TX	77590	409-941-9114	409-943-5056
Mike Jackson	SJRA						

Attendance sheets from Region H meeting held on August 6, 2008 (page 4)

REGION H MEMBER ATTENDANCE November 5, 2008

NAME	SIGNATURE	PLEASE PRINT NAME ALTERNATE	SIGNATURE
ROOSEVELT ALEXANDER			
JOHN BAKER			
JOHN R. BARTOS			
JOHN BLOUNT			
ROBERT BRUNER			
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MARK EVANS			
TED LONG			
JACK HARRIS			
BOB HEBERT			
JOHN HOWARD			
ROBERT ISTRE			
GLYNNA LEIPER			
MARVIN MARCELL			
JAMES MORRISON			
RONALD J. NEIGHBORS		Tom Michel	
JIMMIE SCHINDEWOLF			
JEFF TAYLOR			
WILLIAM TEER			
STEVE TYLER			
MIKE UHL			
DANNY VANCE		JIM SIMS	
C. HAROLD WALLACE			
PUDGE WILLCOX			
WAYNE AHRENS			
DAVID ALDERS			
JENNIFER BAILEY			
RICK GANGLUFF			
LARRY JACOBS			
TEMPLE MCKINNON			
ROBERT STRODER			
WAYNE WILSON			
WOODY WOODROW			
DAVE SCHOLLER			

Attendance sheets from Region H meeting held on November 5, 2008 (page 1)

REGION H MEMBER ATTENDANCE November 5, 2008

PLEASE PRINT NAME

NAME	SIGNATURE	ALTERNATE	SIGNATURE
ROOSEVELT ALEXANDER			
JOHN BAKER			
JOHN R. BARTOS			
JOHN BLOUNT			
ROBERT BRUNER			
REED EICHELBERGER			
MARK EVANS			
TED LONG			
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ROBERT STRODER			
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WOODY WOODROW			
DAVE SCHOLLER			

Attendance sheets from Region H meeting held on November 5, 2008 (page 2)

REGION H REGIONAL WATER PLANNING GROUP
MEETING ATTENDANCE PUBLIC MEETING
November 5, 2008

NAME	AFFILIATION	ADDRESS	CITY	STATE	ZIP	TELEPHONE	FAX NO.
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Ed Bettencourt III	DIAMONDHEAD WSC		[illegible]				
[illegible]	[illegible]						
Lisa [illegible]							
[illegible]	CDM						
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Scott Jones	GBF	17330 Highway 3	Webster				
KENT BURKETT	BCGCD	BRAZORIA COUNTY					
[illegible]	USGS	Shenandoah, TX					

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Attendance sheets from Region H meeting held on November 5, 2008 (page 3)

REGION H REGIONAL WATER PLANNING GROUP
MEETING ATTENDANCE PUBLIC MEETING
November 5, 2008

NAME	AFFILIATION	ADDRESS	CITY	STATE	ZIP	TELEPHONE	FAX NO.
Brenda Callaway	Ekistics Corp	✓	✓	✓	✓	✓	✓
Chris Kr[illegible]	KBR	✓	–				
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DAVE SCHOLLER							
Melinda Silva	NFBWA / BGE						
Dan Davis	MUD 8		Montgomery			448-1900	
MIKE PERSONETT	KBR					512-350-7961	
Greg Lackey	HGSD						
Jeff Taylor	Freese & Nichols					713-600-6831	
Kay Wildox						207-5896	
Mike O'Connell	SWWC	12535 Reed Rd	Sugar Land	Tx	77478	281-[illegible]	
John D'Antoni	[illegible]	3100 Wilcrest St 290	Houston	TX	77042	713 460 3744	
Barbara Payne	STRA						
David Bradley	KBR	1100 Clinton	Houston	Tx	77305	713-859-9650	
Anne Dryfiet	Ecologic	4901 Welford	Bellaire	TX	77401	713-432-7253	
Wayne Ahrens	Dannenbaum					713-527-6378	
John Hofmann	BRA	4600 Cobbs Dr	Waco			254 761-3102	

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Attendance sheets from Region H meeting held on November 5, 2008 (page 4)

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Appendix F:
2008 Drought Situation Reports

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DROUGHT PREPAREDNESS COUNCIL

RICK PERRY
Governor

5805 N. Lamar Blvd.
P.O. Box 4087
Austin, Texas 78773-0220
Phone: (512) 424-2138
Fax: (512) 424-2444

JACK COLLEY
Council Chairman

June 12, 2008

TO: The Honorable Rick Perry, Governor, State of Texas
The Honorable David Dewhurst, Lieutenant Governor, State of Texas
Mr. Phil Wilson, Secretary of State, State of Texas
The Honorable Mario Gallegos, Jr., President Pro Tempore of the Senate, State of Texas
The Honorable Tom Craddick, Speaker of the House, State of Texas,
The Honorable Steve Ogden, Chairman, Senate Finance Committee, State of Texas
The Honorable Kip Averitt, Chairman, Senate Natural Resources Committee, State of Texas
The Honorable John Carona, Chairman, Senate Committee on Transportation & Homeland Security, State of Texas
The Honorable Warren Chisum, Chairman, House Appropriations Committee, State of Texas
The Honorable Mike Hamilton, Vice-Chairman, House Natural Resources Committee, State of Texas
The Honorable Sid Miller, Chairman, House Agriculture & Livestock Committee, State of Texas
The Honorable Aaron Peña, Chairman, House Criminal Jurisprudence Committee, State of Texas
Mr. Brian Newby, Chief of Staff, Office of the Governor
Mr. Steven McCraw, Director, Texas Governor's Office of Homeland Security

FROM: Chief Jack Colley, Chairman, Drought Preparedness Council

SUBJECT: Statewide Drought Situation Report

1. Next Council Meeting

July 10, 2008, 2:00 p.m., Governor's Conference Room of the Governor's Division of Emergency Management State Operations Center, Texas Department of Public Safety Headquarters, 5805 N. Lamar Blvd., Austin, Texas.

2. General Conditions

The month of May produced below-normal precipitation for the State of Texas, and the first ten days of June have been dry as well. As a result, almost the entire state is abnormally dry, and many parts of the state are in or are approaching serious drought conditions.

Areas with particularly severe precipitation deficits include the extreme northwest corner of the state, the area from Midland to Del Rio, areas east of San Antonio, and parts of Deep South Texas. Drought conditions encompass this entire area, from Houston to El Paso as well as the northwest Panhandle. Except for a few isolated areas, most of the rest of the State is in the midst of abnormal dry weather.

An absence of normal precipitation is especially problematic during this time of year. May and early June is climatologically the wettest period of the year through most of the State. For this reason, it is difficult to recover from below-normal precipitation in May with above-normal precipitation during other periods of the year. Furthermore, with the onset of the hot temperatures of summertime, demands on water usage are approaching their peak. This leaves much of the State extremely vulnerable to additional periods of low rainfall.

Long-range forecasts during this time of year have little utility. In this instance, the Climate Prediction Center (CPC) is predicting neither above normal nor below normal conditions for either temperature or precipitation for the State of Texas as a whole.

3. Overall Statewide Drought Conditions

The Trans-Pecos climatic region is experiencing "Moderate Drought" conditions, according to the Palmer Drought Severity Index (PDSI). The remainder of the State varies from "Near Normal" to "Moderately Wet" conditions. The PDSI varies from extremely wet, very wet, moderately wet, slightly wet, incipient wet spell, near normal, incipient dry spell, mild drought, moderate drought, severe drought, and extreme drought in order of increasing severity.

The Crop Moisture Index (CMI) indicates the Trans-Pecos region is experiencing "Abnormally Dry" conditions and the High Plains and Southern regions are under "Mildly Dry" conditions. The remainder of the State is experiencing "Moisture Adequate" conditions. The CMI varies from flooding, standing water, fields too wet, moisture adequate, mildly dry, abnormally dry, excessively dry, severely dry, and extremely dry in order of increasing severity.

The Six-Month Standardized Precipitation Index (SPI) indicates that, as of the end of April, the Southern and Lower Valley regions are experiencing "Extremely Dry" conditions and the High Plains region is under "Severely Dry" conditions. The Low Rolling Plains, Trans-Pecos, Edwards Plateau, North Central, and South Central regions are experiencing "Moderately Dry" conditions. The remainder of the State is under "Near Normal" conditions. The SPI varies in categories of extremely dry, severely dry, moderately dry, near normal, moderately wet, very wet, and extremely wet conditions.

The Keetch-Byram Drought Index (KBDI) indicates significant areas with high fire danger in the High Plains, Trans-Pecos, Edwards Plateau and in South Texas areas. The KBDI is a drought index specifically used to describe potential or expected fire behavior. The index is classified as Low, Moderate, High, or Extreme fire danger, in order of increasing severity.

Texas Forest Service reports outdoor burning bans in 105 counties, covering the western half of the State.

The Texas Commission on Environmental Quality (TCEQ) shows ten water supply systems are under mandatory water use restrictions. Another eight community water supply systems are under voluntary water use restrictions.

The CPC predicts below normal precipitation for the southern third of Texas and above normal temperatures for the western Trans-Pecos area from May 2008 to July 2008. From June 2008 to August 2008, the CPC predicts equal chances of below normal, normal, or above normal precipitation and temperatures for all of the State.

National Oceanic and Atmospheric Administration (NOAA) Seasonal U.S. Drought Outlook, through July 2008, indicates developing and persisting drought conditions in the High Plains, Trans-Pecos, the southern portion of the Edwards Plateau, Southern, and the Lower Valley regions. Drought conditions are expected to improve in the northern and eastern portions of the Edwards Plateau during the same period.

Water level measurements were available for all seven key monitoring wells. Since the beginning of April, water levels rose in only one of the seven monitoring wells; the Harris County Gulf Coast well rose 0.48 feet (ft). Water levels declined in the remaining six monitoring wells, ranging from 0.09 ft in the El Paso County Hueco Bolson well to 3.16 ft in the Bexar County Edwards well. The J-17 well, in Bexar County, recorded a water level of 51.06 ft below land surface, 3.16 ft below last month's measurement. This water level is 29.94 ft above the Stage 1 critical management level.

4. Water Utility Status

May 2008, began with 23 public water systems asking customers to be aware of outside water usage. Of those, 10 are asking customers to follow a mandatory watering restriction based on address and day of the week, and eight are asking for voluntary reductions in water usage. So far in 2008, five public water systems relaxed all restrictions and are operating normally. Recent rains have slowed down outside water usage in some areas of the state. However, West Texas, the Panhandle, and South Texas still need significant amounts of rainfall.

5. Water Rights – Statewide

New temporary water use permit applications are reviewed on a site-specific basis and issued if sufficient surplus water at the requested source exists. Applications for new water use permits and amendments to existing permits remained normal for the month. No curtailment of pumping was required for those permits in the Brazos River Basin containing Hale Clause restrictions, and Lake Proctor restrictions were not necessary for the month. Owners of water rights with these restrictions are reminded to call the "Hale Clause Hotline" on a weekly basis to determine if diversion of water is allowed for the following week. The availability of unappropriated water for new water use permits continues to decrease in all river basins in the State, and the search for long-term, dependable alternate sources of water remains a high priority issue.

6. Water Rights – Lower Rio Grande / Rio Grande Watermaster (RGWM)

Current Overall Conditions: As of May 24, 2008, the U.S. combined ownership at Amistad/Falcon stands at 90.37% of conservation capacity (3,065,295) acre-feet (AF), up from 77.34% (2,572,383 AF) a year ago at this time. Overall the system is holding 56.31% (3,335,261 AF) of conservation capacity with Amistad at 69.88% (2,289,445 AF) and Falcon at 39.51% (1,045,816 AF). Mexico has 10.67% (269,966 AF) of the water it could store at Amistad/Falcon.

Allocations: As of the printing of the April ownership report, in excess of 164,040 acre-feet for irrigation and mining was allocated. An amount in excess of 372,000 acre-feet remains for future allocations in 2008.

Storage & Loss Amistad vs. Falcon: Current storage is approximately 2.19 million acre-feet at Amistad (119%) occupying 352,659 acre-feet of Mexico's space at Amistad (which is not an issue so long as Amistad is below conservation capacity). We are currently storing approximately 1.00 million acre-feet at Falcon (56.2%).

The YTD evaporation and seepage losses at Amistad are 179,383 acre-feet. For the same period, Falcon has lost 156,655 acre-feet. The ratio of loss between Amistad and Falcon remains constant at 1:2 with Amistad twice as efficient in overall storage and loss as compared to total amount in storage.

Releases to Meet Demands: In 2008, Mexico released 539,695 acre-feet from Amistad and 806,735 acre-feet from Falcon for their needs. The U.S. released 340,457 acre-feet from Amistad and 652,501 acre-feet from Falcon for U.S. needs. Combined with gains between Amistad and Falcon, US inflows to Falcon have totaled 389,230 acre-feet. So far, the lower Rio Grande Valley has met 60% of overall needs in the middle and lower Rio Grande directly from middle Rio Grande inflows and Amistad this year. The movement of water from Amistad is primarily driven by U.S. excess amount in storage and the need to keep it below conservation capacity, particularly when the U.S. is occupying Mexico's space in Amistad.

Upper Rio Grande (New Mexico): Elephant Butte in New Mexico is currently storing 616,138 (30.45%) acre-feet and Caballo Dam in New Mexico, downstream of Elephant Butte, is storing 46,210 (20.36%) acre-feet. This water storage in part is used to meet water needs in the El Paso area.

Outlook: Most all accounts began 2008 with 100% usable balances. As we enter peak irrigation season, a dry weather pattern persists in the Region which increases irrigation demand. Strong and dry winds from the south contributed to the dryness. Strong winds are forecast to continue through the middle of June. Coupled with continued drought conditions, irrigation demand will continue to increase through June and July perhaps driving our total to approximately 70% by the end of 2008. Of further concern is the low ownership of Mexico in the reservoirs since it could result in increased evaporation and seepage loss charges for the U.S. To help alleviate losses in Falcon, the U.S. will continue to monitor ownership and elevations levels in both Falcon and Amistad to ensure efficient transfers of water from Amistad to Falcon.

7. South Texas Watermaster – Guadalupe / Lavaca / San Antonio / Nueces Region

Area Counties: Bandera, Blanco, Comal, Kendall and Kerr Counties

The month of May reflects deteriorating drought conditions throughout most of South Texas. The scattered rainfall has not been enough to ease drying soil conditions. Stream flows continue a steady decline in most areas. Temporary permits have been restricted or curtailed throughout South Texas. Some junior water rights have reached their mandated restrictions, which has made it necessary to stop the temporary diversions.

The City of Kerrville on the Upper Guadalupe River will remain closely monitored because of their very junior water right. Flows in the Texas Hill Country have dropped very quickly over the last few weeks and restrictions and curtailments may be forthcoming very soon, unless some badly need showers occur.

Rainfall and Area Conditions: The area received various amounts of precipitation, ranging from 2.0 to 2.5 inches for the month of May. With the current amount of rainfall for May the Texas Crop Moisture Index for this area of the hill country is classified in the **ADEQUATE** to **ABNORMALLY DRY** range of the index. Most of the surface water diversions in this area are for municipal and industrial uses with a few surface water irrigators starting to ready irrigation equipment. The U.S. Drought Monitor indicates that this area is currently in **SEVERE** to **MODERATELY DRY** conditions at this time.

Stream flow Conditions: Very few of the stream flows of the major streams and tributaries continue to carry near normal flows, with most of the major streams still showing a steady decline in the month of May. Most of the smaller secondary tributaries lost surface flow. The Guadalupe River near Kerrville has a current stream flow of approximately 37 CFS, with the historical monthly mean being 145 CFS. This equates to 108 CFS below the monthly mean for the month of May flowing past Kerrville. The Guadalupe River near Comfort has a current stream flow of approximately 55 CFS, with the historical monthly mean being 281 CFS. This equates to 226 CFS below the monthly mean for May flowing past Comfort, Texas. The Medina River near Bandera has a current stream flow of 20 CFS, with the historical monthly mean being 217 CFS. This equates to 197 CFS below the monthly mean of May flowing past Bandera.

Drought Restrictions: As of May 29, 2008, all temporary surface water permits were suspended. Because of the low stream flows, some state permit holders already hit their flow restrictions and are curtailed from pumping. Therefore, the river flows are heavily monitored on a daily basis.

Area Counties: Bee, Goliad, Victoria, Calhoun, Jackson, Refugio, Aransas, San Patricio, Nueces, Kleberg, Jim Wells, Duval, Live Oak, Kenedy, Willacy, Brooks, and Jim Hogg.

Rainfall and Area Conditions: This area received little rainfall during the month of May. The Coastal Bend area received 1 – 2 inches of rain through out the month that provided some localized runoff to increase stream flows for a short period of time. The U. S. Drought Monitor indicates most of the South Texas Watermaster area is currently experiencing **MODERATE** to **SEVERE** drought conditions, at this time. Only the extreme southwestern segment of the South Texas Watermaster area has extended to **EXCEPTIONAL** drought conditions. The Corpus Christi Reservoir System received some inflows from run-off of localized scattered showers in the area, but the level of reservoir system continued to drop slightly. Most of the surface water diversions in this area continue to be for municipal and industrial uses; little irrigational use is noted.

Stream flow Conditions: Stream flows of area streams continue to decrease, and are flowing well below average for this time of year. According to the USGS Stream Flow Gage at the Guadalupe River near Victoria, stream flows were approximately 1,100 CFS (Cubic Feet per Second) at the beginning of the month, and were approximately 600 CFS towards the end of the month, compared to 1,000 CFS last month. The historical mean at this site during this time (based on 73 yrs. of record) is 2,300 CFS. The gage at the San Antonio River near Goliad indicated stream flows were approximately 700 CFS at the beginning of the month, and ended the month at approximately 300 CFS, compared to 900 CFS last month. The historical mean at this site during this time (based on 73 yrs. of record) is 1,090 CFS. The gage at the San Antonio River at McFaddin, which is below Goliad, indicated the stream flows were approximately 650 CFS at the beginning of the month, and ended at approximately 400 CFS, compared to last month at 725 CFS. The historical mean at this site during this time (based on 2 years of record) is 492 CFS. The gage at the Guadalupe River near Tivoli (below the confluence of the San Antonio and Guadalupe Rivers) indicated stream flows of approximately 1,700 CFS at the beginning of the month, and ended the month at approximately 1,000 CFS,

compared to 1,670 CFS last month. The historical mean at this site during this time (based on 2 yrs of record) is 1,680 CFS. The gage at the Mission River near Refugio, indicated stream flows were approximately 13 CFS at the beginning of the month and ended the month at approximately 10 CFS, compared to 13 CFS last month. The historical mean at this site (based on 68 yrs. of record) is 99 CFS. The USGS Stream Flow Gage of the Nueces River at Calallen Dam, indicated 50 CFS of stream flows over the dam, near Corpus Christi at the beginning of the month, but indicated approximately 1.5 CFS of stream flows towards the end of the month, compared to 36 CFS last month. The historical mean at this site during this time (based on 8 yrs. of record) is 261 CFS. The gage at the Aransas River near Skidmore, indicated stream flows were approximately 6.0 CFS at the beginning of the month, and ended the month at approximately 5.1 CFS, compared to 5.7 CFS last month. The historical mean at this site during this time (based on 44 yrs. of record) is 14 CFS.

Corpus Christi Reservoir System: The Corpus Christi Reservoir System received little inflow for the month of May. Therefore, the level of the reservoir system continued to decrease. The Corpus Christi Reservoir System is currently at 92.5% of capacity (880,897 AF) compared to 79.5% of capacity (744,544 AF) during this same time last year. The level of Choke Canyon is currently at 93.6% of capacity (650,950 AF) compared to 79.0% of capacity (549,197 AF) during this same time last year. The level of Lake Corpus Christi is currently at 89.4% of capacity (229,947 AF) compared to 81.0% of capacity (195,347 AF) last year. The City of Corpus Christi continues to divert much of their monthly water supply needs from Lake Texana.

Drought Restrictions: Currently, there are no drought restrictions (stream flow restrictions) that have been activated in this area.

Area Counties: Atascosa, Karnes, Gonzales, Wilson, McMullen, Dewitt, Guadalupe, Lavaca, Fayette, Colorado, Wharton, and Jackson.

Rainfall and Area Conditions: This area received 0.0 to 4.0 inches of rainfall for the month of May. Rainfall occurred in isolated areas within the south and south western portions of the area. The middle and eastern portions of the area received no rainfall in the month of May. Soil moisture conditions are basically poor in this area. Corn, milo and hay crops are beginning to wilt and show signs of drought damage. Irrigational activity increased due to the dry conditions.

Lake Texana is at 88% of capacity (last month ending at 94% of capacity) which is 41.77 ft. above MSL.

According to the U.S. Drought Monitoring System, the entire area is experiencing **MODERATE** to **SEVERE** drought conditions, at this time.

Stream flow Conditions: Currently, the flow of the San Antonio River near Falls City, is 117 CFS, the historical mean flow for May is 290 CFS, ending for last month at 300 CFS. The Cibolo Creek near Falls City, is flowing at 30 CFS, the ending for last month was 38 CFS, with the historical mean flow for May at 36 CFS. The Guadalupe River near Gonzales, is flowing at 754 CFS, the ending reading for last month was 860 CFS, with the historical mean flow for May at 946 CFS. The Lavaca River at Edna, is flowing at 21 CFS, the ending reading for last month was 42 CFS, with the historical mean flow for May at 111 CFS. The Navidad River near Halletsville is currently flowing at 1.6 CFS, the ending reading for last month was 7.4 CFS, and the historical mean flow for May is 41 CFS. The Atascosa River near Whitsett, is flowing at 1.1 CFS, the ending reading for last month was 9.5 CFS, with the historical mean flow for May being 12 CFS. The Frio River near Tilden is flowing at 12 CFS, the ending reading for last month was 23 CFS, and the historical mean flow for May is 43 CFS. Lastly, the Nueces River

near Tilden is currently flowing at 18 CFS, the ending reading for last month was 8.8 CFS, and the historical mean for May is 80 CFS.

Drought Restrictions: Currently, all temporary permit diversions are suspended in the San Antonio River Basin area.

Area Counties: Edwards, Real, Kinney, Uvalde, Zavala, Dimmit, La Salle and Webb.

Rainfall and Area Conditions: The Southwest Texas area did receive some relief from the drought conditions during May. Small rain showers were reported for the beginning of the month with heavier rain showers reported throughout the middle of month for the northern and southern counties. The range of rainfall in the area was from 0.15 to 5.00 inches for the month. Most diversions of surface water were for irrigational use and small amounts for municipal and industrial uses. Crops being irrigated in the area are: milo, onions, corn, hay grazers, and pecans. The U.S. Drought Report indicates this area is experiencing **MODERATE** to **SEVERE** drought conditions, at this time. Drought restrictions are applied to the Southwest area at this time for temporary permits.

Stream flow Conditions: Stream flows for the major tributaries in this area continue to flow below the mean for this time of year. The Nueces River at Laguna has stream flows of 60 CFS, compared to 78 CFS, for last month, with the historical mean being 327 CFS. The Nueces River near Brackettville has stream flows of .06 CFS, compared to .17 CFS, for last month, with the historical mean being 5.2 CFS. The Nueces River below Uvalde has stream flows of 36 CFS, compared to 47 CFS, for last month, with the historical mean being 293 CFS. The Frio River at Concan has stream flows of 38 CFS, compared to 52 CFS, for last month, with the historical mean being 248 CFS. The Sabinal River at Sabinal has stream flows of .74 CFS, compared to 2.8 CFS, for last month, with the historical mean being 198 CFS. The Leona River near Uvalde has stream flows of 23 CFS, compared to 34 CFS, for last month, with the historical mean being 35 CFS.

Stream flows of the intermittent and tributary streams in the area are flowing below average, for this time of the year.

Drought Restrictions: Currently, drought restrictions are in place for temporary permits, and permits with stream flow restrictions are monitored.

Area Counties: Bastrop, Bexar, Blanco, Caldwell, Comal, Fayette, Frio, Guadalupe, Hays, and Medina.

Rainfall and Area Conditions: Below average monthly rainfall fell across the San Antonio Regional Area for the month of May. Month to date rainfall measured at the San Antonio International Airport was 1.36 inches, the average for May is 4.72 inches. Total annual rainfall to date is 3.88 inches; normal year to date is 12.16 inches resulting in a deficit of 8.28 inches.

The U. S. Drought Monitor, dated May 20, 2008, indicates the San Antonio Regional Area is experiencing **ABNORMALLY DRY** conditions in the eastern half of the regional area, and **MODERATE** conditions in the western half of the regional area, impacting crops, pastures and grasslands. Ground moisture improved for those isolated areas impacted by scattered thunderstorms; otherwise, ground moisture continues to remain poor due to the continuing drying trend. Good harvest of hay grazers, yellow squash, white squash, zucchini, cucumbers, tomatoes, white onions, and garlic were reported with supplemental irrigation. Most "dry land" crops are either lost to the ensuing drought or dramatically stunted due to the lack of rainfall.

Stream Flow Conditions: The Guadalupe and Blanco Rivers are now showing the impact of the current drought. Small creeks are now dried up and most major streams are beginning to quickly pool or dry up entirely. Municipal use has increased because of residential lawn planting, fertilizing, and supplemental watering. Industrial use remains constant.

All major tributaries in the San Antonio Regional Area are now beginning to drop below their historical monthly averages for May. The Guadalupe River at Spring Branch is currently 58 CFS; the historical mean flow for May is 503 CFS. The San Marcos River at Luling is flowing at 115 CFS; the historical mean flow for May is 529 CFS. The Blanco River at Wimberley is not flowing; the historical mean flow for May is 212 CFS.

As of May 28, 2008, Canyon Lake Reservoir is 907.97 feet elevation, and is impounding 369,051 AF, and is 97.5% of capacity. The Edwards Aquifer level at the J-17 well in Bexar County, May 27, 2008, is 671.4 feet (the historical average for May is 666.4 feet) which is 5.0 feet above the monthly historical average. The San Marcos Springs, May 26, 2008, are flowing at 134.0 CFS; the historical monthly average for May is 183.0 CFS. This is 49.0 CFS below the monthly historical average. Lastly, the Comal Springs, May 26, 2008, are flowing at 338.0 CFS (the monthly historical flow for May is 298.0 CFS) which is 40.0 CFS above the historical monthly average.

Drought Restrictions: Temporary Permits are now being regulated, as well as permits with stream flow restrictions.

Area Counties: Sterling, Tom Green, Irion, Concho, Coke, Glasscock, Runnels, Reagan, and Schleicher.

Rainfall and Area Conditions: Rainfall for the Concho River Valley did not meet the forecast expectations for May. According to information provided by the USDA, the State Drought Monitor Index, the Concho Valley remained in **Abnormally Dry** drought conditions in the West, and **Normal** conditions in the east.

Rainfall in San Angelo for the month was 2.20 inches. Areas to the east of San Angelo received more rainfall. The average rainfall amount for the month of May is 3.23 inches. Total rainfall for the year is 8.37 inches. In 2007, to date, there was 13.67 inches of rain. Average annual rainfall, based on a 100-year record, is 19 inches. Area reservoirs are showing continued decreases in the amounts of storage from the previous month's amounts. Irrigational demand by appropriated surface water rights in the Concho Valley is at normal volume. The Texas Crop Moisture Index shows soil moisture content is **Abnormally Dry**. Winter wheat is being harvested; corn and sorghum have been planted and are established. Currently, cotton is being planted.

Stream Flow Conditions: Mean daily discharge statistics based on 5 years of record for USGS Gaging Station 08130700 (Spring Creek above Twin Buttes Reservoir near San Angelo) are 1.20 CFS. The most recent value is 8.4 CFS. Mean daily discharge statistics at USGS Gaging Station 08136000 (Concho River at San Angelo/Bell St.) based on 76 years of record, is 10.0 CFS. Currently, it is at 4.8 CFS. Mean daily discharge statistics at USGS Gaging Station 08128000 (South Concho at Christoval, Texas) based on 72 years of record, is 15.5 CFS. The most recent daily value is 8.7 CFS. Area lakes indicate Lake Nasworthy is 83% of capacity (8,493 AF) O. C. Fisher is 8% of capacity (8,975 AF) and Twin Buttes Lake is 42% of capacity (83,021 AF).

Drought Restrictions: There are no restrictions on diversions at this time in the Concho Valley.

8. Upper Colorado

The upper Colorado River area received below normal precipitation during the month of May 2008. The National Weather Service in San Angelo reported monthly precipitation of 1.01 inches, 2.08 inches below normal. The annual total to date is 6.96 inches, 0.72 inches below normal. Diminished flows were the norm for most tributaries in the upper Colorado watershed during most of May. Most tributaries of the Upper Colorado River watershed including the San Saba River and upper reaches of the Llano River are flowing at levels below the long-term medians as reported by USGS. The pool levels of EV Spence and OH Ivie Reservoir decreased during the month. The pool levels of EV Spence and OH Ivie Reservoirs were 13% and 66%, respectively.

9. Texas Panhandle and Southern High Plains

Amarillo Area: Lake Meredith is at 47.33 feet, down from 48.23 feet at the beginning of May. Lake Greenbelt is at 57.92 feet, down from 58.61 feet at the beginning of May. Lake Mackenzie is at 74.52 feet, down from 75 feet at the beginning of May.

The National Weather Service in Amarillo reported a total of 2.08 inches of rainfall for the month of May, 2008, 0.32 inches below average. A total of 6.04 inches was recorded since January 1, 2008, 2.45 inches below average for the year.

Lubbock Area: The Lubbock area had above normal precipitation during May 2008. Lubbock received 5.32 inches for the month (average May is 2.13 inches), and similar amounts were recorded throughout the Region 2 area. Total precipitation for 2008 now stands at 7.28 inches, which is 1.89 inches above normal for this point in the year. The long term drought situation has not changed, and all of the communities previously noted as being on mandatory water restrictions remain on those restrictions. No new communities were added to the water restrictions list during the month of May. As Lake Meredith continues to decline, the City of Lubbock is making preparations to construct a pipeline from Lake Alan Henry to the City of Lubbock (65 miles uphill) to use as an additional source of water. The City of Lubbock owns the water rights at this lake.

Region 2 area lake levels show the following:

White River Lake: This lake is down 28 feet from normal (normal is 46 feet at the dam). This is one foot higher than the level that existed at the end of April 2008. The White River Water Supply District has only 4 feet of water left that can be pulled from the Lake for the Public Water Supply. White River WSD has groundwater wells on standby to supply water to customers in the event the lake level drops below usable levels.

Lake Alan Henry: Almost full (2 feet below the spillway). This lake is not used for public drinking water supplies at present, but will be utilized for this purpose in the near future.

10. Agricultural Concerns

Wheat harvest is under way, with about 40% of the crop harvested. Reports from the Gulf Coast, Central and North Texas indicate above average yields, while reports from the Plains indicate that drought has severely damaged much of the crop. Dry weather during the fall and winter resulted in poor stands while the dry spring has done little to improve conditions. Late planted wheat is in better condition than wheat planted on normal planting dates. Many fields in Southwest Texas, the Edwards Plateau, Rolling Plains and High Plains will be abandoned,

although some areas benefited from localized rains and are harvesting good crops. Statewide, wheat condition is at 48% of normal compared to 82% of normal at this time in 2007.

Drought continues to be a major issue for agricultural producers along the Gulf Coast, South and Southwest Texas and the Rio Grande Valley. While most of the corn crop in the Plains and in North Texas is in good condition, much of the crop in South Texas, the Gulf Coast and Central Texas is either lost due to drought or severely stressed with high potential for aflatoxin, which can destroy corn for feed and food value. Much of the cotton and sorghum crop in the region is also in poor to very poor shape or has been zeroed out by insurance adjusters. Some sesame and other catch crops were planted in late May on the coast and South Texas after the loss of cotton following rain. Pasture conditions continue to decline and ranchers are feeding supplemental feed in this region.

Although scattered rains brought up to three inches in some areas of the South Plains, conditions are mostly poor for the newly planted cotton crop. Unseasonably hot temperatures and high winds have dried out seedbeds and damaged cotton stands either from blow outs or from sand injury. These conditions quickly deplete moisture for planting, leaving dry land producers few options.

Southwest Texas received some beneficial moisture in May, but it was too late for most dry land or limited irrigation producers. Crop and forage losses are widespread. Supplemental feeding of livestock is common.

11. Drought Impacts to Wildlife

No information available at this time.

12. Wildfire Concerns

The Keetch-Byram Drought Index (KBDI) is used to help determine potential for fire risk. It is a numerical index where each number is an estimate of the amount of precipitation (in 100ths of an inch) needed to bring the soil back to saturation. The index ranges from 0 to 800, with 0 representing a saturated soil, and 800 a completely dry soil. The KBDI's relationship to fire danger is that as the index increases, the vegetation is subjected to increased moisture stress. KBDI levels and its relationship to expected fire potential are reflected in the following:

KBDI = 0 – 200: Soil moisture and large class fuel moistures are high and do not contribute much to fire intensity. This is typical of spring dormant season following winter precipitation.

KBDI = 201 – 400: Typical of late spring; early growing season. Lower litter and duff layers are drying and beginning to contribute to fire intensity.

KBDI = 401 – 600: Typical of late summer, early fall. Lower litter and duff layers contribute to fire intensity and will burn actively.

KBDI = 601 – 800: Often associated with more severe drought and increased wildfire occurrence. Intense, deep-burning fires with significant downwind spotting can be expected. Live fuels can also be expected to burn actively at these levels.

There are currently 138 counties, illustrated in Attachment 2, with KBDI values in excess of 400, indicating areas within these counties are beginning to experience dry conditions, which could result in an increased fire risk potential.

The Council, which is chaired by Jack Colley, Chief, Governor's Division of Emergency Management, is composed of state agencies concerned with the effects of drought and fire on the citizens of the State of Texas. The attached information was compiled and provided by representatives listed below. Points of contact, telephone numbers, and web site addresses are also provided.

Jack Colley, Chief, Governor's Division of Emergency Management, (512) 424-2443, fax (512) 424-2444, web site: http://www.txdps.state.tx.us/dem

John Sutton, Texas Water Development Board, (512) 463-7988, fax (512) 463-9893, web site: http://www.twdb.state.tx.us

Chris Loft, Texas Commission on Environmental Quality, (512) 239-4715, fax (512) 239-4770, web site: http://www.tceq.state.tx.us

Richard Egg, Texas State Soil & Water Conservation Board, (254) 773-2250, fax (254) 773-3311, web site: http://www.tsswcb.state.tx.us

Lance Williams, Texas Department of Agriculture, (512) 463-3285, fax (800) 835-2981, web site: http://agr.state.tx.us

Dr. Travis Miller, Texas AgriLife Extension Service, (979) 845-4808, fax (979) 845-0456, web site: http://texasextension.tamu.edu

Cindy Loeffler, Texas Parks & Wildlife Department, (512) 912-7015, fax (512) 707-1358, web site: http://www.tpwd.state.tx.us

Edward T. Morris, Department of Housing and Community Affairs, (512) 475-3329, Fax (512) 475-7498, web site: http://www.tdhca.state.tx.us

Michael Dunivan, Texas Forest Service, (830) 997-5426, web site: http://txforestservice.tamu.edu

Scott Alley, Texas Department of Transportation, (512) 416-3187, fax (512) 416-2941, web site: http://www.dot.state.tx.us/

Paul Tabor, Texas Department of State Health Services, (512) 458-7126, fax (512) 458- 7472, web site: http://www.dshs.state.tx.us/

Thomas Walker, Office of the Governor, Economic Development & Tourism, (512) 936-0169, fax (512) 936-0141, web site: http://www.governor.state.tx.us/divisions/ecodev

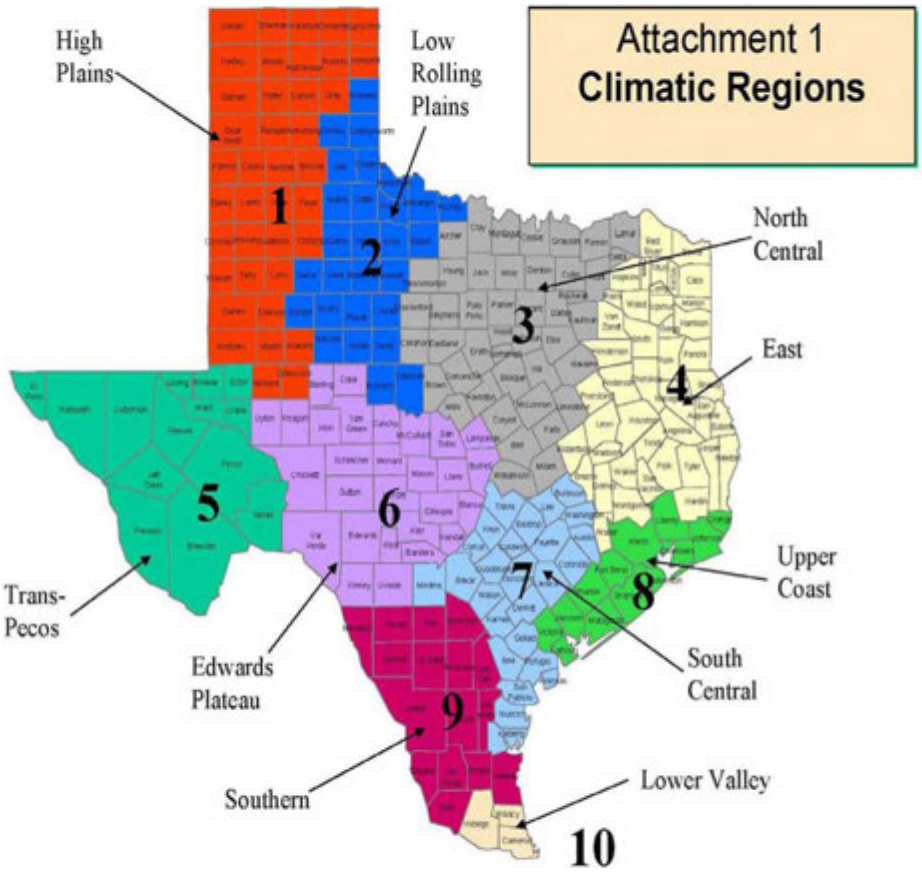
Harvey Everheart, Texas Alliance of Groundwater Districts, (806) 872-9205, fax (806) 872-2838, web site: http://www.texasgroundwater.org/

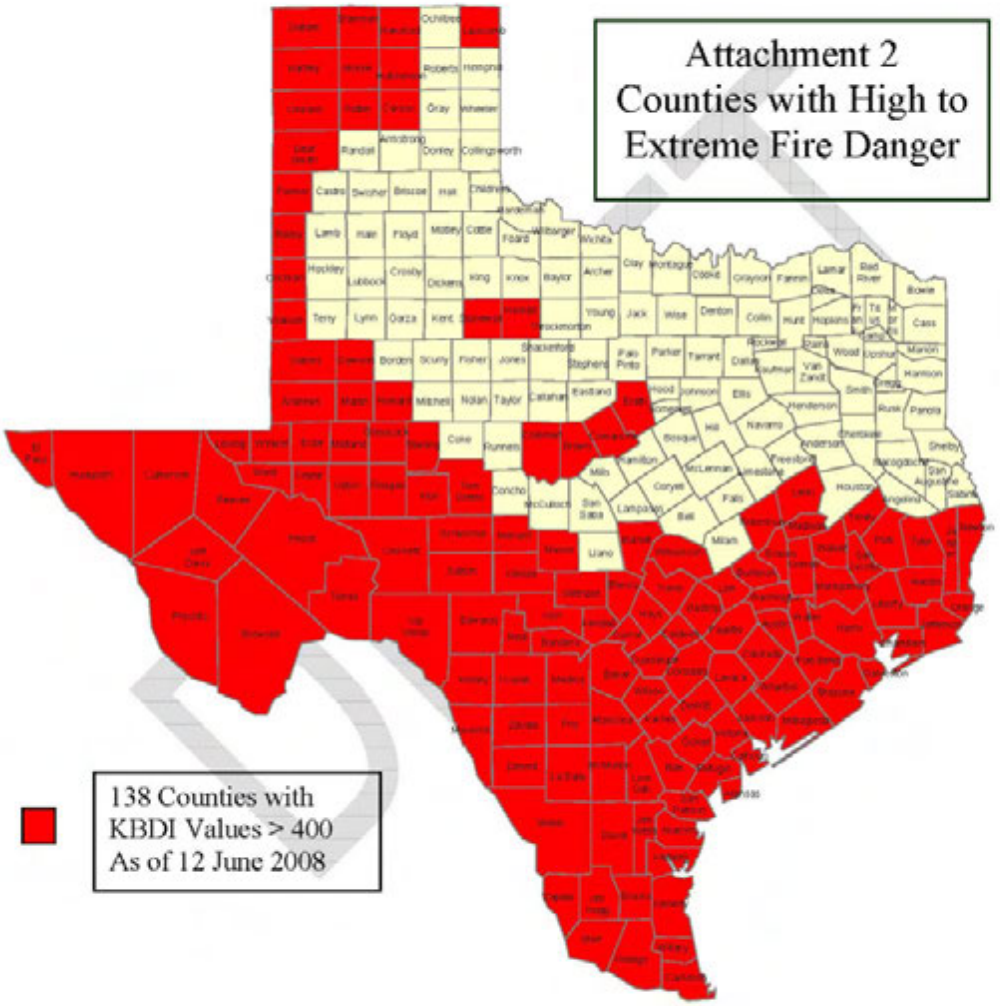
Dr. John W. Nielsen-Gammon, Office of the State Climatologist, (979) 862-2248, fax (979) 862-4466, web site: http://www.met.tamu.edu/osc/

Gus Garcia, Office of Rural Community Affairs, (512) 936-7876, fax (512) 936-6776, web site: http://www.orca.state.tx.us

cc:

Amy Jeter, Committee Clerk, Senate Finance Committee
Sarah Hicks, Committee Director, Senate Finance Committee
Teddy Carter, Committee Clerk, Senate Natural Resources Committee
Amy Peterson, Committee Director, House Appropriations
Hope Wells, Committee Clerk, House Natural Resources Committee
Steven Schar, Committee Clerk, House Agriculture and Livestock Committee
Gina Chung, Committee Clerk, House Criminal Jurisprudence Committee
Zak Covar, Policy Advisor for TCEQ Issues, Governor's Policy Office
Auburn Mitchell, Policy Advisor for Agriculture/TDA, Governor's Policy Office
Rob Johnson, Lt. Governor's Chief of Staff
Carmen Cernosek, Lt. Governor's Natural Resources Policy Analyst
Shane Linkous, Deputy Division Chief, Intergovernmental Relations, Attorney General's Office
Ernest Angelo, Jr., Chairman, Public Safety Commission
Louis E. Sturns, Member, Public Safety Commission
Colonel Thomas Davis, Director, Department of Public Safety
Lieutenant Colonel David McEathron, Assistant Director, Department of Public Safety
Lori Gabbert., Budget Analyst, Legislative Budget Board (LBB-DPS)
Tom Lambert, Budget Analyst, Legislative Budget Board (LBB-TCEQ)
Ed Perez, Executive Director, Texas Office of State-Federal Relations, Washington, DC
Brandon Steinmann, Director, Texas Office of State-Federal Relations, Austin, Texas


Attachment 1
Climatic Regions
High Plains
Low Rolling Plains
North Central
East
Upper Coast
South Central
Lower Valley
Southern
Edwards Plateau
Trans-Pecos
1
2
3
4
5
6
7
8
9
10


Attachment 2
Counties with High to Extreme Fire Danger
138 Counties with
KBDI Values > 400
As of 12 June 2008

DROUGHT PREPAREDNESS COUNCIL

RICK PERRY
Governor

5805 N. Lamar Blvd.
P.O. Box 4087
Austin, Texas 78773-0220
Phone: (512) 424-2138
Fax: (512) 424-2444

JACK COLLEY
Council Chairman

July 10, 2008

TO: The Honorable Rick Perry, Governor, State of Texas
The Honorable David Dewhurst, Lieutenant Governor, State of Texas
Ms. Esperanza Andrade, Secretary of State, State of Texas
The Honorable Mario Gallegos, Jr., President Pro Tempore of the Senate, State of Texas
The Honorable Tom Craddick, Speaker of the House, State of Texas,
The Honorable Steve Ogden, Chairman, Senate Finance Committee, State of Texas
The Honorable Kip Averitt, Chairman, Senate Natural Resources Committee, State of Texas
The Honorable John Carona, Chairman, Senate Committee on Transportation & Homeland Security, State of Texas
The Honorable Warren Chisum, Chairman, House Appropriations Committee, State of Texas
The Honorable Mike Hamilton, Vice-Chairman, House Natural Resources Committee, State of Texas
The Honorable Sid Miller, Chairman, House Agriculture & Livestock Committee, State of Texas
The Honorable Aaron Peña, Chairman, House Criminal Jurisprudence Committee, State of Texas
Mr. Brian Newby, Chief of Staff, Office of the Governor
Mr. Steven McCraw, Director, Texas Governor's Office of Homeland Security

FROM: Chief Jack Colley, Chairman, Drought Preparedness Council

SUBJECT: Statewide Drought Situation Report

1. **Next Council Meeting**

   August 14, 2008, 2:00 p.m., Governor's Conference Room of the Governor's Division of Emergency Management, State Operations Center, Texas Department of Public Safety Headquarters, 5805 N. Lamar Blvd., Austin, Texas.

   At this time, the Council will continue to meet on a monthly basis.

Drought Situation Report July 2008

2. General Conditions

Overall rainfall in Texas was below normal for the month of June, making June the ninth month out of the past ten with below-normal precipitation for the State as a whole. Although the precipitation was spotty, some areas, including western Texas and northeastern Texas, generally received near-normal precipitation for the month. In contrast, less than 50% of normal rainfall fell in central and southern Texas, with zero rainfall observed for the month at some locations near San Antonio and New Braunfels.

As a result of the combination of short-term and long-term dryness, "exceptional drought" conditions were introduced by the U.S. Drought Monitor on July 3, 2008 for an elongated area extending eastward along I-10 from San Antonio. Other extensive areas of central and southern Texas were listed as "extreme drought".

For south-central Texas, the historical record shows no good analogs to the present drought. The most similar years, with dry conditions leading into the hottest part of the summer, were 1917 and 1971; all other years were wetter. Even if rainfall for the rest of the summer is near normal, water demand will remain high, stressing water delivery systems. Fortunately, 2007 was a wet year, so this drought began with ample reservoir levels and hay supplies, which are now dwindling.

The western Edwards Plateau and Pecos River regions were also experiencing extreme dry conditions until the end of June. However, a series of significant convective storms produced two months worth of rain in a few days, at least temporarily easing the drought conditions there. The latest Climate Prediction Center forecasts indicate equal changes of above- and below-normal temperatures and precipitation for the remainder of the summer.

3. Overall Statewide Drought Conditions

The Trans Pecos region is under "Severe Drought" conditions, according to the Palmer Drought Severity Index (PDSI). The South Central, Southern, and Lower Valley regions are experiencing "Moderate Drought" conditions. The remainder of the State varies from "Mild Drought" to "Near Normal" conditions. The PDSI varies, in order of increasing severity, from extremely wet, very wet, moderately wet, slightly wet, incipient wet spell, near normal, incipient dry spell, mild drought, moderate drought, severe drought, and extreme drought.

The Crop Moisture Index (CMI) indicates the Southern region is experiencing "Extremely Dry" conditions. The Edwards Plateau, South Central, and Lower Valley are under "Severely Dry" conditions. In addition, the High Plains, Trans Pecos, and Upper Coast regions are under "Excessively Dry" conditions. The remainder of the state is experiencing "Abnormally Dry" to "Mildly Dry" conditions. The CMI varies, in order of increasing severity, from flooding, standing water, fields too wet, moisture adequate, mildly dry, abnormally dry, excessively dry, severely dry, and extremely dry.

The Six-Month Standardized Precipitation Index (SPI) indicates that at the end of February the Southern and South Central regions are under "Severely Dry" conditions. The Edwards Plateau and Lower Valley are experiencing "Moderately Dry" conditions. The High Plains, Low Rolling Plains, North Central, East, Trans Pecos, and Upper Coast regions are experiencing "Near Normal" conditions. The SPI varies in categories of extremely dry, severely dry, moderately dry, near normal, moderately wet, very wet, and extremely wet conditions.

The Keetch-Byram Drought Index (KBDI) indicates significant areas with high fire danger in the North Central, East, Trans Pecos, Edwards Plateau, South Texas, Upper Coast, Southern, and Lower Valley regions. The KBDI is a drought index specifically used to describe potential or expected fire behavior. The index is classified, in order of increasing severity, as Low, Moderate, High or Extreme fire danger.

Texas Forest Service reports outdoor burning bans in 119 counties.

Fifty water supply systems are under mandatory water use restrictions according to the Texas Commission on Environmental Quality's (TCEQ) list of Public Water Supplies Effected by Drought. Another twenty-six community water supply systems are under voluntary water use restrictions.

The Climate Prediction Center (CPC) predicts normal precipitation for all of Texas from July 2008 to September 2008. During the same period, the CPC predicts above normal temperatures for the western High Plains, Trans Pecos, and western Edwards Plateau in Texas. The remainder of the State has equal chances of below normal, normal, or above normal temperatures.

The CPC predicts equal chances of below normal, normal, or above normal precipitation from August 2008 to October 2008. During the same period, the CPC predicts above normal temperatures for most of the State.

The National Oceanic and Atmospheric Administration (NOAA) Seasonal U.S. Drought Outlook, through September 2008 indicates improvement in drought conditions for most of Texas.

Water level measurements were available for six of the seven key monitoring wells. Water levels declined at all reporting monitoring wells, ranging from 0.98 feet in the Harris Co. Gulf Coast well to 12.80 feet in the Bexar Co. Edwards well. The J-17 well in San Antonio recorded a water level of 73.20 feet below land surface, 12.80 feet below last month's measurement. This water level is 2.2 feet below the Stage 1 critical management level. The Edwards Aquifer Authority declared Stage 1 drought restrictions for the San Antonio segment of the Edwards Aquifer on June 23.

4. **Water Utility Status**

Due to continued lack of rain, July 2008, began with 81 public water systems on the drought list. This number includes five systems that have been able to remove all restrictions since the first of the year and return to normal operations. Of the remaining 76 public water systems on the list, 50 are asking customers to adhere to mandatory outside watering restrictions and 26 are asking customers to voluntarily reduce usage. The forecast for continued lack of rain will cause additional public water supplies to reach Drought Contingency Plan triggers and result in increased water restrictions.

5. **Water Rights – Statewide**

New temporary water use permit applications, both short and long term, are being reviewed on a site-specific basis and issued if sufficient surplus water exists at the requested source. Applications for new water use permits and amendments to existing permits remained normal for the month. No curtailment of pumping was required for those permits in the Brazos River Basin containing Hale Clause and Lake Proctor restrictions for the month.

Owners of water rights with these restrictions are reminded to call the "Hale Clause Hotline" on a weekly basis to determine if diversion of water is allowed for the following week. The availability of unappropriated water for new water use permits continues to decrease in all river basins in the State, and the search for long-term, dependable alternate sources of water remains a high priority issue.

6. Water Rights – Lower Rio Grande / Rio Grande Watermaster (RGWM)

Current Overall Conditions: As of June 21, 2008, the U.S. combined ownership at Amistad/Falcon stands at 84.87% of conservation capacity or 2,878,831 acre-feet, up from 82.60% or 2,747,496 acre-feet a year ago at this time. Overall, the system is holding 52.71% or 3,122,044 acre-feet of conservation capacity with Amistad at 68.20% or 2,234,317 acre-feet and Falcon at 33.54% or 887,727 acre-feet. Mexico has 9.61%, or 243,213 acre-feet of water it could store at Amistad/Falcon.

Allocations: As of the printing of the May ownership report, in excess of 531,973 acre-feet to Class A & B rights has been allocated. There is in excess of 296,000 acre-feet for future allocations in 2008.

Storage & Loss Amistad vs. Falcon: The U.S is currently storing approximately 2.13 million acre-feet or 116% at Amistad, occupying 287,802 acre-feet of Mexico's space at Amistad. Approximately 0.75 million acre-feet or 48.4% is being stored at Falcon.

The YTD evaporation and seepage losses at Amistad are 226,992 acre-feet. During the same period, Falcon lost 186,367 acre-feet. The ratio of loss between Amistad and Falcon continues to consistently be 1:2 with Amistad twice as efficient in overall storage and loss as compared to the total amount in storage.

Releases to Meet Demands: In 2008, Mexico released 557,020 acre-feet from Amistad and 844,088 acre-feet from Falcon for Mexico needs. The U.S. released 421,328 acre-feet from Amistad and 816,673 acre-feet from Falcon for U.S. needs. Combined with gains between Amistad and Falcon, U.S. inflows to Falcon totaled 464,504 acre-feet. So far, 57% of U.S. overall needs were met in the middle and lower Rio Grande directly from middle Rio Grande inflows and Amistad this year. The movement of water from Amistad is primarily driven by U.S. excess amount in storage and the need to keep it below conservation capacity, particularly when occupying Mexico's space in Amistad.

Upper Rio Grande (New Mexico): Elephant Butte in New Mexico is currently storing 628,299 or 31.05% acre-feet, and Caballo Dam in New Mexico, downstream of Elephant Butte, is storing 57,560 or 25.36% acre-feet. This water storage is used in part to meet water needs in the El Paso area.

Outlook: All active accounts began 2008 with 100% usable balances. Since entering peak irrigation season, a dry weather pattern persists in the region which increases irrigation demand. According to the Palmer Drought Severity Index report, the following border counties are considered to be suffering a moderate drought: Hidalgo, Cameron, Willacy, Val Verde and McKinney. Furthermore, Starr, Zapata, Webb, Maverick, Brewster, Presidio, Hudspeth and El Paso Counties are suffering from a severe drought. This drought is forecasted to continue through the end of summer. It is feared that irrigation demand will continue to increase through July and possibly August, perhaps driving the U.S. total to approximately 70% by the end of 2008. Of further concern is Mexico's low ownership in the reservoirs, since it could result in increased evaporation and seepage loss charges for the U.S. To help alleviate losses in Falcon, the U.S. will continue to monitor ownership and

elevation levels in both Falcon and Amistad so U.S. transfers of water from Amistad to Falcon can be most efficient.

7. **South Texas Watermaster – Guadalupe / Lavaca / San Antonio / Nueces Region**

Area Counties: Bandera, Blanco, Comal, Kendall and Kerr Counties

The South Texas area remained in extreme drought conditions for the month of June. The end of the month brought some very limited relief with brief and scattered showers. The flows of most area rivers continue to slowly drop and soil moisture conditions in the area are still in very bad shape.

Many surface water rights reached their restriction limits and cannot divert any surface water until river flows improve. Many temporary water rights were suspended and other areas are being determined on a case by case basis.

The Concho area received some needed rains at month's end and stream flow conditions were better than South Texas. The flow conditions in the Concho basin should remain steady for the next several weeks.

Area Counties: Bee, Goliad, Victoria, Calhoun, Jackson, Refugio, Aransas, San Patricio, Nueces, Kleberg, Jim Wells, Duval, Live Oak, Kenedy, Willacy, Brooks, and Jim Hogg.

Rainfall and Area Conditions: This area received little rainfall during the month of June. The Coastal Bend area received 1-3 inches of rain throughout the month that provided some localized runoff to increase stream flows for a short period; the rains occurred during the third week of the month. Currently, the U.S. Drought Monitor indicates most of this area is currently experiencing "extreme drought" conditions. The Corpus Christi Reservoir System received some inflows from run-off of localized rain showers experienced in the area, but the level of the reservoir system continued to drop slightly. Most of the surface water diversions in the area continue to be municipal and industrial uses; little irrigational use has been noted.

Stream flow Conditions: Stream flows of the area streams continue to decrease, and are flowing below what is expected for this time of the year. According to the USGS Stream Flow Gage at the Guadalupe River near Victoria, stream flows were approximately 650 CFS at the beginning of the month. At this site, stream flows were approximately 525 CFS at the end of the month compared to 600 CFS at the end of last month. The historical mean at this site, based on 73 years of record, is 2,420 CFS. The gage at the San Antonio River near Goliad indicated that the stream flows were approximately 275 CFS at the beginning of the month. At this site, stream flows were approximately 150 CFS at the end of the month compared to 300 CFS at the end of last month. The historical mean at this site, based on 73 years of record, is 1,230 CFS. The gage at the San Antonio River at McFaddin, which is below Goliad, indicated that the stream flows were approximately 475 CFS at the beginning of the month. At this site, stream flows were approximately 165 CFS at the end of the month compared to 400 CFS at the end of last month. The historical mean at this site, based on 2 years of record, is 638 CFS. The gage at the Guadalupe River near Tivoli, below the confluence of the San Antonio River and Guadalupe River, indicated that the stream flows were approximately 1,000 CFS at the beginning of the month. At this site, stream flows were approximately 750 CFS at the end of the month compared to 1,000 CFS at the end of last month. The historical mean at this site, based on two years of record, is 1,450 CFS. The gage at the Mission River near Refugio indicated that stream flows were approximately 9 CFS at the beginning of the month. At this site, stream flows were approximately 7.5 CFS at

the end of the month compared to 10 CFS at the end of last month. The historical mean at this site, based on 68 years of record, is 76 CFS. The gage of the Nueces River at Calallen Dam indicated 0 CFS stream flows over the dam near Corpus Christi at the beginning of the month. However, stream flows were approximately 33 CFS at the end of the month compared to 1.5 CFS at the end of last month. The historical mean at this site, based on 8 years of record, is 796 CFS. The gage at the Aransas River near Skidmore indicated that the stream flows were approximately 5.0 CFS at the beginning of the month. At this site, stream flows were approximately 4.5 CFS at the end of the month compared to 5.1 CFS at the end of last month. The historical mean at this site, based on 44 years of record, is 12 CFS.

Corpus Christi Reservoir System: The Corpus Christi Reservoir System received some inflows for the month of June, but the level of the reservoir system has continued to decrease. The Corpus Christi Reservoir System is currently at 88.0% of capacity (837,899 acre-feet) compared to 94.0% of capacity or 895,541 acre-feet during this same time last year. The level of Choke Canyon is currently at 90.5% of capacity or 629,414 acre-feet compared to 91.8% of capacity or 638,281 acre-feet during this same time last year. The level of Lake Corpus Christi is currently at 81.0% of capacity or 208,485 acre-feet compared to 94.0% of capacity or 257,260 acre-feet last year. The City of Corpus Christi continues to divert much of their monthly water supply needs from Lake Texana.

Drought Restrictions: Currently, some drought restrictions or stream flow restrictions of water rights have been activated in this area.

Area Counties: Atascosa, Karnes, Gonzales, Wilson, McMullen, Dewitt, Guadalupe, Lavaca, Fayette, Colorado, Wharton, and Jackson.

Rainfall and Area Conditions: This area received 0.00 to 1.0 inches of rainfall for the month of June. Soil moisture conditions are poor in the area. The corn crop is being harvested at this time and milo and hay crops are beginning to wilt and show signs of damage. Irrigation activity increased due to the dry conditions. Lake Texana is at 82% of capacity, which is 40.65 ft. above msl. This is a 6% drop in the capacity from last month.

According to the U.S. Drought Monitoring System, this area is experiencing "extreme drought" conditions, at this time.

Stream flow Conditions: Currently, the flow of the San Antonio River near Falls City is 145 CFS. The historical mean flow for June is 256 CFS, ending for last month at 117 CFS. The Cibolo Creek near Falls City is flowing at 23 CFS. The ending for last month was 30 CFS, with an historical mean flow for June at 28 CFS. The Guadalupe River near Gonzales is flowing at 697 CFS. The ending reading for last month was 754 CFS, with an historical mean flow for June at 1130 CFS. The Lavaca River at Edna is flowing at 14 CFS; the ending reading for last month was 21 CFS, with the historical mean flow for June at 58 CFS. The Navidad River near Halletsville is currently flowing at 2 CFS. The ending reading for last month was 1.6 CFS, and an historical mean flow for June is 19 CFS. The Atascosa River near Whitsett is flowing at .42 CFS. The ending reading for last month was 1.1 CFS, with an historical mean flow for June being 1.6 CFS. The Frio River near Tilden is flowing at 2.2 CFS. The ending reading for last month was 12 CFS; with an historical mean flow for June of 29 CFS. The Nueces River near Tilden is currently flowing at .07 CFS. The ending reading for last month was 18 CFS, with an historical mean for June of 19 CFS.

Drought Restrictions: Currently, all temporary permit diversions have been suspended in the San Antonio River Basin due to meeting junior permit flow restrictions.

Area Counties: Edwards, Real, Kinney, Uvalde, Zavala, Dimmit, La Salle and Webb.

Rainfall and Area Conditions: This area received various amounts of precipitation, ranging from 0.5 to 1.0 inches for the month of June. With the current amount of rainfall for this month, the Texas Crop Moisture Index has this area of the hill country classified in the "excessively dry" range. Most surface water diversions in this area are for municipal and industrial uses with a few surface water permit holders irrigating hay and sod fields. The U.S. Drought Monitor indicates that this area is currently in "severe" to "extreme" conditions, at this time.

Stream flow Conditions: None of the stream flows of major streams and their tributaries are flowing at normal capacity. Most major streams are still showing a steady decline in the month of June. Smaller secondary tributaries lost surface flow. The Guadalupe River near Kerrville has a current stream flow of approximately 39 CFS, with an historical monthly mean of 150 CFS. This equates to 111 CFS below the monthly mean for the month of June flowing past Kerrville. The Guadalupe River near Comfort has a current stream flow of approximately 42 CFS, with an historical monthly mean of 326 CFS. This equates to 284 CFS below the monthly mean for June flowing past Comfort. The Medina River near Bandera has a current stream flow of 8.0 CFS, with an historical monthly mean of 205 CFS. This equates to 197 CFS below the monthly mean of June flowing past Bandera.

Drought Restrictions: On June 12, 2008, the City of Kerrville's surface water diversion from the Guadalupe River was cut to 500,000 GPD. All temporary surface water permits were suspended in the Guadalupe River Basin above Canyon Lake as well as all temporary surface water permits in the San Antonio River Basin above Lake Medina. Because of the low stream flows, some state permit holders have already reached their flow restrictions and pumping was curtailed. Therefore, the river flows are heavily monitored on a daily basis.

Area Counties: Bastrop, Bexar, Blanco, Caldwell, Comal, Fayette, Frio, Guadalupe, Hays, and Medina.

Rainfall and Area Conditions: The Southwest Texas area received no relief from drought conditions throughout the month of June. No rain was reported for the beginning of the month. However, rain showers were reported throughout the middle of the month for the northern and southern counties. The month ended with no relief for this entire area. The range of rainfall in the area was 0.25-1.00 inches for the month. Most of the diversions of surface water are for irrigational use and small amounts for municipal and industrial uses. Crops being irrigated in the area are: milo, cotton, corn, hay grazers, and pecans. The U.S. Drought Report indicates the area is experiencing "severe" to "extreme" drought conditions, at this time. Currently, drought restrictions are applied to the Southwest area.

Stream Flow Conditions: Stream flows for the major tributaries in the area continue to flow below the mean for this time of year. The Nueces River at Laguna has stream flows of 37 CFS, compared to 60 CFS, for last month, with an historical mean of 203 CFS. The Nueces River near Brackettville has stream flows of 0.00 CFS, compared to .06 CFS for last month. The historical mean is 29 CFS. The Nueces River below Uvalde has stream flows of 19 CFS, compared to 36 CFS for last month, with an historical mean of 242 CFS. The Frio River at Concan has stream flows of 22 CFS, compared to 38 CFS for last month. The historical mean is 147 CFS. The Sabinal River at Sabinal has stream flows of .80 CFS, compared to .74 CFS for last month. The historical mean is 126 CFS. The Leona River near Uvalde has stream flows of 22 CFS, compared to 23 CFS for last month. The historical mean is 24 CFS.

Drought Restrictions: Currently, all temporary permits are not allowed to divert. Permits with stream flow restrictions are monitored closely.

Area Counties: Sterling, Tom Green, Irion, Concho, Coke, Glasscock, Runnels, Reagan, and Schleicher.

Rainfall and Area Conditions: Below average monthly rainfall fell across the San Antonio Regional Area for the month of June. Month to date rainfall measured at the San Antonio International Airport was 0.11 inches. The average for June is 4.30 inches. Total annual rainfall to date is 3.89 inches; normal year to date is 16.63 inches, a departure from normal of 12.74 inches. The U.S. Drought Monitor, dated June 24, 2008, indicates the San Antonio Regional Area is experiencing "extreme drought" impacting crops, pastures and grasslands, stream flows, and reservoir capacities. Ground moisture has rapidly diminished with above average temperatures and the lack of cloud cover. Good harvest of hay grazers, blackberries, sweet corn, yellow and white squash, zucchini, cucumbers, tomatoes, white onions, watermelons, cantaloupes, and garlic were reported with supplemental irrigation. Most "dry land" crops are either lost to the ensuing drought or dramatically stunted due to the lack of rainfall.

Stream Flow Conditions: The Guadalupe and Blanco Rivers are now showing the impact of the current drought. Small creeks are dried up and most major streams are beginning to quickly pool or dry up entirely. Municipal use increased because of residential lawn planting, fertilizing, and supplemental watering. Industrial use remains constant.

All major tributaries in the San Antonio Regional Area are now beginning to drop below their historical monthly averages for May. The Guadalupe River at Spring Branch is currently 42 CFS; the historical mean flow for June is 563 CFS. The San Marcos River at Luling is flowing at 101 CFS; the historical mean flow for June is 600 CFS. Lastly, the Blanco River at Wimberley is at 18 CFS; the historical mean flow for June is 227 CFS.

Currently, Canyon Lake Reservoir is at 905.60 feet elevation and is impounding 351,514 acre-feet, and is 92.7% of capacity. As of June 28, 2008, the Edwards Aquifer level at the J-17 well in Bexar County is 657.5 feet. The historical average for June is 663.7 feet, and this is 6.2 feet below the monthly historical average. The San Marcos Springs are flowing at 121.0 CFS; the historical monthly average for June is 193.0 CFS. This is 72.0 CFS below the monthly historical average. Lastly, the Comal Springs are flowing at 269.0 CFS. The monthly historical flow for June is 290.0 CFS. This is 21.0 CFS below the historical monthly average.

Drought Restrictions: Temporary Permits and permits with stream flow restrictions are monitored closely.

Area Counties: Sterling, Tom Green, Irion, Concho, Coke, Glasscock, Runnels, Reagan, Schleicher

Rainfall for the Concho River Valley came on the last days of the month to meet forecasted expectations for June. According to information provided by the USDA, the State Drought Monitor Index has the Concho Valley at "severe" drought conditions in the west and "moderate" conditions in the east. The index was last updated on June 24, and does not reflect the recent rain event.

Rainfall and Area Conditions: Rainfall in San Angelo for the month was 2.20 inches. Areas surrounding San Angelo received greater rainfall amounts. Average rainfall amount for the month of June is 2.88 inches. The total amount of rainfall for the year is 10.97 inches. In 2007, to date, there was 19.21 inches of rain. Average annual rainfall, based on a 100-year record, is 19.0 inches. Area reservoirs are showing decreases in the amount of storage from the previous month's amounts. Irrigational demand by appropriated surface water rights in the Concho Valley is at normal volume. The Texas Crop Moisture Index indicates soil moisture content is "extremely dry". However, the index was last updated on June 21, 2008, and does not reflect the recent rain event. Corn, cotton, and sorghum have been planted and are established.

Stream flow Conditions: Mean daily discharge statistics based on 6 years of record for USGS Gaging Station 08130700, Spring Creek above Twin Buttes Reservoir near San Angelo, are 5.8 CFS. The most recent value is 17 CFS. Mean daily discharge statistics at USGS Gaging Station 08136000, Concho River at San Angelo/Bell St., based on 77 years of record is 7.0 CFS. Currently, it is at 55 CFS. Mean daily discharge statistics at USGS Gaging Station 08128000, South Concho at Christoval, based on 73 years of record is 17 CFS. The most recent daily value is 34 CFS. Discharge levels reflect recent rainfall events. Area lakes indicate Lake Nasworthy is 85% of capacity or 8,691 acre-feet; O. C. Fisher is 7% of capacity or 8,088 acre-feet; and Twin Buttes Lake is 40% of capacity or 75,140 acre-feet.

Drought Restrictions: No additional restrictions are in place for Concho Valley.

8. Upper Colorado (Concho River watershed not included)

The upper Colorado River area received slightly less than normal precipitation during the month of June 2008. The National Weather Service in San Angelo reported monthly precipitation of 2.19 inches, 0.33 inches below normal. The annual total to date is 9.15 inches, 1.05 inches below normal. Diminished flows were the norm for most tributaries in the upper Colorado watershed during most of June. However, recent rains increased flows to near normal in some of the major tributaries of the upper Colorado River watershed. The pool levels of EV Spence and OH Ivie Reservoir decreased slightly during the month and were 13% and 64%, respectively.

9. Texas Panhandle and Southern High Plains

Amarillo Area: Lake Meredith is at 45.80 feet or 68,446 acre-feet, down 1.43 feet since the beginning of the month. Lake Greenbelt is at 57.22 feet, down 0.42 feet from the beginning of the month. Lake MacKenzie is at 73.81 feet, down 0.69 feet from the beginning of the month.

The National Weather Service (NWS) in Amarillo reported a total of 3.91 inches of rain for June, which is 1.04 inches above the monthly average. The NWS reported 7.50 inches for the year, which is 1.51 inches below average.

Lubbock Area: The Lubbock area experienced average precipitation during June 2008. Lubbock received 2.91 inches for the month. The average for June is 2.98 inches. Similar amounts were recorded throughout the Region 2 area. Total precipitation for 2008 now stands at 10.19 inches, which is 1.64 inches above normal for this point in the year. The long term drought situation has not changed, and all of the communities previously noted on mandatory water restrictions remain on those restrictions. No new communities were added to the water restrictions list during the month of June.

The following cities in the South Plains area remain on mandatory drought restrictions status: Lubbock and Amherst.

The following cities in the South Plains area remain on voluntary drought restrictions status: Ralls, Crosbyton, Spur, Post, White River WSC, and Valley WSC.

As Lake Meredith continues to decline, Lubbock is making preparations to construct a pipeline from Lake Alan Henry to Lubbock to use as an additional source of water. Lubbock owns the water rights at this lake.

White River Lake: The lake is down 28.6 feet from normal, which is 46 feet at the dam. This is slightly lower than the level that existed at the end of May 2008. The White River Water Supply District has only 4 feet of water left that can be pulled from the lake for the Public Water Supply. White River WSD has groundwater wells on standby to supply water to customers in the event the lake level drops below usable levels.

Lake Alan Henry: The lake is almost full; two feet below the speedway. This lake is not used for public drinking water supplies at present, but will be utilized for this purpose in the near future.

10. Agricultural Concerns

Wheat harvest is near complete, with 79% of the crop ranging from very poor to fair and the overall condition rated at 47% of normal. The current estimate of the wheat crop indicates that we will harvest 3.4 million acres with a yield of 102 million bushels. Many dryland farmers in Southwest Texas and the High Plains abandoned fields due to drought. Blacklands, Central and Gulf Coast farmers generally had a good to excellent crop. Grazing opportunities on wheat pasture were very short this year due to dry fall weather.

Recent rains brought good moisture to much of the High Plains, southern Rolling Plains, the Edwards Plateau, the lower Gulf Coast, and the Rio Grande Valley. This rain will be very helpful to the High Plains cotton and feed grain crops, but will have little impact on the crops in South Texas which are nearing or at maturity. An estimated 1.0-1.1 million acres of dry land cotton in the High Plains were lost due to heat, dry weather and winds after planting. Many High Plains farmers are planting sorghum on moisture from recent rains. These rains will bring relief to dry pastures and rangelands improving grazing conditions. Statewide, pasture conditions have been mostly poor to fair due to the drought.

Much of the sorghum and corn crop in the Rio Grande is harvested. Harvest is approaching Central Texas at this time. Most of the dry land corn crop in south Texas, the Gulf Coast and Central Texas was severely impacted by drought, with many fields abandoned or harvested for forage. Rains slowed harvest of grain crops on the Gulf Coast. Corn and sorghum conditions are mostly fair to good. Conditions statewide should improve significantly in those regions of west Texas and the High Plains receiving the beneficial rains. Central and Southwest Texas remain critically dry. The cotton crop is progressing rapidly and will see early maturity and low yields due to drought.

Northeast Texas remains the bright spot as far as crop and forage conditions are concerned. Those counties along the Red River with significant acres of planted crops are in good to excellent condition. East Texas received some scattered showers of up to two inches, improving pasture and crop conditions.

Far West Texas had scattered showers, ranging from a trace to six inches. Farmers are planting sorghum in areas that received beneficial rains.

11. **Drought Impacts to Wildlife**

No information available at this time.

12. **Wildfire Concerns**

The Keetch-Byram Drought Index (KBDI) is used to help determine potential for fire risk. It is a numerical index where each number is an estimate of the amount of precipitation, in 100ths of an inch, needed to bring the soil back to saturation. The index ranges from 0 to 800, with 0 representing a saturated soil, and 800 a completely dry soil. The KBDI's relationship to fire danger is that as the index increases, the vegetation is subjected to increased moisture stress. KBDI levels and its relationship to expected fire potential are reflected in the following:

KBDI = 0 – 200: Soil moisture and large class fuel moistures are high and do not contribute much to fire intensity. This is typical of spring dormant season following winter precipitation.

KBDI = 201 – 400: Typical of late spring; early growing season. Lower litter and duff layers are drying and beginning to contribute to fire intensity.

KBDI = 401 – 600: Typical of late summer, early fall. Lower litter and duff layers contribute to fire intensity and will burn actively.

KBDI = 601 – 800: Often associated with more severe drought and increased wildfire occurrence. Intense, deep-burning fires with significant downwind spotting can be expected. Live fuels can also be expected to burn actively at these levels.

There are currently 177 counties, illustrated in Attachment 2, with KBDI values in excess of 400, indicating areas within these counties are beginning to experience dry conditions, which could result in an increased fire risk potential.

The Council, which is chaired by Jack Colley, Chief, Governor's Division of Emergency Management, is composed of state agencies concerned with the effects of drought and fire on the citizens of the State of Texas. The attached information was compiled and provided by representatives listed below. Points of contact, telephone numbers, and web site addresses are also provided.

Jack Colley, Chief, Governor's Division of Emergency Management, (512) 424-2443, fax (512) 424-2444, web site: http://www.txdps.state.tx.us/dem

John Sutton, Texas Water Development Board, (512) 463-7988, fax (512) 463-9893, web site: http://www.twdb.state.tx.us

Chris Loft, Texas Commission on Environmental Quality, (512) 239-4715, fax (512) 239-4770, web site: http://www.tceq.state.tx.us

Richard Egg, Texas State Soil & Water Conservation Board, (254) 773-2250, fax (254) 773-3311, web site: http://www.tsswcb.state.tx.us

Lance Williams, Texas Department of Agriculture, (512) 463-3285, fax (800) 835-2981, web site: http://agr.state.tx.us

Dr. Travis Miller, Texas AgriLife Extension Service, (979) 845-4808, fax (979) 845-0456, web site: http://texasextension .tamu.edu

Cindy Loeffler, Texas Parks & Wildlife Department, (512) 912-7015, fax (512) 707-1358, web site: http://www.tpwd.state.tx.us

Edward T. Morris, Department of Housing and Community Affairs, (512) 475-3329, Fax (512) 475-7498, web site: http://www.tdhca.state.tx.us

Michael Dunivan, Texas Forest Service, (830) 997-5426, web site: http://txforestservice.tamu.edu

Scott Alley, Texas Department of Transportation, (512) 416-3187, fax (512) 416-2941, web site: http://www.dot.state.tx.us/

Paul Tabor, Texas Department of State Health Services, (512) 458-7126, fax (512) 458- 7472, web site: http://www.dshs.state.tx.us/

Thomas Walker, Office of the Governor, Economic Development & Tourism, (512) 936-0169, fax (512) 936-0141, web site: http://www.governor.state.tx.us/divisions/ecodev

Harvey Everheart, Texas Alliance of Groundwater Districts, (806) 872-9205, fax (806) 872-2838, web site: http://www.texasgroundwater.org/

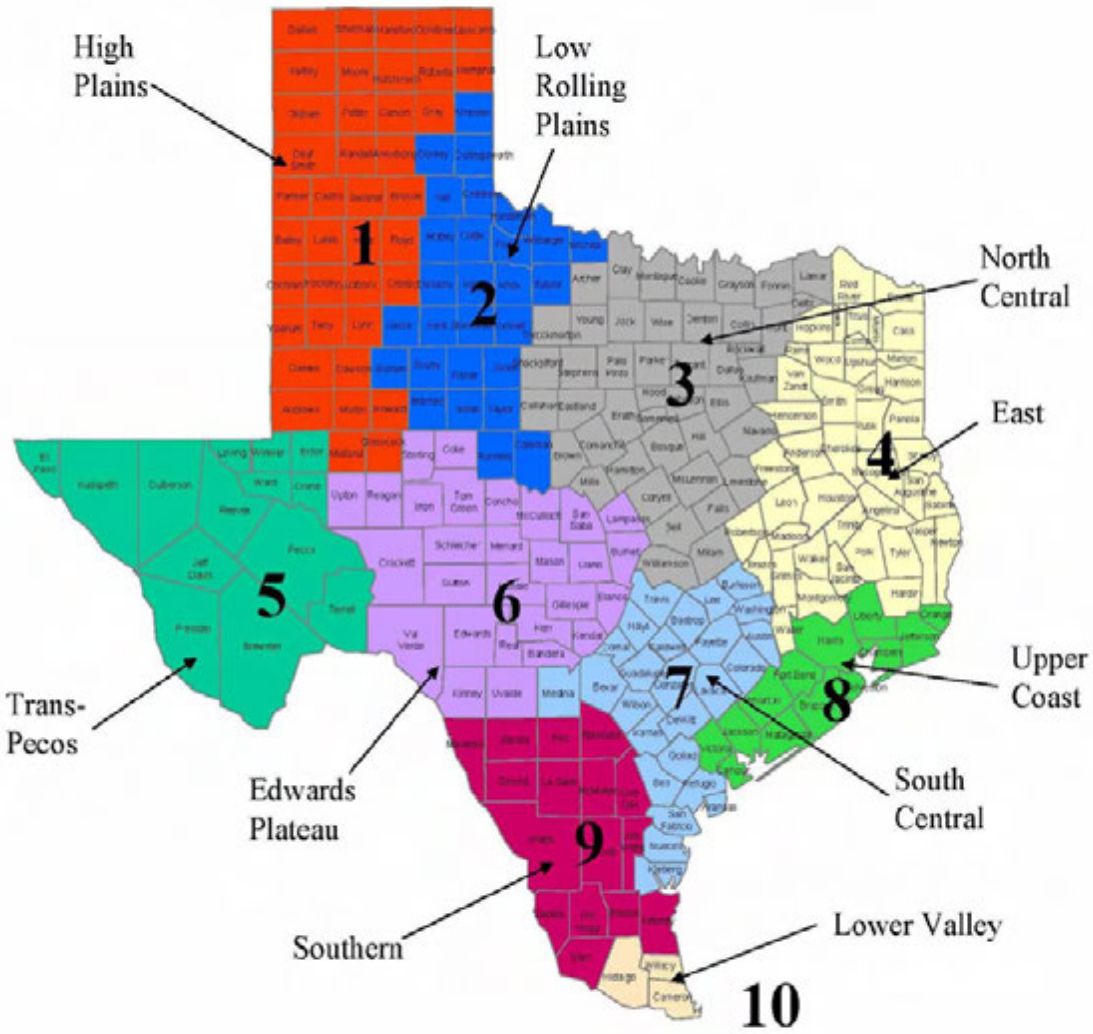
Dr. John W. Nielsen-Gammon, Office of the State Climatologist, (979) 862-2248, fax (979) 862-4466, web site: http://www.met.tamu.edu/osc/

Gus Garcia, Office of Rural Community Affairs, (512) 936-7876, fax (512) 936-6776, web site: http://www.orca.state.tx.us

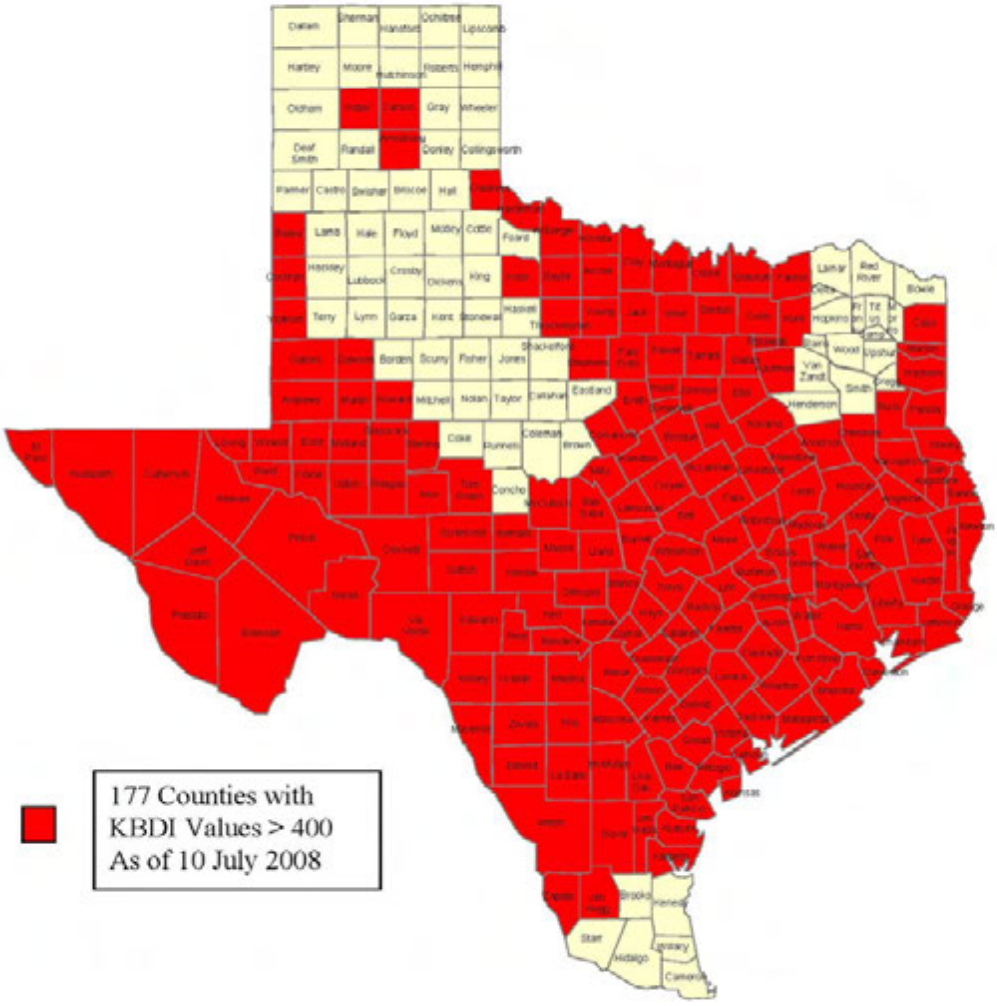
cc:

Amy Jeter, Committee Clerk, Senate Finance Committee
Sarah Hicks, Committee Director, Senate Finance Committee
Teddy Carter, Committee Clerk, Senate Natural Resources Committee
Amy Peterson, Committee Director, House Appropriations
Hope Wells, Committee Clerk, House Natural Resources Committee
Steven Schar, Committee Clerk, House Agriculture and Livestock Committee
Gina Chung, Committee Clerk, House Criminal Jurisprudence Committee
Zak Covar, Policy Advisor for TCEQ Issues, Governor's Policy Office
Auburn Mitchell, Policy Advisor for Agriculture/TDA, Governor's Policy Office
Rob Johnson, Lt. Governor's Chief of Staff
Carmen Cernosek, Lt. Governor's Natural Resources Policy Analyst
Shane Linkous, Deputy Division Chief, Intergovernmental Relations, Attorney General's Office
Ernest Angelo, Jr., Chairman, Public Safety Commission
Louis E. Sturns, Member, Public Safety Commission
Colonel Thomas Davis, Director, Department of Public Safety
Lieutenant Colonel David McEathron, Assistant Director, Department of Public Safety
Lori Gabbert., Budget Analyst, Legislative Budget Board (LBB-DPS)
Tom Lambert, Budget Analyst, Legislative Budget Board (LBB-TCEQ)
Ed Perez, Executive Director, Texas Office of State-Federal Relations, Washington, DC
Brandon Steinmann, Director, Texas Office of State-Federal Relations, Austin, Texas

Attachment 1
Climatic Regions



Attachment 2
Counties with High to Extreme Fire Danger



DROUGHT PREPAREDNESS COUNCIL

RICK PERRY
Governor

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JACK COLLEY
Council Chairman

October 9, 2008

TO: The Honorable Rick Perry, Governor, State of Texas
The Honorable David Dewhurst, Lieutenant Governor, State of Texas
Ms. Esperanza Andrade, Secretary of State, State of Texas
The Honorable Mario Gallegos, Jr., President Pro Tempore of the Senate, State of Texas
The Honorable Tom Craddick, Speaker of the House, State of Texas
The Honorable Steve Ogden, Chairman, Senate Finance Committee, State of Texas
The Honorable Kip Averitt, Chairman, Senate Natural Resources Committee, State of Texas
The Honorable John Carona, Chairman, Senate Committee on Transportation & Homeland Security, State of Texas
The Honorable Warren Chisum, Chairman, House Appropriations Committee, State of Texas
The Honorable Mike Hamilton, Vice-Chairman, House Natural Resources Committee, State of Texas
The Honorable Sid Miller, Chairman, House Agriculture & Livestock Committee, State of Texas
The Honorable Aaron Peña, Chairman, House Criminal Jurisprudence Committee, State of Texas
Mr. Jay Kimbrough, Chief of Staff, Office of the Governor
Mr. Steven McCraw, Director, Texas Governor's Office of Homeland Security

FROM: Chief Jack Colley, Chairman, Drought Preparedness Council

SUBJECT: Statewide Drought Situation Report

1. **Next Council Meeting**

   November 13, 2008, 2:00 p.m., Governor's Conference Room of the Governor's Division of Emergency Management, State Operations Center, Texas Department of Public Safety Headquarters, 5805 N. Lamar Blvd., Austin, Texas.

   At this time, the Council will continue to meet on a monthly basis.

2. **General Conditions**

The September weather headlines were dominated by Hurricane Ike, which brought heavy precipitation to the Upper Texas coast. Though many reporting stations sustained damage that rendered precipitation measurements useless, radar estimates indicated much of the Houston/Galveston area received 10-15 inches of precipitation from Ike. Much of East Texas north of Houston received 3-6 inches of rain from Hurricane Ike, but monthly rainfall totals were near normal in many locations since precipitation was sparse outside of Hurricane Ike.

Most of Texas outside areas directly affected by precipitation from Ike had below normal precipitation during September. Exceptions were areas of West Central Texas from Lubbock to Midland/Odessa and along the Rio Grande in extreme South Texas, where Brownsville received 9.57 inches of rain. Beneficial summer rains in far West Texas eliminated the severe drought that existed in the El Paso and Big Bend regions at the beginning of June.

South Central Texas remained dry, particularly in the I-35 corridor near Austin and San Antonio, highlighted by Austin/Mabry receiving only 0.02 inches of precipitation during September. This was troublesome because this particular area was the location of an extreme drought going into September. As of October 5th, Austin/Mabry and San Antonio have year-to-date rainfall deficits of 12.25 and 11.88 inches, respectively. At both locations, precipitation totals represent only about 50% of normal precipitation through September. Stream flow at Barton Springs in Austin has slowed to 18 CFS, and according to the USGS, the all-time minimum flow on record for Barton Springs is 17 CFS.

Above normal rainfall in West Central Texas helped eliminate extreme drought conditions near Midland/Odessa. This brought year-to-date precipitation to about 75-90% of normal for the year. Outside of Midland/Odessa, South Central Texas is the only area of the State experiencing drought conditions. This area stretched from the Brazos River east of the Austin/San Antonio area to the Rio Grande River. This included Del Rio which received only 0.46 inches of rain in September. Areas of extreme drought are confined to the Austin metropolitan area and surrounding counties.

The current long-range forecast from the Climate Prediction Center (CPC) calls for an equal chance of above normal, near normal, and below normal precipitation, with the exception of far West Texas. This scenario could help ease the severe drought in South Central Texas if precipitation is either near or above normal, but there is some concern for Far West Texas. Any stretch of below normal precipitation might bring back drought conditions to West Texas.

3. **Overall Statewide Drought Conditions**

The South Central region is under "Moderate Drought" conditions, according to the Palmer Drought Severity Index (PDSI). The North Central, Edwards Plateau, and Upper Coast regions are experiencing "Near Normal" conditions. The remainder of the State is under "Slightly Wet" to "Extremely Wet" conditions. The PDSI varies from extremely wet, very wet, moderately wet, slightly wet, incipient wet spell, near normal, incipient dry spell, mild drought, moderate drought, severe drought, to extreme drought in order of increasing severity.

The Crop Moisture Index (CMI) indicates the South Central region is under "Excessively Dry" conditions. The North Central, Edwards Plateau, and Upper Coast regions are experiencing "Mildly Dry" conditions. The remainder of the State is under "Moisture Adequate" or "Flooding" conditions. The CMI varies from flooding, standing water, fields too

wet, moisture adequate, mildly dry, abnormally dry, excessively dry, severely dry, and extremely dry in order of increasing severity.

The Six-Month Standardized Precipitation Index (SPI) indicates that, at the end of September, the South Central region is under "Moderately Dry" conditions while the remainder of the State experienced "Near Normal" or "Extremely Wet" conditions. The SPI varies from extremely dry, severely dry, moderately dry, near normal, moderately wet, very wet, to extremely wet conditions in order of increasing severity.

The Keetch-Byram Drought Index (KBDI) indicates significant areas with high fire danger in the North Central, Edwards Plateau, South Central, and Southern regions. The KBDI is a drought index specifically used to describe potential or expected fire behavior. The index is classified as Low, Moderate, High or Extreme fire danger, in order of increasing severity.

Texas Forest Service reports outdoor burning bans in 52 counties.

The CPC predicts above normal precipitation along the Trans Pecos region from September 2008 to November 2008. During the same period, the CPC predicts above normal temperatures for the entire State. The CPC predicts above normal precipitation along the Trans Pecos region from October 2008 to December 2008. During the same period, the CPC predicts above normal temperatures for the entire State.

The National Oceanic and Atmospheric Administration (NOAA) Seasonal U.S. Drought Outlook, through December 2008, indicates persisting areas of drought in the Edwards Plateau, South Central, and Southern regions.

4. Water Utility Status

October 2008 began with 120 public water supplies on the drought list. That number included nine systems that relaxed implemented watering restrictions and returned to normal operations and water usage. The remaining 111 public water systems on the list included 78 systems that placed customers on a mandatory watering schedule and 33 systems that requested voluntary conservation. Based on trigger criteria in the Drought Contingency Plan, it is expected that additional public water systems will relax restrictions during the upcoming winter months.

Eighty water supply systems are under mandatory water use restrictions according to the Texas Commission on Environmental Quality's (TCEQ) list of Public Water Supplies Effected by Drought. Another thirty-three community water supply systems are under voluntary water use restrictions.

5. Water Rights – Statewide

New temporary water use permit applications are reviewed on a site-specific basis and are issued if there is sufficient surplus water at the requested source. Applications for new water use permits and amendments to existing permits remained normal for the month. Beginning September 1, more severe restrictions for water rights of the Hale Clause along the Brazos River and Brazos River Basin were lifted. Until April 1, 2009, owners of these water rights may observe less severe stream flow restrictions of their permits. The availability of unappropriated water for new water use permits continues to decrease in all river basins in the State and the search for long-term, dependable alternate sources of water remains a high priority issue.

6. **Water Rights – Lower Rio Grande / Rio Grande Watermaster (RGWM)**

Current Overall Conditions: As of September 27, 2008, the U.S. combined ownership at Amistad/Falcon stands at 101.24% of conservation capacity or 3,434,168 acre-feet. This is up from 97.04% or 3,291,483 acre-feet from a year ago at this time. Overall, the system is holding 81.30% or 4,815,617 acre-feet, of conservation capacity with Amistad at 98.24% or 3,218,519 acre-feet and Falcon at 60.34% or 1,597,099 acre-feet. Mexico has 54.58% or 1,381,450 acre-feet of the water it could store at Amistad/Falcon.

Allocations: As of the printing of the August ownership report, the U.S. has allocated in excess of 778,785 acre-feet for irrigation and mining. The U.S. continues to have an amount in excess of 199,000 acre-feet for future allocations in 2008.

Storage & Loss Amistad vs. Falcon: Currently, the U.S. is storing approximately 2.2 million acre-feet at Amistad, occupying 389,141 acre-feet of Mexico's space at Amistad. The U.S. reached conservation capacity at Amistad on 09/29/2008. The current elevation is 1117.68. The U.S. is currently storing approximately 1.2 million acre-feet at Falcon, or 77.6% capacity.

The U.S. evaporation and seepage losses at Amistad are 327,055 acre-feet to date. For the same period, the U.S. lost 251,942 acre-feet at Falcon. The ratio of loss between Amistad and Falcon continues consistently to be 1:2, with Amistad being twice as efficient in overall storage and loss.

Releases to Meet Demands: Mexico released 581,053 acre-feet from Amistad and 861,801 acre-feet from Falcon for Mexico needs. The U.S. released 1,016,936 acre-feet from Amistad and 979,805 acre-feet from Falcon for U.S. needs. Combined with gains between Amistad and Falcon, U.S. inflows to Falcon totaled 1,147,622 acre-feet. So far, the U.S. met 67% of overall needs in the middle and Lower Rio Grande directly from middle Rio Grande and Amistad inflows this year. The movement of water from Amistad is primarily driven by U.S. excess amount in storage and the need to keep it below conservation capacity, particularly when the U.S. is occupying Mexico's space in Amistad.

Upper Rio Grande (New Mexico): Currently, Elephant Butte in New Mexico is storing 584,521 acre-feet or 28.89% and Caballo Dam, downstream of Elephant Butte, is storing 25,132 acre-feet or 11.07%. This water storage, in part, is used to meet water needs in the El Paso area.

Outlook: All active accounts began 2008 with 100% usable balances. Continued rains during mid to late August and into September dropped up to 18 additional inches of rain across the Rio Grande Valley. The reservoirs increased in elevation due to the rainfall in the lower and upper Rio Grande Regions. Consequently, conservation levels were achieved in Amistad and the U.S. is only 11.86 feet below normal in Falcon. To help alleviate losses in Falcon, the U.S. continues to monitor ownership and elevation levels to more efficiently transfer water from Amistad to Falcon.

7. **South Texas Watermaster – Guadalupe / Lavaca / San Antonio / Nueces Region**

The South Texas and Concho areas of Texas received rainfall for the month of September. However, a large part of South Central Texas remains in some category of drought as specified by the U.S. Drought Monitor.

Neither the rain from Hurricane Ike nor the excessive rains along the Texas/Mexico border had significant impact on the conditions through much of Central Texas. River flows continue to be below average flows for this time of year. Ground moisture conditions remain dry for most of the area.

The Concho area has shown improvement for the month. The area received slightly higher than average rainfall and the Concho River remains near average flows for this time of year.

Area Counties: Bandera, Blanco, Comal, Kendall and Kerr Counties

Rainfall and Area Conditions: This area received various amounts of precipitation, ranging from 0.50 to 2.0 inches for September. With the current amount of rainfall, the Texas Crop Moisture Index in this area of the hill country is classified as "Mildly Dry". Most surface water diversions in this area are for municipal and industrial uses, with a few surface water permit holders irrigating hay and sod fields. The U.S. Drought Monitor indicates that this area is currently in "Severe Drought" to "Extreme Drought" conditions.

Stream flow Conditions: None of the stream flows of the major streams and their tributaries are flowing at their normal capacities. Most of the major streams showed a steady decline during September. Most of the smaller secondary tributaries lost surface flow. The Guadalupe River near Kerrville, Texas, has a current stream flow of approximately 39 CFS, with the historical monthly mean being 92 CFS. The Guadalupe River near Comfort, Texas, has a current stream flow of approximately 38 CFS, with the historical monthly mean being 204 CFS. The Medina River near Bandera, Texas, has a current stream flow of 13 CFS, with the historical monthly mean being 66 CFS.

Drought Restrictions: On August 7, 2008, Kerrville was restricted in the amount of surface diversions from the Guadalupe River and limited to pumping three million gallons per day. All temporary surface water permits have been suspended in the Guadalupe River Basin above Canyon Lake as well as all temporary surface water permits in the San Antonio River Basin above Lake Medina. Because of the low stream flows, some State permit holders have already reached their flow restrictions and were curtailed from pumping. Therefore, the river flows are heavily monitored on a daily basis.

Area Counties: Bee, Goliad, Victoria, Calhoun, Jackson, Refugio, Aransas, San Patricio, Nueces, Kleberg, Jim Wells, Duval, Live Oak, Kenedy, Willacy, Brooks, and Jim Hogg.

Rainfall and Area Conditions: This area received much needed rainfall during the first half of September. The rainfall events ranged from a trace to over two inches. Hurricane Ike did not produce much rainfall; only the most southern part of this area received rain. The U. S. Drought Monitor indicates this area is experiencing "No Drought to "Abnormally Dry" conditions. The Corpus Christi Reservoir System received little inflows during this time. Therefore, the reservoir level continues to drop. Most of the surface water diversions in this area continue to be for municipal and industrial uses; little irrigational use has been noted.

Stream flow Conditions: Stream flows in the area increased for a short time period during the rain events, but rapidly decreased and are flowing below what is expected for this time of year. According the USGS Stream Flow Gage at the Guadalupe River near Victoria, stream flows were approximately 650 CFS at the beginning of the month; then rose to 1,200 CFS,

and were approximately 370 CFS toward the end of the month. This is compared to 600 CFS last month. The historical mean at this site, based on 73 years of record, is 1,720 CFS. The gage at the San Antonio River near Goliad indicated the stream flows were approximately 575 CFS at the beginning of the month and ended at approximately 300 CFS. This is compared to 650 CFS last month. The historical mean at this site, based on 73 years of record, is 912 CFS. The gage at the San Antonio River at McFaddin, which is below Goliad, indicated the stream flows were approximately 550 CFS at the beginning of the month, and ended at approximately 250 CFS. This is compared to 500 CFS last month. The historical mean at this site, based on two years of record, is 1,580 CFS. The gage at the Guadalupe River near Tivoli, below the confluence of the San Antonio River and Guadalupe River, indicated stream flows of approximately 1,400 CFS at the beginning of the month, and 550 CFS at the end of the month. This is compared to 1,770 CFS last month. The historical mean at this site, based on two years of record, is 1,600 CFS. The gage at the Mission River near Refugio indicated stream flows were at approximately 5.0 CFS at the beginning of the month; stream flows rose to approximately 100 CFS, and ended at approximately 1.3 CFS. This is compared to 3.3 CFS last month. The historical mean at this site, based on 68 years of record, is 100 CFS. The USGS Stream Flow Gage of the Nueces River at Calallen Dam indicated 50 CFS stream flow over the dam near Corpus Christi; stream flows rose to approximately 150 CFS, and ended 100 CFS of stream flow towards the end of the month. This is compared to 3.7 CFS last month. The historical mean at this site during this time, based on eight years of record, is 230 CFS. The gage at the Aransas River near Skidmore indicated that stream flows were approximately 5.0 CFS at the beginning of the month; rose to approximately 1,000 CFS, and ended at approximately 3.6 CFS. This is compared to 5.3 CFS last month. The historical mean at this site during this time, based on 44 years of record, is 5.1 CFS.

Corpus Christi Reservoir System: The Corpus Christi Reservoir System did not receive many inflows during September and the level of the reservoir system continues to drop slightly. The Corpus Christi Reservoir System is currently at 83.9% of capacity or 799,330 acre-feet, compared to 100.0% of capacity or 951,493 acre-feet, during this same time last year. Choke Canyon is currently at 86.2% of capacity or 599,573 acre-feet, compared to 99.9% of capacity or 694,233 acre-feet, during this same time last year. Lake Corpus Christi is currently at 77.6% of capacity or 199,757 acre-feet, compared to 100.0% of capacity or 257,260 acre-feet, last year. Corpus Christi continues to divert much of their monthly water supply needs from Lake Texana.

Drought Restrictions: Water rights have not been curtailed due to permitted stream flow restrictions.

Area Counties: Atascosa, Karnes, Gonzales, Wilson, McMullen, Dewitt, Guadalupe, Lavaca, Fayette, Colorado, Wharton, and Jackson.

Rainfall and Area Conditions: This area received 0.25 to 0.7 inches of rainfall during September. Soil moisture conditions are poor at this time. Hay crops are beginning to suffer due to the dry windy conditions, and farmers have delayed planting winter oats and rye. Lake Texana is at 88% of capacity. The area ended last month at 77% capacity, which is 41.87 feet above mean sea level.

According to the U.S. Drought Monitoring System, this area is experiencing "Abnormally dry to severely dry" conditions at this time.

Stream flow Conditions: The flow of the San Antonio River near Falls City is currently 177 CFS. The historical mean for September is 230 CFS and the ending reading last month was

352 CFS. The Cibolo Creek near Falls City is currently 25 CFS and the ending reading last month was 42 CFS. The historical mean for September is 24 CFS. The Guadalupe River near Gonzales is currently at 657 CFS and the ending reading last month was 624 CFS. The historical mean for September is 763 CFS. The Lavaca River at Edna is currently 11 CFS and the ending reading last month was 12 CFS. The historical mean for September is 32 CFS. The Navidad River near Halletsville is currently at .62 CFS and the ending reading last month was .62 CFS. The historical mean for September is 7.5 CFS. The Atascosa River near Whitsett is currently 2.4 CFS and the ending reading last month was 20 CFS. The historical mean for September is 7.4 CFS. The Frio River near Tilden is currently 10 CFS and the ending reading last month was 16 CFS. The historical mean for September is 15 CFS. The Nueces River near Tilden is currently 1.0 CFS and the ending reading last month was 173 CFS. The historical mean for September is 65 CFS.

Drought Restrictions: Water rights have not been curtailed due to permitted stream flow restrictions.

Area Counties: Edwards, Real, Kinney, Uvalde, Zavala, Dimmit, La Salle and Webb.

Rainfall and Area Conditions: The Southwest Texas area received some relief from the drought conditions during September. There was no rain reported in the beginning of the month with heavier rain showers reported during the middle of the month for the northern region. The month ended with additional showers in the southern counties. The range of rainfall in this area was 0.25 to 2.00 inches for the month. Most of the diversions of surface water were for irrigational use and small amounts for municipal and industrial uses. Crops currently irrigated in the area are: cabbage, wheat, corn, hay grazers, and pecans. The U.S. Drought Report indicates this area is experiencing "Abnormally Dry to Severely Dry" drought conditions at this time.

Stream flow Conditions: Stream flows for the major tributaries in this area continued to flow well below the mean for this time of year. The Nueces River at Laguna had stream flows of 57 CFS, compared to 99 CFS last month. The historical mean is 150 CFS. The Nueces River near Brackettville had stream flows of .12 CFS, compared to 7.1 CFS last month. The historical mean is 20 CFS. The Nueces River below Uvalde had stream flows of 17 CFS, compared to 19 CFS last month. The historical mean is 161 CFS. The Frio River at Concan had stream flows of 32 CFS, compared to 49 CFS last month. The historical mean is 181 CFS. The Sabinal River at Sabinal had stream flows of 0.94 CFS, compared to 1.5 CFS last month. The historical mean is 34 CFS. The Leona River near Uvalde had stream flows of 29 CFS, compared to 29 CFS last month. The historical mean is 56 CFS.

Stream flows of intermittent and tributary streams in the area are flowing below average for this time of year.

Drought Restrictions: Currently, permits with stream flow restrictions are being regulated. The Zavala/Dimmit Water District has a rotational diversion schedule on the Nueces River to ensure adequate water for domestic and livestock use.

Area Counties: Bastrop, Bexar, Blanco, Caldwell, Comal, Fayette, Frio, Guadalupe, Hays, and Medina.

Rainfall and Area Conditions: Above average monthly rainfall fell across the San Antonio Regional Area for the month of September. Month to date rainfall measured at the San Antonio International Airport was 0.34 inches. The average for September is 3.0 inches. Total annual rainfall to date is 13.19 inches; normal year to date is 24.52 inches, a departure

from normal of -11.33 inches. On 09/23/2008, the U. S. Drought Monitor indicated the San Antonio Regional Area is experiencing "Severe to Extreme" Drought Conditions. This has impacted crops, pastures and grasslands, stream flows, and reservoir capacities. Ground moisture is now relatively poor with the lack of rain and no cloud cover with warm temperatures. Preparation for fall planting is underway; plowing, planting, fertilizing, etc. Cotton and hay grazers are harvested.

Stream Flow Conditions: The Guadalupe and Blanco Rivers are showing the impact of the ensuing current drought. Small creeks have dried and most major streams are beginning to quickly pool or dry up entirely. Municipal use has decreased with the shorter days and residential lawns requiring less irrigation. Industrial use remains constant.

All major tributaries in the San Antonio Regional Area are still well below their historical monthly averages for September. The Guadalupe River at Spring Branch is currently 27 CFS; the historical mean flow for September is 296 CFS. The San Marcos River at Luling is flowing at 89 CFS; the historical mean flow for September is 283 CFS. Lastly, the Blanco River at Wimberley is flowing at 11 CFS; the historical mean flow for September is 88.2 CFS.

Currently, Canyon Lake Reservoir is at 900.05 feet elevation and is impounding 312,354 acre-feet, and is at 82.4% of capacity. On 09/28/2008, the Edwards Aquifer level at the J17 well in Bexar County was 669.4 feet. The historical average for September is 661.6 feet, which is 7.8 feet above the monthly historical average. On 09/28/2008, the San Marcos Springs were flowing at 118.0 CFS. The historical monthly average for September is 165.0 CFS. This was 47.0 CFS below the monthly historical average. On 09/28/2008, the Comal Springs were flowing at 296.0 CFS. The monthly historical flow for September is 269.0 CFS; which is 27.0 CFS above the historical monthly average.

Drought Restrictions: Temporary Permits are now regulated, as well as permits with stream flow restrictions.

Area Counties: Sterling, Tom Green, Irion, Concho, Coke, Glasscock, Runnels, Reagan, and Schleicher.

No significant rainfall for the Concho River Valley came in July. According to information provided by the USDA, the State Drought Monitor Index has the Concho Valley at "Severe Drought".

Rainfall and Area Conditions: Rainfall in San Angelo for the month was 3.99 inches. Areas surrounding San Angelo received slightly higher rainfall amounts. The average rainfall amount for the area was 3.10 inches. The total amount of rainfall for the year is 18.51 inches. In 2007, there was 30.15 inches of rain. Average annual rainfall, based on 100 years of record, is 19 inches. Area reservoirs are showing slight decreases in the amount of storage from the previous month. Irrigational demand by appropriated surface water rights in the Concho Valley is at reduced volume, due to timely rains. The Texas Crop Moisture Index indicates soil moisture content is "Adequate". However, the Index has not been updated since September 6, 2008. Corn and sorghum are finished for the season. Cotton is in full bloom and winter wheat is being planted.

Stream Flow Conditions: Mean daily discharge statistics, based on six years of record, for USGS Gaging Station 08130700 at Spring Creek above Twin Buttes Reservoir near San Angelo is 0.00 CFS. The most recent value is 0.20 CFS. Mean daily discharge statistics at USGS Gaging Station 08136000 at Concho River at San Angelo/Bell Street is 4.7 CFS. This

is based on 77 years of record. Currently, it is at 3.0 CFS. Mean daily discharge statistics at USGS Gaging Station 08128000 at South Concho at Christoval is 11 CFS. This is based on 73 years of record. The most recent daily value is 13 CFS. Area lakes indicate Lake Nasworthy is at 83% of capacity or 8,493 acre-feet, O. C. Fisher is at 6% of capacity or 7,450 acre-feet, and Twin Buttes Lake is at 34% of capacity.

Drought Restrictions: Water rights have not been curtailed due to permitted stream flow restrictions.

8. **Upper Colorado** (Concho River watershed not included)

The upper Colorado River area received above normal precipitation during the month of September 2008. The National Weather Service in San Angelo reported monthly precipitation of 3.99 inches, which is 1.04 inches above normal. The annual total to date is 16.92 inches, which is 0.62 inches below normal. According to the U.S. Drought Monitor, the drought conditions in the area range from abnormally dry to moderate, and the upper reaches of the Llano River watershed are in an area of severe drought. Most tributaries in the upper Colorado watershed have diminished flows. The pool levels of EV Spence and OH Ivie Reservoir decreased during the month. The pool levels of EV Spence and OH Ivie Reservoirs were 12% and 59% of capacity, respectively.

9. **Texas Panhandle and Southern High Plains**

Amarillo Area: The Amarillo Region reports the following summary for the Northern panhandle area:

Lake Meredith is at 50.44 feet; up from a record low of 45.25 feet reported in July 2008. Lake Greenbelt started the month of July at 57.12 feet, and ended at 56.10 feet. Lake MacKenzie is at 72 feet, down three inches from the first of September. Lake Greenbelt is at 55.5 feet, down six inches from the first of September. The National Weather Service in Amarillo reported a total rainfall in September of 1.32 inches, which is 1.30 inches above the yearly average.

Lubbock Area: The Lubbock area had average precipitation during September 2008. Lubbock received 8.70 inches for the month. The average rainfall for September is 2.50 inches. Similar amounts were recorded throughout the Region 2 area. Approximately 7.9 inches fell within a 24 hour period and marked the largest single rainfall event in the area's history. Total precipitation for 2008 now stands at 24.14 inches; which is 8.60 inches above normal for this point in the year. The long term drought situation has not changed, and all of the communities previously noted as being on mandatory water restrictions remain on those restrictions. No new communities were added to the water restrictions list during September.

The following cities in the South Plains area remain on mandatory drought restrictions status: Lubbock and Amherst.

The following cities in the South Plains area remain on voluntary drought restrictions status: Ralls, Crosbyton, Spur, Post, White River WSC, and Valley WSC.

As Lake Meredith continues to decline, the City of Lubbock is making preparations to construct a pipeline from Lake Alan Henry to the City of Lubbock, 65 miles uphill, to use as an additional source of water. The City of Lubbock owns the water rights at this lake.

White River Lake: The lake is down 18.1 feet from normal. The normal level is 46 feet at the dam. This is approximately the same level that existed at the end of August 2008. This leaves the White River Water Supply District in a better position to supply water to its customers than it has in the past. White River WSD has groundwater wells on standby to supply water to its customers in the event the lake level drops below usable levels.

Lake Alan Henry: The lake is full. This lake is not used for public drinking water supplies at present, but will be utilized for this purpose in the near future.

10. Agricultural Concerns

No information available at this time.

11. Drought Impacts to Wildlife

No information available at this time.

12. Wildfire Concerns

The Keetch-Byram Drought Index (KBDI) is used to help determine potential for fire risk. It is a numerical index where each number is an estimate of the amount of precipitation, in 100ths of an inch, needed to bring the soil back to saturation. The index ranges from 0 to 800, with 0 representing a saturated soil, and 800 a completely dry soil. The relationship of the KBDI to fire danger is, as the index increases, the vegetation is subjected to increased moisture stress. KBDI levels and its relationship to expected fire potential are reflected in the following:

KBDI = 0 – 200: Soil moisture and large class fuel moistures are high and do not contribute much to fire intensity. This is typical of spring dormant season following winter precipitation.

KBDI = 201 – 400: Typical of late spring; early growing season. Lower litter and duff layers are drying and beginning to contribute to fire intensity.

KBDI = 401 – 600: Typical of late summer, early fall. Lower litter and duff layers contribute to fire intensity and will burn actively.

KBDI = 601 – 800: Often associated with more severe drought and increased wildfire occurrence. Intense, deep-burning fires with significant downwind spotting can be expected. Live fuels can also be expected to burn actively at these levels.

There are currently 136 counties, illustrated in Attachment 2, with KBDI values in excess of 400, indicating areas within these counties are beginning to experience dry conditions, which could result in an increased fire risk potential.

The Council, which is chaired by Jack Colley, Chief, Governor's Division of Emergency Management, is composed of state agencies concerned with the effects of drought and fire on the citizens of the State of Texas. The attached information was compiled and provided by representatives listed below. Points of contact, telephone numbers, and web site addresses are also provided.

Jack Colley, Chief, Governor's Division of Emergency Management, (512) 424-2443, fax (512) 424-2444, web site: http://www.txdps.state.tx.us/dem

John Sutton, Texas Water Development Board, (512) 463-7988, fax (512) 463-9893, web site: http://www.twdb.state.tx.us

Chris Loft, Texas Commission on Environmental Quality, (512) 239-4715, fax (512) 239-4770, web site: http://www.tceq.state.tx.us

Richard Egg, Texas State Soil & Water Conservation Board, (254) 773-2250, fax (254) 773-3311, web site: http://www.tsswcb.state.tx.us

Lance Williams, Texas Department of Agriculture, (512) 463-3285, fax (800) 835-2981, web site: http://agr.state.tx.us

Dr. Travis Miller, Texas AgriLife Extension Service, (979) 845-4808, fax (979) 845-0456, web site: http://texasextension .tamu.edu

Cindy Loeffler, Texas Parks & Wildlife Department, (512) 912-7015, fax (512) 707-1358, web site: http://www.tpwd.state.tx.us

Edward T. Morris, Department of Housing and Community Affairs, (512) 475-3329, Fax (512) 475-7498, web site: http://www.tdhca.state.tx.us

Michael Dunivan, Texas Forest Service, (830) 997-5426, web site: http://txforestservice.tamu.edu

Paul Tabor, Texas Department of State Health Services, (512) 458-7126, fax (512) 458- 7472, web site: http://www.dshs.state.tx.us/

Thomas Walker, Office of the Governor, Economic Development & Tourism, (512) 936-0169, fax (512) 936-0141, web site: http://www.governor.state.tx.us/divisions/ecodev

David A. Van Dresar, Texas Alliance of Groundwater Districts, (979) 968-3135, fax (979) 968-3194, web site: http://www.texasgroundwater.org/

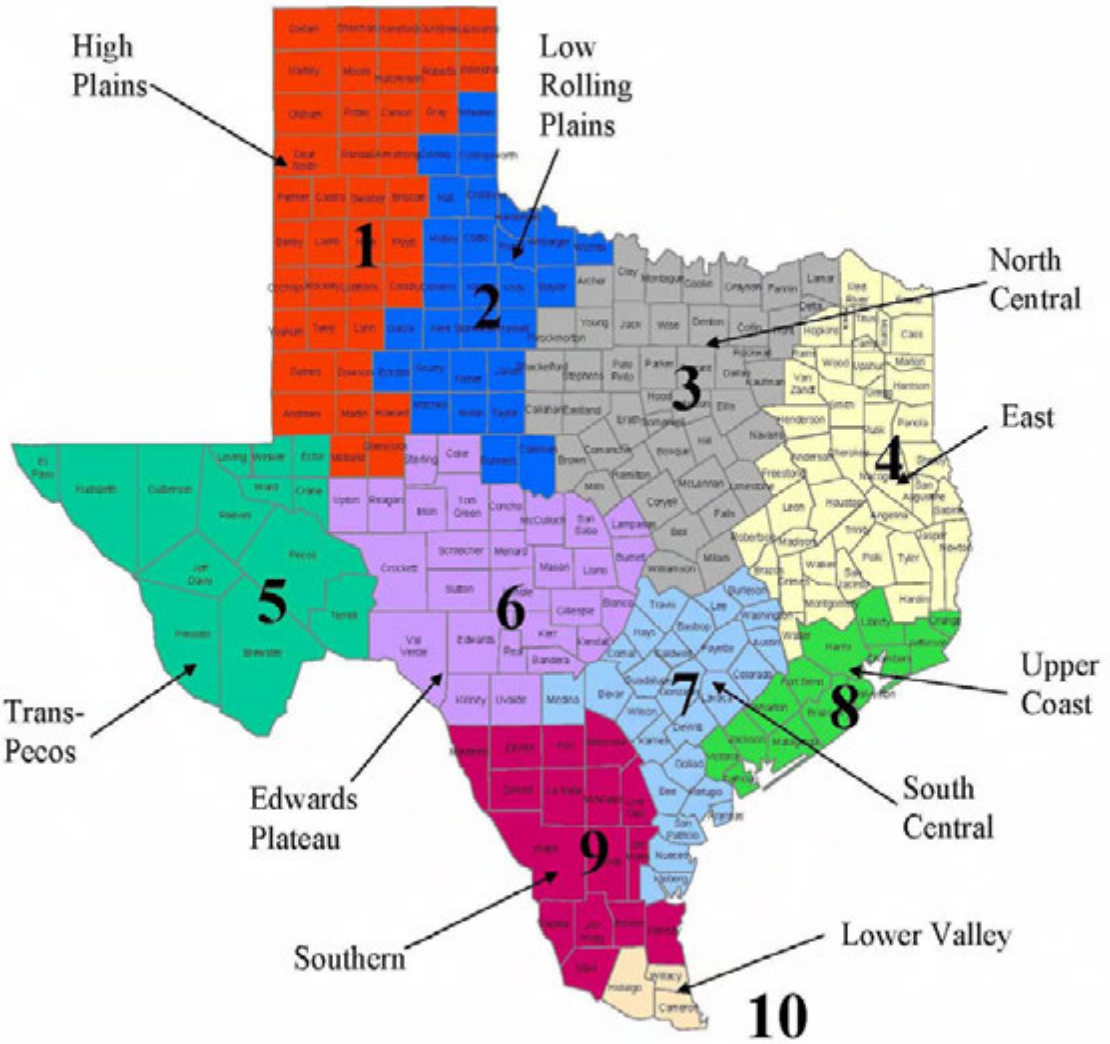
Dr. John W. Nielsen-Gammon, Office of the State Climatologist, (979) 862-2248, fax (979) 862-4466, web site: http://www.met.tamu.edu/osc/

Gus Garcia, Office of Rural Community Affairs, (512) 936-7876, fax (512) 936-6776, web site: http://www.orca.state.tx.us

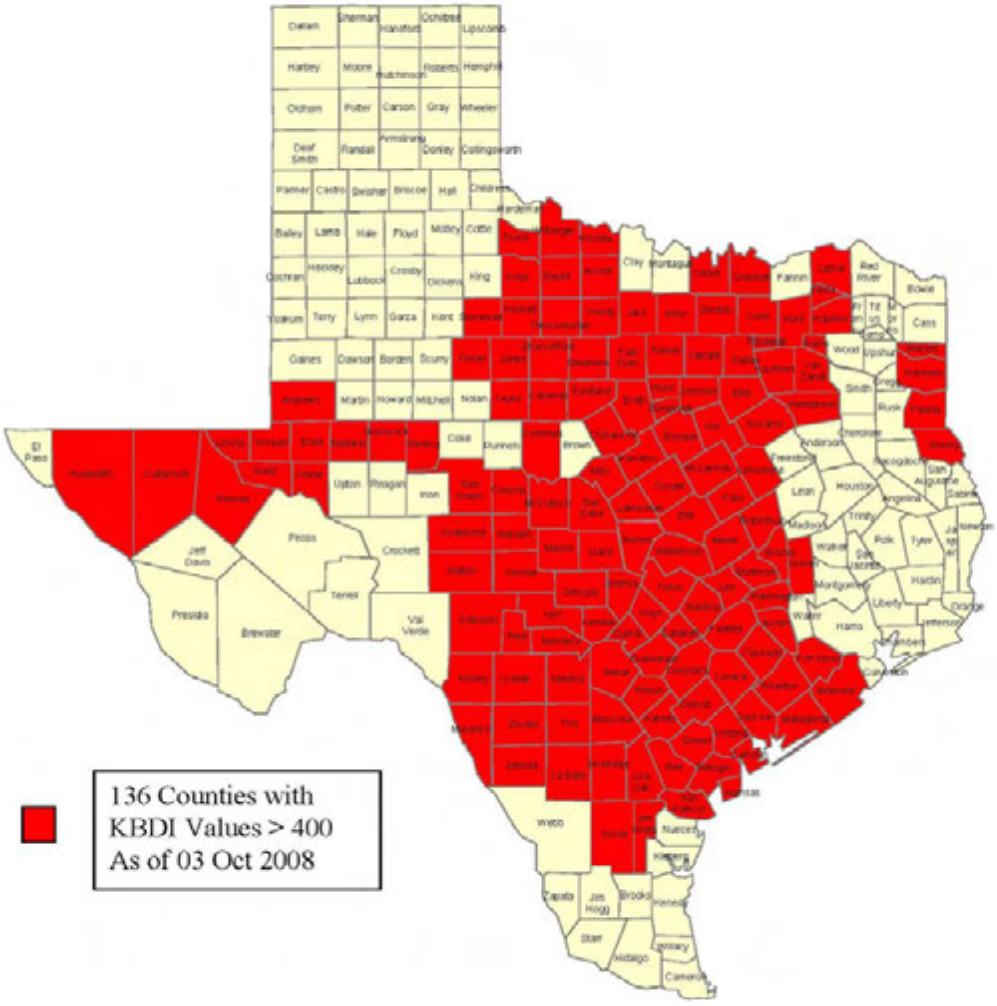
cc:

Amy Jeter, Committee Clerk, Senate Finance Committee
Sarah Hicks, Committee Director, Senate Finance Committee
Teddy Carter, Committee Clerk, Senate Natural Resources Committee
Amy Peterson, Committee Clerk, House Appropriations
Hope Wells, Committee Clerk, House Natural Resources Committee
Steven Schar, Committee Clerk, House Agriculture and Livestock Committee
Anne Creixell, Committee Clerk, House Criminal Jurisprudence Committee
Zak Covar, Policy Advisor for TCEQ Issues, Governor's Policy Office
Auburn Mitchell, Policy Advisor for Agriculture/TDA, Governor's Policy Office
Rob Johnson, Lt. Governor's Chief of Staff
Carmen Cernosek, Lt. Governor's Natural Resources Policy Analyst
Shane Linkous, Deputy Division Chief, Intergovernmental Relations, Attorney General's Office
Allan B. Polunsky, Chairman, Public Safety Commission
Louis E. Sturns, Member, Public Safety Commission
Colonel Stanley Clark, Interim Director, Department of Public Safety
Lieutenant Colonel Lamar Beckworth, Interim Assistant Director, Department of Public Safety
Lori Gabbert., Budget Analyst, Legislative Budget Board (LBB-DPS)
Tom Lambert, Budget Analyst, Legislative Budget Board (LBB-TCEQ)
Ed Perez, Executive Director, Texas Office of State-Federal Relations, Washington, DC
Brandon Steinmann, Director, Texas Office of State-Federal Relations, Austin, Texas

Attachment 1
Climatic Regions



Attachment 2
Counties with High to Extreme Fire Danger



DROUGHT PREPAREDNESS COUNCIL

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JACK COLLEY
Council Chairman

November 13, 2008

TO: The Honorable Rick Perry, Governor, State of Texas
The Honorable David Dewhurst, Lieutenant Governor, State of Texas
Ms. Esperanza Andrade, Secretary of State, State of Texas
The Honorable Mario Gallegos, Jr., President Pro Tempore of the Senate, State of Texas
The Honorable Tom Craddick, Speaker of the House, State of Texas
The Honorable Steve Ogden, Chairman, Senate Finance Committee, State of Texas
The Honorable Kip Averitt, Chairman, Senate Natural Resources Committee, State of Texas
The Honorable John Carona, Chairman, Senate Committee on Transportation & Homeland Security, State of Texas
The Honorable Warren Chisum, Chairman, House Appropriations Committee, State of Texas
The Honorable Mike Hamilton, Vice-Chairman, House Natural Resources Committee, State of Texas
The Honorable Sid Miller, Chairman, House Agriculture & Livestock Committee, State of Texas
The Honorable Aaron Peña, Chairman, House Criminal Jurisprudence Committee, State of Texas
Mr. Jay Kimbrough, Chief of Staff, Office of the Governor
Mr. Steven McCraw, Director, Texas Governor's Office of Homeland Security

FROM: Chief Jack Colley, Chairman, Drought Preparedness Council

SUBJECT: Statewide Drought Situation Report

1. **Next Council Meeting**

   December 11, 2008, 2:00 p.m., Governor's Conference Room of the Governor's Division of Emergency Management, State Operations Center, Texas Department of Public Safety Headquarters, 5805 N. Lamar Blvd., Austin, Texas.

   At this time, the Council will continue to meet on a monthly basis.

2. General Conditions

Overall Texas precipitation during the month of October was above normal in the panhandle and below normal in most other locations. The first half of October was more active than the second half across the State, characterized by several cold fronts pushing through Texas. These fronts brought heavy rain to the northern half of Texas, particularly the Panhandle, with isolated areas of Central and Southeast Texas receiving normal to above normal rainfall in October. However, the southern half of Texas was abnormally dry, worsening drought conditions already afflicting a large area.

The main drought concern is in the I-35 corridor near Austin and San Antonio stretching west to the Rio Grande River. The storm systems passing through Texas avoided these areas and, for the second straight month, most of South Central and West Central Texas received little, if any, precipitation. Del Rio had only 0.16 inches and San Antonio had only 0.26 inches of rainfall during October. Most of the USGS stations along the Colorado River in this region reported stream flow below normal levels, less than the 10^{th} percentile.

The good news across Texas compared to three months ago, drought conditions are much less widespread, thanks in large part to a wet August. However, the area of extreme drought in South Central Texas expanded during the last two months, increasing 1.8% in the past week alone, and now encompasses a 15-20 county region centered just to the south of Austin. The year-to-date precipitation in San Antonio as of November 9 was 13.50 inches. At least three more inches of precipitation in 2008 is needed to avoid having its driest year since the long-term drought of the 1950s. Austin/Camp Mabry, currently with 14.96 inches of precipitation in 2008, is in danger of receiving less than 20 inches of annual rainfall for only the tenth time since records were first kept in 1856.

Regions of moderate to severe drought extend from the area of extreme drought southward to the middle Texas coast, westward to the Rio Grande River, including Victoria and areas just to the north of Corpus Christi. After a very dry October, a small area along the Red River near Sherman was classified as having moderate drought conditions. The USGS station at Denison Dam along the Red River was reporting streamflow at only the second percentile.

The current long-range forecast from the Climate Prediction Center (CPC) calls for a 33-40% chance of below normal precipitation for the central third of Texas and a greater than 40% chance of below normal precipitation for the southern third of Texas. Due to the greater than 40% chance of below normal precipitation in most of South Texas, expect persistent drought conditions in these areas in addition to the possible development of drought conditions to the south of areas already in severe to extreme droughts. An equal chance of below normal, near normal, and above normal precipitation in extreme North Texas should improve the moderate drought along the Red River.

3. Overall Statewide Drought Conditions

The South Central region is under "Moderate Drought" conditions, according to the Palmer Drought Severity Index (PDSI). The Edwards Plateau region is at "Incipient Dry Spell," and the remainder of the State is mostly under "Slightly Wet" to "Extremely Wet" conditions. The PDSI varies from extremely wet, very wet, moderately wet, slightly wet, incipient wet spell, near normal, incipient dry spell, mild drought, moderate drought, severe drought, and extreme drought in order of increasing severity.

The Crop Moisture Index (CMI) indicates the South Central region is under "Abnormally Dry" conditions and the remainder of the State is under "Mildly Dry" to "Moisture Adequate"

conditions. The CMI varies from flooding, standing water, fields too wet, moisture adequate, mildly dry, abnormally dry, excessively dry, severely dry, and extremely dry in order of increasing severity.

The Six-Month Standardized Precipitation Index (SPI) indicates the South Central region is under "Moderately Dry" conditions, while the remainder of the State is experiencing "Near Normal" or "Extremely Wet" conditions. The SPI varies in categories of extremely wet conditions, very wet, moderately wet, near normal, moderately dry and, severely dry, extremely dry in order of increasing severity.

The Keetch-Byram Drought Index (KBDI) indicates the South Central region is under "very high fire risk" condition. The North Central, East, Edwards Plateau, Upper Coast, as well as Southern regions are under "high fire risk" conditions, and the Trans-Pecos region is under "fire risk above average" condition. The KBDI is a drought index specifically used to describe potential or expected fire behavior. The index is classified as Low, Moderate, High or Extreme fire danger, in order of increasing severity.

Texas Forest Service reports outdoor burn bans in 47 counties.

The Climate Prediction Center (CPC) forecasts above normal precipitation with up to 40% chance in upper High Plains, Low Rolling Plains, North Central, and East regions, but below normal precipitation with up to 40% chance in Trans-Pecos, Edwards, South Central, Upper Coast, Southern, and Lower Valley regions from November 2008 to January 2009. During the same period, the CPC forecasts above normal temperatures for the entire state.

The National Oceanic and Atmospheric Administration (NOAA) Seasonal U.S. Drought Outlook through January 2009, forecasts persisting areas of drought in the Edwards Plateau, South Central, Upper Coast, and Southern regions, and "likely developing drought" conditions in lower Southern region.

4. **Water Utility Status**

November 2008 began with 120 public water systems on the drought list. That number included 13 water systems that relaxed restrictions imposed in 2008 and returned to normal operations and water usage. The remaining 107 water systems on the list included 75 systems that placed their customers on mandatory outside water restrictions and 32 systems that requested voluntary conservation. With the approach of colder winter weather conditions, it is expected additional water systems will review the triggers of their Drought Contingency Plans and be able to relax all watering restrictions.

5. **Water Rights – Statewide**

New temporary water use permit applications are reviewed on a site-specific basis and are issued if there is sufficient surplus water at the requested source. Applications for new water use permits and amendments to existing permits remained normal for the month. Beginning September 1, more severe restrictions for water rights of the Hale Clause along the Brazos River and Brazos River Basin were lifted. Until April 1, 2009 the owners of these water rights may observe less severe stream flow restrictions of their permits. The availability of unappropriated water for new water use permits continues to decrease in all river basins in the State and the search for long-term, dependable alternate sources of water remains a high priority issue.

6. **Water Rights – Lower Rio Grande / Rio Grande Watermaster (RGWM)**

Current Overall Conditions: As of October 25, 2008, the U.S. combined ownership at Amistad/Falcon stands at 100.00% of conservation capacity or 3,392,011 acre-feet. This is down from 103.92% or 3,524,967 acre-feet from a year ago at this time. Overall, the system is holding 98.80% or 5,851,705 acre-feet, of conservation capacity with Amistad at 100.92% or 3,306,075 acre-feet and Falcon at 96.17% or 2,545,629 acre-feet. Mexico has 97.18% or 2,459,694 acre-feet of the water it could store at Amistad/Falcon.

Allocations: As of the printing of the September ownership report, the U.S. has allocated in excess of 785,038 acre-feet for irrigation and mining. The U.S. continues to have an amount in excess of 636,328 acre-feet for future allocations in 2008.

Storage & Loss Amistad vs. Falcon: The U.S. is currently storing approximately 1.8 million acre-feet at Amistad. The U.S. reached conservation capacity at Amistad on September 29, 2008. The U.S. is currently storing approximately 1.5 million acre-feet at Falcon, or 100% capacity.

Evaporation and seepage losses at Amistad YTD are 16,828 acre-feet. During the same period, the U.S. lost 20,243 acre-feet at Falcon. The ratio of loss between Amistad and Falcon continues to be 1:2, consistently with Amistad being twice as efficient in overall storage and loss.

Releases to Meet Demands: Mexico released 865,432 acre-feet from Amistad and 861,801 acre-feet from Falcon for Mexico needs. The U.S. released 1,551,433 acre-feet from Amistad and 1,009,950 acre-feet from Falcon for U.S. needs. Combined with gains between Amistad and Falcon, U.S. inflows to Falcon totaled 1,764,336 acre-feet. So far, the U.S. met 64% of overall needs in the middle and Lower Rio Grande directly from middle Rio Grande and Amistad inflows this year. The movement of water from Amistad is primarily driven by U.S. excess amount in storage and the need to keep it below conservation capacity, particularly when the U.S. is occupying Mexico's space in Amistad.

Upper Rio Grande (New Mexico): Currently, Elephant Butte in New Mexico is storing 582,089 acre-feet or 28.77% and Caballo Dam, downstream of Elephant Butte, is storing 17,025 acre-feet or 7.50%. This water storage, in part, is used to meet water needs in the El Paso area.

Outlook: All active accounts began 2008 with 100% usable balances. The reservoirs increased in elevation due to the rainfall here and in the upper Rio Grande Regions as well. To help alleviate losses in Falcon, the U.S. will continue to monitor ownership and elevations levels in both Falcon and Amistad for more efficient U.S. transfers of water from Amistad to Falcon. It appears at this point that 2009 will start with all active accounts at full capacity. The unique situation at this point is both the U.S. reservoirs are considered full as are the majority of the Mexican reservoirs in the Rio Grande Basin. Effective October 26, 2008, No Charge Pumping was declared from Amistad down to the Gulf for all diversion requests until further notice.

7. **South Texas Watermaster – Guadalupe / Lavaca / San Antonio / Nueces Region**

The South Texas and Concho areas of Texas received rainfall during October. The drought ranges from "Severe" to "Extreme" according to the U.S. Drought Monitor. There was minimal rainfall in the central part of the State with surrounding areas receiving sufficient

amounts to limit the drought conditions. Cooler weather is expected and irrigation will decrease, but the area is still in need of rain.

Area Counties: Bandera, Blanco, Comal, Kendall and Kerr Counties

Rainfall and Area Conditions: This area received various amounts of precipitation, ranging from 2.0 to 2.50 inches during October. With the current amount of rainfall, the Texas Crop Moisture Index in this area of the hill country is classified as "Abnormally Dry". Most surface water diversions in this area are for municipal and industrial uses, with a few surface water permit holders irrigating hay and sod fields. The U.S. Drought Monitor indicates that this area is currently in "Severe Drought" to "Extreme Drought" conditions.

Stream flow Conditions: None of the major streams or their tributaries flowed at normal capacities. Most of the major streams showed a steady decline during October and most of the smaller, secondary tributaries lost surface flow. The Guadalupe River near Kerrville has a current stream flow of approximately 47 CFS. The historical monthly mean is 122 CFS. The Guadalupe River near Comfort has a current stream flow of approximately 35 CFS. The historical monthly mean is 278 CFS. The Medina River near Bandera has a current stream flow of 17 CFS. The historical monthly mean is 104 CFS.

Drought Restrictions: On August 7, 2008, Kerrville was restricted in the amount of surface diversions from the Guadalupe River and limited to pumping three million gallons per day. All temporary surface water permits in the Guadalupe River Basin above Canyon Lake and the San Antonio River Basin above Lake Medina were suspended. Because of the low stream flows, some State permit holders already reached their flow restrictions and were curtailed from pumping. Therefore, the river flows are heavily monitored on a daily basis.

Area Counties: Bee, Goliad, Victoria, Calhoun, Jackson, Refugio, Aransas, San Patricio, Nueces, Kleberg, Jim Wells, Duval, Live Oak, Kenedy, Willacy, Brooks, and Jim Hogg.

Rainfall and Area Conditions: This area received little rainfall during October. Some localized rainfall events occurred throughout the month, ranging from a trace to over one inch, which provided temporary soil moisture and runoff into local area streams. The U. S. Drought Monitor indicates this area is experiencing "No Drought to "Abnormally Dry" conditions. The Corpus Christi Reservoir System received little inflows during this time. Therefore, the reservoir level continued to drop. Most of the surface water diversions continued to be for municipal and industrial uses little irrigational use has been noted.

Stream flow Conditions: Stream flows in the area continued to decrease and were flowing below expectations for this time of year. According the USGS Stream Flow Gage at the Guadalupe River near Victoria, stream flows were approximately 400 CFS at the beginning of the month and approximately 360 CFS toward the end of the month, compared to 370 CFS last month. The historical mean at this site, based on 73 years of record, is 1,730 CFS. The gage at the San Antonio River near Goliad indicated the stream flows were approximately 200 CFS at the beginning of the month and ended at approximately 275 CFS, compared to 300 CFS last month. The historical mean at this site, based on 73 years of record, is 829 CFS. The gage at the San Antonio River at McFaddin, which is below Goliad, indicated the stream flows were approximately 250 CFS at the beginning of the month, and ended at approximately 285 CFS, compared to 250 CFS last month. The historical mean at this site, based on one year of record, is 308 CFS. The gage at the Guadalupe River near Tivoli, below the confluence of the San Antonio River and Guadalupe River, indicated stream flows of approximately 800 CFS at the beginning of the month, and 850 CFS at the end of the month, compared to 850 CFS last month. The historical mean at this site, based

on two years of record, is 1,940 CFS. The gage at the Mission River near Refugio indicated stream flows at approximately 5.0 CFS at the beginning of the month and ended at approximately 4.2 CFS, compared to 1.3 CFS last month. The historical mean at this site, based on 68 years of record, is 242 CFS. The USGS Stream Flow Gage of the Nueces River at Calallen Dam indicated 125 CFS stream flow over the dam near Corpus Christi. Stream flows rose to approximately 300 CFS around October 4, 2008 and ended at approximately 18 CFS of stream flow towards the end of the month, compared to 100 CFS last month. The historical mean at this site during this time, based on eight years of record, is 2,110 CFS. The gage at the Aransas River near Skidmore indicated that stream flows were approximately 4.5 CFS at the beginning of the month and ended at approximately 3.1 CFS, compared to 3.6 CFS last month. The historical mean at this site during this time, based on 43 years of record, is 38 CFS.

Corpus Christi Reservoir System: The Corpus Christi Reservoir System did not receive much inflow during October and the level of the reservoir system continued to drop slightly. The Corpus Christi Reservoir System is currently at 80.7% of capacity or 768,306 acre-feet, compared to 98.8% of capacity or 941,373 acre-feet, during this same time last year. Choke Canyon is currently at 84.1% of capacity or 584,844 acre-feet, compared to 98.5% of capacity or 684,660 acre-feet, during this same time last year. Lake Corpus Christi is currently at 71.3% of capacity or 183,462 acre-feet, compared to 99.8% of capacity or 257,713 acre-feet, last year. Corpus Christi continues to divert much of their monthly water supply needs from Lake Texana.

Drought Restrictions: Water rights have not been curtailed due to permitted stream flow restrictions.

Area Counties: Atascosa, Karnes, Gonzales, Wilson, McMullen, Dewitt, Guadalupe, Lavaca, Fayette, Colorado, Wharton, and Jackson.

Rainfall and Area Conditions: This area received 0.00 to 1.7 inches of rainfall during October. Soil moisture conditions are poor at this time. Hay season ended and oat and rye crops are suffering without supplemental irrigation. There is currently very little irrigation activity. Lake Texana is at 82% of capacity. The area ended last month at 88% capacity, which is 40.8 feet above mean sea level.

According to the U.S. Drought Monitoring System, this area is experiencing "Abnormally Dry to Severely Dry" conditions at this time.

Stream flow Conditions: The flow of the San Antonio River near Falls City is currently 212 CFS. The historical mean for October is 254 CFS and the ending reading last month was 177 CFS. The Cibolo Creek near Falls City is currently 23 CFS and the ending reading last month was 25 CFS. The historical mean for October is 27 CFS. The Guadalupe River near Gonzales is currently at 321 CFS and the ending reading last month was 657 CFS. The historical mean for October is 879 CFS. The Lavaca River at Edna is currently 10 CFS and the ending reading last month was 10 CFS. The historical mean for October is 48 CFS. The Navidad River near Halletsville is currently at 0.96 CFS and the ending reading last month was 0.62 CFS. The historical mean for October is 14 CFS. The Atascosa River near Whitsett is currently 2.8 CFS and the ending reading last month was 2.4 CFS. The historical mean for October is 10 CFS. The Frio River near Tilden is currently 6.6 CFS and the ending reading last month was 10 CFS. The historical mean for October is 59 CFS. The Nueces River near Tilden is currently 0.3 CFS and the ending reading last month was 1 CFS. The historical mean for October is 36 CFS.

Drought Restrictions: Water rights have not been curtailed due to permitted stream flow restrictions.

Area Counties: Edwards, Real, Kinney, Uvalde, Zavala, Dimmit, La Salle and Webb.

Rainfall and Area Conditions: The Southwest Texas area received very little relief from the drought conditions during October. There was no rain reported in the beginning of the month, but heavier rain showers were reported during the middle of the month for the northern region. The month ended with no additional relief from the drought. The range of rainfall in this area was 0.05 to 1.5 inches for the month. Most of the diversions of surface water were for irrigational use and small amounts for municipal and industrial uses. Crops currently irrigated in the area are: cabbage, wheat, corn, hay grazers, and pecans. The U.S. Drought Report indicates this area is experiencing "Abnormally Dry" to "Severe" drought conditions at this time.

Stream flow Conditions: Stream flows for the major tributaries in this area continued to flow well below the mean for this time of year. The Nueces River at Laguna had stream flows of 50 CFS, compared to 57 CFS last month. The historical mean is 203 CFS. The Nueces River near Brackettville had stream flows of 0.09 CFS, compared to 0.12 CFS last month. The historical mean is 16 CFS. The Nueces River below Uvalde had stream flows of 16 CFS, compared to 17 CFS last month. The historical mean is 186 CFS. The Frio River at Concan had stream flows of 28 CFS, compared to 32 CFS last month. The historical mean is 133 CFS. The Sabinal River at Sabinal had stream flows of 0.74 CFS, compared to .94 CFS last month. The historical mean is 23 CFS. The Leona River near Uvalde had stream flows of 28 CFS, compared to 29 CFS last month. The historical mean is 45 CFS.

Stream flows of intermittent and tributary streams in the area are flowing below average for this time of year.

Drought Restrictions: Currently, permits with stream flow restrictions are being regulated. The Zavala/Dimmit Water District has a rotational diversion schedule on the Nueces River to ensure adequate water for domestic and livestock use.

Area Counties: Bastrop, Bexar, Blanco, Caldwell, Comal, Fayette, Frio, Guadalupe, Hays, and Medina.

Rainfall and Area Conditions: Well below average monthly rainfall fell across the San Antonio Regional Area during October. Month to date rainfall measured at the San Antonio International Airport was 0.07 inches. The average for October is 3.86 inches. Total annual rainfall to date is 13.45 inches; normal year to date is 28.38 inches, a departure from normal of 14.93 inches. On October 28, 2008, the U. S. Drought Monitor indicated the San Antonio Regional Area is experiencing "Severe to Extreme" Drought Conditions. This has impacted crops, pastures and grasslands, stream flows, and reservoir capacities. Ground moisture is now relatively poor with the lack of rain and no cloud cover. Winter oats, mustard greens, turnips, beets, carrots, swiss chard, collard greens, and spinach are being planted.

Stream Flow Conditions: The Guadalupe and Blanco Rivers were showing the impact of the worsening drought. Small creeks have dried and most major streams are beginning to quickly pool or dry up entirely. Municipal use has decreased with the shorter days and residential lawns require less irrigation. Industrial use remained constant.

All major tributaries in the San Antonio Regional Area were still well below their historical monthly averages for September. The Guadalupe River at Spring Branch is currently 35

CFS, the historical mean flow for October is 350 CFS. The San Marcos River at Luling is flowing at 100 CFS, the historical mean flow for October is 414 CFS. The Blanco River at Wimberley is flowing at 12 CFS, the historical mean flow for October is 117 CFS.

Currently, Canyon Lake Reservoir is at 899.19 feet elevation, impounding 303,757 acre-feet, and is at 80.17% of capacity. On October 31, 2008, the Edwards Aquifer level at the J17 well in Bexar County was 667.8 feet. The historical average for October is 664.6 feet, which is 3.2 feet above the monthly historical average. On October 30, 2008, the San Marcos Springs were flowing at 105 CFS. The historical monthly average for October is 161 CFS. This was 56 CFS below the monthly historical average. On October 31, 2008, the Comal Springs were flowing at 286 CFS. The monthly historical flow for October is 281 CFS; which is 5 CFS above the historical monthly average.

Drought Restrictions: Temporary Permits are now regulated, as well as permits with stream flow restrictions.

Area Counties: Sterling, Tom Green, Irion, Concho, Coke, Glasscock, Runnels, Reagan, and Schleicher.

Beneficial rains came to the Concho River Valley in October. However, the amounts were below average. According to information provided by the USDA, the State Drought Monitor Index has the Concho Valley at "Moderate Drought".

Rainfall and Area Conditions: Rainfall in San Angelo for the month was 1.81 inches. Areas surrounding San Angelo received slightly higher rainfall amounts. The average rainfall amount for the area was 2.33 inches. The total amount of rainfall for the year is 20.31 inches. In 2007, there were 30.98 inches of rain. Average annual rainfall, based on 100 years of record, is 19 inches. Area reservoirs were showing slight decreases in the amount of storage from the previous month. Irrigation demand by appropriated surface water rights in the Concho Valley has reduced volume, due to timely rains. The Texas Crop Moisture Index indicated soil moisture content was "Abnormally Dry". However, the Index has not been updated since October 4, 2008. Cotton is being stripped and picked and winter wheat is being planted.

Stream Flow Conditions: Mean daily discharge statistics, based on six years of record for USGS Gaging Station 08130700 at Spring Creek above Twin Buttes Reservoir near San Angelo was 8.7 CFS. The most recent value was 5.20 CFS. Mean daily discharge statistics at USGS Gaging Station 08136000 at Concho River at San Angelo/Bell Street was 60 CFS. This is based on 77 years of record. Currently, it is at 9.0 CFS. Mean daily discharge statistics at USGS Gaging Station 08128000 at South Concho at Christoval was 26 CFS. This is based on 73 years of record. The most recent daily value was 19 CFS. Area lakes indicate Lake Nasworthy is at 82% of capacity or 8,396 acre-feet, O. C. Fisher was at 6% of capacity or 6,491 acre-feet, and Twin Buttes Lake was at 33% of capacity or 62,206 acre-feet.

Drought Restrictions: There are no additional restrictions on diversions in the Concho Valley.

8. <u>Upper Colorado</u> (Concho River watershed not included)

The upper Colorado River area received less than normal precipitation during October. The National Weather Service in San Angelo reported monthly precipitation of 1.81 inches, which was 0.76 inches above normal. The annual total to date is 18.73 inches, which was 0.14

inches below normal. According to the U.S. Drought Monitor, the drought conditions in the area range from abnormally dry to moderate, and the upper reaches of the Llano River watershed are in an area of severe drought. Most tributaries in the upper Colorado watershed have diminished flows. However, there were isolated areas that were flowing at or above USGS long-term median. The pool levels of EV Spence and OH Ivie Reservoir decreased during the month. The pool levels of EV Spence and OH Ivie Reservoirs were 11% and 57% of capacity, respectively.

9. **Texas Panhandle and Southern High Plains**

Amarillo Area: The Amarillo Region reports the following summary for the Northern panhandle area:

Lake Meredith was at 53.41 feet and appears to be on a slow rise. Lake Greenbelt started the month at 55.49 feet and ended without change. Lake MacKenzie was at 71.90 feet. The National Weather Service in Amarillo reported a total rainfall in October of 3.87 inches, which was 3.78 inches above the yearly average.

Lubbock Area: The Lubbock area had average precipitation during October. Lubbock received 3.77 inches for the month. The average rainfall for October is 1.66 inches. Similar amounts were recorded throughout the Region 2 area. Total precipitation for 2008 now stands at 27.91 inches; which is 10.64 inches above normal for this point in the year. The long term drought situation was not changed and all of the communities previously noted as being on mandatory water restrictions remained on those restrictions. No new communities were added to the water restrictions list during October.

The following cities in the South Plains area remained on mandatory drought restrictions status: Lubbock and Amherst.

The following cities in the South Plains area remained on voluntary drought restrictions status: Ralls, Crosbyton, Spur, Post, White River WSC, and Valley WSC.

As Lake Meredith continued to decline, the City of Lubbock made preparations to construct a pipeline from Lake Alan Henry to the City of Lubbock, 65 miles uphill, to use as an additional source of water. The City of Lubbock owns the water rights at this lake.

White River Lake: The lake is currently at 28.6 feet at the dam, and is considered to be full at 46 feet. This is an increase of 0.7 feet from the level at the end of September 2008. White River WSD has groundwater wells on standby to supply water to its customers if the lake level drops below usable levels.

Lake Alan Henry: The lake is full. It is not used for public drinking water supplies at present, but will be utilized for this purpose in the near future.

10. **Agricultural Concerns**

Most of Texas agriculture was negatively affected by drought in 2008. On September 8, 2008, the Texas AgriLife Extension Service released an estimate of drought losses which totaled $1.4 billion in direct losses to agricultural producers to that date, with the estimate containing $1.1 billion in losses to crops and $260 million to the livestock sector which included losses to hay producers. The greatest losses were to cotton, followed by hay, cattle, corn, sorghum and wheat. Severe weather caused the loss of 1.3 million of the

State's 4.7 million planted acres of cotton. This figure included about 200,000 acres lost to Hurricane Dolly. Much of the cotton loss was dryland cotton in the High Plains. Early summer rains allowed many of these acres to be replanted to sorghum and other crops, whereas severe crop losses along the coast and in central Texas did not receive beneficial moisture and remained dry at this time. Hay is in short supply over most of the eastern part of the State due to the dry spring and summer.

Hurricane Ike provided much needed moisture in parts of east and central Texas on September 11 and 12, but general rainfall was very limited in eastern portions of the State until early November, when light rains brought some relief. Much of the central, southwest, and coastal areas of the State remained dry, offering poor growing conditions for wheat, oats and other winter pastures. Wheat in the Blacklands and south Texas was in poor condition or had not germinated due to dry weather. Livestock operations are culling cattle in central Texas due to lack of water and forages. The High and Rolling Plains are in fair to excellent condition with respect to moisture.

11. Drought Impacts to Wildlife

No information available at this time.

12. Wildfire Concerns

The Keetch-Byram Drought Index (KBDI) is used to help determine potential for fire risk. It is a numerical index where each number is an estimate of the amount of precipitation, in 100ths of an inch, needed to bring the soil back to saturation. The index ranges from 0 to 800, with 0 representing a saturated soil, and 800 a completely dry soil. The relationship of the KBDI to fire danger is, as the index increases, the vegetation is subjected to increased moisture stress. KBDI levels and its relationship to expected fire potential are reflected in the following:

KBDI = 0 – 200: Soil moisture and large class fuel moistures are high and do not contribute much to fire intensity. This is typical of spring dormant season following winter precipitation.

KBDI = 201 – 400: Typical of late spring; early growing season. Lower litter and duff layers are drying and beginning to contribute to fire intensity.

KBDI = 401 – 600: Typical of late summer, early fall. Lower litter and duff layers contribute to fire intensity and will burn actively.

KBDI = 601 – 800: Often associated with more severe drought and increased wildfire occurrence. Intense, deep-burning fires with significant downwind spotting can be expected. Live fuels can also be expected to burn actively at these levels.

There are currently 141 counties, illustrated in Attachment 2, with KBDI values in excess of 400, indicating areas within these counties are beginning to experience dry conditions, which could result in an increased fire risk potential.

The Council, which is chaired by Jack Colley, Chief, Governor's Division of Emergency Management, is composed of state agencies concerned with the effects of drought and fire on the citizens of the State of Texas. The attached information was compiled and provided by representatives listed below. Points of contact, telephone numbers, and web site addresses are also provided.

Jack Colley, Chief, Governor's Division of Emergency Management, (512) 424-2443, fax (512) 424-2444, web site: http://www.txdps.state.tx.us/dem

John Sutton, Texas Water Development Board, (512) 463-7988, fax (512) 463-9893, web site: http://www.twdb.state.tx.us

Chris Loft, Texas Commission on Environmental Quality, (512) 239-4715, fax (512) 239-4770, web site: http://www.tceq.state.tx.us

Richard Egg, Texas State Soil & Water Conservation Board, (254) 773-2250, fax (254) 773-3311, web site: http://www.tsswcb.state.tx.us

Lance Williams, Texas Department of Agriculture, (512) 463-3285, fax (800) 835-2981, web site: http://agr.state.tx.us

Dr. Travis Miller, Texas AgriLife Extension Service, (979) 845-4808, fax (979) 845-0456, web site: http://texasextension .tamu.edu

Cindy Loeffler, Texas Parks & Wildlife Department, (512) 912-7015, fax (512) 707-1358, web site: http://www.tpwd.state.tx.us

Edward T. Morris, Department of Housing and Community Affairs, (512) 475-3329, Fax (512) 475-7498, web site: http://www.tdhca.state.tx.us

Michael Dunivan, Texas Forest Service, (830) 997-5426, web site: http://txforestservice.tamu.edu

Paul Tabor, Texas Department of State Health Services, (512) 458-7126, fax (512) 458- 7472, web site: http://www.dshs.state.tx.us/

Thomas Walker, Office of the Governor, Economic Development & Tourism, (512) 936-0169, fax (512) 936-0141, web site: http://www.governor.state.tx.us/divisions/ecodev

David A. Van Dresar, Texas Alliance of Groundwater Districts, (979) 968-3135, fax (979) 968-3194, web site: http://www.texasgroundwater.org/

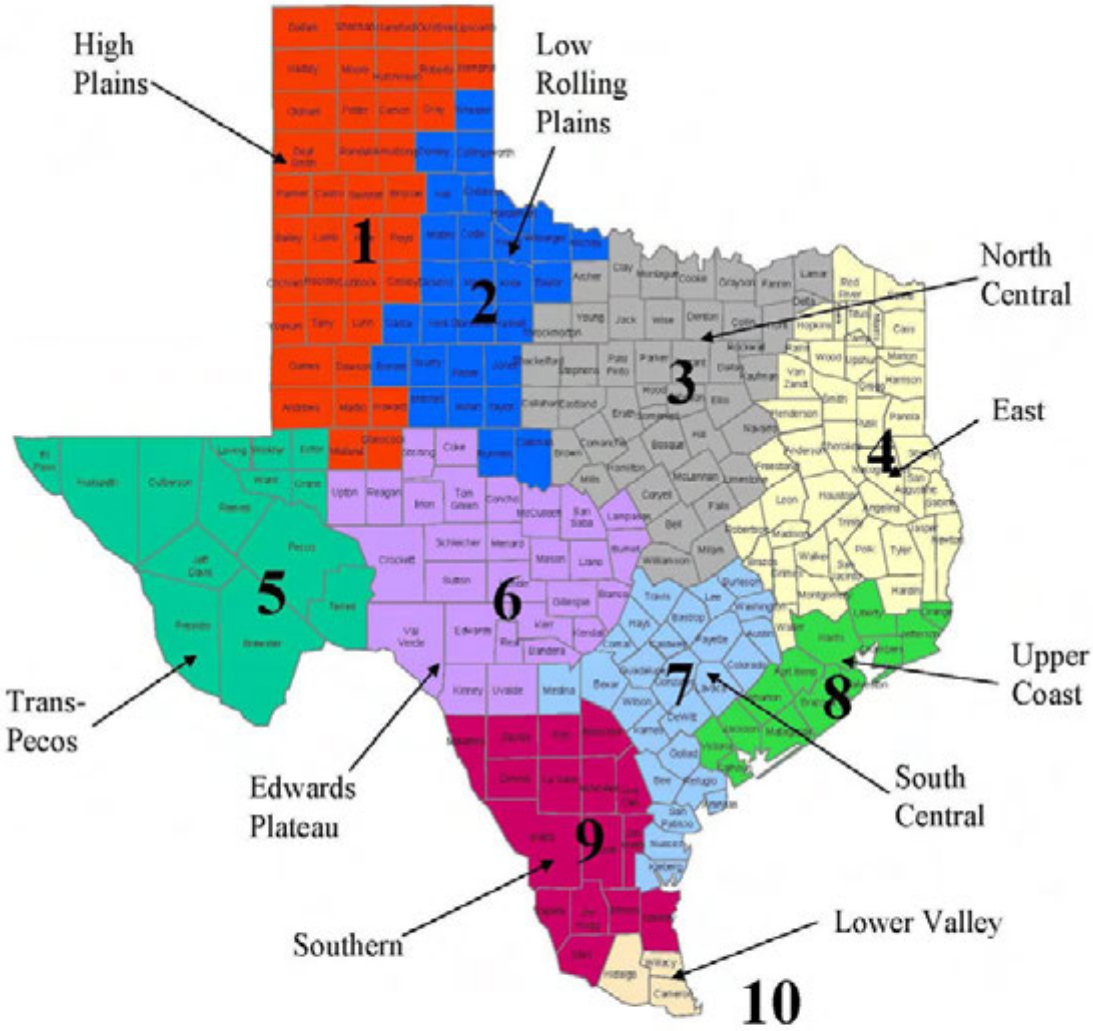
Dr. John W. Nielsen-Gammon, Office of the State Climatologist, (979) 862-2248, fax (979) 862-4466, web site: http://www.met.tamu.edu/osc/

Gus Garcia, Office of Rural Community Affairs, (512) 936-7876, fax (512) 936-6776, web site: http://www.orca.state.tx.us

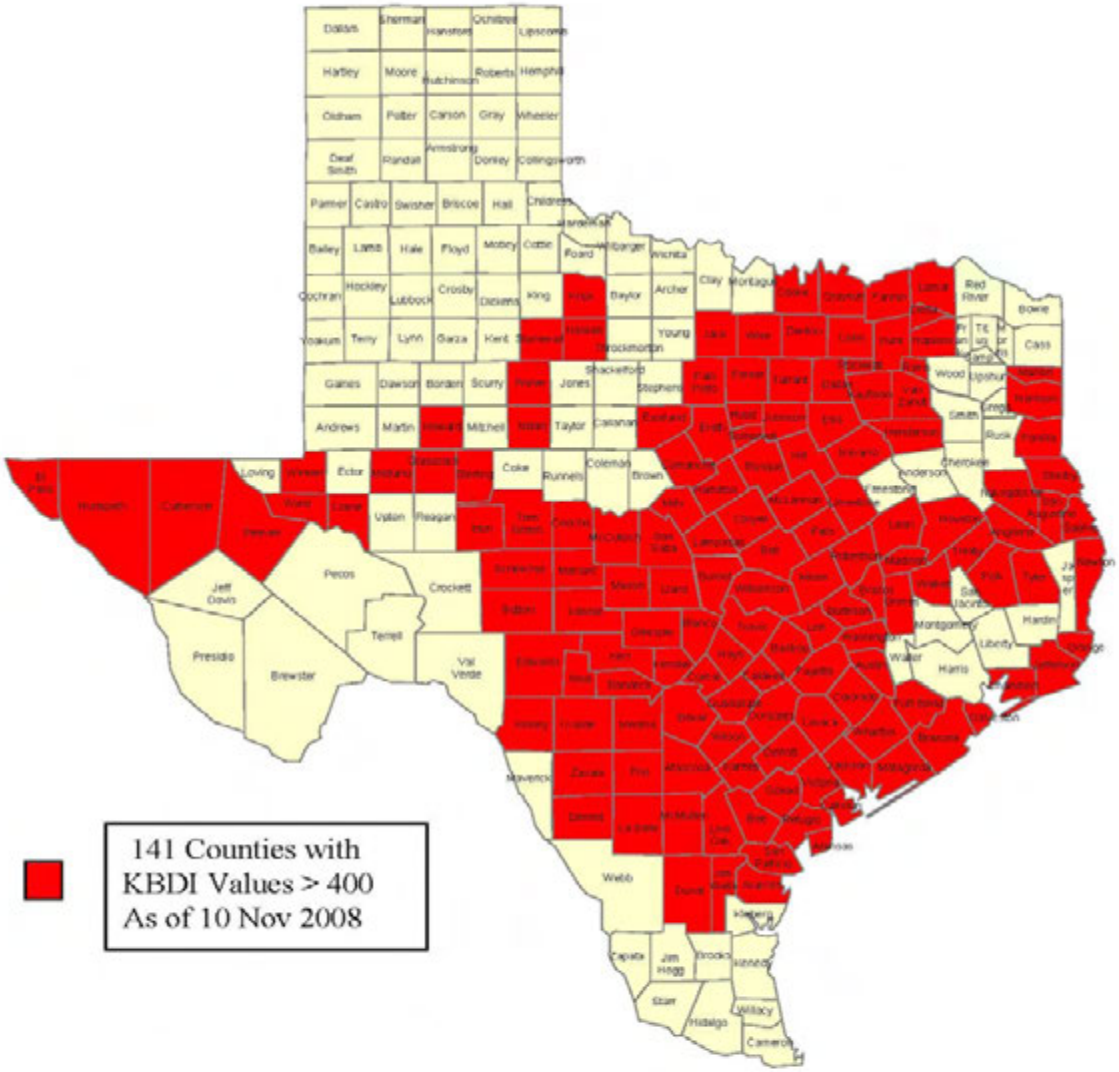
cc:

Amy Jeter, Committee Clerk, Senate Finance Committee
Sarah Hicks, Committee Director, Senate Finance Committee
Teddy Carter, Committee Clerk, Senate Natural Resources Committee
Amy Peterson, Committee Clerk, House Appropriations
Hope Wells, Committee Clerk, House Natural Resources Committee
Steven Schar, Committee Clerk, House Agriculture and Livestock Committee
Anne Creixell, Committee Clerk, House Criminal Jurisprudence Committee
Zak Covar, Policy Advisor for TCEQ Issues, Governor's Policy Office
Auburn Mitchell, Policy Advisor for Agriculture/TDA, Governor's Policy Office
Rob Johnson, Lt. Governor's Chief of Staff
Carmen Cernosek, Lt. Governor's Natural Resources Policy Analyst
Shane Linkous, Deputy Division Chief, Intergovernmental Relations, Attorney General's Office
Allan B. Polunsky, Chairman, Public Safety Commission
Louis E. Sturns, Member, Public Safety Commission
Colonel Stanley Clark, Interim Director, Department of Public Safety
Lieutenant Colonel Lamar Beckworth, Interim Assistant Director, Department of Public Safety
Lori Gabbert., Budget Analyst, Legislative Budget Board (LBB-DPS)
Tom Lambert, Budget Analyst, Legislative Budget Board (LBB-TCEQ)
Ed Perez, Executive Director, Texas Office of State-Federal Relations, Washington, DC
Brandon Steinmann, Director, Texas Office of State-Federal Relations, Austin, Texas

Attachment 1
Climatic Regions



Attachment 2
Counties with High to Extreme Fire Danger



DROUGHT PREPAREDNESS COUNCIL

RICK PERRY
Governor

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JACK COLLEY
Council Chairman

December 11, 2008

TO: The Honorable Rick Perry, Governor, State of Texas
The Honorable David Dewhurst, Lieutenant Governor, State of Texas
Ms. Esperanza Andrade, Secretary of State, State of Texas
The Honorable Mario Gallegos, Jr., President Pro Tempore of the Senate, State of Texas
The Honorable Tom Craddick, Speaker of the House, State of Texas
The Honorable Steve Ogden, Chairman, Senate Finance Committee, State of Texas
The Honorable Kip Averitt, Chairman, Senate Natural Resources Committee, State of Texas
The Honorable John Carona, Chairman, Senate Committee on Transportation & Homeland Security, State of Texas
The Honorable Warren Chisum, Chairman, House Appropriations Committee, State of Texas
The Honorable Mike Hamilton, Vice-Chairman, House Natural Resources Committee, State of Texas
The Honorable Sid Miller, Chairman, House Agriculture & Livestock Committee, State of Texas
The Honorable Aaron Peña, Chairman, House Criminal Jurisprudence Committee, State of Texas
Mr. Jay Kimbrough, Chief of Staff, Office of the Governor
Mr. Steven McCraw, Director, Texas Governor's Office of Homeland Security

FROM: Chief Jack Colley, Chairman, Drought Preparedness Council

SUBJECT: Statewide Drought Situation Report

1. **Next Council Meeting**

   January 8, 2008, 2:00 p.m., Governor's Conference Room of the Governor's Division of Emergency Management, State Operations Center, Texas Department of Public Safety Headquarters, 5805 N. Lamar Blvd., Austin, Texas.

   At this time, the Council will continue to meet on a monthly basis.

December Drought Situation Report

2. General Conditions

Precipitation during November was below normal across a vast majority of Texas, with a few exceptions in East Texas and near the Dallas/Fort Worth area. The western half of the state received little to no rainfall. The continuation of the dry conditions prompted the United States Drought Monitor (USDM) to classify parts of South Central Texas as having exceptional drought conditions. The past three months were the third driest September through November stretch in the South Central Texas Climate Division (CD) Seven since 1895.

Most of the significant precipitation occurred when two frontal boundaries moved across the Eastern half of the State between November 11th and 13th. Veterans Day brought heavy rainfall to the Metroplex. The Houston metro area received the bulk of its monthly rainfall on the 12th. Other than a few widely scattered showers, little precipitation was recorded across the State between the 14th and Thanksgiving on the 27th. A stationary front draped across Central Texas brought precipitation during the latter half of the Thanksgiving weekend, but any significant precipitation stayed to the north and east of drought stricken South Central Texas.

According to radar estimates, a large area receiving less than 25% of normal November precipitation covered most of Texas west of I-35. Del Rio and Fort Stockton received no precipitation during the entire month. The area of I-35 between Austin and San Antonio with the exceptional drought designation also remained extremely dry. Austin Bergstrom reported 0.11" and San Antonio only 0.01" of precipitation. Austin/Mabry received only 50% of its normal year-to-date precipitation and San Antonio only 44% of its normal precipitation. The drought would be much worse if not for an abnormally wet 2007, which saw annual precipitation totals about 40% more than normal in South Central Texas; and 48% more than normal in the Edwards Plateau region.

The USGS stream flow maps indicate several stations along the Colorado River in Central Texas have discharges below the tenth percentile, relative to those that have historically occurred at this time of year. The persistent dry weather is affecting the water discharge downstream along the Upper Texas Coast, with several stations reporting numbers in the first to fifth percentiles. Moderate drought conditions along the Red River in far northern Texas have caused the current discharge to rank below the fifth percentile.

According to the Climate Prediction Center (CPC), the El Nino-Southern Oscillation (ENSO) cycle is forecasted to be neutral through the early part of 2009. The current three-month forecast calls for a 33-40% chance of below normal precipitation for the southern half of Texas, and a small area with a 40% or greater chance of below normal precipitation in an area of West Texas near El Paso.

A greater than equal chance of below normal precipitation covers drought stricken South Central Texas. In addition, development of drought conditions to the south of regions already in extreme to exceptional droughts is possible in the short term. An equal chance of below normal, near normal, and above normal precipitation is expected over the next three months across most of the northern half of Texas, with a 33-40% chance of above normal precipitation forecast for the regions of the panhandle north of Amarillo.

3. Overall Statewide Drought Conditions

The South Central region is under "Moderate Drought" conditions, according to the Palmer Drought Severity Index (PDSI). The Edwards Plateau region is in a "Mild Drought," and the remainder of the State is mostly under "Slightly Wet" to "Extremely Wet" conditions. The remainder of the State is under either "Normal" or "Wet Spell" conditions. The High Plains and east regions are experiencing "Moderately Wet" conditions. The PDSI varies from extremely wet, very wet, moderately wet, slightly wet, incipient wet spell, near normal, incipient dry spell, mild drought, moderate drought, severe drought, and extreme drought in order of increasing severity.

The Crop Moisture Index (CMI) indicates the Southern region is under "Abnormally Dry" conditions and the East region is under the boundary of "Moisture Adequate" and "Fields Too Wet" conditions. The remainder of the State is under "Mildly Dry" to "Moisture Adequate" conditions. The CMI varies from flooding, standing water, fields too wet, moisture adequate, mildly dry, abnormally dry, excessively dry, severely dry, and extremely dry in order of increasing severity.

The Six-Month Standardized Precipitation Index (SPI) indicates the South Central region is under "Moderately Dry" conditions, the High Plains region is under "Moderately Wet" conditions, the Lower Valley region is under "Extremely Wet" conditions, and the remainder of the State is experiencing "Near Normal" conditions. The SPI varies in categories of extremely wet conditions, very wet, moderately wet, near normal, moderately dry and, severely dry, extremely dry in order of increasing severity.

The Keetch-Byram Drought Index (KBDI) indicates the High Plains, Trans-Pecos, Upper Coast, and Lower Valley regions are experiencing an "above average" fire risk. The North Central and Edwards Plateau regions are under "high fire risk" conditions, the South Central and the Southern regions are experiencing a "very high fire risk" condition. The KBDI is a drought index specifically used to describe potential or expected fire behavior. The index is classified as Low, Moderate, High or Extreme fire danger in order of increasing severity.

Texas Forest Service reported outdoor burn bans in 67 counties.

The Climate Prediction Center (CPC) forecast indicates above normal precipitation chances for the upper High Plains region and below normal precipitation for the Texas-New Mexico border line during the December 2008-February 2009. During the same period, the CPC forecast above normal temperatures with a 33% to 50% chance of normal precipitation for the State.

The National Oceanic and Atmospheric Administration (NOAA) Seasonal U.S. Drought Outlook through February 2009, forecast persisting areas of drought in the Edwards Plateau, South Central, North Central, Upper Coast, and Southern regions, and "likely developing drought" conditions in lower Southern region.

4. Water Utility Status

December 2008 began with 120 public water systems on the drought list. The number included 20 water systems that relaxed restrictions imposed in 2008 and returned to normal operations and water usage. The remaining 110 water systems on the list included 70 systems that placed their customers on mandatory outside water restrictions and 30 systems that requested voluntary conservation. Significant rainfall will need to occur in regions of the State for additional systems to relax restrictions. Current long range forecasts do not predict rain events through January 2009.

5. **Water Rights – Statewide**

New temporary water use permit applications are reviewed on a site-specific basis and are issued if there is sufficient surplus water at the requested source. Applications for new water use permits and amendments to existing permits remained normal during the month. The water rights owners in the Brazos River Basin, whose permits contain the Hale Clause restrictions, observed less severe stream flow conditions during the winter months. The availability of unappropriated water for new water use permits continued to decrease in all river basins in the State and the search for long-term, dependable alternate sources of water remained a high priority issue.

6. **Water Rights – Lower Rio Grande / Rio Grande Watermaster (RGWM)**

Current Overall Conditions: As of November 22, 2008, the U.S. combined ownership at Amistad/Falcon stood at 96.65% of conservation capacity or 3,477,946 acre-feet. This is down from 103.49% or 3,510,374 acre-feet from a year ago at this time. Overall, the system is holding 97.64% or 6,134,643 acre-feet of conservation capacity with Amistad at 96.25% or 3,342,557 acre-feet and Falcon at 99.37% or 2,792,085 acre-feet. Mexico has 98.97% or 2,656,697 acre-feet of the water it could store at Amistad/Falcon.

Allocations: As of the printing of the November ownership report, the U.S. allocated in excess of 785,038 acre-feet for irrigation and mining. The U.S. continued to have an amount in excess of 603,410 acre-feet for future allocations in 2008.

Storage & Loss Amistad vs. Falcon: The U.S. is currently storing approximately 1.85 million acre-feet or 94.7% at Amistad, and approximately 1.63 million acre-feet or 98.9% at Falcon.

Evaporation and seepage losses at Amistad YTD were 33,183 acre-feet. During the same period, the U.S. lost 35,516 acre-feet at Falcon. The ratio of loss between Amistad and Falcon continued to be 1:2, consistent with Amistad being twice as efficient in overall storage and loss.

Releases to Meet Demands: Mexico released 889,382 acre-feet from Amistad and 861,801 acre-feet from Falcon for Mexico needs. The U.S. released 1,631,946 acre-feet from Amistad and 1,054,455 acre-feet from Falcon for U.S. needs. Combined with gains between Amistad and Falcon, U.S. inflows to Falcon totaled 1,901,038 acre-feet. So far, the U.S. met 65% of overall needs in the middle and Lower Rio Grande directly from middle Rio Grande and Amistad inflows this year. The movement of water from Amistad was primarily driven by U.S. excess amount in storage and the need to keep it below conservation capacity, particularly when the U.S. is occupying Mexico's space in Amistad.

Upper Rio Grande (New Mexico): Currently, Elephant Butte in New Mexico is storing 597,492 acre-feet or 29.53% and Caballo Dam, downstream of Elephant Butte, is storing 19,457 acre-feet or 8.57%. This water storage, in part, was used to meet water needs in the El Paso area.

Outlook: All active accounts began 2008 with 100% usable balances. The reservoirs increased in elevation due to the rainfall here and in the upper Rio Grande Regions. To alleviate losses in Falcon, the U.S. continued to monitor ownership and elevation levels in both Falcon and Amistad for more efficient U.S. transfers of water from Amistad to Falcon. It appeared that 2009 will start with all active accounts at full capacity. Both U.S. reservoirs

are considered full as are the majority of the Mexican reservoirs in the Rio Grande Basin. Effective October 26, 2008, "No Charge Pumping" was declared from Amistad down to the Gulf for all diversion requests until further notice.

7. **South Texas Watermaster – Guadalupe / Lavaca / San Antonio / Nueces Region**

November left South Central Texas in a drought situation that showed no short term relief in sight. The Coastal regions and Concho River Basin experienced better conditions than the Central region of the State. If rainfall does not occur soon near Austin and San Antonio, the Hill Country could reach the most critical of drought conditions.

Area Counties: Bandera, Blanco, Comal, Kendall and Kerr Counties

Rainfall and Area Conditions: This area received varying amounts of precipitation, ranging from 0.10 to 0.50 inches during November. With that rainfall, the Texas Crop Moisture Index in this area of the Hill Country was classified as "Mildly" to "Normally Dry". Most surface water diversions in this area are for municipal and industrial uses, with a few surface water permit holders irrigating hay and sod fields. The U.S. Drought Monitor indicated this area is currently in "Extreme Drought" condition.

Stream flow Conditions: None of the major streams or their tributaries flowed at normal capacities. Most of the major streams showed a slight increase in flow during November, which may be contributed to the trees along the water courses in their dormant stages. Most of the smaller secondary tributaries lost surface flow. The Guadalupe River near Kerrville had a stream flow of approximately 53 CFS. The historical monthly mean is 111 CFS. The Guadalupe River near Comfort had a stream flow of approximately 60 CFS. The historical monthly mean is 157 CFS. The Medina River near Bandera had a stream flow of 26 CFS. The historical monthly mean is 98 CFS.

Drought Restrictions: On August 7, 2008, Kerrville restricted the amount of surface diversions from the Guadalupe River and was limited to pumping three million gallons per day. All temporary surface water permits in the Guadalupe River Basin above Canyon Lake and the San Antonio River Basin above Lake Medina were suspended. Because of the low stream flows, some State permit holders reached their flow restrictions and were curtailed from pumping. River flows are monitored on a daily basis.

Area Counties: Bee, Goliad, Victoria, Calhoun, Jackson, Refugio, Aransas, San Patricio, Nueces, Kleberg, Jim Wells, Duval, Live Oak, Kenedy, Willacy, Brooks, and Jim Hogg.

Rainfall and Area Conditions: This area received little rainfall during November. Some localized rainfall events occurred throughout the month, ranging from a trace to one or two inches. The rainfall did not provide much soil moisture or runoff into local area streams. The U.S. Drought Monitor indicated the area is experiencing "No Drought to "Abnormally Dry" to "Severe Drought" conditions. The Corpus Christi Reservoir System received little inflows during this time. Therefore, the reservoir level continued to drop. Most of the surface water diversions continued to be for municipal and industrial uses, little irrigation was noted.

Stream flow Conditions: Stream flows in the area continued to decrease and flowed below expectations for this time of year. According the USGS Stream Flow Gage at the Guadalupe River near Victoria, stream flows were approximately 350 CFS at the beginning of the month and approximately 380 CFS toward the end of the month, compared to 360 CFS last month. The historical mean at the site, based on 73 years of record, is 1,680 CFS. The gage at the San Antonio River near Goliad indicated the stream flows were

approximately 275 CFS at the beginning of the month and ended at approximately 214 CFS, compared to 275 CFS last month. The historical mean at the site, based on 73 years of record, is 516 CFS. The gage at the San Antonio River at McFaddin, which is below Goliad, indicated the stream flows were approximately 270 CFS at the beginning of the month, and ended at approximately 269 CFS, compared to 285 CFS last month. The historical mean at the site, based on two years of record, is 299 CFS. The gage at the Guadalupe River near Tivoli, below the confluence of the San Antonio River and Guadalupe River, indicated stream flows of approximately 820 CFS at the beginning of the month, and 822 CFS at the end of the month, compared to 850 CFS last month. The historical mean at the site, based on two years of record, is 2,860 CFS. The gage at the Mission River near Refugio indicated stream flows at approximately 4.0 CFS at the beginning of the month and ended at approximately 4.8 CFS, compared to 4.2 CFS last month. The historical mean at the site, based on 68 years of record, is 25 CFS. The USGS Stream Flow Gage of the Nueces River at Calallen Dam indicated 25 CFS stream flow over the dam near Corpus Christi and ended at approximately 4.7 CFS of stream flow towards the end of the month. This is compared to 18 CFS last month. The historical mean at the site during this time, based on eight years of record, is 734 CFS. The gage at the Aransas River near Skidmore indicated stream flows were approximately 3.0 CFS at the beginning of the month and ended at approximately 3.5 CFS, compared to 3.1 CFS last month. The historical mean at the site based on 43 years of record, is 5.7 CFS.

Area Counties: Atascosa, Karnes, Gonzales, Wilson, McMullen, Dewitt, Guadalupe, Lavaca, Fayette, Colorado, Wharton, and Jackson.

Rainfall and Area Conditions: This area received 0.00 to 2.7 inches of rainfall during November. The month's rainfall events in the Lavaca Area were small, isolated showers. Soil moisture conditions were very poor. Hay season ended and oat and rye crops suffered without supplemental irrigation. There was very little irrigation activity. Lake Texana is at 78% of capacity, which is 40.04 feet above mean sea level.

According to the U.S. Drought Monitoring System, this area experienced "Severe" to "Extreme" drought conditions.

Stream flow Conditions: The flow of the San Antonio River near Falls City was 184 CFS. The historical mean for November is 256 CFS. The Cibolo Creek near Falls City is 33 CFS and the ending reading last month was 25 CFS. The historical mean for November is 30 CFS. The Guadalupe River near Gonzales is at 515 CFS and the ending reading last month was 657 CFS. The historical mean for November is 786 CFS. The Lavaca River at Edna is at 13 CFS and the ending reading last month was 11 CFS. The historical mean for November is 39 CFS. The Navidad River near Halletsville is at 1.6 CFS and the ending reading last month was 0.62 CFS. The historical mean for November is 21 CFS. The Atascosa River near Whitsett is at 4.9 CFS and the ending reading last month was 2.4 CFS. The historical mean for November is 10 CFS. The Frio River near Tilden is at 7 CFS and the ending reading last month was 10 CFS. The historical mean for November is 44 CFS. The Nueces River near Tilden is at 0.4 CFS and the ending reading last month was 1 CFS. The historical mean for November is 48 CFS.

Drought Restrictions: There were no additional restrictions on diversions.

Area Counties: Edwards, Real, Kinney, Uvalde, Zavala, Dimmit, La Salle and Webb.

Rainfall and Area Conditions: The Southwest Texas area received no relief from the drought conditions during November as there was no rain reported during the month. Most

diversions of surface water were for irrigational use and small amounts for municipal and industrial uses. Crops irrigated in the area were: wheat, sesame seeds, winter rye, hay grazers, and pecans. The U.S. Drought Report indicated this area is experiencing "Abnormally Dry" to "Extreme" drought conditions.

Stream flow Conditions: Stream flows for the major tributaries in this area continued to flow well below the mean for this time of year. The Nueces River at Laguna had stream flows of 50 CFS, compared to 50 CFS last month. The historical mean is 129 CFS. The Nueces River near Brackettville had stream flows of 0.14 CFS, compared to 0.03 CFS last month. The historical mean is 4.5 CFS. The Nueces River below Uvalde had stream flows of 17 CFS, compared to 16 CFS last month. The historical mean is 88 CFS. The Frio River at Concan had stream flows of 28 CFS, compared to 28 CFS last month. The historical mean is 96 CFS. The Sabinal River at Sabinal had stream flows of 0.80 CFS, compared to .74 CFS last month. The historical mean is 12 CFS. The Leona River near Uvalde had stream flows of 24 CFS, compared to 28 CFS last month. The historical mean is 49 CFS.

Stream flows of intermittent and tributary streams in the area were flowing well below average for this time of year.

Drought Restrictions: Permits with stream flow restrictions are being regulated. The Zavala/Dimmit Water District had a rotational diversion schedule on the Nueces River to ensure adequate water for domestic and livestock use.

Area Counties: Bastrop, Bexar, Blanco, Caldwell, Comal, Fayette, Frio, Guadalupe, Hays, and Medina.

Rainfall and Area Conditions: Well below average monthly rainfall fell across the San Antonio Regional Area during November. There was no measurable rainfall at the San Antonio International Airport. The average for November is 2.58 inches. Total annual rainfall to date is 13.45 inches; normal year to date is 30.19 inches, a departure from normal of 16.74 inches. On November 18, 2008, the U. S. Drought Monitor indicated the San Antonio Regional Area was experiencing "Severe" to "Extreme" Drought Conditions. This impacted crops, pastures and grasslands, stream flows, and reservoir capacities. Ground moisture was relatively poor due to the lack of rain and cloud cover. Winter oats, mustard greens, turnips, beets, carrots, Swiss chard, collard greens, and spinach were planted.

Stream Flow Conditions: The Guadalupe and Blanco Rivers showed the impact of the worsening drought. Small creeks dried and most major streams are beginning to quickly pool or dry up entirely. Municipal use decreased with the shorter days and residential lawns required less irrigation. Industrial use remained constant.

All major tributaries in the San Antonio Regional Area were well below their historical monthly averages for November. The Guadalupe River at Spring Branch flowed at 48 CFS; the historical mean flow for November is 273 CFS. The San Marcos River at Luling flowed at 98 CFS, the historical mean flow for November is 380 CFS. The Blanco River at Wimberley flowed at 13 CFS, the historical mean flow for November is 116 CFS.

The Canyon Lake Reservoir was at 898.58 feet elevation, impounding 299,517 acre-feet, and was at 79.0591% of capacity. On December 1, 2008, the Edwards Aquifer level at the J17 well in Bexar County was 668.1 feet. The historical average for November is 669.1 feet, which is 1.0 feet below the monthly historical average. On November 30, 2008, the San Marcos Springs were flowing at 102.0 CFS. The historical monthly average for November is 174 CFS. This was 72 CFS below the monthly historical average. On November 30, 2008,

the Comal Springs were flowing at 288 CFS. The monthly historical flow for November is 302 CFS; which is 14 CFS below the historical monthly average.

Drought Restrictions: Most Temporary Permits were not allowed to divert surface water. Surface water permits are closely monitored in regards to "real time" stream flows as to whether or not they are allowed to divert.

Area Counties: Sterling, Tom Green, Irion, Concho, Coke, Glasscock, Runnels, Reagan, and Schleicher.

Rainfall was scarce in the Concho River Valley during November, falling well below the monthly average for the second consecutive month. According to information provided by the USDA, the State Drought Monitor Index of the Concho Valley was at "Abnormally Dry" drought conditions.

Rainfall and Area Conditions: Rainfall in San Angelo during November was 0.25 inches. The average rainfall amount in the area was 1.20 inches. The total yearly amount of rainfall is 20.56 inches. In 2007, there were 31.87 inches of rain. Average annual rainfall, based on 100 years of record, is 19 inches. Area reservoirs were showing slight decreases in the amount of storage from the previous month. Irrigation demand by appropriated surface water rights in the Concho Valley was at a reduced volume, due to timely rains. The Texas Crop Moisture Index indicated soil moisture content was "Abnormally Dry". However, the Index has not been updated since November 1, 2008. Cotton was stripped and picked and winter wheat was planted.

Stream Flow Conditions: Mean daily discharge statistics, based on five years of record, for USGS Gaging Station 08130700 at Spring Creek above Twin Buttes Reservoir near San Angelo was 15 CFS. The most recent value was 9.0 CFS. Mean daily discharge statistics at USGS Gaging Station 08136000 at Concho River at San Angelo/Bell Street was 25 CFS. This is based on 77 years of record. Currently, it is at 8.4 CFS. Mean daily discharge statistics at USGS Gaging Station 08128000 at South Concho at Christoval was 21 CFS. This is based on 73 years of record. The most recent daily value was 21 CFS. Area lakes indicate Lake Nasworthy is at 81% of capacity or 8,300 acre-feet, O. C. Fisher was at 5% of capacity or 6,347 acre-feet, and Twin Buttes Lake was at 33% of capacity or 62,922 acre-feet.

Drought Restrictions: There were no additional restrictions on diversions in the Concho Valley.

8. **Upper Colorado** (Concho River watershed not included)

The upper Colorado River area received less than normal precipitation during November. The National Weather Service in San Angelo reported monthly precipitation of 0.23 inches, which was 0.87 inches below normal. The annual total to date was 18.96 inches, which was 1.01 inches below normal. According to the U.S. Drought Monitor, the drought conditions in the area ranged from "Abnormal" to "Moderate", and the upper reaches of the Llano River watershed are in an area of "Severe" drought. Most tributaries in the upper Colorado watershed had diminished flows. However, there were isolated areas that flowed at or above the USGS long-term median. The pool levels of EV Spence and OH Ivie Reservoir decreased during November, reaching levels of 11% and 56% of capacity, respectively.

9. **Texas Panhandle and Southern High Plains**

Amarillo Area: The Amarillo Region reported the following summary for the Northern panhandle area:

Lake Meredith was at 53.44 feet and decreasing. Lake Greenbelt ended November at 55 feet, 0.3 feet lower than the beginning of the month. The Canadian River upstream of the lake flowed at 25 CFS. Lake MacKenzie was at 71.33 feet. The National Weather Service in Amarillo reported a total rainfall in November of 0.68 inches, which was 3.29 inches above the yearly average.

Lubbock Area: Lubbock received only 0.08 inches for the month. The average rainfall for November was 0.71 inches. Similar amounts were recorded throughout the Region 2 area. Total precipitation for 2008 stood at 27.99 inches; which was 9.97 inches above normal for this point in the year. The long term drought situation was not changed. All of the communities previously noted as being on mandatory water restrictions remained on those restrictions. No new communities were added to the water restrictions list during November, and none were removed.

The following cities in the South Plains area remained on mandatory drought restrictions status: Lubbock and Amherst.

The following cities in the South Plains area remained on voluntary drought restrictions status: Ralls, Crosbyton, Spur, Post, White River WSC, and Valley WSC.

White River Lake: The lake's pool elevation was at 2352.3 acre-feet, or 17.7 feet below full. This is an increase of 0.31 feet from the level at the end of October 2008. White River WSD has groundwater wells on standby to supply water to its customers if the lake level drops below usable levels.

Lake Alan Henry: The lake is full. It is not used for public drinking water supplies at present, but will be utilized for this purpose in the near future.

10. **Agricultural Concerns**

No information available at this time.

11. **Drought Impacts to Wildlife**

No information available at this time.

12. **Wildfire Concerns**

The Keetch-Byram Drought Index (KBDI) is used to help determine potential for fire risk. It is a numerical index where each number is an estimate of the amount of precipitation, in 100ths of an inch, needed to bring the soil back to saturation. The index ranges from 0 to 800, with 0 representing a saturated soil, and 800 a completely dry soil. The relationship of the KBDI to fire danger is, as the index increases, the vegetation is subjected to increased moisture stress. KBDI levels and its relationship to expected fire potential are reflected in the following:

KBDI = 0 – 200: Soil moisture and large class fuel moistures are high and do not contribute much to fire intensity. This is typical of spring dormant season following winter precipitation.

KBDI = 201 – 400: Typical of late spring; early growing season. Lower litter and duff layers are drying and beginning to contribute to fire intensity.

KBDI = 401 – 600: Typical of late summer, early fall. Lower litter and duff layers contribute to fire intensity and will burn actively.

KBDI = 601 – 800: Often associated with more severe drought and increased wildfire occurrence. Intense, deep-burning fires with significant downwind spotting can be expected. Live fuels can also be expected to burn actively at these levels.

There are currently 131 counties, illustrated in Attachment 2, with KBDI values in excess of 400, indicating areas within these counties are beginning to experience dry conditions which could result in an increased fire risk potential.

The Council, which is chaired by Jack Colley, Chief, Governor's Division of Emergency Management, is composed of state agencies concerned with the effects of drought and fire on the citizens of the State of Texas. The attached information was compiled and provided by representatives listed below. Points of contact, telephone numbers, and web site addresses are also provided.

Jack Colley, Chief, Governor's Division of Emergency Management, (512) 424-2443, fax (512) 424-2444, web site: http://www.txdps.state.tx.us/dem

John Sutton, Texas Water Development Board, (512) 463-7988, fax (512) 463-9893, web site: http://www.twdb.state.tx.us

Chris Loft, Texas Commission on Environmental Quality, (512) 239-4715, fax (512) 239-4770, web site: http://www.tceq.state.tx.us

Richard Egg, Texas State Soil & Water Conservation Board, (254) 773-2250, fax (254) 773-3311, web site: http://www.tsswcb.state.tx.us

Lance Williams, Texas Department of Agriculture, (512) 463-3285, fax (800) 835-2981, web site: http://agr.state.tx.us

Dr. Travis Miller, Texas AgriLife Extension Service, (979) 845-4808, fax (979) 845-0456, web site: http://texasextension .tamu.edu

Cindy Loeffler, Texas Parks & Wildlife Department, (512) 912-7015, fax (512) 707-1358, web site: http://www.tpwd.state.tx.us

Edward T. Morris, Department of Housing and Community Affairs, (512) 475-3329, Fax (512) 475-7498, web site: http://www.tdhca.state.tx.us

Michael Dunivan, Texas Forest Service, (830) 997-5426, web site: http://txforestservice.tamu.edu

Paul Tabor, Texas Department of State Health Services, (512) 458-7126, fax (512) 458- 7472, web site: http://www.dshs.state.tx.us/

Thomas Walker, Office of the Governor, Economic Development & Tourism, (512) 936-0169, fax (512) 936-0141, web site: http://www.governor.state.tx.us/divisions/ecodev

David A. Van Dresar, Texas Alliance of Groundwater Districts, (979) 968-3135, fax (979) 968-3194, web site: http://www.texasgroundwater.org/

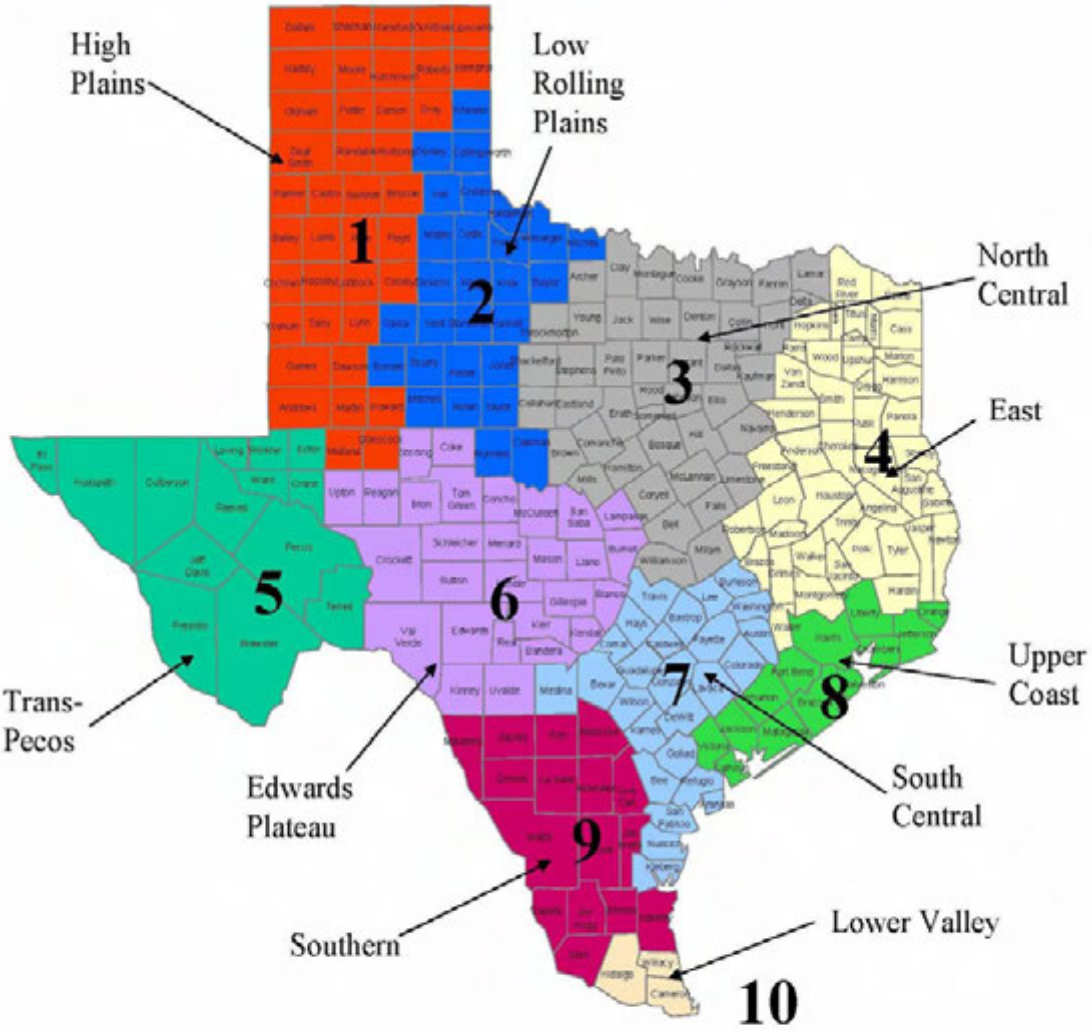
Dr. John W. Nielsen-Gammon, Office of the State Climatologist, (979) 862-2248, fax (979) 862-4466, web site: http://www.met.tamu.edu/osc/

Gus Garcia, Office of Rural Community Affairs, (512) 936-7876, fax (512) 936-6776, web site: http://www.orca.state.tx.us

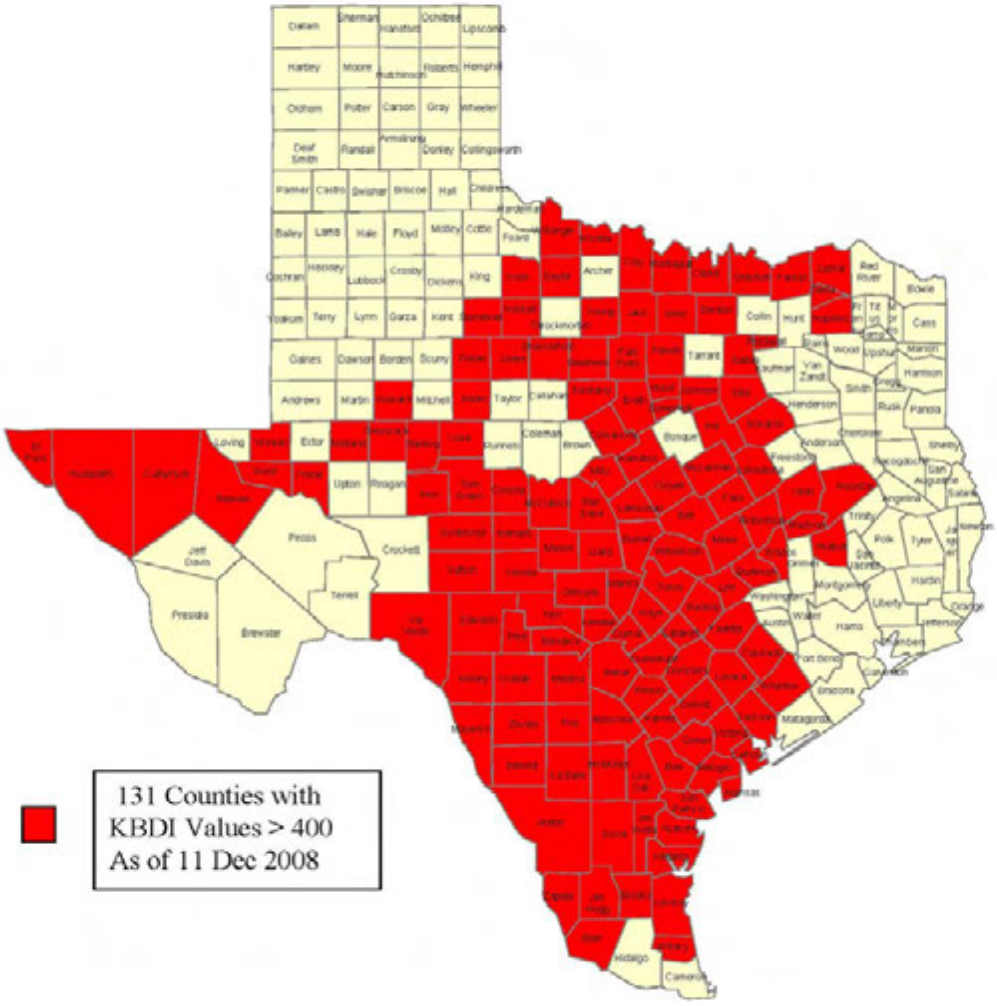
cc:

Amy Jeter, Committee Clerk, Senate Finance Committee
Sarah Hicks, Committee Director, Senate Finance Committee
Teddy Carter, Committee Clerk, Senate Natural Resources Committee
Amy Peterson, Committee Clerk, House Appropriations
Hope Wells, Committee Clerk, House Natural Resources Committee
Steven Schar, Committee Clerk, House Agriculture and Livestock Committee
Anne Creixell, Committee Clerk, House Criminal Jurisprudence Committee
Zak Covar, Policy Advisor for TCEQ Issues, Governor's Policy Office
Auburn Mitchell, Policy Advisor for Agriculture/TDA, Governor's Policy Office
Rob Johnson, Lt. Governor's Chief of Staff
Carmen Cernosek, Lt. Governor's Natural Resources Policy Analyst
Shane Linkous, Deputy Division Chief, Intergovernmental Relations, Attorney General's Office
Allan B. Polunsky, Chairman, Public Safety Commission
Louis E. Sturns, Member, Public Safety Commission
Colonel Stanley Clark, Interim Director, Department of Public Safety
Lieutenant Colonel Lamar Beckworth, Interim Assistant Director, Department of Public Safety
Lori Gabbert., Budget Analyst, Legislative Budget Board (LBB-DPS)
Tom Lambert, Budget Analyst, Legislative Budget Board (LBB-TCEQ)
Ed Perez, Executive Director, Texas Office of State-Federal Relations, Washington, DC
Brandon Steinmann, Director, Texas Office of State-Federal Relations, Austin, Texas

Attachment 1
Climatic Regions



Attachment 2
Counties with High to Extreme Fire Danger



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Appendix G:
Monthly PDSI Images for 2008

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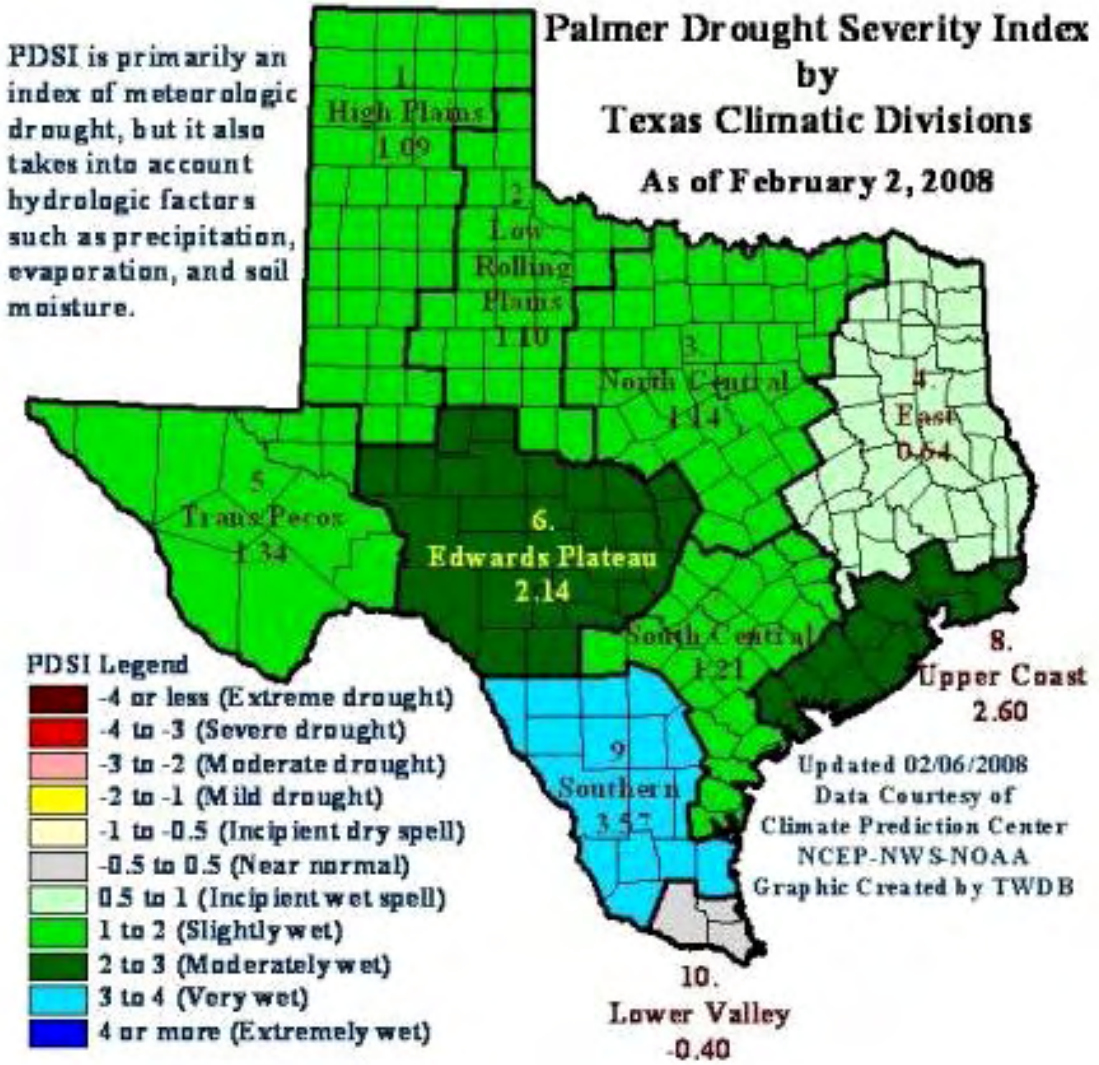
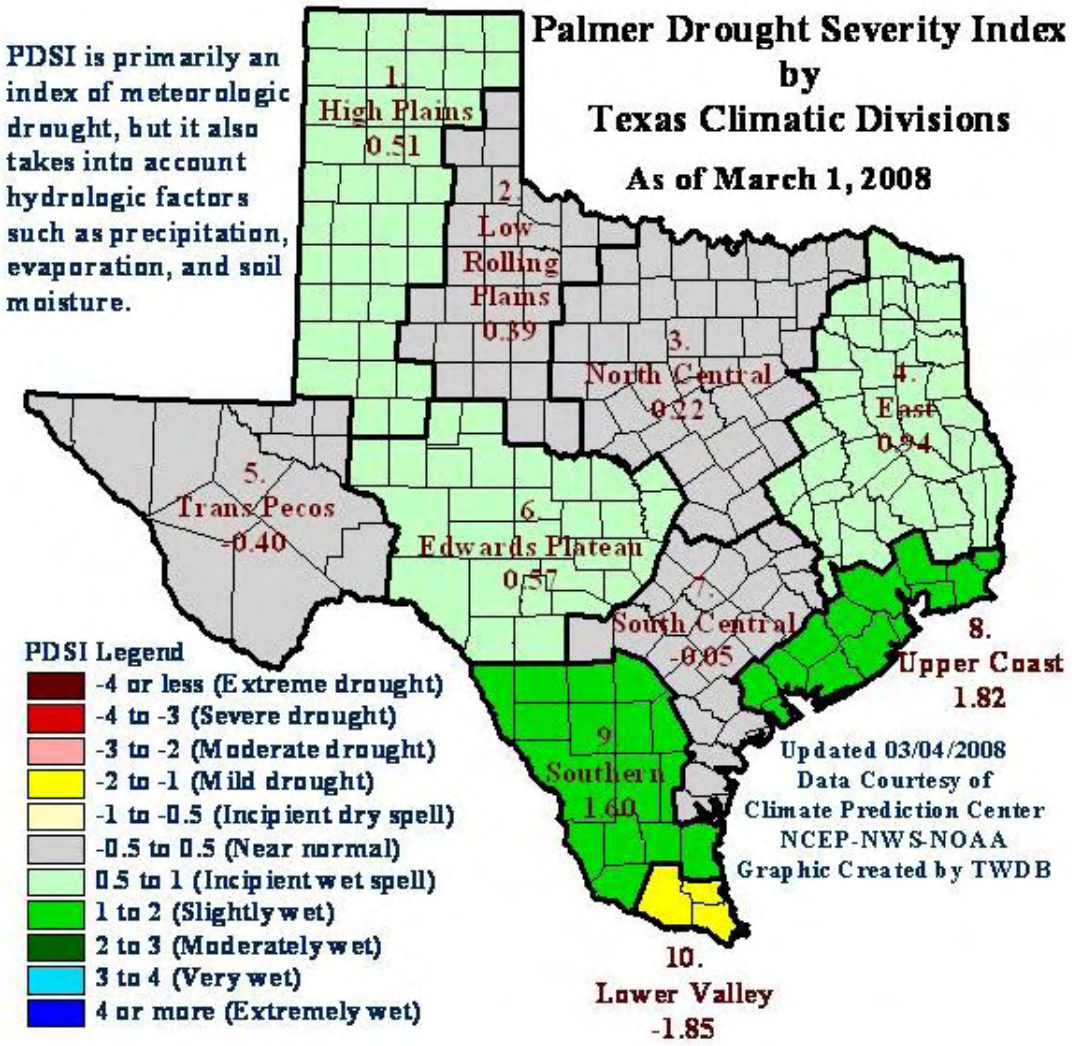
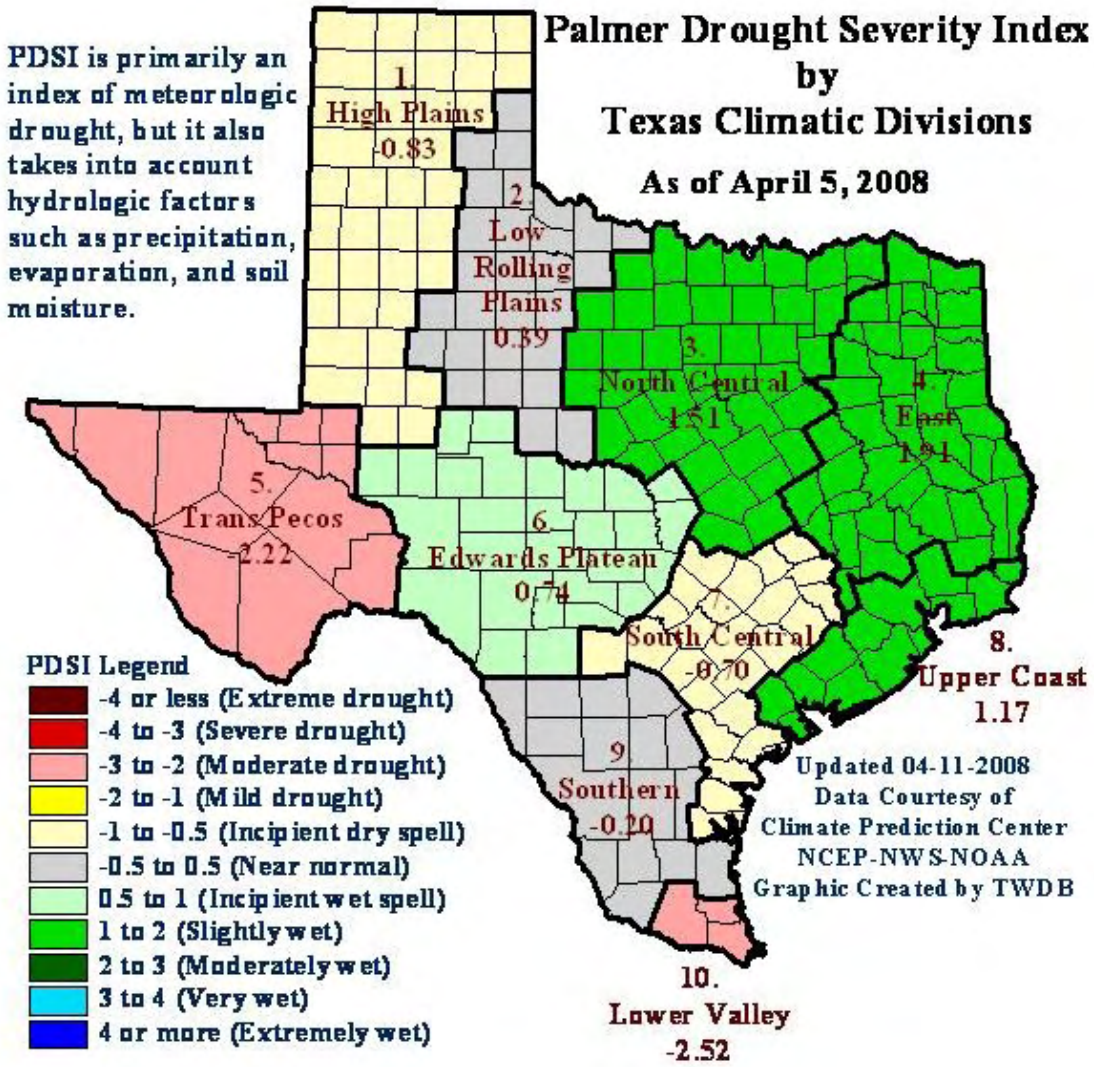
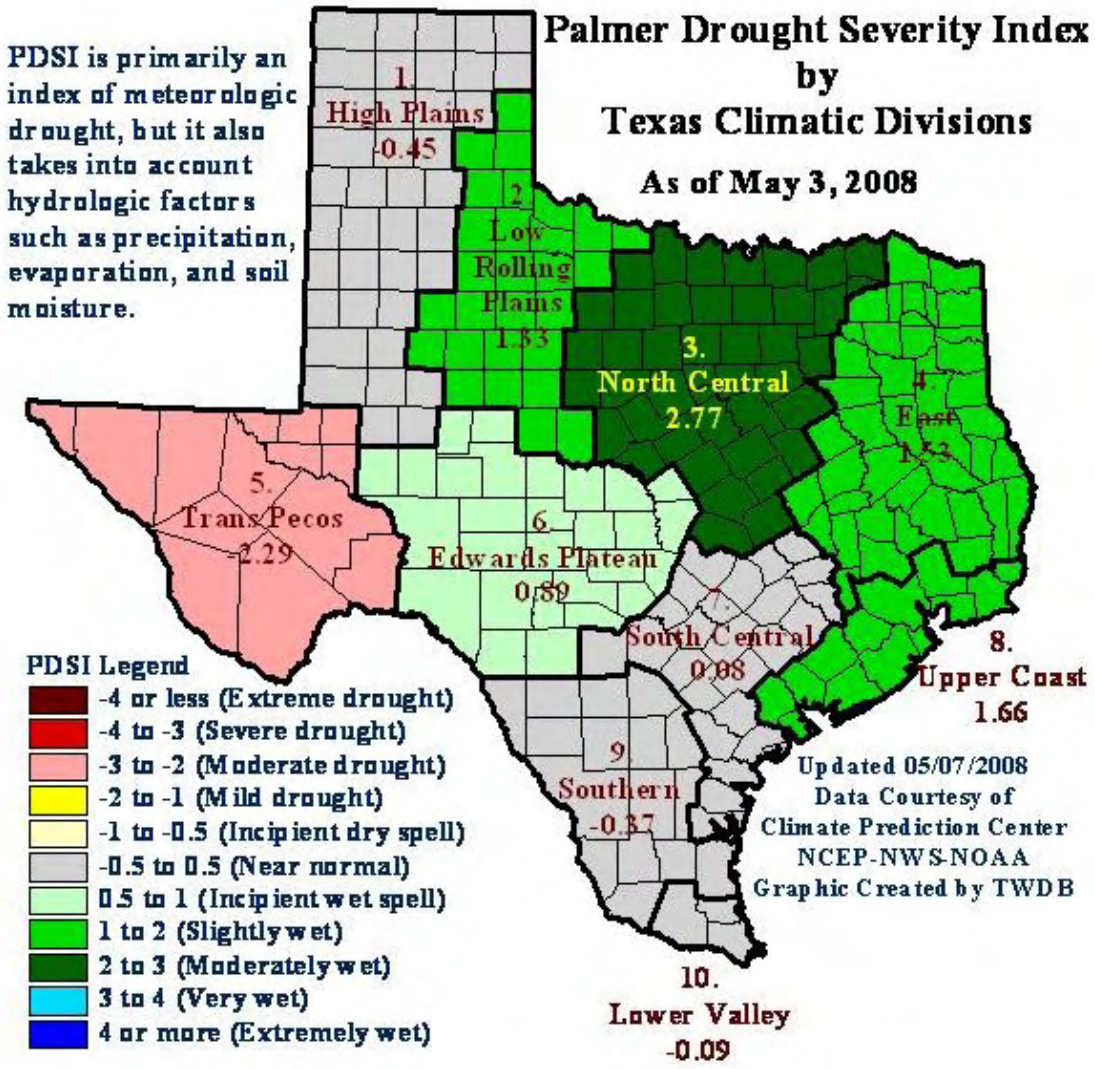
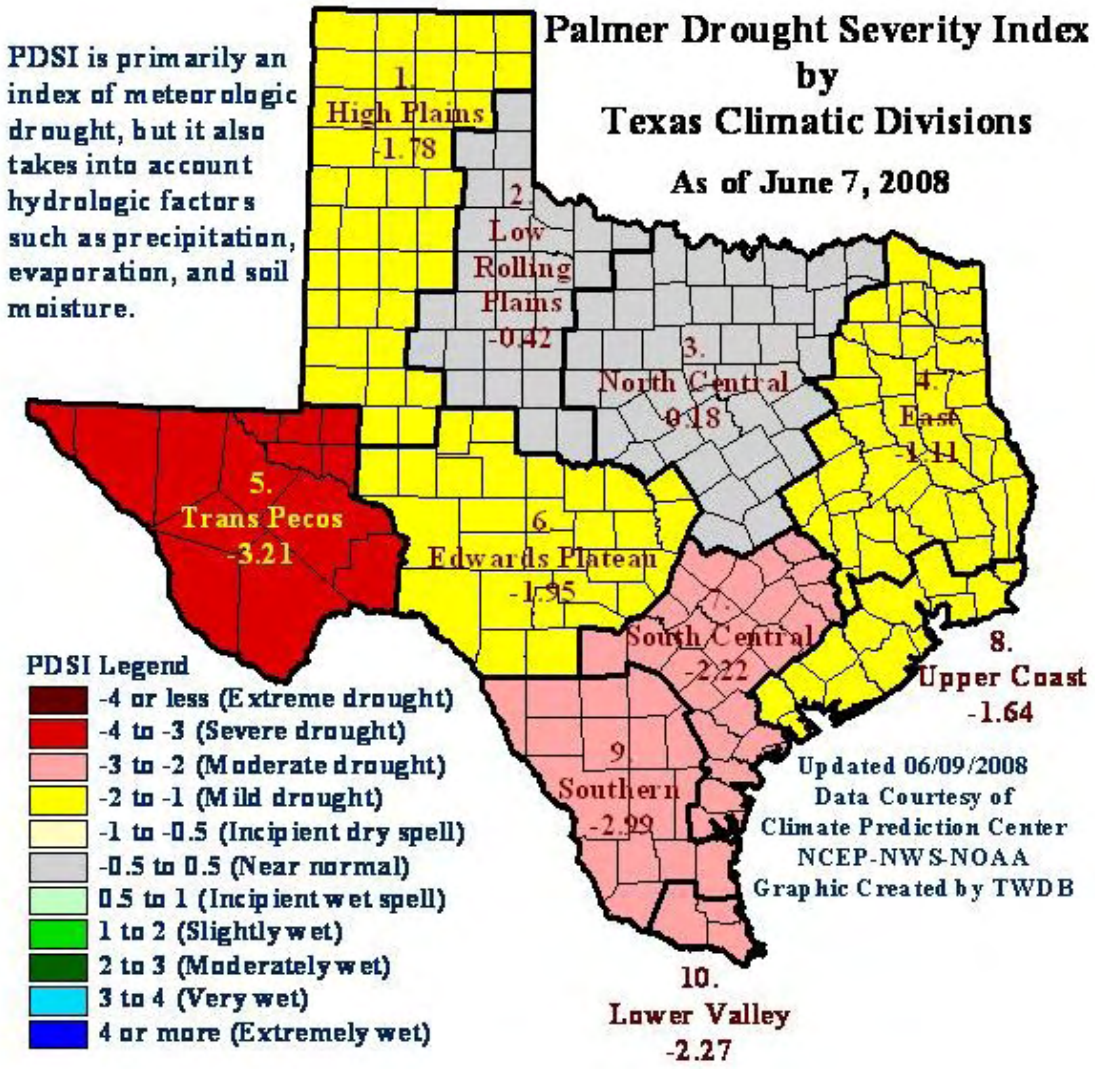
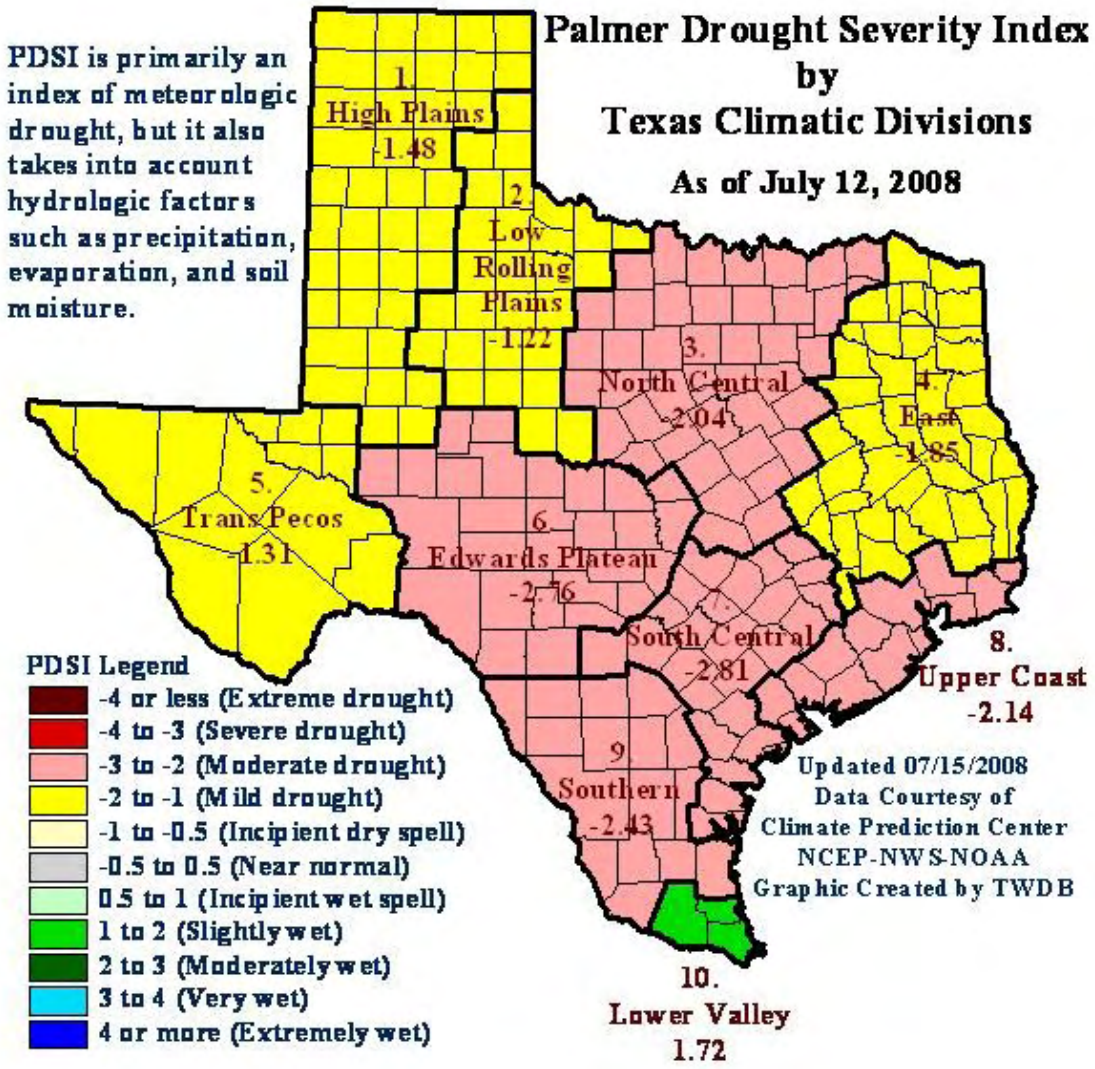

Palmer Drought Severity Index
by
Texas Climatic Divisions
As of February 2, 2008
PDSI is primarily an index of meteorologic drought, but it also takes into account hydrologic factors such as precipitation, evaporation, and soil moisture.
1. High Plains 1.09
2. Low Rolling Plains 1.10
3. North Central 1.14
4. East 0.64
5. Trans Pecos 1.34
6. Edwards Plateau 2.14
7. South Central 1.21
8. Upper Coast 2.60
9. Southern 3.52
10. Lower Valley -0.40
PDSI Legend
-4 or less (Extreme drought)
-4 to -3 (Severe drought)
-3 to -2 (Moderate drought)
-2 to -1 (Mild drought)
-1 to -0.5 (Incipient dry spell)
-0.5 to 0.5 (Near normal)
0.5 to 1 (Incipient wet spell)
1 to 2 (Slightly wet)
2 to 3 (Moderately wet)
3 to 4 (Very wet)
4 or more (Extremely wet)
Updated 02/06/2008
Data Courtesy of
Climate Prediction Center
NCEP-NWS-NOAA
Graphic Created by TWDB

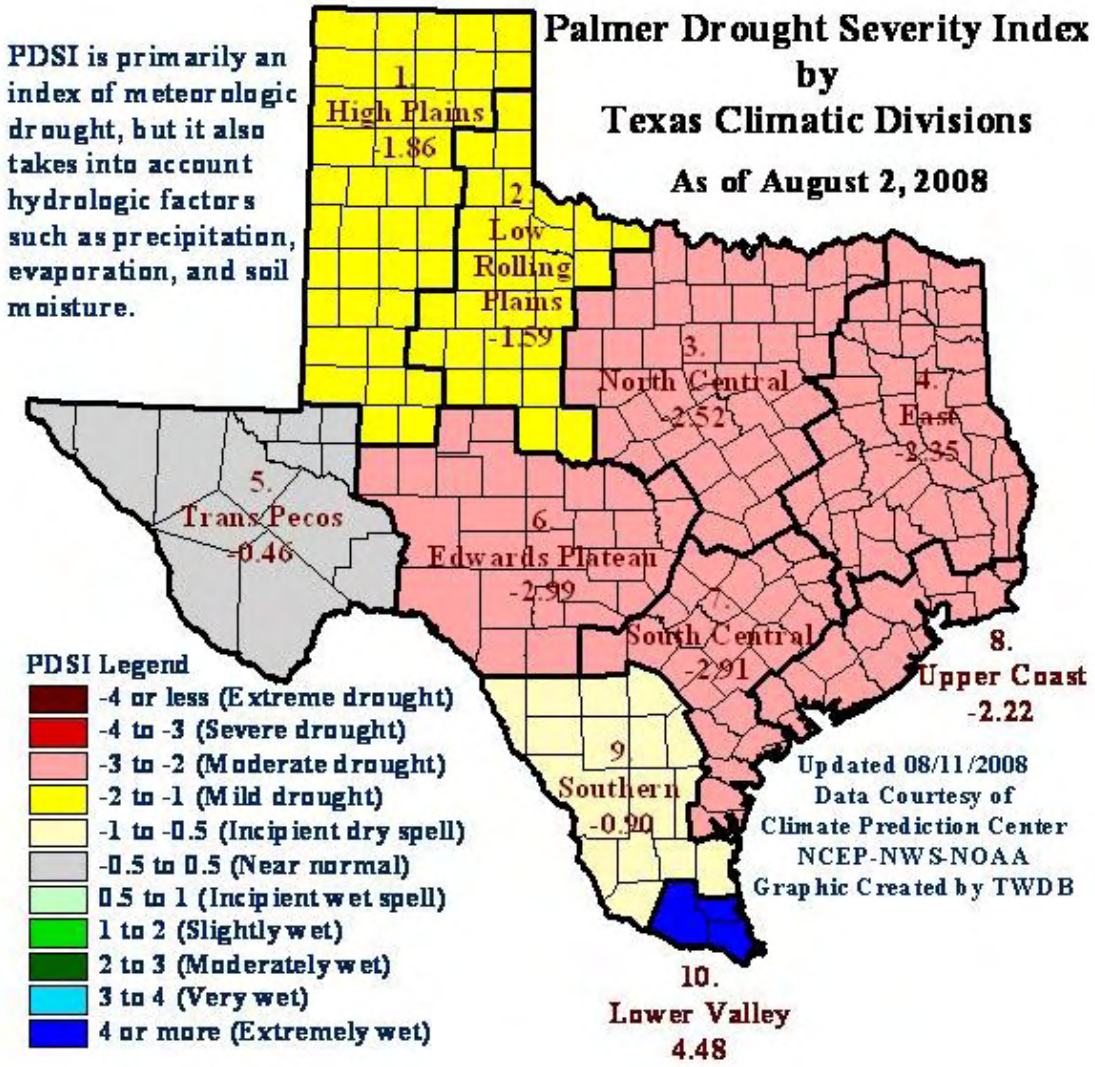

Palmer Drought Severity Index
by
Texas Climatic Divisions
As of March 1, 2008
PDSI is primarily an index of meteorologic drought, but it also takes into account hydrologic factors such as precipitation, evaporation, and soil moisture.
1. High Plains 0.51
2. Low Rolling Plains 0.59
3. North Central 0.22
4. East 0.94
5. Trans Pecos -0.40
6. Edwards Plateau 0.57
7. South Central -0.05
8. Upper Coast 1.82
9. Southern 1.60
10. Lower Valley -1.85
PDSI Legend
-4 or less (Extreme drought)
-4 to -3 (Severe drought)
-3 to -2 (Moderate drought)
-2 to -1 (Mild drought)
-1 to -0.5 (Incipient dry spell)
-0.5 to 0.5 (Near normal)
0.5 to 1 (Incipient wet spell)
1 to 2 (Slightly wet)
2 to 3 (Moderately wet)
3 to 4 (Very wet)
4 or more (Extremely wet)
Updated 03/04/2008
Data Courtesy of
Climate Prediction Center
NCEP-NWS-NOAA
Graphic Created by TWDB

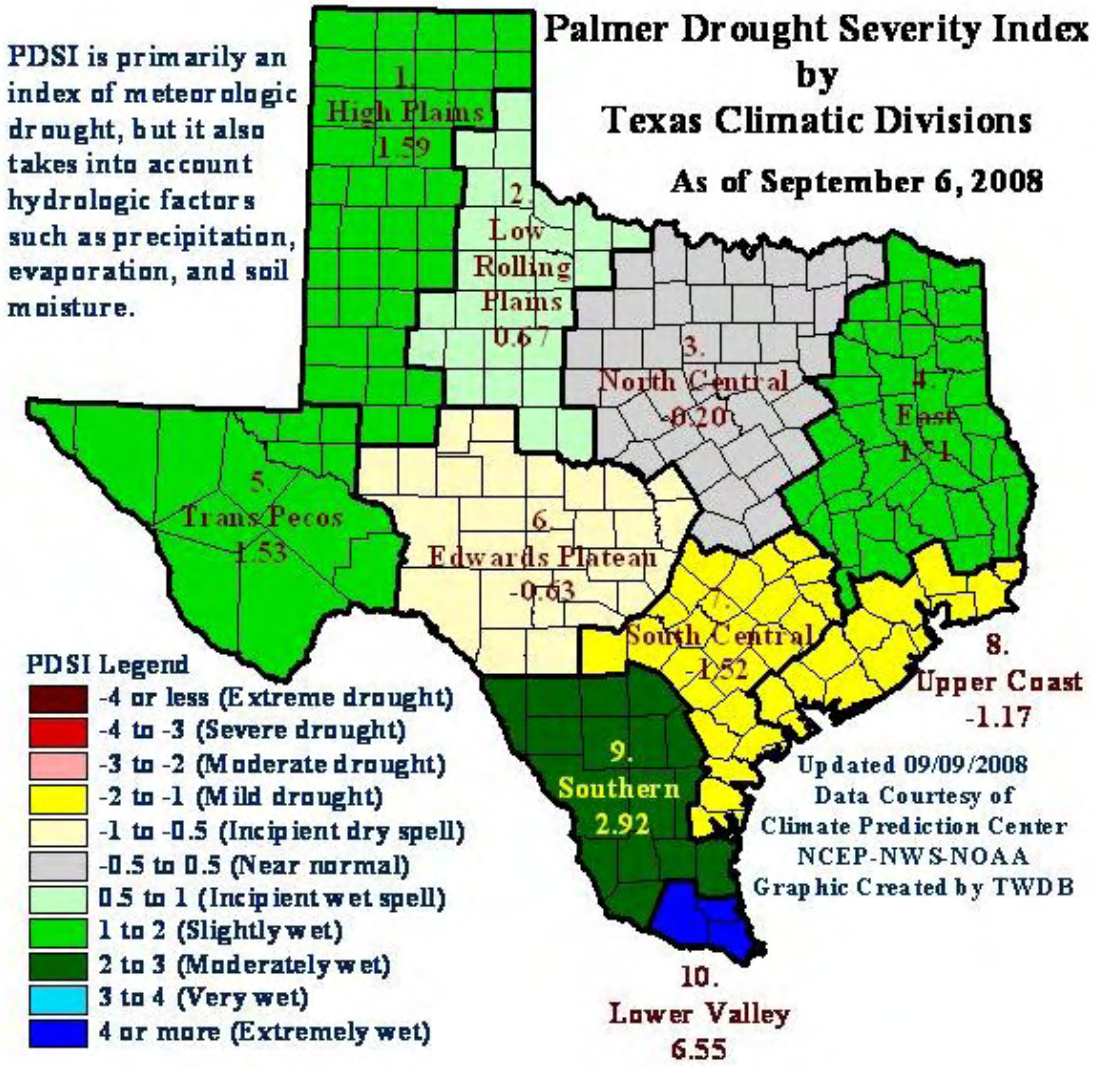

Palmer Drought Severity Index
by
Texas Climatic Divisions
As of April 5, 2008
PDSI is primarily an index of meteorologic drought, but it also takes into account hydrologic factors such as precipitation, evaporation, and soil moisture.
1. High Plains -0.83
2. Low Rolling Plains 0.39
3. North Central 1.51
4. East 1.91
5. Trans Pecos 2.22
6. Edwards Plateau 0.74
7. South Central -0.70
8. Upper Coast 1.17
9. Southern -0.20
10. Lower Valley -2.52
PDSI Legend
-4 or less (Extreme drought)
-4 to -3 (Severe drought)
-3 to -2 (Moderate drought)
-2 to -1 (Mild drought)
-1 to -0.5 (Incipient dry spell)
-0.5 to 0.5 (Near normal)
0.5 to 1 (Incipient wet spell)
1 to 2 (Slightly wet)
2 to 3 (Moderately wet)
3 to 4 (Very wet)
4 or more (Extremely wet)
Updated 04-11-2008
Data Courtesy of
Climate Prediction Center
NCEP-NWS-NOAA
Graphic Created by TWDB

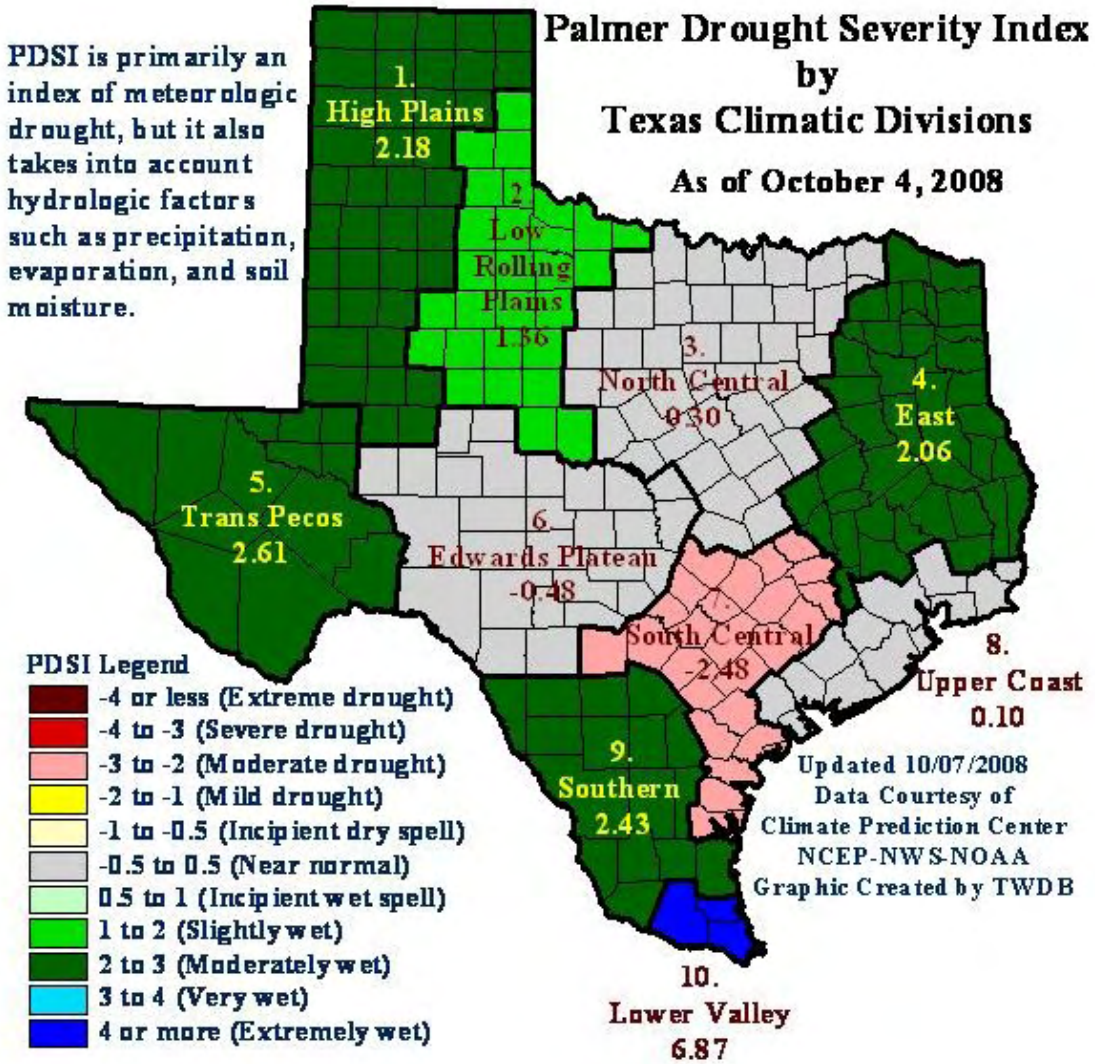

Palmer Drought Severity Index
by
Texas Climatic Divisions
As of May 3, 2008
PDSI is primarily an index of meteorologic drought, but it also takes into account hydrologic factors such as precipitation, evaporation, and soil moisture.
1. High Plains -0.45
2. Low Rolling Plains 1.53
3. North Central 2.77
4. East 1.53
5. Trans Pecos 2.29
6. Edwards Plateau 0.89
7. South Central 0.08
8. Upper Coast 1.66
9. Southern -0.37
10. Lower Valley -0.09
PDSI Legend
-4 or less (Extreme drought)
-4 to -3 (Severe drought)
-3 to -2 (Moderate drought)
-2 to -1 (Mild drought)
-1 to -0.5 (Incipient dry spell)
-0.5 to 0.5 (Near normal)
0.5 to 1 (Incipient wet spell)
1 to 2 (Slightly wet)
2 to 3 (Moderately wet)
3 to 4 (Very wet)
4 or more (Extremely wet)
Updated 05/07/2008
Data Courtesy of
Climate Prediction Center
NCEP-NWS-NOAA
Graphic Created by TWDB

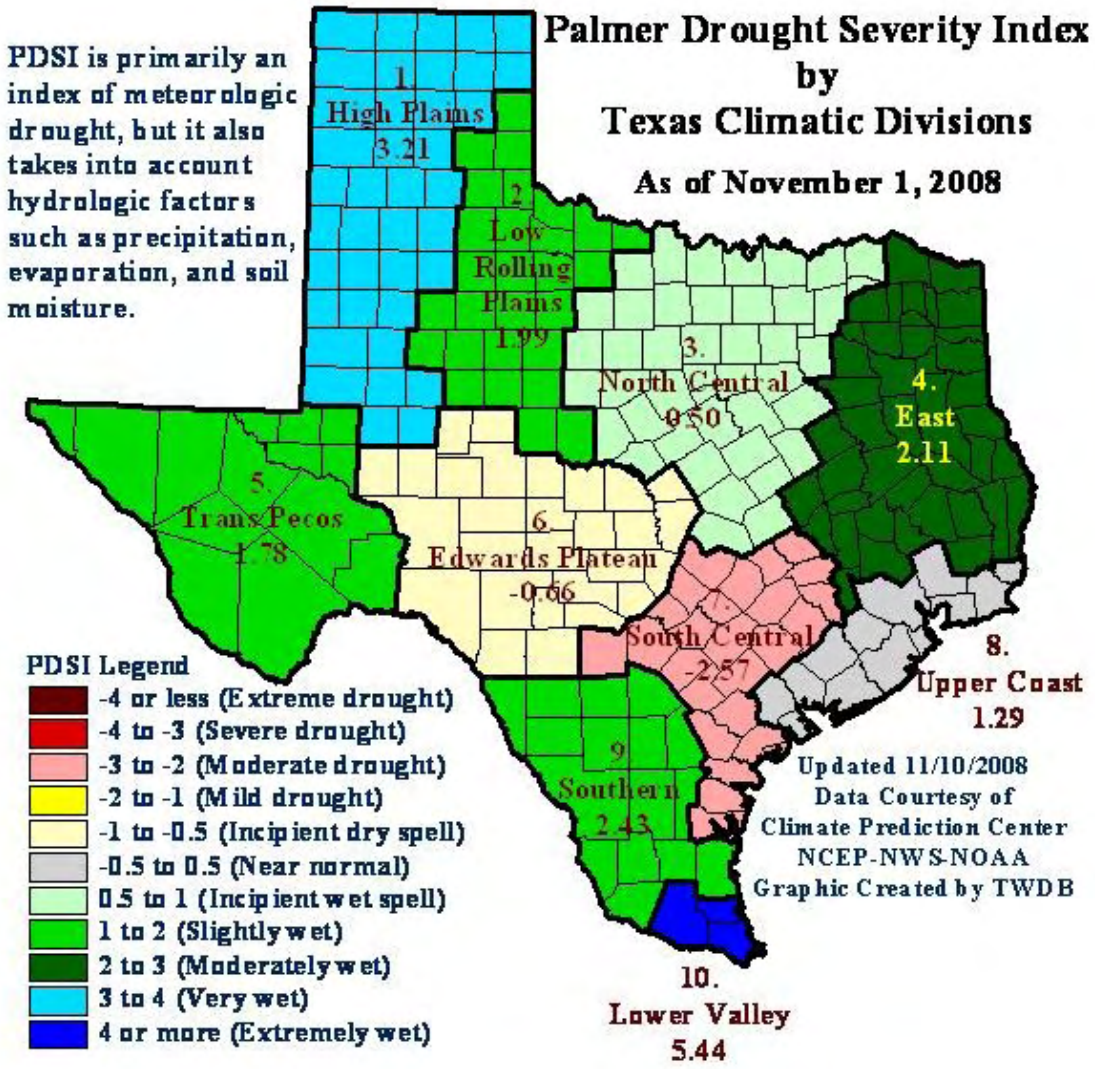

Palmer Drought Severity Index
by
Texas Climatic Divisions
As of June 7, 2008
PDSI is primarily an index of meteorologic drought, but it also takes into account hydrologic factors such as precipitation, evaporation, and soil moisture.
1. High Plains -1.78
2. Low Rolling Plains -0.42
3. North Central -0.18
4. East -1.11
5. Trans Pecos -3.21
6. Edwards Plateau -1.95
7. South Central -2.22
8. Upper Coast -1.64
9. Southern -2.99
10. Lower Valley -2.27
PDSI Legend
-4 or less (Extreme drought)
-4 to -3 (Severe drought)
-3 to -2 (Moderate drought)
-2 to -1 (Mild drought)
-1 to -0.5 (Incipient dry spell)
-0.5 to 0.5 (Near normal)
0.5 to 1 (Incipient wet spell)
1 to 2 (Slightly wet)
2 to 3 (Moderately wet)
3 to 4 (Very wet)
4 or more (Extremely wet)
Updated 06/09/2008
Data Courtesy of
Climate Prediction Center
NCEP-NWS-NOAA
Graphic Created by TWDB

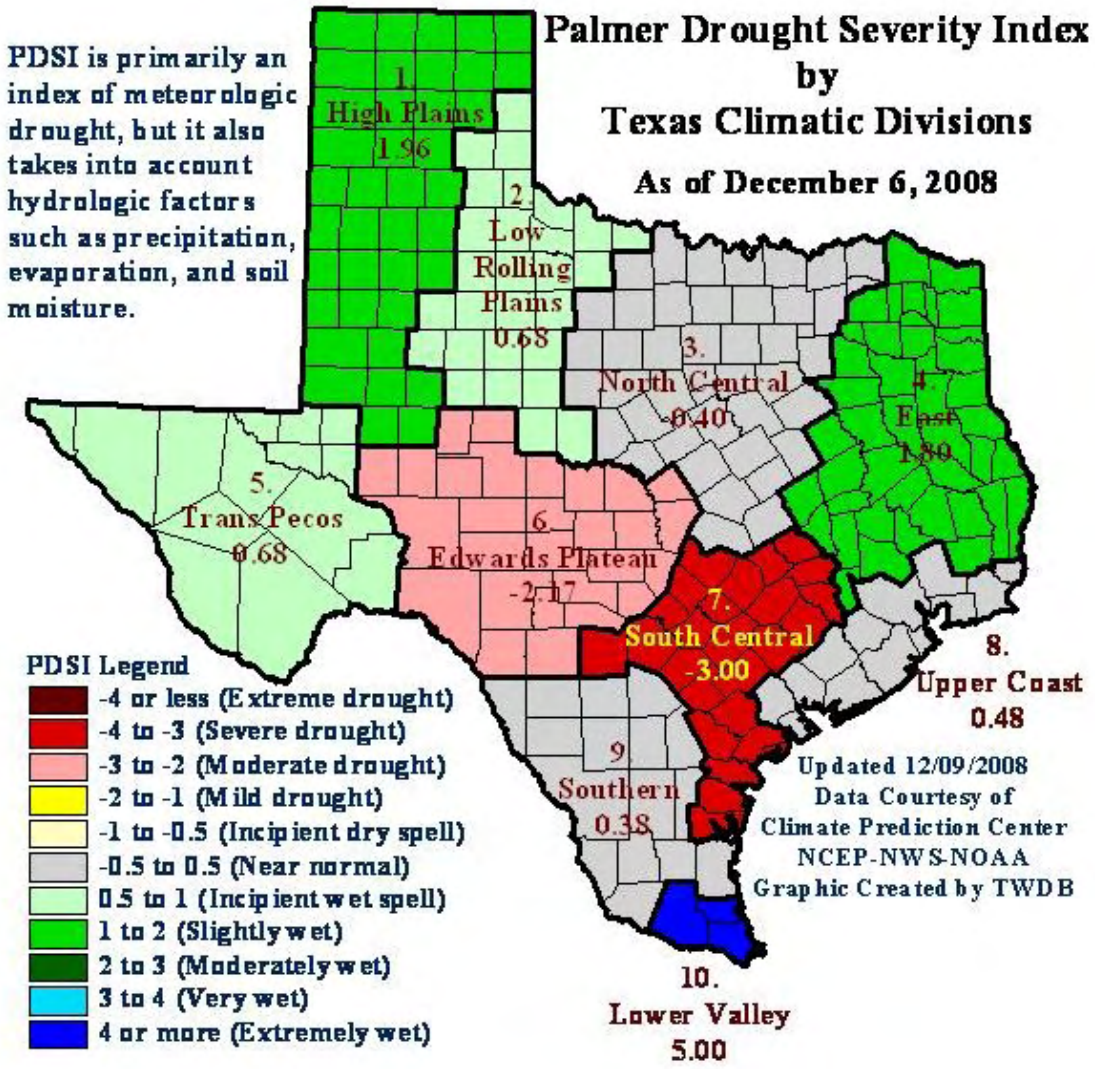

Palmer Drought Severity Index
by
Texas Climatic Divisions
As of July 12, 2008
PDSI is primarily an index of meteorologic drought, but it also takes into account hydrologic factors such as precipitation, evaporation, and soil moisture.
1. High Plains -1.48
2. Low Rolling Plains -1.22
3. North Central -2.04
4. East -1.85
5. Trans Pecos 1.31
6. Edwards Plateau -2.76
7. South Central -2.81
8. Upper Coast -2.14
9. Southern -2.43
10. Lower Valley 1.72
PDSI Legend
-4 or less (Extreme drought)
-4 to -3 (Severe drought)
-3 to -2 (Moderate drought)
-2 to -1 (Mild drought)
-1 to -0.5 (Incipient dry spell)
-0.5 to 0.5 (Near normal)
0.5 to 1 (Incipient wet spell)
1 to 2 (Slightly wet)
2 to 3 (Moderately wet)
3 to 4 (Very wet)
4 or more (Extremely wet)
Updated 07/15/2008
Data Courtesy of
Climate Prediction Center
NCEP-NWS-NOAA
Graphic Created by TWDB


Palmer Drought Severity Index
by
Texas Climatic Divisions
As of August 2, 2008
PDSI is primarily an index of meteorologic drought, but it also takes into account hydrologic factors such as precipitation, evaporation, and soil moisture.
1.
High Plains
-1.86
2.
Low Rolling Plains
-1.59
3.
North Central
-2.52
4.
East
-2.35
5.
Trans Pecos
-0.46
6.
Edwards Plateau
-2.39
7.
South Central
-2.91
8.
Upper Coast
-2.22
9.
Southern
-0.90
10.
Lower Valley
4.48
PDSI Legend
-4 or less (Extreme drought)
-4 to -3 (Severe drought)
-3 to -2 (Moderate drought)
-2 to -1 (Mild drought)
-1 to -0.5 (Incipient dry spell)
-0.5 to 0.5 (Near normal)
0.5 to 1 (Incipient wet spell)
1 to 2 (Slightly wet)
2 to 3 (Moderately wet)
3 to 4 (Very wet)
4 or more (Extremely wet)
Updated 08/11/2008
Data Courtesy of
Climate Prediction Center
NCEP-NWS-NOAA
Graphic Created by TWDB


Palmer Drought Severity Index
by
Texas Climatic Divisions
As of September 6, 2008
PDSI is primarily an index of meteorologic drought, but it also takes into account hydrologic factors such as precipitation, evaporation, and soil moisture.
1. High Plains 1.59
2. Low Rolling Plains 0.67
3. North Central -0.20
4. East 1.71
5. Trans Pecos 1.53
6. Edwards Plateau -0.63
7. South Central -1.52
8. Upper Coast -1.17
9. Southern 2.92
10. Lower Valley 6.55
PDSI Legend
-4 or less (Extreme drought)
-4 to -3 (Severe drought)
-3 to -2 (Moderate drought)
-2 to -1 (Mild drought)
-1 to -0.5 (Incipient dry spell)
-0.5 to 0.5 (Near normal)
0.5 to 1 (Incipient wet spell)
1 to 2 (Slightly wet)
2 to 3 (Moderately wet)
3 to 4 (Very wet)
4 or more (Extremely wet)
Updated 09/09/2008
Data Courtesy of
Climate Prediction Center
NCEP-NWS-NOAA
Graphic Created by TWDB


Palmer Drought Severity Index
by
Texas Climatic Divisions
As of October 4, 2008
PDSI is primarily an index of meteorologic drought, but it also takes into account hydrologic factors such as precipitation, evaporation, and soil moisture.
1.
High Plains
2.18
2.
Low Rolling Plains
1.36
3.
North Central
0.30
4.
East
2.06
5.
Trans Pecos
2.61
6.
Edwards Plateau
-0.48
7.
South Central
-2.48
8.
Upper Coast
0.10
9.
Southern
2.43
10.
Lower Valley
6.87
PDSI Legend
-4 or less (Extreme drought)
-4 to -3 (Severe drought)
-3 to -2 (Moderate drought)
-2 to -1 (Mild drought)
-1 to -0.5 (Incipient dry spell)
-0.5 to 0.5 (Near normal)
0.5 to 1 (Incipient wet spell)
1 to 2 (Slightly wet)
2 to 3 (Moderately wet)
3 to 4 (Very wet)
4 or more (Extremely wet)
Updated 10/07/2008
Data Courtesy of
Climate Prediction Center
NCEP-NWS-NOAA
Graphic Created by TWDB


Palmer Drought Severity Index
by
Texas Climatic Divisions
As of November 1, 2008
PDSI is primarily an index of meteorologic drought, but it also takes into account hydrologic factors such as precipitation, evaporation, and soil moisture.
1. High Plains 3.21
2. Low Rolling Plains 1.99
3. North Central 0.50
4. East 2.11
5. Trans Pecos 1.78
6. Edwards Plateau -0.66
7. South Central -2.57
8. Upper Coast 1.29
9. Southern 2.43
10. Lower Valley 5.44
PDSI Legend
-4 or less (Extreme drought)
-4 to -3 (Severe drought)
-3 to -2 (Moderate drought)
-2 to -1 (Mild drought)
-1 to -0.5 (Incipient dry spell)
-0.5 to 0.5 (Near normal)
0.5 to 1 (Incipient wet spell)
1 to 2 (Slightly wet)
2 to 3 (Moderately wet)
3 to 4 (Very wet)
4 or more (Extremely wet)
Updated 11/10/2008
Data Courtesy of
Climate Prediction Center
NCEP-NWS-NOAA
Graphic Created by TWDB


Palmer Drought Severity Index
by
Texas Climatic Divisions
As of December 6, 2008
PDSI is primarily an index of meteorologic drought, but it also takes into account hydrologic factors such as precipitation, evaporation, and soil moisture.
1. High Plains 1.96
2. Low Rolling Plains 0.68
3. North Central -0.40
4. East 1.80
5. Trans Pecos 0.68
6. Edwards Plateau -2.17
7. South Central -3.00
8. Upper Coast 0.48
9. Southern 0.38
10. Lower Valley 5.00
PDSI Legend
-4 or less (Extreme drought)
-4 to -3 (Severe drought)
-3 to -2 (Moderate drought)
-2 to -1 (Mild drought)
-1 to -0.5 (Incipient dry spell)
-0.5 to 0.5 (Near normal)
0.5 to 1 (Incipient wet spell)
1 to 2 (Slightly wet)
2 to 3 (Moderately wet)
3 to 4 (Very wet)
4 or more (Extremely wet)
Updated 12/09/2008
Data Courtesy of
Climate Prediction Center
NCEP-NWS-NOAA
Graphic Created by TWDB