

Lone Star Groundwater Conservation District

# 2010 Annual Report



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## 2010 HIGHLIGHT

In 2010, the Lone Star Groundwater Conservation District partnered with the San Jacinto River Authority and Save Water Texas to launch a new water conservation program for Montgomery County. The program includes a new curriculum for elementary school classrooms that focuses on water conservation and a Mobile Teaching Lab that provides a more hands-on approach. Part of

the elementary curriculum, which follows TEKS guidelines for science, social studies and math, includes "Dime Novels" for students to learn about how critical water was to frontier Texas families. A video will also be added to supplement the novels and will follow two students as they travel back in time to visit a family and learn about the challenges of frontier life. The Mobile Teaching Lab travels to schools and community events to provide the opportunity for the public to learn about where water comes from, how it's used and the importance of conservation.

## Creation

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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

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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 Offices

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207 W. Phillips, Suite 300  
Conroe, Texas 77301  
Phone: 936-494-3436  
Fax: 936-494-3438

## District Mission

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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.



[www.lonestargcd.org](http://www.lonestargcd.org)



## **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.



## **Samantha Reiter, Receptionist/Staff Assistant**

Ms. Reiter 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. Reiter prepares and compiles information for each monthly Board Meeting and 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 website to ensure that information is current and available to the public.



## **Dawn Havran, Permitting/Technical Support**

Ms. Havran has worked for the Lone Star Groundwater Conservation District for more than three years and has various responsibilities dealing with incoming well permits and permit renewals.

**Darlene Milstead, Permitting/Technical Support**

Ms. Milstead has worked for the District for more than three years and is responsible for processing incoming well permits and application amendments. Legal notices are also prepared within the permitting section.

**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.

**Daphne Walker, Bookkeeper**

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

**2010 HIGHLIGHT**

In 2010, the Lone Star GCD contracted with the U. S. Geological Survey to evaluate recharge across Montgomery County. The three-year study will use environmental tracers present in water samples collected from selected wells and analyzed for chlorofluorocarbons, sulfur hexafluoride, tritium, helium isotopes and diagnostic dissolved gases to estimate the rate of recharge across the county. A draft report of the study will be made public in late summer 2011.



# 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.

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 and by-laws and provide reports on progress of District Water Committees.

## — 2010 HIGHLIGHT —

The Member Districts of Groundwater Conservation Management Area 14 adopted their Desired Future Conditions for all relevant aquifers in the area at their August 25, 2010, public meeting. The Texas Water Development Board will use these DFCs to estimate the amount of available groundwater that can be pumped while not exceeding the DFCs. The Lone Star GCD's data on groundwater use and long-term water demand projections played a critical role in the process, and the adopted DFC parallels the District's current Management Plan.

**Richard J. Tramm**

President

Represents Montgomery County

Term Expires 1/31/13

**Orval R. Love**

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**

Treasurer

Represents Woodlands Joint Power Authority

Term Expires 1/31/11

**Reed Eichelberger**

Represents San Jacinto River Authority

Term Expires 1/31/13

**Roy McCoy, Jr**

Represents MUD's West of I-45

Term Expires 1/31/11

**M. Scott Weisinger**

Represents all areas except Conroe

Term Expires 1/31/13

**James B. Wesley**

Represents City of Conroe

Term Expires 1/31/13

**W.B. Wood**

Represents Soil and Water Conservation District

Term Expires 1/31/11

# GENERAL MANAGER'S STATEMENT



By Kathy Turner Jones

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## MANAGED AVAILABLE GROUNDWATER

We are awaiting word from the Texas Water Development Board on the Managed Available Groundwater for our area.

Member districts of Groundwater Management Area 14 (GMA 14) participated in a joint planning process to adopt Desired Future Conditions (DFCs) for all relevant aquifers within the area. This included a review of the best available scientific data compiled for the included groundwater conservation districts (GCDs) as well as outlying areas not contained within GCDs. Final action to adopt DFCs was taken on Aug. 25. TWDB will use the DFCs to estimate total groundwater availability. In turn, this groundwater volume, less an estimate of exempt groundwater use, will be used to define the Managed Available Groundwater (MAG), or the amount of groundwater that can be pumped while not exceeding the DFCs. DFCs for the Gulf Coast Aquifer were adopted for all 21 counties with area within the GMA. However, the resolution also included sections of the Carrizo Sand, Queen City, Sparta, and Yegua-Jackson Aquifers as well as various water-bearing alluvial formations that occur in the area.

In this process, the District contributed groundwater pumpage data toward a refinement of the TWDB Groundwater Availability Model (GAM) for the Northern Gulf Coast Aquifer. We also worked to ensure compatibility with the goals of the District's Management Plan and the goals of other stakeholders in the area. This process has significant impact on the long-term plans of the District and we will eagerly await the results of TWDB's study, accordingly. Furthermore, we intend to continue support of the GMA process through the cyclical nature of reviewing DFCs against the ever-evolving science of groundwater within the region.

## COURT CASES

We are also waiting to hear how the Texas Supreme Court will rule in the *Edwards Aquifer Authority v. Day* case. Landowners claimed that the Authority's denial of a permit to pump groundwater constituted a "taking" of property without adequate compensation, as required by the Texas Constitution. A Court of Appeals agreed with the landowners saying they had a vested property right in the groundwater beneath their land. The Supreme Court, at this writing, is deliberating. If it upholds the theory, an *amicus curae* brief filed by the Texas Alliance of Groundwater Conservation Districts warns, "groundwater conservation in Texas would be finished."

If that's not troubling enough, a judge in another case — *Bragg v. Edwards Aquifer Authority* — awarded compensation to landowners because their property rights were taken when the Authority restricted pumping.

## LEGISLATURE

While the courts are forming their opinions on groundwater regulation, the Texas Legislature is meeting in Austin. Amid the other challenges facing lawmakers, several bills affecting groundwater districts are moving forward. They could either bolster or dilute our ability to assure reliable groundwater supplies for the people of Montgomery County.

# MANAGEMENT GOALS

## Evidence of the District's Progress in Achieving Management Goals

The 75<sup>th</sup> 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.

### 2010 HIGHLIGHT

On April 22, 2010, the Lone Star GCD adopted the amended District Regulatory Plan, Phase II(B). The DRP Phase II(B) provides for the actual regulatory requirements needed for achieving a long-term sustainable rate of groundwater production in Montgomery County. The plan starts with an initial conversion effort that must be met by 2016 (the original date stated in Phase II(A) has been moved from 2015 to 2016). Phase II(B) requires each Large Volume Groundwater User (LVGU) in Montgomery County to submit a Groundwater Reduction Plan and establishes regulatory milestones for the initial phase of conversion from groundwater to Alternative Water Source. For more information on the DRPs and the full adoption document, please see the District's website, [www.lonestargcd.org](http://www.lonestargcd.org).



## Providing the Most Effective Use of Groundwater 2010

### 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 permitted (non-exempt) wells registered or permitted by the District for the year is given in **Table 1**.

**Table 1: Number of Exempt and Permitted Wells Registered or Permitted by the District for 2010**

Number of Exempt Wells Registered .....	431
Number of Non-Exempt Wells Permitted .....	81
<b>TOTAL</b>	<b>512</b>

### 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.

**Table 2** provides the number and types of applications made to the District for the permitted use of groundwater in 2010. **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 2010. **Table 4** provides the primary use of water listed on the permit applications approved by the District in 2010.

# PERMITTING SYSTEM

**Table 2: Number and Type of Applications for the Permitted Use of Groundwater Received in 2010**

Amendment to an Existing Operating Permit or Historical Use Permit Application*	119
New Operating Permits**	88
<b>TOTAL</b>	<b>207</b>

\*Applications for Permit Amendments may not reference a specific well

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

**Table 3: Number of Operating Permits or Permit Amendments Issued and Administrative Disposition of Applications/Permits Made by the District in 2010**

Application or Permit Disposition	Number
Applications Approved as Submitted	46
Applications Approved as Amended	108
Applications or Permits Expired due to inaction by Applicant or Permittee	3
Applications Approved w/ Conditions	22
Applications Denied	0
Applications Pending at end of 2010	23
Applications Voided or Merged	3
Applications Withdrawn by Applicant	2
<b>TOTAL*</b>	<b>207</b>

\*Reflects Board Action on Applications in 2010. This total includes applications submitted in late 2009 but with Board action on the application occurring in 2010. The total excludes applications submitted in late 2010 which could not be set for Board action until 2011.

**Table 4: Primary Use of Water on Permits Approved in 2010**

Water Use	Number of Applications
Industrial	10
Irrigation	21
Irrigation (Agriculture)	2
Public Supply/Commercial	174
Other	0
<b>TOTAL</b>	<b>207</b>

# CONTROLLING AND PREVENTING WASTE OF GROUNDWATER 2010

## **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 Board of Directors of the Lone Star Groundwater Conservation District adopted Phase II(B) of the District Regulatory Plan on April 22, 2010. The DRP Phase II(B) is designed to provide the actual regulatory requirements for achieving a long-term sustainable rate of groundwater productions within Montgomery County — beginning with an initial conversion effort that is required to be met by 2016. The District has determined that the year of initial groundwater reduction and conversion should be changed from calendar year 2015 to 2016 because of the delay in the originally anticipated time frame for adoption of these actual regulatory requirements and the need for LVGU's to have a corresponding increment of time to implement them. As part of those requirements, Phase II(B) requires each LVGU in the District to submit a Groundwater Reduction Plan ("GRP"), either individually or jointly with other LVGUs, and it otherwise establishes regulatory milestones designed to allow for the initial phase of conversion from groundwater to an Alternative Water Source, generally consistent with the underlying conversion assumptions set out in Phases I and II(A) of the DRP.

## **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 2010 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**.

# CONTROLLING AND PREVENTING WASTE OF GROUNDWATER 2010

**Table 5: The Amount of Water Use Fees Generated by the District in 2010**

Water Use Type	Permitted Amount	Fee Rate	Fee Amount
HUP Applications/ Operating Permits* .....	27,895,939,406 .....	.06/1000 gallons .....	\$1,673,756.36
Water Subject to Transportation Fee .....	50,074,049 .....	.09/1000 gallons .....	\$4,506.66
AG Permits/Applications .....	492,436,217 .....	\$1.00 per acre ft. ....	\$1,511.23
<b>TOTAL</b>	<b>28,438,449,672</b>		<b>\$1,679,774.25</b>

*\*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 .....	28,523,154
Industrial .....	470,493,441
Irrigation .....	649,909,668
Irrigation (Agriculture) .....	97,378,047
Public Supply .....	1,480,249,394
Public Supply (Commercial) .....	534,921
Public Supply (PWS) .....	11,909,817,144
<b>GRAND TOTAL*</b>	<b>14,636,905,769</b>

*\*The reported pumping for 2010 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 the 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 the District's website is provided on Page 12 and 13.

# CONTROLLING AND PREVENTING WASTE OF GROUNDWATER 2010

EPA832-F-09-004



## Fix a Leak Week Family Fact Sheet

*Fix a Leak Week, sponsored by the U.S. Environmental Protection Agency's WaterSense® program, takes place in March. It's a time when families are encouraged to check for water leaks and drips in bathrooms, kitchens, and yards at home.*

### What Is WaterSense?

The U.S. Environmental Protection Agency, or EPA for short, is the part of our nation's government that helps to protect the air we breathe, the water we drink, and the land where we live. EPA's WaterSense program encourages Americans to use only the water they need and avoid wasting this precious resource. This concept, known as "water efficiency," is important because the more people there are on the planet, the more strain it puts on limited water supplies. In fact, from 1950 to 2000, the number of people living in the United States doubled, while the demand for water more than tripled. Using only what we need helps keep this growing thirst for water in check.



### The Facts on Leaks:

- Did you know that, in a year, water leaks in your home can waste enough water to fill a backyard swimming pool? And if we added up all the water leaking in people's homes right now it could fill a trillion gallons of milk jugs? That's enough water for all the people living in the cities Los Angeles, Chicago, and Miami combined.
- Water-wasting leaks include running toilets, dripping faucets, and other leaking pipes around your home. Most of these leaks can be fixed easily.
- Fixing these leaks can save your family more than 10 percent on water bills. That's like saving \$1 for every \$10 spent on water.

### Finding Leaks:

- Ask your parents to help you find the water meter on your house. Usually, it's on the outside of the house in a box or under a metal cover on the sidewalk that says "Water." The numbers in the box represent either gallons or cubic feet of water used in your home. Check your meter, then don't flush the toilet, run the faucet, or use any water for two hours. At the end of the two hours, check the water meter again. If the meter does not read exactly the same, you probably have a leak.
- Walk through your house listening for running toilets and looking for drips. Drips usually mean leaks.
- Find out if your toilet is leaking silently by placing a drop of food coloring in the toilet tank (that's the area behind the toilet seat—ask for mom or dad's help to remove the lid). If color shows up in the toilet bowl after 15 minutes without flushing, you have a leak. Once you finish the experiment, flush a few times so you don't stain the toilet.



# CONTROLLING AND PREVENTING WASTE OF GROUNDWATER 2010

## Faucets:

- Take a watch or clock with a second hand and time how often your faucet drips. A leaky faucet that drips at the rate of one drip per second can waste more than 3,000 gallons in a year!
- There are parts that hold your faucet together called washers and gaskets—they can wear down and cause drips. If someone in your house is handy, these parts usually can be replaced easily.
- There's also a little screen device called an "aerator" that can be screwed onto the tip of your faucet—it adds air into the water stream so you can use less water to wash your hands or brush your teeth without noticing a difference in water flow. Ask your parents to look for the WaterSense label when buying an aerator or replacing a faucet—that means the product will work well and save water.



## Showers:

- Showerheads—the place where water comes out in streams at the top of your shower—can also get old and leak, even when the water is not on. A showerhead that drops just 10 drips in a minute wastes more than 500 gallons per year. That's enough water, if you saved it all up, to wash 60 loads of dishes in your dishwasher!
- Most leaky showerheads can be fixed by making sure they're screwed in tight. Having someone handy wrap the showerhead in "pipe tape," a special tape available at hardware stores, and using a wrench to tighten it will help.

## Toilets:

- It's one of the oldest prank phone calls—"Is your toilet running? Then you'd better catch it!" But a running toilet is no joke. If you can hear the water in your toilet making noise, even when no one flushed recently, you have a running toilet that could be wasting 200 gallons of water or more every day! Sometimes you just need to jiggle the handle to fix it, but sometimes a part needs to be replaced.
- Many toilets leaks are caused because the "flapper" is decayed or broken. The flapper is a rubber piece that opens up to let the water flow from the tank into the bowl when you pull down on the toilet handle. If someone in your house is handy, they can easily replace this inexpensive part of your toilet.
- If the problem is not just an old flapper and your family has to replace a leaky toilet, tell your parents to look for one with the WaterSense label to save both water and money on your family's water and sewer bill.



## Outdoors:

- Check your garden hose for leaks where it connects to the side of the house. If it leaks when the hose is turned on, make sure the hose is screwed in tight. If that doesn't work, someone handy may need to replace the nylon or rubber hose washer or wrap the "spigot," which is the metal faucet where the end of the hose attaches to the wall, in pipe tape.
- If your family has a sprinkler system that waters your lawn, remind your parents to check the system each spring before turning it on to make sure the sprinklers were not broken during the winter or have sprung any leaks.

**For more information, visit [www.epa.gov/watersense/fixaleak](http://www.epa.gov/watersense/fixaleak).**



## **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**

September 30, 2010, at the Harris-Galveston Subsidence District

Present: Ron Neighbors (HGSD), Tom Michel (FBSD), Kathy Turner Jones (LSGCD), Orval Love (LSGCD), Richard J. Tramm (LSGCD), and Mark Lowry (LSGCD)

The Harris-Galveston (HGSD) and Fort Bend (FBSD) Subsidence Districts are authorized by legislation to regulate the withdrawal of groundwater in Harris, Galveston and Fort Bend counties; and the Lone Star Groundwater Conservation District (LSGCD) is authorized by the LSGCD legislation to regulate the withdrawal of groundwater in Montgomery County.

Given the withdrawal of groundwater in the HGSD and FBSD affects groundwater levels and subsidence in the LSGCD, and the withdrawal of groundwater in the LSGCD affects subsidence in the HGSD and FBSD, the districts have entered into an interlocal agreement for review and recalibration of Groundwater Models.

On Sept. 30, 2010, a planning meeting was held between the Subsidence Districts and the Lone Star GCD. Items discussed included receiving reports from Freese and Nichols, Inc. on Work Order 1 and work done to date by USGS.

The management of our groundwater resources has involved significant coordination with regional ground and surface water suppliers; ongoing interaction with other state and local regulatory bodies; analysis of accurate and up to date predictions on water usage; the enforcement of real disincentives to those who rely too heavily on groundwater; and a steadfast commitment to practicing and promoting water conservation.

# CONTROLLING AND PREVENTING SUBSIDENCE 2010

## 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 2010 can be found on Pages 15-17.

### WHAT IS SUBSIDENCE AND WHY SHOULD WE CARE ABOUT IT?



**Sub-si-dence** – the sinking down of land resulting from natural shifts or human activity, frequently causing structural damage to buildings.

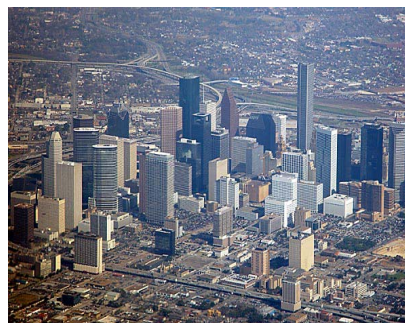
Following a period of rapid and sustained growth and an influx of new residents triggered by the expansion of the petrochemical industry and allied businesses following World War II, six or more feet of subsidence had occurred in Harris and Galveston Counties by the mid-1970's along the Ship Channel. By 1979, up to 10 feet of subsidence was measured there, and over 3,000 square miles had 'sunk' by more than 1 foot. The elevation of the land surface is lowered when the many layers of clay beneath the land surface are compacted.

As people have been saying for centuries, "Nature abhors a vacuum." When large amounts of groundwater are drawn out of the aquifers, it should be no surprise that the clay layers would collapse under the weight of everything above them, and effectively decrease the storage capacity of the aquifer...never to return to previous levels. Some natural settling or shifting of sediments laid down millions of years ago may also cause subsidence, but not to the extent of that caused by the withdrawal of oil and gas, subsurface coal mining, and the pumpage of groundwater.



An example of what can happen when land loses elevation by subsidence. (USGS photo)

Most of the groundwater wells that supply drinking water to the Houston-Galveston area are completed in the upper 1,000 to 2,000 feet of the Chicot and Evangeline aquifers. As subsidence increased inland – north and west of Houston – water levels have declined more than 100 feet in the Evangeline aquifer between 1977 and 1997. The area's steadily increasing population and decades of aggressive water usage have resulted in a corresponding decline of the aquifers and in subsidence.

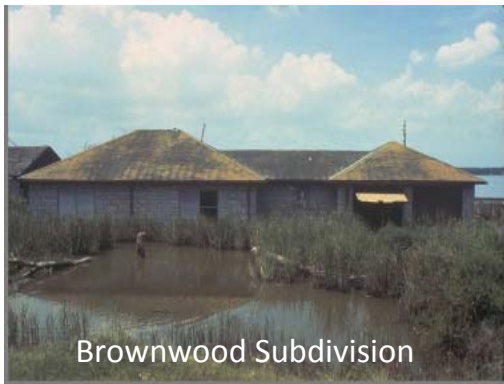


#### That "sinking" feeling...

According to the United States Geological Service (USGS), the greater Houston area has been more adversely impacted by subsidence than any other metropolitan area in the U.S. Extensive subsidence – caused primarily by groundwater pumping (and to a lesser extent, by oil and gas extraction) has caused damage to the area's industrial and transportation infrastructure, increased the frequency of flooding, and has cost millions of dollars. (One conservative estimate places the average annual direct and indirect cost of subsidence to property owners at more than \$90 billion in 1998 dollars.)

*Continued next page*

# CONTROLLING AND PREVENTING SUBSIDENCE 2010



Look at it this way. If the elevation of your house is only 10 feet above sea level and you lose 10 feet of elevation because of subsidence...your house is now under water. This actually happened to Brownwood, a subdivision in the City of Baytown that had to be abandoned – an extreme example of the effects of subsidence in coastal areas. While regional land subsidence can be subtle and difficult to detect, there are locations in and near Houston where the effects are quite evident. As much as 10 feet of subsidence has shifted the coastline and changed the distribution of important wetlands. One of the most obvious impacts of subsidence has occurred at the San Jacinto Battleground State Historical Park, where Texas won its independence, which is now partly submerged with 100 acres of the park under water.



*A road that provided access to the San Jacinto Monument was closed due to flooding caused by subsidence.*

## **In search of solutions...**

It was a growing awareness of subsidence and related problems that prompted community and business leaders to lobby for some relief. The 1975 Texas Legislature responded with the creation of the Harris-Galveston Coastal Subsidence District “for the purpose of ending subsidence which contributes to, or precipitates, flooding, inundation, and overflow of any area within the District...” This unique District was authorized to control the issuance of well permits, promote water conservation and education, and promote conversion from groundwater to surface water supplies. It was largely successful in its efforts to arrest subsidence in the coastal plain east of Houston, and the Fort Bend Subsidence District was created in 1989 to accomplish the same reduction of reliance on groundwater.

Surface water is managed at the state level; groundwater in the state of Texas is managed by local Groundwater Conservation Districts — over 95 of which have been created, that cover more than 150 counties across the state. The Lone Star Groundwater Conservation District was created by the 77th legislature in 2001 to protect and manage the groundwater resources of Montgomery County. As with the other Districts, Lone Star (LSGCD) works to maintain a balance between protecting the rights of private landowners and our responsibility to protect groundwater. The District focuses on preventing waste, collecting data, educating the public about water conservation and preventing irreparable harm to the aquifer.

Montgomery County faces similar groundwater withdrawal problems. Quite simply, we’re pumping groundwater faster than the aquifers can recharge. According to Kathy Turner Jones, general manager of LSGCD, “Virtually all of our current water supply is provided by groundwater. In 2009, the permitted demand in the county was 87,000 acre feet per year, exceeding the sustainable recharge rate by 50%. By 2040 the total water demand is expected to be 154,000 acre feet. What this means,” she continued, “is that in 2040, we will be exceeding the

# CONTROLLING AND PREVENTING SUBSIDENCE 2010

sustainable recharge rate of the aquifer by almost 90,000 acre-feet per year!”

Over the years, there have been adequate supplies of groundwater to fuel and sustain significant economic growth and development in Montgomery County. In just the last decade, the County’s population had already experienced a staggering 52 percent increase, making it one of the fastest growing counties in the U. S. Obviously, more people mean increasing demand for water...at least that has always been true in the past. Since the early 1990’s however, some parts of the state have learned that by aggressively taking some common-sense measures to use water more efficiently, they were actually able to keep the level of demand relatively constant even though the population continued to increase.

“Obviously, it is necessary to reduce our reliance on groundwater, so the District sought the most fair and equitable regulatory process to accomplish this. As of January 1, 2016, groundwater withdrawals must be reduced,” Turner said, “and alternative sources of water will be required. This applies county-wide to all industrial, commercial and public water suppliers.”

“One of our major tasks,” Turner said, “is to communicate with area residents about the critical need for this transition, and to solicit everyone’s help in achieving a consensus that using our finite water resources more efficiently is absolutely necessary if we are to have an adequate future supply of water.”

For additional information about subsidence and the LSGCD groundwater reduction mandates, please visit [www.lonestargcd.org](http://www.lonestargcd.org).



The **Gulf Coast Aquifer** forms an irregular shaped belt along the Gulf of Mexico from Florida to Mexico. In Texas, it provides water to all or parts of 54 counties, and the greater Houston metropolitan area is the largest municipal user (1997, Water For Texas). The aquifer is made up of a combination of clays, silts, sands, and gravels that are all connected to form a large, leaky artesian aquifer system comprised of four major components. The deepest of these water producing formations is the Catahoula. Above that is the Jasper Aquifer, followed by the Evangeline Aquifer, and topped by the Chicot Aquifer.

According to the Texas Water Development Board, years of heavy pumpage in portions of the aquifer have resulted in areas of significant water level decline. Declines of 200 to 300 feet have been measured in some areas of eastern and southeastern Harris and northern Galveston County. Although there is some continued decline in the Galveston area, conversion to surface water and a reduction in groundwater usage has slowed the rate of decline, and has actually allowed some recharge of the aquifer in at least one location.

This aquifer recharge and reduction in subsidence is the objective of the Lone Star Groundwater Conservation District’s Regulatory Plan that mandates the conversion to surface water. 💧

# CONJUNCTIVE SURFACE WATER MANAGEMENT ISSUES 2010

## 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 posted on the District website, [www.lonestargcd.org](http://www.lonestargcd.org).

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

**Table 7: Record of District representative attendance at Region H Regional Water Planning Meetings (Total of 6 meetings were held with 100% attendance)**

Meeting Date	Attendees
Jan. 6 .....	Reed Eichelberger, Kathy Turner Jones, Mel Lonon
Feb. 3 .....	Reed Eichelberger, Kathy Turner Jones, Mel Lonon
April 7 .....	Reed Eichelberger
July 7 .....	Reed Eichelberger, Mel Lonon
Aug. 4 .....	Mel Lonon
Oct. 6.....	Kathy Turner Jones

## 2010 HIGHLIGHT

Every year the Lone Star GCD sponsors one to three high school students to attend the State Youth Water Camp. In July 2010, the District sponsored Lili Varela-Radliff, a junior at Eastwood Academy High School, to attend the five-day camp in Monahans, Texas. The camp focuses on water issues, quality and conservation education, and features field trips, tours and hands-on group projects. The District sponsors students by paying \$150 to cover transportation and registration costs.



# DROUGHT SUMMARY

## 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](http://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 for 2010 can be found on the District website.

## Quarterly Drought Briefings for 2010

### 1<sup>st</sup> Quarter 2010

No Statewide Drought Situation Reports were published for the months of January, February or March 2010.

### 2<sup>nd</sup> Quarter 2010

Monthly precipitation totals across most of the state were below normal in June 2010, and in East Texas and North Central Texas there were regions of severe drought (D2) by month's end. In addition to the rainfall deficits in most of the state, average temperatures for the month were far above normal and served to accelerate the normally high June evaporation rates.

A swath of the state, from South Central Texas to the Red River in Northeast Texas, saw a quick elimination of drought conditions after a storm system produced several inches of rain on the 9<sup>th</sup> and 10<sup>th</sup> of June.

No Statewide Drought Situation Reports were published for April or May 2010.

### 3<sup>rd</sup> Quarter 2010

Monthly precipitation totals in July were above normal across most of Texas, with the majority of precipitation falling in the first ten days of the month.

Monthly precipitation totals in August were below normal across all areas of Texas except for the eastern Trans Pecos and the extreme northwest Panhandle. Extremely dry conditions were prevalent across all of South Central Texas, with most areas receiving less than 0.25 inches of August precipitation.

September brought a wide variety of monthly precipitation totals across Texas, with much-above-normal precipitation in Central Texas and below-normal precipitation in East Texas and West Texas. By the end of September, the most significant drought in the state was in Harrison, Panola, Shelby, Sabine and Newton counties, located at the Texas-Louisiana border, designated as severe drought (D2) by the United States Drought Monitor (USDM). A small area of moderate drought (D1) extended west of the D2 area, and the overall drought situation in this region was very similar to conditions at the end of August. The rest of East Texas, east of the Trinity River, was designated as "Abnormally Dry" (D0) by the USDM entering the month of October.

### 4<sup>th</sup> Quarter 2010

Most of Texas had below-normal precipitation during the month of October, with most areas outside of the Panhandle picking up only a small fraction of normal precipitation amounts. As of the end of October, the two main areas of drought concern are in Southeast Texas and in Southwest Texas along the Rio Grande.

In November, most of Texas had below-normal precipitation. For the first time in 2010, extreme drought (D3) was present in the USDM depiction for Nov. 30.

December produced drought conditions ranging from abnormally dry to extreme conditions across most of Texas, except for regions in the panhandle. Throughout the month, Southeast Texas was classified by the USDM as experiencing moderate (D1) to extreme (D3) conditions throughout the month.



The Texas Water Development Board has stopped making the Texas specific Palmer Drought Severity Index maps, as explained in the email found on this page. The District will now use other sources to monitor drought conditions.

**From:** Robert Bradley [Robert.Bradley@twdb.state.tx.us]  
**Sent:** Wednesday, January 12, 2011 11:49 AM  
**To:** Samantha Reiter  
**Cc:** Peter George  
**Subject:** TWDB Drought information

Ms. Reiter,

The TWDB stopped making the Texas specific Palmer Drought Severity Index maps. Our main drought contact is Mr. Yujuin Yang and he can be contacted at [Yujuin.yang@twdb.state.tx.us](mailto:Yujuin.yang@twdb.state.tx.us) or (512) 936-2385.

You may want to use the Climate Prediction Center national map at [http://www.cpc.ncep.noaa.gov/products/analysis\\_monitoring/regional\\_monitoring/palmer.gif](http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/palmer.gif). Additional information on this can be seen in this page [http://www.cpc.ncep.noaa.gov/products/monitoring\\_and\\_data/drought.shtml](http://www.cpc.ncep.noaa.gov/products/monitoring_and_data/drought.shtml)

If the national map is not satisfactory, you can always use the raw data that is posted to created your own maps. This information is posted weekly at this link. [http://www.cpc.ncep.noaa.gov/products/analysis\\_monitoring/cdus/palmer\\_drought/wpdsouth.txt](http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/cdus/palmer_drought/wpdsouth.txt)

Historical Palmer Drought Severity Index data can be found here <ftp://ftp.ncdc.noaa.gov/pub/data/cirs/>, just use the readme file to understand the files in that directory.

Here is additional information you might find helpful.

One alternative is to use the U.S. Drought Monitor; here is a link for the Texas Map [http://www.drought.unl.edu/dm/DM\\_state.htm?TX,S](http://www.drought.unl.edu/dm/DM_state.htm?TX,S)

And other links.

<http://atmo.tamu.edu/osc/drought/>  
<http://www.txdps.state.tx.us/dem/droughtCouncil/stateDroughtPrepCouncil.htm>  
<http://agrilife.tamu.edu/drought/>

If I can assist you please contact me.

Robert G. Bradley, P.G.  
GMA Liaison  
Groundwater Technical Assistance  
Texas Water Development Board  
P.O. Box 13231  
Austin, Texas 78711  
voice: 512-936-0870

# CONSERVATION PROGRAMS

## **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 2010 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 on Pages 27 through 33 and on the District website, [www.lonestargcd.org](http://www.lonestargcd.org).

### **F.2. Objective**

The District will develop or implement a pre-existing educational program for use in public or private schools that will be included in the Annual Report to the Board of Directors for the year 2010.

### **F.2. Performance Standard**

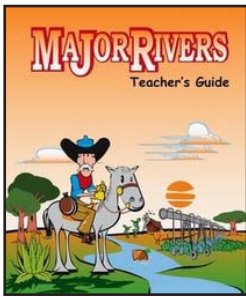
A description of the educational program developed or implemented by the District for use in Montgomery County public or private schools will be included in the Annual Report to the Board of Directors for the year 2010.

# CONSERVATION EDUCATION PROGRAMS

## Major Rivers:

### A Texas Water Education Program

Classroom curriculum is geared towards educating 4<sup>th</sup> and 5<sup>th</sup> 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.

**In 2010 LSGCD spent \$1,309 for its part of the program on:**

- 7 ..... Educational Packages
- 100 ..... Replacement Packages – English
- 18 ..... Replacement Packages – Spanish

## State Youth Water Camp

In pursuit of providing education programs for Montgomery County students, the District sponsors annually one to 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 home water use on water quality and supply. Cost to attend is \$150/student plus travel.

## 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 2010, over 52,000 book covers were distributed to six (6) school districts within the county to assist in meeting the Texas Education Agency's requirement that all textbooks be covered.

**In 2010, LSGCD spent \$4,791.66 for its part of the program.** School districts included:

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



# CONSERVATION EDUCATION PROGRAMS

## Montgomery County Fair and Rodeo

The 2010 Montgomery County Fair and Rodeo was held April 9-18. As in past years, the District provided the aquifer display, on loan from the San Antonio Water System, for public exhibit during the fair and rodeo. Staffers Mel Lonon and Marjie Risk helped set up and monitor 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 was rained out for 2010. It was scheduled for Saturday, April 10 and the theme for 2010 was "It's all Connected." This event is held annually to celebrate the environment with 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.



The Lone Star Groundwater Conservation District makes a presentation on water conservation to the Lions Club.

## Southwest Grounds Maintenance Conference

The 17th Annual Southeast Texas Grounds Maintenance Conference was held in Conroe. Attendees were individuals associated with the maintenance of golf courses, schools, landscape, parks and recreation. The Lone Star Groundwater Conservation District set up its new Mobile Teaching Lab to provide a hands-on educational opportunity for the public to learn about where water comes from, how it's used and the importance of conservation.

## Other Activities

The District accepts every opportunity to educate the public on water conservation. Outside the many efforts already highlighted above, in 2010 the District participated in many meetings and numerous events. The District's goal at these events is to present water conservation concepts in an entertaining and educational format. The events include:

- Hosted a two-day Water Audit Training Workshop on Aug. 25-26 at the Lone Star Convention Center for 26 attendees. It awarded water and wastewater system operators with 12 hours of training credit.
- Official unveiling of the Mobile Teaching Lab on Sept. 2, 2010
- General Manager Kathy Turner Jones and Mel Lonon attended The Woodlands Landscape Solutions Event on Sept. 25
- Classroom presentations
- Community Association presentations
- Rotary, Kiwanis, and Lions Club presentations
- Chamber of Commerce presentations
- Presentation to various City Councils as requested (Conroe, Panorama, etc.)

# CONSERVATION EDUCATION PROGRAMS

## 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
- Aerator
- Rain Gauge
- Moisture Meter
- Leak Detection Dye Tablets
- Shower Flow Meter Bag
- 5-Spray, Water-Saving Hose Nozzle

District staff maintains stock of these items for various presentations, meetings and outreach events. Staff estimates that approximately 100 bags were distributed in 2010 at various events and presentations throughout the county. In addition, the conservation kits are available to the walk-in public on request. The District spent \$1,628.50 on supplies and reorder of items for the water conservation kits in 2010.

## 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, depending on the specific resource.

The District offers and encourages educators to take advantage of the District's water resource information material. A new item added in 2008 was a desktop Groundwater Flow Model, which serves as an interactive classroom tool designed to show the flow of water and pollutants through



Lone Star GCD's General Manager Kathy Turner Jones spoke at the Greater Conroe/Lake Conroe Area Chamber of Commerce's Jan. 27 luncheon about how to use water more resourcefully.

*Pictured from left to right:* Chairman of the Board Charlie Irvine, Kathy Turner Jones and Mark Stevens.

differing gradients. It can be used in front of the classroom and is easily used by students themselves. It demonstrates flowage through confined and unconfined aquifers, as well as the effects of pumping on these aquifers. The District maintains this teaching tool as a means to teach the community about the hydrologic characteristics of aquifers and the impacts of groundwater pumping.



# CONSERVATION EDUCATION PROGRAMS

In 2010, the Lone Star GCD formed a partnership with the San Jacinto River Authority and SaveWaterTexas.com to increase water conservation education opportunities in the classroom. The multi-faceted program includes the Texas Water: Origins and Destinations curriculum, a Teacher's Resource Guide and the Mobile Teaching Lab.

The **Texas Water: Origins and Destinations** curriculum was created for grades 3-6 and follows TEKS guidelines for science, social studies and math. It will be used in schools in Montgomery County for the 2010-2011 school year.

The **Teacher's Resource Guide** includes an engaging and educational DVD about Texas Rivers, and also incorporates "Dime Novels" for students to read and learn about how critical water was to "frontier" families in Texas. A video will also be added that follows two students as they travel back in time to visit a family and learn about the challenges of frontier life.

The **Mobile Teaching Lab** was created to provide a more hands-on learning experience for students and the public, providing opportunities to learn about where water comes from, how it's used and the importance of conservation. The "Frontier Ladies" visit schools with the Mobile Teaching Lab and do exciting school assemblies that introduce students to important Texas history and offers hands-on experiences with everyday items from the past.

The program will be introduced to educators in special workshops to highlight how the interactive materials can be used with students, and give educators a chance to experiment with all the teaching tools they'll receive. Participants will receive continuing education credits and themed "goodie bags" to help them in classroom projects.



The Lone Star Groundwater Conservation District's new Mobile Teaching Lab features a hands-on conservation education program called "Texas Water – Origins and Destinations." The Mobile Lab travels to different schools and community events to teach the public about water conservation.



Throughout 2010 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 Releases**

**September 26, 2010, Conroe, Texas: Groundwater Management Area 14 Adopts Desired Future Conditions** – The Member Districts of Groundwater Management Area 14 (GMA 14) adopted desired Future Conditions (DFSc) for all relevant aquifers within their area at their August 25 public meeting.

**April 22, 2010, Conroe, Texas: Lone Star Groundwater Conservation District encourages you to celebrate Earth Day on April 22, 2010** – The Lone Star Groundwater Conservation District encourages you to celebrate Earth Day by being more water wise in all of your daily activities.

**February 2010, Conroe, Texas: Lone Star Groundwater Conservation District launches table tent program for Montgomery County Restaurants** – The Lone Star Groundwater Conservation District has taken the next step towards building a stronger water efficiency ethic for Montgomery County with the creation of a table tent for restaurants asking that water only be served to patrons upon request. The District is hoping to raise awareness about the amount of water that can be saved by asking residents to adopt a water conserving lifestyle.

A sample of the press release issued on Feb. 11, 2010 can be found on Page 27.

## **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 2010, 13 articles were published with a circulation distribution of 65,000. Copies of each published article are available on the District website, [www.lonestargcd.org](http://www.lonestargcd.org), and samples can be found on Pages 28 through 30.



For Immediate Release: February 11, 2010

District Contact:  
Marjie Risk, Education/Public Awareness Coordinator  
Lone Star Groundwater Conservation District  
936-494-3436  
[mrisk@lonestargcd.org](mailto:mrisk@lonestargcd.org)

## **Lone Star Groundwater Conservation District Launches Table Tent Program for Montgomery County Restaurants**

The Lone Star Groundwater Conservation District has taken the next step towards building a stronger water efficiency ethic for Montgomery County with the creation of a table tent for restaurants asking that water only be served to patrons upon request. The District is hoping to raise awareness about the amount of water that can be saved by asking residents to adopt a water conserving lifestyle. What most people don't realize is that it takes about four glasses of water to wash that one glass that is served. It is not uncommon to see full water glasses remain on tables due to patrons ordering other types of beverages and not drinking the water provided.

The table tents will be provided free of charge to restaurant owners within Montgomery County on a first come, first served basis. The District made a conscious decision to tie this effort to their participation in the Texas Water IQ Campaign which educates residents about where their water comes from and how to use it more efficiently. The water savings from this voluntary change in behavior can save water just like not letting the faucet run when brushing your teeth. One glass not served, is at least one glass saved. When you factor in up to four glasses of water to wash the one glass served and then consider that older commercial dishwashers are for the most part inefficient, you are looking at even more water used.



If you are a restaurant owner in Montgomery County who is interested in participating in the Lone Star Groundwater District Table Tent Program, please contact Education/Public Awareness Coordinator, Marjie Risk, by email @: [mrisk@lonestargcd.org](mailto:mrisk@lonestargcd.org) to place an order.



## NATIONAL 4-H WEEK FOCUSES ON WATER QUALITY

By: Marjie Risk, Education/Public Awareness Coordinator

### Ready to Experiment?

Want to learn more about water quality and why it is so important? Get involved at home, in your community or at school with the 4-H National Youth Science Day Experiment. This big event is being conducted nationally on October 6th, but you can participate whenever is convenient! This 4-H effort is designed to get youth involved in the topics of science, engineering and technology!



### Montgomery County Already a 2009 Winner!

The event this October will be the 2nd Annual Nat'l Youth Science Day. Last year Montgomery County participated in the 2009 experiment and won for highest participation in the State of Texas! This effort locally was spearheaded by Caroline M. Cruz, Montgomery County Extension Agent for the Urban Youth Development Texas AgriLife Extension Service. Ms. Cruz worked with Montgomery County Schools to create interest and encourage participation. The greatest participation came from the Wilkerson Intermediate science classes, and the Conroe Independent School District.

### Concerned About Quality...

#### Why is Water Quality So Important?

We hear so much about having water supplies to meet growing demands and new communities. The other important piece of the puzzle is having enough water of the right quality. Water quality is a big business as seen through the number of suppliers of bottled water, reverse osmosis systems and other home filtration systems available. We

invest a great deal of money to ensure that we are drinking water of a suitable quality.

We need clean water supplies for this and future generations!



### 4-H Water Quality Definition...

"Water quality is a term used to describe the chemical, physical, and biological characteristics of water. Today, as our population evolves, we face a growing concern that our sources of clean water are becoming contaminated by warming temperatures, carbon dioxide emissions and dangerous run off. These changes in the water quality affect not only our drinking water supply, but also the natural habitats of aquatic plants, animals and organisms. This year's National Science Experiment - 4-H2O - is designed to engage youth around the country in asking the question: Why is water quality important and why is it important to understand it now?"

### Take the Plunge into Water Quality and Determine your Carbon Footprint!

This experiment (kits are available from the National 4-H) can be fun for people of all ages! The experiment begins by conducting a simple activity to see how much CO<sub>2</sub> levels in the atmosphere can build up quickly. Next, you will use effervescent tablets in sandwich bags to realize how CO<sub>2</sub> expands in our atmosphere. Lastly, over a longer period of time you will see how CO<sub>2</sub> levels can cause temperatures to rise and result in algae growth. Energy from the sun can be used by algae in the process of photosynthesis!

### Get Involved! Where Can You Order an Experiment Kit?

To purchase your kit and participate in the water quality experiment, check out the

2010  
National  
Science  
Experiment

4-H<sub>2</sub>O



website: [www.4-h.org/NYSDD/the-experiment.php](http://www.4-h.org/NYSDD/the-experiment.php)

### The Lone Star Groundwater Conservation District

The Lone Star Groundwater Conservation District challenges Montgomery County schools, youth groups and families to experiment with water quality. Do your part at a local level to learn more about water quality and why it is so important.

The Lone Star Groundwater Conservation District (LSGCD) is committed to teaching residents of Montgomery County about the water sources available and the need to use these sources as wisely as possible. The Mobile Teaching Lab will be available for use within local school districts in coordination with existing water curriculums, environmental fairs, and other types of educational events. The LSGCD is convinced that knowing more about our resources will help to encourage the wise management and efficient use of our water for this and future generations!







## Just a simple glass of water... right?

By: Kathy Turner Jones

Residents of Montgomery County are paying a lot more attention these days to where our drinking water comes from. The Lone Star Groundwater Conservation District wants you to know why it will be critical to use water more efficiently in the future, and how you can help preserve and protect this precious natural resource.

Over the years, there have been adequate supplies of groundwater to fuel and sustain significant economic growth and development in Montgomery County. In just the last decade, the County's population had already experienced a staggering 52 percent increase by 2009, making it one of the fastest growing counties in the U. S. Obviously, more people mean increasing demand for water... at least that has always been true in the past. Since the early 1990's however, some parts of the state have learned that by aggressively taking some common-sense measures to use water more efficiently, they were actually able to keep the level of demand relatively constant even though the population continued to increase.

There is no question that our national 'thirst' for water is increasing. According to the U. S. Environmental Protection Agency, between 1950 and 2005, the U.S. population doubled while the demand for public supply systems -- such as water and sewer -- more than tripled. Experts project that it will be necessary to invest billions of dollars to update aging infrastructure over the next 20 years. This is consistent with projections in the Texas Water Development Board's WATER FOR TEXAS 2007 report that the population of Texas is expected to more than double, going from about 21 million to about 46 million in 2060. In our region of the state -- Region H, which includes all or parts of 15 counties, including Montgomery -- population is expected to grow by 89 percent, to 10.9 million.

Traditionally, the focus has been on the supply side -- how could we get more water to meet the spiralling demand. Today, however, that approach has been exhausted, and it is necessary to consider more long-term alternatives. According to Kathy Turner Jones, General Manager of the Lone Star Groundwater Conservation District, "After being created by the Texas Legislature in 2001, protecting and managing the groundwater resources for Montgomery County has been our primary assignment. We focus on preventing water waste, collecting data, educating the public about water conservation, and preventing irreparable harm to the aquifer. Virtually the entire water supply in Montgomery County originates as groundwater from the Gulf Coast Aquifer System," she explained. "The fact that we have been taking water out of the aquifer faster than it has time to recharge is our number one concern."

Turner points out that current research and information indicate that the long term sustainable recharge of the aquifer in Montgomery County is about 64,000 acre-ft a year. (An acre foot is the amount of water it would take to cover one acre with water one foot deep.) The bad news is that last year, the permitted demand in the county was 87,000 acre feet per year, which already exceeds the sustainable recharge rate by 50 percent. By 2040, the total water demand is expected to be 154,000 acre feet. What this means is that in 2040, we will be exceeding the sustainable recharge rate of the aquifer by almost 90,000 acre-feet per year!



**We're pumping groundwater faster than the aquifer can recharge...**

"Obviously, it's necessary to reduce our reliance on groundwater, so the District sought the most fair and equitable regulatory process to accomplish this. Phase I of the Lone Star District's Regulatory Plan establishes January 1, 2016 as the date groundwater withdrawals must be reduced," Turner said, "and alternative sources of water will be required. This applies county-wide to all industrial, commercial and public water suppliers."

"The Large Volume Groundwater Users -- those with a single well or combination of wells that produce or are permitted to produce more than 10 million gallons a year; NOT single family residences or agricultural users -- will be required to limit their future water use to no more than 70 percent of overall water supply. One of our major tasks to address," Turner said, "is to communicate with area residents about the critical need for this transition, and to solicit their help in achieving a consensus that using our finite water resources



more efficiently is absolutely necessary if we are to have an adequate future supply of water."

### Where does our water come from?

In late 2009, the San Jacinto River Authority commissioned some consumer research among Montgomery County residents. They were asked what level of importance would they assign having an adequate future water supply. Ninety percent of the respondents said it was "very important" and 8 percent said it was "somewhat important." The same research project, however, revealed that only 11 percent of the respondents could correctly identify that all of Montgomery County's water supply comes from underground aquifers or wells. Twenty nine percent of those questioned said they didn't know, or were undecided.



"These findings simply underscore the importance of engaging area residents in dialogue and discussion about the new water management strategies we will need to employ in the months and years ahead if we are to sustain economic growth and keep pace in meeting the demands of an ever-expanding population base. We know that successful community-based water conservation programs can be created... other cities and municipalities in this state have done it," Turner said emphatically, "and we will do it, too. The District will continue to offer consumer information about using our water supplies more efficiently, to be available to meet with local groups and organizations to talk about these critical issues."

"We recognize the importance of helping today's youngsters learn good water efficiency habits, so we have recently introduced a major new education program for elementary and intermediate school classrooms in partnership



### 3 Top Water Savers...

**1. Find and Fix Leaks** -- Probably the single greatest water waster is a leaking toilet! A leak of one gallon every six minutes (not an unusual amount) totals 10 gallons an hour, or 240 gallons a day. This is almost equal to the average amount of water consumed each day in a single family home!

**2. Take Shorter Showers** -- If every individual in this area showered for one minute less per day, for example, the water saved would be in excess of 125 million gallons in a single year! Installing water-saving shower heads or flow restrictors can save another 500 to 800 gallons per month.

**3. Water your lawn only when it needs it.** Step on your grass. If it springs back when you lift your foot, it doesn't need water. After October, turn OFF your automatic sprinkler system -- your lawn doesn't need it during the dormant phase. Not overwatering your yard can save 750-1,500 gallons per month.

*The water we conserve today can serve us tomorrow!*



*The Mobile Teaching Lab with TEXAS WATER -- Origins and Destinations curriculum.*

with the San Jacinto River Authority and Save-WaterTexas.com. And we have put together some innovative classroom programs that engage the students in hands-on water activities that make the learning fun," Turner reported.

The days of cheap and plentiful water are behind us, the General Manager said, and it will be up to all of us to ask ourselves when we go to turn on the faucet, "Is it worth the water?" ♦



*Educator Carol Fraser, in her frontier garb, works with a group of students.*



# Spring Water Conservation Reminders

By: Marjie Risk, Education/Public Awareness Coordinator

How many of you have heard the spring saying "April showers bring May flowers"? Just by driving along our highways you can see that many flowers have already arrived and flourished. What is really interesting and pretty amazing is that many of these areas receive no irrigation. The wildflowers appear on their own prompted by the rainfall that nature provides. The same is true for your lawns and landscapes.



## Spring lawn watering

Take a look outside now that the weather is warming up. Plants that may have been frost damaged and pruned back are now beginning to re-emerge and "leaf out". Lawns that have lain dormant for months are greening up, all without the aid of supplemental watering. As you begin to spruce up your yards,

be conscious of the amount of water you are using. Your lawns and plants are already reviving on their own!

## How much should you water?

There are very views on this topic but generally most irrigation or lawn maintenance companies will tell you that you need no more than one inch per week. Having said that, measuring that amount is more than some homeowners want to take on. You have probably heard of the tuna can test whereby you set out a set of tuna cans across your yard in the different sprinkler zones, and see how long it takes the cans to fill up. This measurement is probably closer to an inch and one half than one inch but is truly more than your lawn requires.



## Time for a spring check-up!

If you have wisely managed your water use during the winter seasons, hopefully you are just now thinking of turning your irrigation system back on. Use this opportunity to evaluate how much water you are applying and also to check for any leaks, broken lines, and sprinkler heads in your irrigation system. Avoid being the person in your neighborhood who has a geyser in their yard

when the system turns on. Geysers can waste hundreds of gallons of water when undetected and even small household leaks can waste enough water in a year to fill a backyard swimming pool!

## Change it up!

Have you considered changing any of your landscape zones from spray heads to more water efficient micro spray heads or drip irrigation? With a few changes, you can direct water to where it is needed and avoid overspray on patios or sidewalks. Your home improvement center can give you ideas and assistance or consider hiring a licensed irrigation contractor to help you make these changes.

## The Lone Star Groundwater Conservation District

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 through providing valuable water conservation messages and information throughout Montgomery County. Check out our website: [www.lonestargcd.org](http://www.lonestargcd.org). ♦



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# CONSERVATION PROGRAMS

## 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 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 2010 included print ads and a total of six billboards located throughout Montgomery County. Samples of the promotional materials are included in this document as a measure of the Performance Standard.



## 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.



**Nobody wakes up and says,  
"I'm going to waste some water today!"**

Yet thousands of a gallons of this finite resource are wasted every day through dripping faucets, "running" toilets, unnecessary lawn irrigation, and even just plain carelessness. Let's face it...we've taken our water supplies for granted. The Lone Star Groundwater Conservation District is implementing aggressive measures to preserve our groundwater resources to enable our aquifers to recharge through the phased conversion to surface water. This challenge will require everyone's commitment to use water wisely, so let's put water-wasting habits to bed!

**The water we conserve today can serve us tomorrow!**



**USE LESS...  
SAVE MORE!**

This important water conservation message is brought to you by



[www.lonestargcd.org](http://www.lonestargcd.org)

Annually, the District will 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 total of 3,150 fliers were distributed in Montgomery County in 2010. The printing and distribution cost to the District totaled \$574.70.



## 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 website in rainwater harvesting.

The following information on Pages 32-33 was placed on the District's website in 2010 to educate the residents of Montgomery County about rainwater harvesting:

 **Rainwater Harvesting Projects For Your Home**  
By: Marjie Risk, Education Public Awareness Coordinator

The temperatures are climbing and we have seen several really good rain showers during the month of July. Some of these storms brought an inch or more to Montgomery County. You might install a rain gauge in your garden or on a fence as a fun way to see how much rain we actually do get in this area. Summer rains present a great opportunity to talk about rainwater harvesting at home so that you can collect water for the hot months to come.

**Take the challenge!**  
Rainwater harvesting may present some challenges especially if you do not have a rain gutter system already in place or live where there may be homeowner restrictions. If you think you are a good candidate for rainwater harvesting due to be able to use rain gutters or having no restrictions, you have a few options!

Shop around! You may want to purchase a ready-made rain barrel, if so; you will still need to determine where you are going to place it and how to connect it so that you channel the water to where it is needed. There are a few options available locally that only require you to select your style and color, drive home and install your new landscape feature. Make your choice depending on water needs and what will make an attractive addition to your residential garden.

**Want a fun project at home? Make your own rain barrel!**  
For a fairly small investment, you might want to consider constructing your own rain barrel. You will need to find a watertight container for collecting the rainwater. You could use an old barrel, plastic 55 gallon drum, etc. Whatever your choice, you want the inside to be clean and be safely sealed at both ends with only a small opening in the top for rainwater to prevent creating a drowning hazard or a breeding ground for mosquitoes. Do not use any container that has a large enough opening for a person of any size or stray animal to fit through. White or clear containers may allow too much sunlight inside which could cause algae to form.

**Site Selection**  
A reminder... Depending on where you live, you may have homeowner restrictions that may either prevent or dictate the type of container or catchment that you can install. Save yourself time and headaches by finding out if there are any restrictions before you spend your time and money to complete this project. You may have restrictions that don't allow anything to be constructed in your front yard. If so, is your backyard a possibility?

Do you already have rain gutters installed to channel the water to various parts of your yard?

What you will need if you already have rain gutters installed:  
You will need a flexible downspout and a hose bib/spigot available from most home improvement centers. Next you will need to drill a hole in your container about 5 inches from the bottom. The hole you drill should be the same diameter as the spigot. To make this fitting more secure, you might want to insert a PVC sleeve/connector (threaded on the inside) into the hole first and then fit the hose bib into the threaded


Photo courtesy of Paul Nelson

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# CONSERVATION PROGRAMS

connector. Insert the spigot and seal around the spigot with a water proof sealant (silicone, etc.).

## **Safety first!**

You will have to cut into your rain gutter downspout at a height approximately the same as the height of your rain barrel. Safety glasses should be worn to give you proper eye protection while making this cut. Be careful as the cut edges may be sharp! Use the proper cutting tool and associated safety measures for the material you will be cutting through. If you are unsure about this step, ask for guidance from someone at your local home improvement center.



Wear a pair of gloves as you carefully insert one end of the flexible downspout into the cut off end of your stationary downspout. Now, carefully bend the other end accordingly to empty into the top of your rain barrel. You are now ready to collect the next rainfall!

Want more information?

There are some great resources out there for learning how to complete rainwater harvesting projects. Here locally, you should definitely visit the Montgomery County Extension Office to see their demonstration garden. Looking for a great guide that will help you conceptualize, design and implement a successful and sustainable system? Check out the

*Continued on page 56* ➞



*Uncut downspout and flexible downspout*

book by Brad Lancaster: "Rainwater Harvesting for Drylands and Beyond, Volume 1: Guiding Principles to Welcome Rain Into Your Life and Landscape". This guide-

book will demonstrate the basic principles of designing a landscape and rainwater harvesting system to channel water through your yard in the most effective path for maximum water infiltration.

## **Is a standard size rain barrel not big enough for you?**

Containment Solutions in Conroe has developed a 500 gallon cistern for home use. This newly developed tank can be painted which may help it to be a more aesthetically pleasing addition to your landscape if you should have any concerns along those lines. Their website is [www.containment-solutions.com](http://www.containment-solutions.com)

## **The Lone Star Groundwater Conservation District (LSGCD)**

The Lone Star Groundwater Conservation District is also an excellent resource for information on rainwater harvesting. Check out our website at [www.lonestargcd.org](http://www.lonestargcd.org)

The District funded a large rainwater harvesting project out at Memory Park. If you happen to be out in the direction of

Montgomery and visit the park, walk around the back side of the building and you will find the cistern that was installed to harvest rainwater from the roof. Also take the opportunity to walk around the rest of the site.

Rainwater harvesting at your home can be a fun and worthwhile project that can provide supplemental water for your garden and container plants. Your efforts may inspire your friends and neighbors to take on this same type of project! ♦



For the fiscal year ending Dec. 31, 2010, the District's assets increased by \$282,667 and liabilities increased by \$69,194. Net assets increased by \$213,473.

During the year, the District had expenses that were \$273,123 more than the prior year. Total revenues were \$288,516 less than in 2009.

Net assets of the District increased by 11% (\$2,089,708 compared to \$1,876,235). Lone Star Ground-water Conservation District has no long-term debt.

Total revenues for the District decreased by 13% as the water usage rate was reduced from \$.07 to \$.06 per 1,000 gallons pumped. Total expenses increased by 20% as nearly \$160,000 was spent on the GIS website upgrade.

Copies of the annual audits are available at the District office.

## — 2010 HIGHLIGHT —

In 2010, the Lone Star GCD finalized plans to construct a new office building in Conroe in the Industrial Park area off of FM 3083. The LSGCD offices are currently housed in the courthouse, and the District has outgrown the space. The District will officially break ground on the new office in 2011.

## **Lone Star Groundwater Conservation District**

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**207 W. Phillips, Suite 300**

**Conroe, Texas 77301**

**Phone: 936-494-3436**

**Fax: 936-494-3438**

**[www.lonestargcd.org](http://www.lonestargcd.org)**