



**Lone Star Groundwater Conservation District**

## **2012 ANNUAL REPORT**

***More water for  
sustained  
growth***



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## Creation

In 2001, the 77th Texas Legislature, through House Bill 2362, authorized the creation of the Lone Star Groundwater Conservation District. Montgomery County voters then confirmed Lone Star Water's creation on November 6, 2001, with 73.85 percent of the vote.



Since its creation, Lone Star Water has carried out its statutorily mandated functions to conserve and protect groundwater resources in Montgomery County, and has expended considerable resources to develop a system to ensure that the groundwater supply in Montgomery County will remain a sustainable resource for years to come.

## Lone Star Water's Mission

The Lone Star Groundwater Conservation 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.

Lone Star Water's regulatory system was developed through a public process and allows flexibility among water users in how they go about achieving compliance with Lone Star Water's rules and groundwater reduction requirements.

Lone Star Water 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.

## Location and Extent

Lone Star Water is located in Montgomery County, in southeastern Texas. Its boundaries are coterminous with the boundaries of Montgomery County, Texas. Lone Star Water is bordered by Walker County to the north, San Jacinto and Liberty Counties to the east, Harris County to the south, and Waller and Grimes Counties to the west.

Peach Creek is the boundary with San Jacinto County, and Spring Creek forms most of the boundary with Harris County. Lone Star Water comprises an area of approximately 1090 square miles.

## District Office

655 Conroe Park North Drive • Conroe, Texas 77303

Phone: 936-494-3436 • Fax: 936-494-3438

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



## **Kathy Turner Jones | General Manager**

Kathy Turner Jones is a native Texan, having lived the majority of her life in the Lubbock area. Ms. Jones earned a Bachelor of Arts and Sciences in Business with a Finance Minor from the University of the Southwest in Hobbs, New Mexico, graduating Summa Cum Laude. She is currently completing course work towards a Master of Science at Texas A&M University in the Water Management and Hydrologic Science Program. 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. Prior to the Lone Star GCD, Kathy worked for the Sandy Land UWCD in West Texas and was later employed by an Austin-based environmental law firm to serve as their groundwater specialist. Kathy serves as a member of the Region H Water Planning Group, Chair of GMA 14, and currently serves on the Trinity and San Jacinto and Galveston Bay Basin and Bay Area Stakeholder Committee created by Senate Bill 3 during the 80th Legislative Session to look at environmental river flow issues in each river basin. In addition, Ms. Jones presides as current President of the Texas Alliance of Groundwater Districts (TAGD) and as a Board of Director to Texas Water Conservation Association (TWCA).



## **Paul R. Nelson | Assistant General Manager**

Mr. Nelson, former Planning and GIS Coordinator with the North Harris County Regional Water Authority, joined the Lone Star staff as the Assistant General Manager in May of 2011. Mr. Nelson comes to the District with an extensive background in the areas of public works administration, water conservation, and long-range water planning. He is an alternate member of the Region H Water Planning Group, and currently serves on the Trinity and San Jacinto and Galveston Bay Basin and Bay Area Stakeholder Committee created by Senate Bill 3 during the 80th Legislative Session to look at environmental flow issues in each river basin. In addition, Mr. Nelson is a member of the working committees of several statewide water-related organizations, including the Texas Water Conservation Association. He holds a Bachelor of Science Degree in Biology from Lamar University in Beaumont. He has lived in Montgomery County for over 30 years. Mr. Nelson's activities include performing, reviewing or coordinating efforts of consultants on technical studies pertinent to the determination of the effectiveness of the District's regulatory plan as it relates to the District's overall mission, managing and reporting on progress of consultant activities, assisting in presentations and communications with public water supply entities, and assisting the General Manager interfacing with federal, state and local agencies engaged in the groundwater industry in the state.

# 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.



**Richard J. Tramm**  
President

Represents Montgomery County  
Term Expires 1/31/13

**Sam W. Baker**  
Vice President

Represents Montgomery County  
Term Expires 1/31/15

**M. Scott Weisinger, PG**  
Secretary

Represents all areas except Conroe  
Term Expires 1/31/13

**James M. Stinson, PE**  
Treasurer

Represents Woodlands Joint Powers Agency  
Term Expires 1/31/15

**John D. Bleyl, PE**

Represents City of Conroe  
Term Expires 1/31/13

**Reed Eichelberger, PE**

Represents San Jacinto River Authority  
Term Expires 1/31/13

**Roy McCoy, Jr**

Represents MUD's West of I-45  
Term Expires 1/31/15

**Rick Moffatt**

Represents MUD's East of I-45  
Term Expires 1/31/15

**W.B. Wood**

Represents Soil and Water  
Conservation District  
Term Expires 1/31/15

# Letter from the General Manager



**By Kathy Turner Jones**

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2102 was an important year in Montgomery County's efforts to continue to grow economically while reducing its reliance on the Gulf Coast Aquifer System. The region made great strides in both conservation and diversifying our water supplies. Although much hard work lies ahead for the county, we're moving in the right direction.

While much of the state of Texas remained in drought conditions, Montgomery County found a bit of relief from the extremely dry conditions of 2011 with some timely rains during 2012. While the total rainfall for Montgomery County in 2012 was still well below average, the rains that did come were welcomed and conditions look much better going into 2013.

In April of 2012, the District moved into its new offices and Board Room, designed to be both environmentally friendly and to showcase water conservation. The new building features pervious concrete sidewalks, four above-ground metal cisterns to capture rain runoff from the roof and a river bed to drain rainwater into a 15,000 gallon underground water storage tank. All of the captured water is used for irrigating the office's landscaping. The building also incorporates the latest water-efficient fixtures in the restrooms and placards are located throughout the office and grounds to inform visitors of the various water conservation features.

In 2012, the District continued its efforts to be the county's leading advocate for water conservation. In June, the District hosted the first meeting of the Gulf Coast/Montgomery County Water Efficiency Network. The Network is an informal group of water professionals from around the region sharing information relating to water conservation, new laws and regulations affecting water quality and production, as well as evolving technologies relating to the efficient use of water. The group meets monthly and operates under the premise that there is a wealth of information to be gained by sharing experiences and successes with others. These meetings have been very well attended and we look forward to the continued hosting and sponsorship of the Network.

Also in 2012, several domestic supply wells were completed in the Catahoula Aquifer. In addition, the study commissioned by Lone Star GCD to determine the effects of pumping from the Catahoula on the Jasper was completed. The results of the modeling effort indicate that utilizing waters from the Catahoula will have a negligible effect on the Jasper, and the preliminary results from the wells drilled have been very positive. While there is still much to be learned about the quality and quantity of water in the Catahoula and, as with all of our groundwater resources, careful management will be required, it appears that it can and will serve as a valuable alternate water supply.

During 2012, there was much focus and attention on the Texas Water Development Board's State Water Plan. Many newspaper articles and editorials were written about the estimated \$53 billion that would be required to build the state's water supplies over the next 50 years in order to meet anticipated demands. That fact, and the devastating drought of 2011, spurred much con-

versation about water, conservation, and the economic devastation that will occur should we not respond.

Now, as our legislature goes into the 83rd State session, we will see how they respond to the call. As always, I will be actively involved and ready to represent the District in Austin should the need arise.

The year has been an active and successful one for Lone Star GCD. With the continued support of the citizens of Montgomery County, we, here at the District, look forward to next year being just as productive.

## **We're Making Progress: A Summary of 2012 Milestones**

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 Plan of complying with the achievement of management goals as outlined herein.

# Permitting System

## Register or Permit All New Exempt Wells

### 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**.

In 2012, Lone Star Water registered 496 new exempt wells in Montgomery County, and permitted 83 non-exempt wells.

**Table 1: Number of Exempt and Permitted Wells Registered or Permitted by the District for 2012**

Number of Exempt Wells Registered .....	496
Number of Non-Exempt Wells Permitted .....	83
<b>TOTAL</b>	<b>579</b>

## Regulate Groundwater Production

### 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 to be given to the Board of Directors.

In addition to permitting or registering new exempt wells in Montgomery County, Lone Star Water is also responsible for regulating the production of groundwater by maintaining a system of permitting the use and production of groundwater within the boundaries of Montgomery County. This year, 579 applications were submitted for the permitted use of groundwater in the district.

The tables on Page 9 show the number and type of permits issued by Lone Star Water in 2012. **Table 2** provides the number and types of applications made to the District for the permitted use of groundwater during the year. **Table 3** provides the number of applications for Operating Permits or Permit Amendments issued or other administration disposition of applications made by the District in 2012. **Table 4** provides the primary use of water listed on the permit applications approved by the District in 2012.

**Table 2: Number and Type of Applications for the Permitted Use of Groundwater Received in 2012**

Amendment to an Existing Operating Permit or Historical Use Permit Application* .....	108
New Operating Permits** .....	53
<b>TOTAL</b>	<b>161</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 2012**

Application or Permit Disposition	Number
Applications Approved as Submitted .....	116
Applications Approved as Amended .....	10
Applications or Permits Expired Due to In-Action by Applicant or Permittee .....	3
Applications Approved w/ Conditions .....	21
Applications Denied .....	0
Applications Pending at End of 2012 .....	13
Applications Voided or Merged .....	5
Applications Withdrawn by Applicant .....	6
<b>TOTAL*</b> .....	<b>174</b>
<b>TOTAL Less Pending at End of 2012</b> .....	<b>161</b>

\*Reflects Board Action on Applications in 2012. This total includes applications submitted in late 2011 but with Board action on the application occurring in 2012. The total excludes applications submitted in late 2012 which could not be set for Board action until 2013.

**Table 4: Primary Use of Water on Permits Approved in 2012**

Water Use	Number of Applications
Industrial .....	12
Irrigation .....	15
Irrigation (Agriculture) .....	3
Public Supply/Commercial .....	131
Other .....	0
<b>TOTAL</b>	<b>161</b>

# Controlling & Preventing Waste of Groundwater

## Evaluate District Rules Annually to Decrease Waste

### 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.

In 2012, pursuant to several bills passed during the 82nd Legislative Session relative to groundwater management and Desired Future Conditions (DFC's), the Texas Water Development Board (TWDB) published proposed rule changes to Chapter 356 of the Texas Administrative Code. While the District did not take any action to change its rules in 2012, the final adoption of the TWDB's rules may require new or amended rules in 2013.

## Apply Fees to Reduce or Eliminate Waste

### 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 the 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 2012 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**.

In order to reduce and eliminate water waste, Lone Star Water applies a water use fee structure to the permitted use of groundwater in Montgomery County. In 2012, fees associated with water use totaled \$1,839,366.59. The tables on Page 11 illustrate the fee structure and the amounts of water used for each type of groundwater use in the District.

# Controlling & Preventing Waste of Groundwater

**Table 5: The Amount of Water Use Fees Generated by the District in 2011**

Water Use Type	Permitted Amount	Fee Rate	Fee Amount
HUP Applications/ Operating Permits* .....	30,554,580,143 .....	.06/1000 gallons .....	\$1,833,274.81
Water Subject to Transportation Fee .....	50,074,049 .....	.09/1000 gallons .....	\$4,506.66
AG Permits/Applications .....	516,510,366 .....	\$1.00 per acre ft. ....	\$1,585.11
<b>TOTAL</b>	<b>31,121,164,558</b>		<b>\$1,839,366.59</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 .....	57,800,689
Industrial .....	496,390,999
Irrigation .....	1,181,154,688
Irrigation (Agriculture) .....	92,341,829
Public Supply .....	450,832,456
Public Supply (PWS) .....	25,043,499,707
<b>GRAND TOTAL*</b>	<b>27,322,020,368</b>

*\*The reported pumping for 2012 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.*

## Provide Information to the Public to Reduce Waste

### B.3. Objective

Each year, the District will provide information to the public on elimination 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 in the groundwater waste reduction page of the District's website is provided on Page 12.

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## PRESS RELEASE

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*Lone Star Groundwater  
Conservation District*



### FOR IMMEDIATE RELEASE

**SEPTEMBER 11, 2012 - PROTECT YOUR GROUNDWATER DAY.**

**CONROE, TEXAS. SEPTEMBER 11, 2012** - - The Board of Directors of the Lone Star Groundwater Conservation District encouraged Montgomery County residents today to help protect the region's groundwater supplies.

Calling the Gulf Coast Aquifer the "cornerstone of the county's economic development," the Board passed a resolution commemorating Protect Your Groundwater Day, a national movement designed to increase public understanding of groundwater issues.

The District, which is responsible for protection of the Gulf Coast Aquifer within Montgomery County, has determined that large suppliers in the county must reduce the amount they pump from the aquifer. To avoid any negative impact on economic development, pumpers must find alternative water sources and ask users to conserve water.

"It is going to take a concerted effort, backed by solid public understanding, to make the changes that are necessary," said Board President Richard J. Tramm. "But the economy of the area depends on it."

The population of the county is expected to double by 2040, as people are drawn to jobs and the excellent quality of life. Meanwhile, water use from the aquifer must be cut 30 percent from 2009 levels to protect the aquifer over the long term. "We need to prepare for growth and we need to avoid the negative impacts of over pumping," said Kathy Turner Jones, General Manager of the District. "We can achieve both ends by conserving water and finding alternative supplies."

For more information, contact:

*Kathy Turner Jones, General Manager  
P.O. Box 2467  
Conroe, TX 77305  
Phone: 936/494-3436  
Email: [kjones@lonestargcd.org](mailto:kjones@lonestargcd.org)  
[www.lonestargcd.org](http://www.lonestargcd.org)*

# Controlling & Preventing Waste of Groundwater

In order to reduce wasteful water usage practices, Lone Star Water has gone a long way to educate Montgomery County citizens. This year, we honored Protect Your Groundwater Day and put out a press release and purchased local advertisements to remind our residents about ways to reduce wasteful water use.



Take a moment to be *grateful*

On the occasion of National Protect Your Groundwater Day, the board and staff of the Lone Star Groundwater Conservation District would like to remind you that all of our drinking water in Montgomery County currently comes from the Gulf Coast Aquifer.

Like our children, the Aquifer is a precious resource. We must protect it by:

- Conserving water
- Finding new water sources
- Keeping the Aquifer safe from contamination



For more information about the role of water resources in our county's economic development, sign up for a new informational newsletter at <http://www.lonestargcd.org>.

# Controlling & Preventing Subsidence

## Coordinate Information Sharing with Subsidence Districts

### 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 by the Board of Directors of the District. A summary of the joint conference on subsidence issues follows:

### Subsidence Joint Conference

July 17, 2012, at the Harris-Galveston Subsidence District offices

Present: Ron Neighbors (HGSD), Tom Michel (FBSD), Kathy Turner Jones (LSGCD), Rick Moffat (LSGCD), Reed Eichelberger (LSGCD), Paul R. Nelson (LSGCD), and Mark Lowry (LSGCD).

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

The withdrawal of groundwater in Montgomery County affects subsidence within the boundaries of the FBSD and the HGSD and vice versa. Realizing this, the three (3) Districts entered into an inter-local agreement for the review and recalibration of the Groundwater Models for the Gulf Coast Aquifer and the effects of sustained pumping of that aquifer on land subsidence, as well as to update the regional population and water demand forecasts.

On July 17, 2012, the HGSD, FBSD, and LSGCD met to receive an update of the progress of the review and recalibration from Freese and Nichols, Inc. Reports on the status of Work Orders 3 (Groundwater Model Update and Improvements), 4 (Population Projections) and 5 (Projected Gallons per Capita Demands and Projected Population and Water Demand Distribution) were given. WO #'s 3 and 4 were deemed to be complete and WO #5 was reported to be nearing conclusion. The development of Work Order 6 (Groundwater Pumping Scenario Analysis) was discussed; whereby the effects of various levels of pumping on the Gulf Coast Aquifer will be modeled.

The management of Montgomery County's groundwater resources involves significant coordination with regional ground and surface water suppliers and ongoing interaction with other state and local regulatory entities. The continued analysis of accurate and current predictions on water usage and population growth is critical to the management of our water sources. The enforcement of real incentives on those who rely too heavily on groundwater and a steadfast commitment to practicing and promoting water conservation will continue to be significant management strategies.

# Controlling & Preventing Subsidence

## Write an Article About Subsidence

### 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 ran in the December 2012 issue of Dock Line Magazine can be found below and on Page 16.

**The Hidden Water Beneath Our Feet**  
By: Kathy Turner Jones

Back in 1904, the Texas Supreme Court, wrestling with whether groundwater could be managed by the state, decided that groundwater was too "occult and mysterious" to be regulated. Well, a lot has changed since then, including our scientific knowledge of the hidden water beneath our feet. Now, with the Internet you can get an up-to-date look at how the water actually supports the land we build on. This article will tell you how and what the data mean.

Lone Star Water operates eight monitoring stations that provide data from Montgomery County. We take regular, precise, automated readings of the elevation of the ground at or near these locations, as measured by satellites. This data is temporarily stored in an on-site monitor and then "uploaded" to computers at the Harris Galveston Subsidence District, where the charts discussed below are generated.

The data show how the "terra firma" beneath our feet changes elevation as a result of the underground water that we cannot see until we pump it to the surface. The land is less "firm" than it appears; it will lose elevation if too much water is pumped from beneath the surface. That has a variety of negative impacts, including an increase in flooding.

For a look at some data in Montgomery County, go to: [http://mapper.subsidence.org/charts/pam13\\_LSGCD.aspx](http://mapper.subsidence.org/charts/pam13_LSGCD.aspx). The chart, recreated below, shows how much the land has dropped at this particular location since 2001, about one-half foot.

For you do-it-your-selves, here are quick instructions for how to find this local data any time for any of the eight measurement points in Montgomery County:

1. Download Google Earth if it is not on your computer. It is free at: [www.earth.google.com](http://www.earth.google.com)
2. Go to: <http://mapper.subsidence.org/>

**Lone Star Groundwater Conservation District - PAM 13**

*Subsidence Observations*

Year	Subsidence in feet
2001	0.0
2002	-0.05
2003	-0.1
2004	-0.15
2005	-0.2
2006	-0.25
2007	-0.3
2008	-0.35
2009	-0.4
2010	-0.45
2011	-0.5
2012	-0.55

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# Controlling & Preventing Subsidence

3. Click on Lone Star Groundwater Conservation District (KMZ). It will download a file to your computer.
4. Open Google Earth and open the file that was downloaded.
5. You'll get a map of Montgomery County. Go to PAM 13, just northwest of The Woodlands. Click on it. Click on [http://mapper.subsidence.org/charts/pam13\\_LSGCD.aspx](http://mapper.subsidence.org/charts/pam13_LSGCD.aspx)
6. Call up the other sites for additional information. PAM sites 13 and 12 have been around about as long as Lone Star Water. The rest were added by Lone Star Water within the last year and therefore the data shown on these charts is very preliminary and will be used as a "baseline" for determining future changes, if any, in surface elevations at these locations.

Lone Star Water is part of the state's effort to battle subsidence, because when land subsides, it is more likely to experience flooding. Flooding is a big problem for Texas, which has ranked #2, just behind Louisiana, in the number of flood-prone structures that are flooded repeatedly, according to the Federal Emergency Management Agency. In a county that gets an average of 47 inches of rain per year, but can get much more, flooding is a real issue.



The good news is that effective management of groundwater has been found to halt subsidence. That is what we learned in Harris and Galveston counties. Before the overdraft of groundwater was curtailed by local management of the Gulf Coast Aquifer, some areas lost up to 10 feet in elevation above sea level.

Montgomery County, of course, draws from the same aquifer, and it has increased its water pumping substantially, as its population has grown. Lone Star Water's monitoring of the land gives the county the information it needs to determine how much subsidence is occurring.

There's nothing "mysterious" in the fact that there is a negative consequence to over-pumping the aquifer. Is there any resource – whether a family budget or the federal budget – that does not suffer when you spend more than you can replace? That's the main idea behind Lone Star Water's mandate that large-volume users reduce their pumping by 30 percent of Total Qualifying Demand by January 1, 2016.

Finding new water sources and cutting demand through conservation will allow Montgomery County to continue to grow without paying an unwanted price in increased flooding, pollution of water resources and the high cost of re-drilling wells.

Kathy Turner Jones is General Manager of the Lone Star Groundwater Conservation District

The Lone Star Groundwater Conservation District was created by the 77th Legislature in 2001 to protect and manage the groundwater resources of Montgomery County. Lone Star Water works to maintain a balance between protecting the rights of private landowners and the responsibility to protect groundwater. For additional information about the Lone Star Groundwater Conservation District, visit the District's web site, [www.lonestargcd.org](http://www.lonestargcd.org). ♦

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ENERGY STAR

Dock Line Magazine, Inc. - Lake Conroe Edition December 2012 51

# Conjunctive Surface Water Management Issues

## Participate in Region H Planning Efforts

### 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).

Each year, Lone Star Water participates in the regional planning process by attending Region H Planning Group Meetings. Our attendance at these meetings and membership on various Region H committees provides valuable input to the Planning Group relative to groundwater's role in overall regional planning.

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 5 meetings were held with 100% attendance)**

Meeting Date	Attendees
Feb 29 .....	Kathy Turner Jones, Paul R. Nelson
May 2 .....	Kathy Turner Jones, Paul R. Nelson
June 6 .....	Paul R. Nelson
Sept. 5 .....	Paul R. Nelson
Dec. 5 .....	Paul R. Nelson

# Drought Summary

## Keep Up-to-Date With 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](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 2012 can be found on the District website.

## Quarterly Drought Briefings for 2012

### 1<sup>st</sup> Quarter 2012

In January, February and March, portions of the area received 3-8 inches of rain each month. This was good news for Lake Conroe, which increased in storage from 287,900 acre-feet to more than 315,000 acre-feet. Ground moisture also increased. Because of the rains, on the Jan. 3, 2012 U.S. Drought Monitor, all of Montgomery County was in exceptional or extreme drought, the highest two levels of drought. By April 3, however, a portion of the county was “abnormally dry,” the lowest status on the Drought Monitor.

### 2<sup>nd</sup> Quarter 2012

In April, the rains that had blessed the county dropped off, with total rainfall of less than 1.68 -3.93 inches for the month. May was even drier, with less than one inch of rain in some locations. Summer rains came back in June, with more than 7 inches in part of the county.

Most of the county fell into the “abnormally dry” category by the end of June, with a portion slipping back into moderate drought. Lake Conroe remained above 350,000 acre-feet.

### 3<sup>rd</sup> Quarter 2012

Drought was eliminated in most of Montgomery County by the end of September, the result of good rains in July (11-12 inches). August (0.84-3.57 inches) and September, however, tended to be drier, leaving open the question of how fall rains would leave the countryside. Lake Conroe remained above 350,000 acre-feet.

### 4<sup>th</sup> Quarter 2012

Montgomery County slipped back into moderate to severe drought during the Fourth Quarter of 2012. All of Texas experienced one of the driest fall seasons on record, especially October and November. Most of Montgomery County experienced 2.8-4.6 inches of rain for the entire three-month period. Exceptional drought had come back to the Lower Rio Grande Valley, the Northern Panhandle and a “hotspot” centered in Bosque and Erath County in north-central Texas. Lake Conroe remained slightly above 350,000 acre-feet at year’s end. For the year, Montgomery County received 40-50 inches of rain, about normal, though one month, July, accounted for 25 percent of the rainfall.

## The Drought of 2012

Drought has two dimensions: length and intensity. The drought of 2011 in Texas was one of the most damaging on record. New records for extreme heat were set that year. Some rivers carried less water than ever before. Reservoir levels dropped precipitously.

Some relief in the drought was felt in early 2012, but by the end of the year, lack of rainfall again was profoundly affecting much of the state. November 2012 was one of the four driest on record. An average of only a quarter inch of rain fell in Texas in November 2012, according to estimates provided to news media by the National Oceanic and Atmospheric Administration (NOAA).

Late 2012 found Montgomery County once again in a state of moderate-to-severe drought. Though the county experienced some rainfall in December, the region is the southern-most edge of a continental weather pattern that has brought exceptional drought to much of the nation's mid-section.

Now, Texans are wondering how many years the drought, which some believe began in late 2010, will be with us. As a drought drags on, its impact grows and widens. Rainfall-dependent agriculture is the first to be affected; as little as six months of dry weather can damage agriculture. Continued drought causes water supplies to fall. Trees and native plants die. Fire risk escalates. Water providers ask for voluntary water reduction compliance and then move to mandatory water-use restrictions. Some cities and towns may lose their water supplies completely and be forced to take short-term emergency measures.

Drought doesn't mean just a lack of rain, but is defined as a decrease in rainfall totals over months or years. It may rain intermittently during a drought but in reduced amounts. Drought does mean hardship and a change in conditions that requires permanent alterations in the way we plan for, develop and use water. Lone Star GCD will continue to encourage the practice of watering lawns a maximum of two times per week (with the use of only amounts of water necessary to promote healthy lawns), as well as all other forms of conservation. Regardless of how hot or dry it may be next summer, the lessons of the drought of 2011-2012 should not soon be forgotten.

# 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.

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.

## **Write an Article About Water Conservation in at Least One Newspaper**

### **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 articles 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.

This year, Lone Star Water wrote a number of guest columns encouraging water conservation methods in Montgomery County. Montgomery County News is one such publication that is distributed throughout Montgomery County. Another vehicle used to disseminate information to the public has been the Dock Line magazine, which is published monthly and has a circulation of 65,000. Examples of these efforts are provided on pages 28 through 31 and on the District website at [www.lonestargcd.org](http://www.lonestargcd.org).

## **Educate Students About Water**

### **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 2012.

### **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 2012.

# Conservation Education Programs

## Walraven – Book Cover Program

Lone Star Water also leads a program with SJRA to provide book covers with water conservation messages to Montgomery County Students. In 2012, more than 57,000 book covers were distributed to six school districts within the county to meet TEA's requirement that all textbooks be covered.



**In 2012, LSGCD spent \$4,791.66 for its part of the program.** School districts included:

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

## Other Activities

Lone Star Water also educates the public by providing exhibits at local events in the county. This year, District staff and the Mobile Education Trailer appeared at the Texas Wildlife and Woodlands Exhibition on March 24, and at the Toyota Bass Classic held at the Lone Star Convention and Expo Center grounds September 28-30. The Mobile Lab Trailer was also present at the District's facilities when the District hosted a statewide conference of the Texas Alliance of Groundwater Districts. In addition, staff made several presentations to city council meetings of municipalities throughout Montgomery County, as well as at the Woodlands Children Museum and the Texas Irrigation Network's annual conference.

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

District staff maintains stock of these items for various presentations, meetings and outreach events. Staff estimates that approximately 200 conservation kits were distributed in 2012 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 \$1,929.09 on supplies and reorder of items for the water conservation kits in 2012.

# Conservation Education Programs

## **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 desktop Groundwater Flow Model, which serves as an interactive classroom tool designed to show the flow of water and pollutants through differing gradients, is available and can be used in front of the classroom and is easily used by students themselves. It demonstrates flow 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.

## **State Youth Water Camp**

In 2012, Lone Star Groundwater Conservation District again offered student sponsorship to the "State Youth Water Camp". The camp is held annually and this year was co-sponsored by Texas AgriLife Extension Service, Natural Resources Conservation Service and the Upper Pecos Soil and Water Conservation District. The 5-day event is designed to help older youth throughout the state become aware of current water issues including municipal and home water use on water quality and supply. The camp features field trips, tours and hands-on group project work. LSGCD offers to pay full registration and transportation assistance for the two (2) students selected to attend.

## **Advocating Conservation**

Lone Star Water continues to be the county's leading advocate for water conservation. It does so in a number of ways, by:

- Backing the "Texas Water - Origins and Destinations" curriculum
- Maintaining a mobile education/teaching lab for students
- Providing water conservation kits and informative book covers for children
- Implementing water-use reduction methods in area restaurants by asking restaurateurs to provide water only upon request
- Using press releases, e-newsletters, magazine articles, guest columns and social media to keep conservation in front of the public

## Communicate to Permit Holders About Water Conservation by Mail

### 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.

This year, approximately 8,200 fliers were distributed in Montgomery County. The printing and distribution costs to Lone Star Water totaled \$1,743.98. An example of the flier is found below:



The Drought May Be Over  
**BUT** water remains in short supply in Montgomery County.  
**PUMPING MUST BE REDUCED 30 PERCENT TO PROTECT THE GULF COAST AQUIFER.**  
The water we conserve today  
Can serve our children and us tomorrow

 Conserving, Protecting and Enhancing the Groundwater Resources of Montgomery County, Texas

**PLEASE DON'T WASTE A DROP**



**DO YOU KNOW THE DO'S AND DON'TS OF SAVING WATER?**

**DO...**

- Take shorter showers
- Find and fix toilet and faucet leaks
- Install water-efficient toilets and showerheads ... They really work!
- Run water appliances only when fully loaded
- Take control of your irrigation system

When you water less, you save more ... water and money

**DON'T...**

- Water landscapes in the heat of the day or after rainfalls
- Water sidewalks and driveways. They never grow!
- Use water to "sweep" paved surfaces

Don't let a single drop of water go to waste

**EVERY DROP COUNTS**

# Conservation Programs

## Promote Rainwater Harvesting

### 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.



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**Montgomery County News**

Montgomery, Texas



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**GALLERY** ▾

**GALLERY** ▾

**GALLERY** ▾

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### HARVESTING RAINWATER: IT'S SIMPLY A GOOD IDEA

Kathy Turner Jones • Wed, Dec 12, 2012/Wed, Dec 12, 2012

**W**ater is life. Thousands of years ago, humans began purposefully capturing rainwater for drinking and irrigation where water was, or could quickly become, scarce. Some of our ancestors caught runoff in naturally occurring crevices and rock formations. Others modified those formations to be more efficient, even building rainwater catchments and delivery systems. Not that long ago even, water didn't just "come out of the tap." Many of our grandparents used "cisterns" to catch and store rainwater.

Today, as we become more aware of the value of conservation and the realization that our water demands will exceed supplies in the not-too-distant future, the practice of capturing rainfall is being rediscovered. Rainwater harvesting not only provides a natural, soft water, devoid of minerals and chlorine, fluoride and other chemicals, it is also an immediate, alternate source of water that decreases the energy needed for water treatment and distribution, which in turn conserves fossil fuels and saves on utility bills.

But how much rain can you expect to capture in Texas? Most rainwater harvesting applications capture roof runoff. Simply directing a downspout to a pre-fabricated rain barrel readily found at any home and garden store can collect a surprising amount of water. Just how much? The simple answer is this: One inch of rain falling on one square foot of roof = 0.6233 gallons or about 600 gallons per inch of rain on 1,000 square feet of roof.

Do your own calculation to estimate how much water you can expect to capture from your location and situation. Of course, you can only collect as much rain as you have the capacity for. But whether you install one barrel or 10, the water you collect will go a long way towards meeting your gardening needs.

Choosing a rain barrel: There are a variety of pre-fabricated rain barrels. Some are made to look like terra cotta; others are simply rigid plastic barrels in various styles and colors. All usually come with a hose bib at the bottom, a spigot and length of hose. Make sure that the opening at the top has a screen or grated cover to keep out mosquitoes or other critters. In the basic system, you simply place the barrel under a downspout. Elevating the barrel on blocks will make it easier to place a container or watering can under the hose and spigot at the bottom of the barrel. Most barrels have an outlet in the back of the barrel to connect a hose to additional barrels for more storage capacity.

Connecting the modified downspout to the barrel: If your downspout runs to the ground, you can use a hacksaw to shorten it so the rainwater runs directly into the screened opening on the barrel. An inexpensive flexible downspout can also be purchased at any home improvement store if the shortened downspout does not line up with the barrel opening. If you don't have a gutter system in place, one can be installed relatively easily. Even a short piece of guttering (as little as 10 or 12 feet) can produce a surprisingly large amount of water in a very short period of time. Make certain that you wear all of the appropriate safety equipment, such as gloves and glasses when modifying the downspout or constructing a gutter system.

Rainwater uses: You can use the collected rainwater for your garden and house plants, and for other non-potable uses such as flushing toilets. There are some homes in Texas that use ONLY rainwater for all of household water needs. All of these "indoor" applications require that plumbing codes and local rules and regulations be carefully followed, but it can be done. These applications will also require storage tanks larger than those found at the home and garden stores. And pumps may be required. Even so, tanks and related rainwater harvesting supplies can be easily found online.

Benefits: Whether you're installing a 55-gallon barrel or a 2,500-gallon consolidated system, you're helping the environment and your wallet by:

- \* Reducing runoff to the local storm water collection system
- \* Providing naturally softened water for your garden and delicate houseplants
- \* Creating a backup source of water for times of drought
- \* Reducing your water bill
- \* Delaying the cost of finding and developing alternate water supplies
- \* Educating your neighbors and encouraging them to build their own rainwater collection system.

Visit the Lone Star Groundwater Conservation District web site at [www.lonestargcd.org](http://www.lonestargcd.org) for more information on rainwater harvesting. Kathy Turner Jones is the general manager at the Lone Star Groundwater Conservation District. You may contact her at 936-494-3436 or at [kjones@lonestargcd.org](mailto:kjones@lonestargcd.org).

### HIGHLIGHTS

**Front Page News**

- Facelit to Historic Downtown Montgomery
- April Sound Man Arrested For Murder Of Wife
- Morning Fire Damages Home
- Merry Christmas & Happy New Year

**Community**

- Gardening: Starting Your Own Transplants
- Devotional: HIS BANNER IS LOVE
- There's more to Girl Scout Cookies than what's in the box
- The Daughters of the American Revolution, Heritage Trails chapter, honored our veterans and active military during the Christmas Season.
- AREA VETS CELEBRATE CHRISTMAS
- LIBRARY CORNER: Friends of the C.B. Stewart-West Branch Library
- Crusin' Cape Conroe
- Ila sophia(r) Names Top Sales Advisor in Montgomery
- AREA VETS CELEBRATE CHRISTMAS
- UHD Student Danielle Picklesimer Serves as Commencement Speaker, Embodies "Never Give Up" Mindset After Nine-Year College Journey
- Letters to Santa

**Government**

- Brady Votes to Stop Pay Raise for Congress; Stop Tax Hikes on Texans New Year's Day tax hikes reversed; Brady challenges President to cut spending

**Sports**

- The Houston Texans Were
- Kubiak Weak Losing a Big Game Against the Colts 28-15

**Sheriff's Weekly "Blotter"**

- December 26, 2012 Weekly Media Summary & "BLOTTER" Review

**View Legal Notices**

- CITATION BY PUBLICATION CIVIL

**Letters To The Editor/Commentary**

- SANDY HOOK SCHOOL MASSACRE - Demonic Spirits, Not Guns
- What The Hell Has Happened To Our Country???
- The Passing of a Legal Legend: Robert Bork
- Comments According to Doc...

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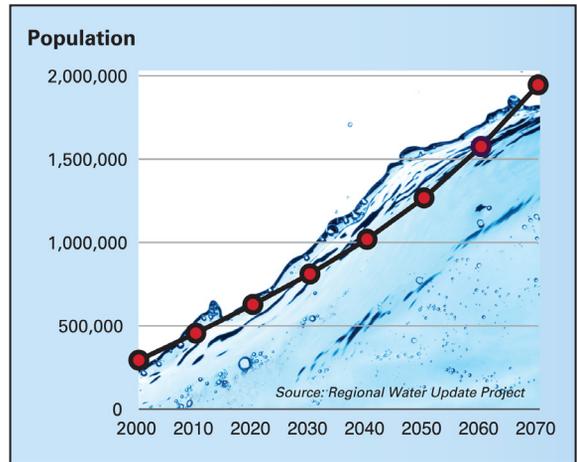
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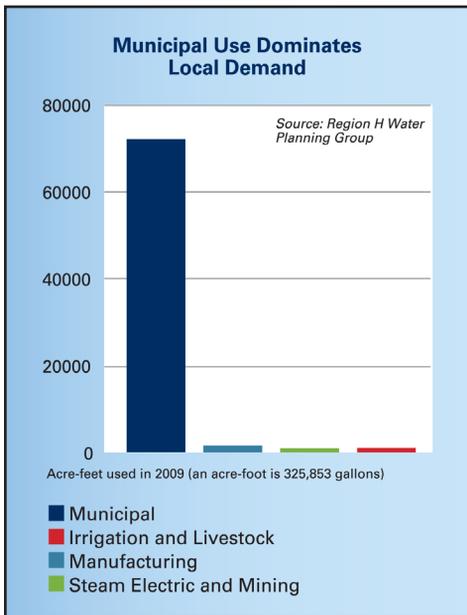
## Montgomery County: A Thirst for Growth

Forty years ago, only 45,000 people lived in Montgomery County. Just 10 years ago, the population of the county was 290,000. Today, we're at almost half a million and that number is expected to double by 2040.

There's little surprise then, that public water supply requires 85 percent of the water pumped from the Gulf Coast Aquifer in Montgomery County. At current water-use rates, that demand significantly exceeds the Gulf Coast Aquifer's ability to recharge. The county is running at a deficit.



To continue to meet our rapidly growing needs, new water sources and a continued emphasis on conservation are required.



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***“The purpose of Lone Star Water is to find a solution to the problem of declining groundwater supplies in Montgomery County so that growth will continue.”***

**Kathy Turner Jones,  
General Manager**

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## **Gulf Coast Aquifer: Overdrawn Resource**

Today, all municipal water comes from wells in the Gulf Coast Aquifer. Public water supply used at least 85 percent of the aquifer water pumped in 2012. The aquifer is over-pumped. Pumping exceeds recharge from rainfall by some 4 billion gallons per year.

Continued over-pumping will lead to loss of wells and possible pollution of groundwater. Lone Star Water also keeps an eye on subsidence. By January 1, 2016, entities that rely on the aquifer for large quantities of water must reduce their use by 30 percent from the amount used in 2009.

Despite the deadline, growing demands still rely on groundwater. In 2012, Lone Star Water received 363 applications for groundwater. None was denied, but many were modified or reduced.

Unlike other areas of the state, Montgomery County cannot divert water from agriculture, which uses only 2.5 billion gallons.

Throughout 2012 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**

**February 28, 2012, Conroe: March 11th – 17th Is National Groundwater Awareness Week. Learn More About How You Can Protect and Preserve This Precious Resource by Conserving** – The Lone Star Groundwater Conservation District Board encouraged Montgomery County citizens to spread the word on protecting and preserving our groundwater and shared indoor and outdoor water conservation tips.

**April 26, 2012, Conroe: Groundwater District Offers Student Sponsorship to Water Camp** The Lone Star Groundwater Conservation District Board announced its plan to sponsor two local high school students to attend the State Youth Water Camp, held July 8-12, in Monahans, Texas.

**July 10, 2012, Conroe: Lone Star GCD Board Votes to Maintain 2013 Water Use Fees at Current Level** – The Lone Star Groundwater Conservation District approved a resolution adopting the 2013 fiscal year water use fee of \$0.06 per 1,000 gallons. That action left the rate at the same level for the fourth consecutive year.

**September 11, 2012, Conroe: Protect Your Groundwater Day** – The Lone Star Groundwater Conservation District encouraged Montgomery County residents to help protect the region's groundwater supplies.

**October 18, 2012, Conroe: Texas Alliance of Groundwater Districts – Quarterly Meeting** – The Lone Star Groundwater Conservation District announced the quarterly meeting of the Texas Alliance of Groundwater Districts, held in Conroe on October 30-31.

**November 12, 2012, Conroe: Protect Your Groundwater Day – Greetings from Lone Star Groundwater Conservation District** – The Lone Star Groundwater Conservation District announced its first Lone Star Water newsletter and encourage Montgomery County residents to protect the region's groundwater supplies on Protect Your Groundwater Day.

**November 19, 2012, Conroe: This Week in Drought: Inching Towards the Red** – The Lone Star Groundwater Conservation District reminded Montgomery County residents about drought conditions in Texas.

## 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 2012, 11 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 31.





## Montgomery County Water Use Differs Significantly from the Rest of Texas

No matter how you use water, it is essential to your life, your workplace, and your future. But Texas is a very big place, and each region uses water a little differently.

Here in Montgomery County, our water use differs significantly from the rest of the state. That's why local action and local management is so important -- each area knows its needs best.

In 2010, according to the State Water Plan, agricultural irrigation used 56 percent of the 18,010,599 acre-feet of water consumed in Texas. An acre-foot is the amount of water it takes to cover one acre, about 325,800 gallons. A theoretical flat-bottomed 10,000-acre reservoir that is 10 feet deep would hold 100,000 acre-feet.

Water used by cities is the next biggest category -- no surprise in a state with 25 million people. Municipal water demand consists of water to be used for residential (single family and multi-family), commercial (including some manufacturing firms that do not use water in their production process), and institutional purposes (establishments dedicated to public service). Municipal use accounted for 27 percent, a little less than half agriculture's demand. Here's the rest of the rundown from the State Water Plan.

Municipal	4,851,201
Manufacturing	1,727,808
Mining	296,230
Steam-electric	733,179
Livestock	322,966
Irrigation	10,079,215
<b>Texas</b>	<b>18,010,599</b>

Now, that's not our experience here in Montgomery County. Of the water withdrawn from wells drilled into the Gulf Coast Aquifer, municipal use accounts for 97 percent of the roughly 90,000 acre-feet used, with no substantial water used for crop irrigation.

Municipal use is so important because Texas' water population is growing. The state is planning to host 46,323,000 people in 2060, and none of those 20 million babies and people coming from other parts of the United States is bringing their own water.

At the state level, it is clear that there is not enough water to fulfill all demands now, and it is not going to get better as those demands increase. There is expected to be some surface water development, but the heyday of building new reservoirs in Texas came in the 1930s, with the New Deal, and the 1960s, following the great drought that seized Texas from 1949-1956.

We have about as much reservoir capacity per Texan now as we did a half-century ago, much less than we had in the 1970s, when capacity peaked.

According to the State Water Plan, groundwater supplies will actually drop 30 percent by 2060, because of depletion of the Ogallala Aquifer in the Panhandle area and reduction of use of the Gulf Coast Aquifer, closer to home.

Another answer may be storing water in aquifers. In some cases, one can pump excess water into an aquifer and withdraw it later. That process is not very effective in the Gulf Coast aquifer.

One can reuse treated wastewater for industrial and irrigation purposes; it happens all the time. It will become more important in the future, the plan says.

End-user conservation is critical. Clearly, even with some additional water development, average use will have to fall. We will start using water more prudently and our concept of conservation will move away from "we do when we have to" and towards "simply the way we live in Texas."

By the way, the estimated bill for water development strategies statewide is \$53 billion. What is the cost to industry and the economy of running out of water during droughts? Phenomenal.

What does this mean for Montgomery County? Like the rest of the state, the population and municipal demand is growing. Here, it's just growing faster. Water demand is expected to rise from 56,277 acre-feet in 2000 to 237,116 acre-feet in 2060.

You may be hearing a lot of about water and the need for conservation -- drought or no drought. There's good reason. Easy answers just aren't there, either at the state level or locally. But with cooperation, innovation and good research of the science of water, we will have adequate water. Thankfully, Texas has an abundance of those qualities.

For additional information, please visit the District's website, [www.lonestargcd.org](http://www.lonestargcd.org). ♦

**Water demand is expected to rise from 56,277 acre-feet in 2000 to 237,116 acre-feet in 2060**

52 Dock Line Magazine, Inc. - Eake Corroe Edition July 2012



## Conservation - It Isn't Just For Droughts Anymore

By: Kathy Turner Jones

To really understand water in Montgomery County, there is a key piece of information one needs to know.

To paraphrase Anita Bryant's famous orange juice ad, "Conservation – it isn't just for droughts anymore".

The purpose behind the 1970s-era ad ("orange juice – it isn't just for breakfast anymore") was to get people thinking differently about OJ; that it was OK to drink it any time of the day. The way it fits water is this: conservation is not just for balancing short-term supply and demand during extended dry spells. In Montgomery County, where we are overusing our sole source of drinking water, conservation should be for dry and wet times,

**All the water for new residents and industry – plus about 30 percent of the water we use today – needs to come from new sources.**

winter and summer.

Conservation works on a variety of levels to save money and natural resources. Of course, the business or homeowner saves money, because they have to buy less water. That's easy to see in your monthly bill.

But cutting back can also save really big bucks for the cities, municipal utility districts, and other water providers that serve the public. These entities must plan major infrastructure in order to continue to meet the water

needs of the public, especially in fast-growing areas like ours. Some of their major costs are pipes in the ground and storage facilities, usually in the form of water tanks constructed above the ground.

The size of the pipes and the size of the towers are based on water demand. The more water a community uses for things like watering lawns, the faster these storage tanks and water supplies are diminished. In this area, high use means planners put a lot of concrete and steel in the ground and you and I pay for it.

But wait, there are more costs to consider.

All the water for new residents and industry – plus about 30 percent of the water we use today – needs to come from new sources. We overpump the Gulf Coast Aquifer and we have to reduce demand on it. While conservation is a tremendously effective and necessary tool, as a community we will have to spend a lot of money on additional water sources to assure economic growth throughout the coming decades. Conservation can help reduce those capital costs and delay the need to spend those dollars.

The Aquifer is a blessing to this region and it holds a lot of water. But it does not respond much to rainfall and it doesn't respond quickly. This is a lot different than, say, the Edwards Aquifer, which is under San Antonio. Once, it was San Antonio's only source of water. When it rains, the level pops up quickly and there is ample water. In droughts, the level of the aquifer drops like a stone.

The Gulf Coast Aquifer is very different. It recharges slowly. The rain that falls today may not be available for a very, very long time. According to our calculations, the recharge to the Aquifer attributable to Montgomery County amounts to about 20 billion gallons per year.

Twenty billion gallons sounds like a lot of water, and it is, but current demand on the aquifer in our county is about 25 billion gallons, so you see we're running a deficit that is not weather-related.

Our demands on the aquifer can be compared to a personal bank account or a federal budget – you cannot run a deficit without bad things eventually happening. The larger the deficit, the worse the impacts. We are withdrawing more than is being contributed and the results are real costs, subsidence and water insecurity. This creates uncertainty about our future water supplies.

San Antonio came to the conclusion that the cheapest water is the water that you do not use. Water saved is, indeed, water earned. Through conservation, San Antonio has been able to extend its water supply to hundreds of thousands of new residents, without increasing demand on the aquifer.

For Montgomery County, conservation is part of the answer, but it will mean more than cutting back in droughts and during the summer – as important as those practices are. It means permanent and lasting changes in how we use water, which we'll discuss in future Dock Line articles. ♦

## Irrigation Research Project Results...



# HOW MUCH WATER IS ENOUGH FOR MY TEXAS LAWN?

An important, locally funded research project has recently been initiated at the Texas A&M Turf Grass Research Site. This project is expected to produce additional information about the irrigation needs of various turf grasses that will help answer residents' questions about "how much water"...and "how long should a system run." This article will be updated as this information becomes available.

### Raw land at Texas A&M, Bryan College Station, before plotting and installing comparison irrigation systems and turfgrass.

One of the most frequent questions homeowners ask about maintaining their lawns is, "How much water is enough?" One response has been that an inch of water a week -- by rainfall or irrigation -- is the right amount. Others argue that even that is more than is really needed to sustain Texas turf. In search of an answer that can be supported by solid, replicated research, a group of water industry leaders invited licensed irrigators, irrigation equipment manufacturers and distributors, Texas AgriLife Extension Service Agents, state and national water conservation experts, Texas A&M Turfgrass Specialists, Extension Master Gardener Volunteers, MUD officers, engineers and operators to a "workshop" to address this persistent issue.

As the meeting progressed, conversations kept coming back to the need for research-based data on how much water is needed to sustain an attractive and healthy residential turf area. The Task Force recognized two important things: 1. That frequency and duration are the essential irrigation functions for homeowners to understand if they are to apply the correct amount of water to establish a healthy lawn; and 2. That it is equally important for water providers (MUDs, municipalities, and Authorities) to be able to explain to their users that they can water efficiently with less water...without sacrificing the desired appearance.

Local research -- obtained through a series of residential irrigation system evaluations -- demonstrated unequivocally that homeowners over-water their grass; in fact, the evaluations revealed that most residential irrigation systems are set to run 3 days a week...or more. When asked, homeowners explained they believe that their irrigation systems must run more than three days a week in order to sustain the

desired landscape. This response validated the need for research-based irrigation usage facts upon which to base "efficient use" messages and consumer outreach efforts.

Subsequently, a Task Force was created to acquire critical data that would be consistent and accurate enough to support irrigation usage recommendations by water suppliers. The group, primarily composed of irrigation specialists and Texas A&M University System (TAMU) representatives, proposed a joint research project with Texas A & M University on their Turf Grass Research Site.

Dr. David Chalmers, Texas AgriLife Extension professor and co-author (with Dr. James McAfee) of *Turfgrass Selection for Texas and Turfgrass Establishment for Texas*, informed the group that as the University continued to grow, their current research building and research fields -- situated on future building sites -- needed to move. They had already established their new research site, but needed help completing the new irrigation system, according to Chalmers.

He asked the Task Force members present (three

irrigators -- representing the Houston Gulf Coast Irrigation Association [HG CIA] -- and representatives of an irrigation manufacturer) what it would take to complete their irrigation system and if collaboration was possible to accomplish this.

The HG CIA Board members visited the site, evaluated what irrigation system equipment needed to be installed to complete the project, and agreed that inviting funding participation from the groups represented at the initial roundtable discussion was a viable way to finish the assignment. HG CIA agreed to raise the money necessary to complete the installation of their irrigation system, and invited sponsorship/participation by the irrigation manufacturers to help supply some of the missing parts.

In return for helping underwrite the costs of this University project, a generous section of land was designated for the task force to use for additional research opportunities to quantify frequency and duration of irrigation system usage under controlled comparisons. The TAMU Soil and Crop Science Department's Turfgrass Research Facility Development Committee, in charge of the site, has provided six 50' x 50' test plots, and another area of approximately 30' x 500' for Task Force research and consumer education about irrigation options for a typical southeast Texas home.

Each 50' x 50' plot (shown) was divided in two



**Doug Goodwin**, left, former chair of the TCEQ Irrigators Advisory Council and HG CIA board member, talks with **James C. Thomas**, Department of Soil and Crop Sciences, College of Agriculture and Life Sciences Texas A&M University, about the project.



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sections; with half planted in St. Augustine grass and the other half planted with Bermuda grass. The water to the test areas is delivered by spray heads, rotors, and rotating spray heads — the most common irrigation heads utilized in residential and commercial landscapes in Texas.

According to project manager, Jay Hartley, HG-CIA, "The grass got established over the winter, and our research activities began in earnest in the spring. This collaboration among a group of recognized experts in their respective fields enables us to agree upon some practical water conservation guidelines for residential irrigation that will allow homeowners to sustain attractive lawns AND avoid wasting water to keep them that way."

One objective of these planting/watering comparisons was to demonstrate for a homeowner how the turfgrass planted in their yard — Common Bermuda or St. Augustine — will respond if watered 2 days a week versus 4 days a week. A second goal was to allow a visual comparison of the overall appearance of the grass in the plots relative to the length of time the stations were allowed to run. For most homeowners, spray heads are usually set on 15 minutes per zone, and rotors are set on 30 minutes for the zones they water.

Here's an example: If the homeowner's yard has St. Augustine grass, with spray heads in the turf, the test plots can confirm that watering for "X" amount of time, 2 days a week will produce turf that looks just as good as the plots that were watered for "X" amount of time, 4 days a week. These test plots are in full sun, totally without shade. So, since most homeowners have some kind of shade in their yard -- either in the grass or beds or both -- irrigation run times can be adjusted even lower due to less evaporation.

In this study, the equipment in the plots was duplicated exactly so any variance in appearance of the grass could not be the result of different equipment. With six plots with rotors, sprays, drip, and rotary nozzles, plots 4, 5, and 6 are installed to replicate plots 1, 2, and 3, so the frequency of irrigation running on one plot can be increased or decreased compared to the other plot... making a valid comparison possible.

The irrigation systems were completed in July 2010 and the sod was installed in August 2010. The grass was established over the winter, and, as is typical in South Texas, winter was pretty much over by the last week in February. The research criteria for this first year was based on a "visual" indication of how the grass looked — watered two days a week versus four days a week...and the length of run times. Root



St. Augustine and Common Bermuda watered four times per week

depths were taken and an audit was performed on three of the irrigation zones. Homeowners tend to set up their irrigation system based on how their grass looks and mistakenly set the system to water four or more days per week.

Even in this year's record setting extreme heat and drought, the first three plots were watered two days per week, twice per night and looked the same as the plots that were watered four days per week, once per night. The turf spray plots were watered for 12 minutes, rotary spray areas for 45 minutes, and rotors for 30 minutes.

In light of watering restrictions — with some water districts allowing only two days a week watering — the minimum watering schedules employed on the test plots demonstrate that a yard can thrive being watered only two days a week. Using two watering cycles per night with a brief run time, permits the water to soak into the soil and is called Cycle and Soak. Basically, if a homeowner runs the system for 15 minutes once per night, that is the same as 7 or 8 minutes, twice per night.

Most of the soils in this region of the state are high in clay. To saturate clay soil, it will take approximately an 8 minute watering cycle. Any water applied after saturation just runs off and is wasted. Until now, there has not been any definitive research in our area to confirm that a yard can sustain a drought with water applied — by rain or irrigation — two days a week.

In May, the Turfgrass Research team was asked to set up the controllers starting off the program in anticipation of "normal" spring weather conditions. But the spring rains never came, and it was quickly apparent that more water would be needed than what was planned. What happened between the middle of May to the middle of June, however, was completely unplanned and unexpected. During Jay Hartley's visit to the site on Thursday June 9th, he noted that all of the plots looked virtually the same — with the exception of the first plot that was a little stressed compared to the others.

Hartley met with Jim Thomas, who oversees the research center, and got a closer look at the plots. Both agreed that overall, the plots looked good and the research project was off to a good start. Thomas then revealed that the irrigation had been off since the middle of May — that was almost 4 weeks without any irrigation! Due to a wiring problem, the irrigation system had not been operating. About an inch of rain had fallen toward the end of the four week period. But, even with only a minuscule amount of rain, the test plots looked great...confirming that Texas turfgrass doesn't need much water to survive!

In October, 2011 the University held its Turfgrass Field day. Several hundred visitors attended and observed many different locations at the research site. The six plot research site was featured on one of the teaching stops, sharing information about how the program got started, methodology, and the goal of providing homeowner comparison goals of the plots. Participants were able to see for themselves that the plots having been watered 4 days a week appeared to be virtually identical to the ones watered two days a week.

#### In summary...

The project's objective was to compare a Southeast Texas Lawn watered two days a week with one watered four days a week. As it turned out, the project effectively showed us that grass can indeed survive with minimal watering or just a little rainfall...as an equipment glitch that denied irrigation water being delivered for more than three weeks at the start of the project demonstrated! During traditional weather patterns, irrigation is supposed to supplement rainfall -- but during this drought of record, the roles are



This comparison\* of turf grass that has been overwatered (top) and some that has received water only once a week or when it was needed, "training" it to grow deeper roots. Obviously the deeper roots will allow the grass to survive periods of little water. This root base is not accomplished overnight, but results from a water-sparing irrigation approach and proper soil amendments.

\*Not from this project.

reversed with rainfall supplementing irrigation. It is therefore important to continue to educate homeowners about the effects of overwatering — not only from a finite resource standpoint, but for the health and sustainability of the resident's landscape.

According to Dr. Chalmers, "If you know a few simple facts, it isn't all that difficult. First, throw out the "inch of water a week" advice. That may -- or may not -- prove to be the formula that will work for your lawn. Here's a clue: water moves into most clay soils at a rate of about 0.09 inches per hour...not very fast. Irrigation systems, on the other hand, may apply water at a rate of 0.25 to 1.5 inches per hour or more. So... for efficiency, the irrigation controller should be set to apply only about 0.10 inch of water at a time. Applying water faster than a soil can absorb in one setting results in water moving across the soil surface, running into the gutter, and down the storm drain. Setting irrigation to repeat this type of cycle every few hours allows water to move into the soil!"

The results of this important irrigation research project is brought to you by the Lone Star Groundwater Conservation District. The District was created by the 77th legislature in 2001 to protect and manage the groundwater resources of Montgomery County. Lone Star works to maintain a balance between protecting the rights of private landowners and the responsibility to protect groundwater. For additional information, please visit the District's website, [www.lonestargcd.org](http://www.lonestargcd.org).

#### ACKNOWLEDGEMENTS

The irrigation design was donated by Doug Goodwin of Irrigation Services; and the irrigation materials were donated by Hunter Industries, Texas Irrigation Supply, Lasco Fittings, WWIP Corporation, Cimmaron Marketing and AMC Industries. The St. Augustine and Common Bermuda sod was donated, delivered and installed by Mata Turf. The system's irrigation mainline was installed, and the smaller mainlines to each test plot are also now complete. Coordination for the research project was handled by the Houston GulfCoast Irrigation Association (HG CIA) under the leadership of Jay Hartley.

# Catahoula Aquifer Study

## **Catahoula Aquifer Study Finalized**

2011 proved to be the year that the exploration of the Catahoula Aquifer began in earnest. Modeling done by the Texas Water Development Board and others had previously ignored the Catahoula, a formation considered to be a part of the Gulf Coast Aquifer, but which was a lower formation and assumed to have water quality issues and limited availability. However, in 2011, several entities within the county made a significant investment in time and resources in order to explore the Catahoula as a possible source of water that would fulfill the requirement to locate and utilize alternative water sources. The preliminary results of those test wells indicated that the amount of fresh water in the Catahoula formation was greater than previously reported in studies based on electric log and other oil well data.

Following these findings and the amplified interest in the Catahoula, the District, in April of 2011, convened an expert panel of hydrologists from LBG-Guyton Associates, INTERA, Inc., and Bill Mullican and Associates, to study the Catahoula Formation and determine the impacts that pumping may have on the Gulf Coast Aquifer, including transmissivity between aquifers.

The study consisted, in part, of modeling the Catahoula and then simulating various pumping scenarios to determine the effects of those pumping schemes on the Jasper, as well as the Catahoula. Four (4) pumping scenarios were performed. The results of the scenarios were presented to the public and Lone Star Board of Directors at various public meetings held throughout 2012. Based on the modeling study, in a worst-case scenario depicting the highest level of pumping modeled, 36,000 acre feet per year for a 50-year period, it was found that the effects on the Jasper were negligible.

While the results of this study and the success of the wells currently in the Catahoula are very encouraging, we still have much to learn about the sustainability and quality of the Catahoula waters. The District will utilize an adaptive management approach to the Catahoula and will continue to carefully monitor water table levels and other related data as usage increases.

## **Lone Star Launches Water Efficiency Network**

### **Gulf Coast/Montgomery County Water Efficiency Network (GCMCWEN)**

The Gulf Coast/Montgomery County Water Efficiency Network (GCMCWEN) held its first meeting in June of 2012, pursuant to 2 water efficiency workshops held in the greater Houston area. Attendees at those workshops were asked to express their interest in forming a water efficiency network, with the Lone Star Groundwater Conservation District acting as host and organizing entity for the group. A significant number of attendees expressed their interest in continuing to meet on a regular basis, and the first meeting of the group took place in May in the form of a Water Conservation Workshop sponsored by Lone Star and the San Jacinto River Authority and held at the Lone Star Convention and Expo Center. The Network has met every month since that initial gathering.

It is the goal of the Gulf Coast/Montgomery County Water Efficiency Network to bring interested water professionals from around the region together to share information relative to water conservation, the efficient use and protection of our water supplies, new laws and regulations affecting water quality and production, as well as evolving technologies in the water business. The group operates under the premise that there is a wealth of information to be gained by getting interested professionals together on a regular basis to share their experiences and successes with others having the same goal; the efficient use of our water resources.

As the Gulf Coast/Montgomery region is a very large and populous area, meeting locations are rotated each month. The meetings are scheduled for afternoons and have typically lasted less than 2 hours. A guest speaker is featured at each meeting, followed by a “roundtable” discussion, giving all members the opportunity to share their experiences (successes and perhaps less successful endeavors) with the group. To date, our speakers have included representatives from the City of Houston detailing the city’s advances in web-based technology, including “smart phone” notification of customers when their water usage exceeds pre-determined parameters. In addition, presentations focused on the conservation factor/strategy in the Region H Water Plan 2012, and advances in water conservation by the City of Conroe were also given. Most recently, the Network received a talk on the authority given water districts to regulate irrigation schedules and water rates from a water district attorney. While the presentations are an important part of the network, the sharing of information from members remains the primary focus of the group. Members are encouraged to submit topics of interest, as well as recommend particular speakers. The Gulf Coast/Montgomery County Water Efficiency Network meetings have been very well attended (over 50 persons attended the meeting in August) and we are hopeful that interest will remain high and that participation will increase as time goes on and the word gets out. The Network is just getting started, but in 2013 we will be expanding our methods to include a web site, jointly sponsored conservation initiatives and outreach programs in addition to our monthly meetings.

# Looking to the Future

## **Change is Coming**

Montgomery County is responding to its water challenge. For the past 10 years, Lone Star Water has been studying water supplies and usage. These science-based methods have determined that the Gulf Coast Aquifer System can sustainably deliver only about 21 billion gallons of water year after year. Lone Star Water's challenge is to ensure that water use is reduced to a sustainable level—without affecting economic growth.

Current water use is far above 21 billion gallons, and all large-volume pumpers are on notice that they must reduce their Total Qualifying Demand by 30 percent. How that reduction affects each water supplier differs, based on permits. But the January 1, 2016, deadline is getting closer for everyone.

A significant action was taken in 2012 when plans called for by the Groundwater Reduction Plan of the San Jacinto River Authority were executed. Construction began on elements of a water supply system that uses surface water stored in Lake Conroe, a reservoir constructed in the early 1970s. This adds an important new source to the county's water portfolio.

In addition, Lone Star Water studied how the possible use of the Catahoula Aquifer as an alternate water source might affect the total yield and quality of the Aquifer System, most notably the Jasper. More study is needed, but the new information opens the possibility that additional water can be taken from the Catahoula without negative impact.

## **Financial Summary**

For the fiscal year ending December 31, 2012, the District's assets increased by \$641,948 and liabilities increased by \$441,977. Net assets increased by \$199,971.

During the year, the District had expenses that were \$89,372 less than the prior year. Total revenues were \$162,458 less than in 2011.

Net assets of the District increased by 8% (\$2,562,736 compared to \$2,362,765. Lone Star Groundwater Conservation District has a long-term debt of \$937,869 due to financing of the new District facilities.

Total revenues for the District increased by 7% due to continuing drought conditions resulting in increased water use. Total expenses decreased by 5% due to decreased spending on programs such as land acquisition and consulting fees.

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