

North Harris County Regional Water Authority



WATERLINES

WINTER 2016

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Addressing 2025 Water Supply Mandates

Over the past decade and a half, the North Harris County Regional Water Authority has accomplished many of its initial objectives: securing a long-term supply of quality water; maintaining regulatory compliance; and constructing a large portion of the entirely new infrastructure needed to transport surface water to our neighborhoods. In 2013, the Subsidence District revised their Regulatory Plan mandating groundwater reduction to 60% conversion by 2025.

"Thanks to some visionary leaders in the City well over 50 years ago who realized that if Houston was to grow and achieve its future economic growth potential," explained Jimmie Schindewolf, P.E., the Authority's General Manager, "we would need a viable, accessible, affordable supply of water. They laid this critical foundation by establishing three major man-made lakes – fed by the San Jacinto and Trinity rivers – Lake Livingston, Lake Houston and Lake Conroe to serve as reservoirs. It is virtually impossible to think where we'd be today if these leaders had not successfully accomplished this foundation for our future water supply."

"Today, we're addressing projects on a regional scale," Schindewolf continued. "Things we thought of only in 'future tense' when the Authority was created are now becoming a reality, with projects like **Luce Bayou**; the huge expansion to the **Northeast Water Purification Plant**; and construction of 10-foot diameter pipelines to transport water to our neighborhoods. NHCRWA is partnering with other regional water agencies to share construction costs and other efficiencies, and we all continue to emphasize the importance of water conservation."

The Texas Water Development Board approved four Financial Assistance Applications submitted by the Authority which provides critical access to \$953.4 million in multi-year, low interest **SWIFT** (State Water Implementation Fund for Texas) loans. SWIFT plays a vital role in our ability to ensure a sustainable water supply for our community's growing population – which is projected to exceed 780,000 in 2025.

According to NHCRWA President, Al Rendl, "Over the next decade and beyond, we will be developing historic water supply infrastructure projects, acting solely and in cooperation with the City of Houston and other regional water authorities. We will be constructing (and participating in the construction of) another 108 miles of transmission and distribution lines. The Northeast Transmission Line will ultimately convey 113 MGD of treated water into the Authority system, which will significantly increase the number of MUDs served."

"There is one inescapable fact," Rendl emphasized. "The price of water will continue to increase in the future as we fund massive construction projects and purchase the water our community needs. We promised in February 2000 that we would keep the price of water as low as possible, for as long as possible. We have done that...and will continue to do so going forward. 💧"





Irrigation systems don't waste water, people do.

No matter what kind of spring Mother Nature has planned for us this year -- rainy or dry -- we have to tame the demand for water used for residential turf irrigation. Why? Based on results of almost 11,000 actual residential irrigation system evaluations, reports show that ***at least 90 percent of residents who have irrigation systems water too often...and 43 percent of that water runs off into the gutter and ultimately into the storm drain.***

Perhaps you've put off checking the settings on your irrigation system controller. "It's not hurting the grass," you think, "so what's the harm?" Besides wasting water and money, *too much water actually does harm your lawn.* Overwatering encourages turf to grow shallow roots which cause the grass to stress if water isn't available. All installed irrigation systems should include an automatic rain sensor shut-off device.

Here are some things you can do to maximize the use of your irrigation system and avoid wasting precious drinking water...and your money:

- ◆ **Work with a licensed irrigator*** to design, maintain, and operate an efficient irrigation system; this will also help you conserve water and save money. If you already have an irrigation system in place, consider having it evaluated by a Licensed Irrigator to determine if there are any leaks, broken heads or rotors, and to confirm that the system is operating efficiently.

- ◆ **Hydrozone your Yard.** Since January 2009, the rules of the Texas Commission on Environmental Quality (TCEQ) require all new irrigation systems to be hydrozoned. Applying only the amount of water required by the plant material versus watering everything the same can save up to 21,300 gallons of water annually on a typical residential lot. Also take into account that shrubs or turf exposed to afternoon sun need more water than those protected by the shade.

- ◆ **Find and fix irrigation system leaks!** A typical residential 5/8" or 3/4" water meter will flow about 13 gallons

of water per minute. Your system probably runs while you are asleep so leaks may have gone unobserved. Imagine a broken pipe leaking all day while you are away from home. After 8 hours, more than 6,000 gallons of water could be wasted down the drain. When your system is underground it is difficult to find leaks until they appear. So, if there's a spike in your water bill, or there are persistent soggy areas in the yard, don't delay in scheduling a professional audit/evaluation of your system, and then repair any pipe leaks or broken, leaky heads that are confirmed.

- ◆ **Timing is EVERYTHING!** Set the controller to deliver a water-efficient watering schedule. **Complete the watering cycle before 4:00 a.m.** to avoid the peak morning household water demand, and to avoid excessive evaporation that occurs in strong sunlight. Adopt a technique called "**Cycle and Soak**" to apply water slowly so the soil actually can absorb it. Water only as long as it takes to get moisture down into the soil, and that could be as little as 10 minutes or as many as 20, depending on the soil. Wait an hour to schedule the next cycle. Do a test run; turn on a zone to discover at what length of time water is no longer soaking into the soil, and begins to run off. Use that amount of time to set the first programmed "cycle". Set the timer to come on again after an hour, to deliver a similar amount of water. Technically, while you may be watering more often, the system is delivering the same amount of water...only it is being utilized more efficiently!

- ◆ **Overspray – WHAT A WASTE!** The TCEQ's irrigation rules do not allow spraying water over impervious surfaces such as walls, fences, sidewalks, and streets. It may cost more to design and install a system that does not spray onto these surfaces, but in the long run, having an efficient, professionally designed irrigation system is worth it to conserve our most precious natural resource! ■

* As of 2009, Texas irrigators are required to be licensed by the Texas Commission on Environmental Quality (TCEQ).

Climate is what you expect...Weather is what you get!

The State's continuing saga of rain and drought and floods

By **Jeff Lindner**, Flood Watch Department Manager/Meteorologist,
Harris County Flood Control District

During 2015, weather patterns resulted in vast fluctuations between intense periods of excessive rainfall and intense periods of dryness. Few would have imagined -- after the record breaking spring rainfall -- that drought conditions would develop in just a few months over the region and that the developing drought would end abruptly with more significant flooding, and underscore the need for flood control and mitigation and water conservation.

The fact that these weather extremes occurred within such short time periods emphasizes how important it is for local residents to know the risks of both flood and drought across Harris County and the state of Texas. Understanding how quickly such extremes can onset enables residents to take the necessary actions to mitigate damages related to these weather events.

Weather Extremes...

Last year -- 2015 -- started off similar to the previous six years with below normal rainfall across much of southeast Texas. Rainfall greatly increased across the area in March 2015 with the following three months bringing extraordinary rainfall to much of the state. The period from March to May 2015 became the *wettest spring period ever on record for the City of Houston* with 26.61 inches of rainfall surpassing the previous record of 22.79 inches in 1993. More rain fell in that three month period than during all of 2011 which recorded 24.57 inches of rain.

May and June 2015 brought several major flooding events across Texas, including the devastating Blanco River flood and the Memorial Day evening flood that hit portions of Harris and Fort Bend Counties. During a three hour period that evening, portions of southwest Harris County and northeastern Fort Bend County received a staggering 8.0-11.0 inches of rainfall. This resulted in one of the most significant urban flash flood events across the City of Houston since Tropical Storm Allison (June 2001).

May 2015 became the wettest month ever for the state of Texas with an average of 8.93 inches of rainfall surpassing the previous record of 6.66 inches in June 2004 by an impressive 2.27 inches. ***The statewide average of 8.93 inches of rainfall in that one month was equivalent to 35 trillion gallons of water.***

Only a few weeks later -- in the middle of June -- Tropical Storm Bill made landfall on the middle Texas coast resulting in additional flooding rainfall across the western counties of southeast Texas from Wharton to

Sealy to College Station. A record crest of West Mustang Creek at Ganado closed US 59 in both directions following the passage of Tropical Storm Bill and the Lavaca River at Edna reached its fourth highest crest ever.

The Pendulum Swings...

After an incredibly wet first half of 2015, the rainfall greatly subsided during the first week of July. Areas north of I-10 recorded generally less than 10.0 inches of rainfall from early July to mid October with some locations recording less than 5.0 inches of rainfall. Rainfall for that period ranged from 1.0 to 8.0 inches below normal over southeast Texas.

After the cool temperatures and soaking rains of spring the dramatic shift to dry and hot conditions resulted in a rapid deterioration of vegetation across the region that had become accustomed to the plentiful rainfall. ***Irrigation demands greatly increased in the August and September time period.*** Lake Conroe after reaching a peak of 202.42 ft on May 27 (1.42 ft into its flood pool) fell steadily to a low of 198.98 ft on October 21st, or 2.02 ft below its conservation pool level. The "flash drought" came to an abrupt end in late October when two significant rainfall events struck the region.

The first rainfall event occurred from October 23-26 as the remnants of powerful eastern Pacific Hurricane Patricia moved across Texas. Rainfall averaged 8.0-10.0 inches across portions of southeast Texas including Harris County. Since the area was suffering from ongoing drought conditions flooding was minimal with this rainfall. Less than a week later, however, another significant rainfall event would impact Texas.

On October 30th, severe flash flooding struck the I-35 corridor with many of the same locations impacted on Memorial Day weekend being hit again. An incredible 10.81 inches of rainfall was recorded by a Lower Colorado River Authority gage at Onion Creek and HWY 183 in a 2 hour period. A day later, 8.0-10.0 inches of rain fell across central and eastern Harris County into Liberty County resulting in significant flooding. During the last 9 days of October, portions of eastern Harris County recorded over 20.0 inches of rainfall compared to just 9.0 inches for the entire period from early July to mid October.

2015 ended as the wettest year ever for the state of Texas with an average statewide rainfall of 41.39 inches surpassing the previous record of 40.22 inches in 1941. ♠

Why does the cost of water keep going up? and Other Frequently Asked Questions



Q. Will we have enough water to meet the needs of a growing population and to sustain economic growth and development for future generations?

A. The answer is a cautiously optimistic “Yes”. We may not have all the water we want, but we will have the water we need if we all make a commitment to use water as efficiently as possible and to end wasteful practices such as excessive residential turf irrigation. The 2011-12 drought provided compelling testimony that we cannot take our finite water supplies for granted. The Texas Water Development Board’s state water plan (WATER FOR TEXAS 2012) calls for 34% of our water supply to come from water conservation and reuse by 2060, when the population of Texas is expected to nearly double. If we have any chance of achieving that goal, the commitment to stop wasting water has to start today.

Q. What are the NHCRWA fees that show up on my water bill?

A. The NHCRWA -- North Harris County Regional Water Authority -- “fee” is charged to the MUDs/Well Owners within the Authority’s boundaries based on the amount of groundwater pumped by their wells, and/or the amount of surface water they receive from the NHCRWA. The MUDs charge their individual customers for the water they use. The more water a customer uses, the higher the fee will be.

Q. How often does the NHCRWA fee increase?

A. Fee increases are imposed only as necessary. Without taxing authority, funding for construction projects must come from pumpage fees and water sales. There will be more rate increases in the future; however, the Authority is committed to keeping the price as low as possible...for as long as possible.

Q. What are the Authority’s current ground- and surface water fees?

A. As of January 1, 2014, the current rates are:

- \$2.00 per 1,000 gallons for groundwater, and
- \$2.45 per 1,000 gallons for surface water.

Q. When is the next increase and how much will it be?

A. The next increase, which will go into effect on April 1, 2016, is \$0.40 per 1,000 gallons. The new rates will be:

- \$2.40 per 1,000 gallons for groundwater, and
- \$2.85 per 1,000 gallons for surface water.

Here is more information about key North Harris County Regional Water Authority topics.

WHO?

The Harris-Galveston Subsidence District (HGSD) was created by the Texas Legislature in 1974. The new District compiled hydrologic information on the Chicot and Evangeline aquifers and studied water usage and water supply in Harris and Galveston counties, then issued their first groundwater regulatory plan. This required that industries on the Houston Ship Channel convert to surface water supplied from the recently completed Lake Livingston reservoir. The results were dramatic -- subsidence in the Baytown-Pasadena area was dramatically improved, and has since been largely halted.

The North Harris County Regional Water Authority (NHCRWA) was created by the 76th Texas Legislature in 1999 and was approved by voters in January 2000. Its mission was to find and assure a long-term supply of quality drinking water at the lowest responsible cost, to promote water conservation, and to identify/provide cost effective alternative water sources for the future.

WHAT?

Decades before WATER became the global issue that it is today, the state of Texas began taking concerted measures to preserve and protect this finite natural resource.

The Gulf Coast Aquifers -- the source we traditionally relied upon for our drinking water -- are made up of many layers of clay, rocks and sand. Over geologic time, these layers naturally compacted. Sadly, the area’s steadily increasing population and voracious demand for water sped up this natural process. Decades of aggressive groundwater pumping not only resulted in a decline of the aquifers, but also triggered land-surface elevation loss, or what is called **subsidence**.

WHEN?

The Subsidence District’s success in reigning in the advance of subsidence by conversion to surface water in Galveston County provided the impetus to extend similar groundwater reduction mandates into north and west Harris County, where increasing levels of subsidence

had also been measured. The District issued its 1999 Regulatory Plan that outlined a phased timeline for reducing reliance on groundwater through conversion to surface or alternate water.

In 2002, the NHCRWA successfully negotiated a long-term water supply contract with the City of Houston and design and construction of the necessary transmission lines and facilities began. Thanks to cooperation by the many MUDs within the Authority's boundaries and their customers, the 30 percent groundwater reduction goals required by the initial HGSD 2010 mandate were met.

In their 2013 Regulatory Plan, the Subsidence District revised their conversion requirements which allow a little more time to meet the next milestone – 60% conversion by 2025. The challenge continues, however, with some of the biggest hurdles still ahead because there is not enough water in the San Jacinto River system to meet our 2025 needs and beyond.

WHERE?

People and businesses have been flocking to north Harris County in record numbers since the early 1970's when about a quarter of a million people called the area home. The population boom has continued; the 2010 census recorded a staggering population of 601,000 for the northwest community. To address the pressing question, "where will our future water come from?" the

water authorities in the region have teamed up with the City of Houston to initiate the **Luce Bayou Interbasin Transfer Project** with the capacity to bring nearly 450 million gallons a day (MGD) of raw water from the Trinity River to Lake Houston and the City's North East Water Purification Plant (NEWPP).

WHY?

With the availability of more raw water coming into the San Jacinto/Lake Houston reservoir, additional treatment capacity is urgently needed. A Supplemental agreement for participation in the NEWPP expansion was recently negotiated by the regional water Authorities and signed with the City of Houston. The project will be completed in phases over the next 6 to 9 years, increasing the treatment capacity from the current 80 MGD to 400 MGD at a total cost of about \$1.28 billion. The NHCRWA share of the expansion will be approximately \$469 million.

In addition to the cost of purchasing the surface water from the City of Houston, there are shared transmission, operations and maintenance expenses to be paid. Some routine water facility expenses -- chemicals and energy, for example -- have spiraled in recent years.

All of these factors -- coupled with the cost of constructing the 2025 system -- will impact the future cost of water.

SECURING THE WATER OUR NEIGHBORHOODS NEED IN THE FUTURE



The NHCRWA will be constructing (and participating in the construction of) another 108 miles of transmission and distribution lines.

■ **The Northeast Transmission Line** will eventually convey 113 Million Gallons a Day (MGD) of treated water from the North East Water Purification Plant (NEWPP) near Lake Houston to the Authority's system. This will significantly increase the number of MUDs receiving surface water from NHCRWA.

■ **Segment 1** of this transmission line is a 10 ft diameter waterline (see above, left). The cost for this portion of the line is shared by the authorities and the City of Houston.

■ **Segment 2** will continue to the NHCRWA point of delivery just west of I-45. This is a 9 ft diameter water line shared by the City of Houston, NHCRWA and the Central Authority.

WATER 101...Learning the Lexicon

WATER -- *we're using up supplies of this valuable natural resource faster than they can be replenished, and this has become a topic of global concern. Here are some key definitions that will help you join the discussion...*

AQUIFER -- A body of saturated rock through which water can easily move. Normally such water must be pumped to the surface so a well is drilled into the ground to penetrate the aquifer. If water is pumped from a well faster than it is replenished, the water table is lowered and the well may go dry.

CONSERVATION -- Water conservation refers to any beneficial reduction of water usage, loss or waste. It also includes the strategies and activities to manage and protect our finite water resources to meet the demand for human consumption (e.g., agriculture, municipal, industrial, and residential uses).

DIRECT REUSE -- Water **reuse** is the practice of using water that has already been used. **Direct reuse** refers to the introduction of reclaimed water via pipelines, storage tanks, and other necessary infrastructure directly from a water reclamation plant to a distribution system. For example, treating wastewater and then piping it to an industrial center or a golf course is considered direct reuse.

E.P.A. -- The U.S. Environmental Protection Agency. The Agency's basic mission is to "protect human health and the environment". When Congress writes an environmental law, EPA implements it by writing regulations. They often set national standards that states enforce through their own regulations.

EVAPOTRANSPIRATION -- (ET) is a measurement of the total amount of water needed to grow plants and crops (*Evaporation* -- loss of water from the soil in the form of a vapor or gas; and *transpiration* -- the loss of water from the plants and grasses themselves).

GROUNDWATER -- the water present beneath Earth's surface in soil pore spaces and in the fractures of rock formations. Heavy rains or melting snow replenish or recharge groundwater supplies by seeping down into the cracks and crevices beneath the land's surface. Serious water shortages occur when groundwater is used faster than it is naturally replenished. Groundwater is used for drinking water by more than 50 percent of the people in the United States, including almost everyone who lives in rural areas. The largest use for groundwater is to irrigate crops.

REUSE -- There are two major categories of water reuse: direct reuse and indirect reuse. **Indirect reuse** is the placement of water, usually treated effluent, back into a water supply source, such as a lake, river, or aquifer, and then retrieve it to be used again. Indirect reuse projects that involve a watercourse require a *bed and banks permit* from the state, which authorizes the permit holder to convey and subsequently divert water.

TEXAS WATER DEVELOPMENT BOARD (TWDB): The Texas agency charged with creating and administering the State's water plan and providing water planning, data collection and dissemination, financial assistance and technical assistance services.

STATE WATER IMPLEMENTATION FUND FOR TEXAS (SWIFT): A new fund that lowers the cost of borrowing for regional water projects. Voters overwhelmingly approved amending the Texas Constitution to allow \$2 billion to flow from the Rainy Day Fund to SWIFT. This money is expected to help finance more than \$25 billion in water projects over the next 50 years.

STATE WATER IMPLEMENTATION REVENUE FUND FOR TEXAS (SWIRFT): A vehicle used to issue revenue bonds, or bonds repaid through income generated by the project. SWIRFT secures lower interest rates for regional water providers that couldn't otherwise afford costly infra-structure projects.

STATE WATER PLAN (SWP): Development of the state water plan is central to the mission of the TWDB. Based on 16 regional water plans, the plan addresses the needs of all water user groups in the state -- municipal, irrigation, manufacturing, livestock, mining, and steam-electric power.

SURFACE WATER -- water on the surface of the planet -- such as in a stream, river, lake, wetland, or ocean. Of all the water used in the United States, about 75-80 percent comes from surface water sources. 💧



WHO SAYS WATER CONSERVATION IS IMPORTANT?

"Some Texas cities still use 50 percent or more of their water for landscapes, a prime target for water conservation.... As a horticulturist, I can reasonably say that one half of that water use is unnecessary. In most of Texas, you can have attractive landscapes if your irrigation technology is good, you have no leaks and you are using the right amount of water and the right kind of plants."



"It doesn't make any sense to spend billions of dollars on new water resources when we haven't eliminated water waste."

Dr. Calvin Finch, *Director, Texas A&M Water Conservation and Technology Center*

"Unknowingly, many home-owners put two to three times more water on their outdoor landscapes than is needed, which undermines efforts to provide water to meet the essential needs of all Texans....In the absence of strong measures, the amount of water wasted will increase with our population. Just by limiting lawn watering frequency and eliminating watering during the heat of the day, in the Houston-Galveston area savings by 2060 could total over 62,000 acre-feet (about 20 billion gallons) per year, potentially avoiding more than \$200 million in infrastructure costs."



Myron Hess, *Manager of Texas Water Projects, National Wildlife Federation*

"Many residents are not aware of exactly where their water comes from. Past studies have shown that the more people are aware of their water source, the more likely and willing they are to participate in water conservation activities. Residents should be able to look at their water bill and understand how many gallons they used and for what activity. Once people have that realization, they can better decide for themselves on what they may want to do to reduce use or at least be aware of their use."



John Sutton, *team leader for Texas Water Development Board's municipal water conservation program*

"The earth is largely covered by water. But only about 2% of that water is drinkable. And, with a constantly growing population, that small amount of water is being shared by more and more people, as well as having to supply all of the water needed for agriculture, manufacturing, power generation, our cities and neighborhoods, too. We have taken our precious water supplies for granted...for too long. Now, water — quantity and quality — is a global issue. That's why we have to learn to be better stewards of this finite resource...and learn to make informed decisions about how we use it."



Carole Baker, *President, Texas Water Foundation*

"In recent research on urban landscape water use in Texas, we found that water use by residential, municipal, business and educational landscapes and golf courses represented roughly 46 percent of total urban/municipal water use during 2010. Even without factoring in golf course water use, they estimate that the total annual water use for lawns and landscapes ranges from 1.9 million acre-feet to 4 million acre-feet. This effectively positions urban irrigation as the state's third largest water user, after agricultural irrigation and other urban uses, such as in-home and municipal use."



Dr. Raul Cabrera, *Associate Professor, Department of Horticultural Sciences, Texas A&M University*

"What is the true value of water? We have taken it for granted because it has always been cheap and readily available when we turn on the faucet. It is time to make intelligent decisions — choices, really — about how to SPEND this vital resource. There are hundreds of ways to use water more efficiently, and most of them come down to old fashioned common sense. Suppose that you have a specific amount of DRINKING QUALITY water allocated to you...not a drop more, not a drop less. How much would you devote to watering your yard and landscape? Decisions have **consequences**...remember that you are 'spending' drinking water. How much do you really need?"



Al Rendl, *President NHCRWA*

To learn more about water conservation, visit: www.SaveWaterTexas.org; www.TexasWater.org; www.twdb.texas.gov/; <http://water.tamu.edu/water-conservation/water-conservation-and-technology-center/>; http://texaslivingwaters.org/wpcontent/uploads/2015/03/SC_WaterConservByYard_report_031115_R.pdf

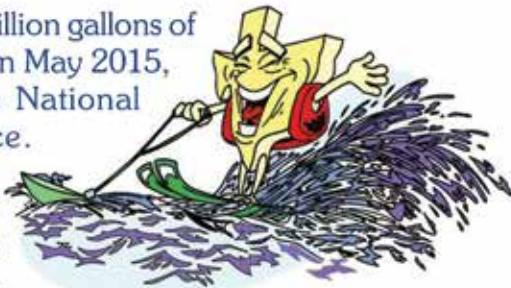
Water Factoids

We have an abundance of water in the United States even though it is not always where we need it to be! Some regions continue to experience extreme drought. Did you know that the US has 4.5 percent of the world's population yet almost 8 percent of its freshwater resources?



◆ The US has the largest freshwater lake system in the world -- the Great Lakes -- which holds 6 quadrillion gallons of water (that's a 6 followed by 15 zeros).

◆ More than 35 trillion gallons of rain fell on Texas in May 2015, according to the National Weather Service. That's enough rainfall to cover the entire state with ankle-deep water. and sets an all time record for the most rain in any month ever! (Source: CNN News)



◆ If all of the water vapor in the Earth's atmosphere fell at once, distributed evenly, it would only cover the earth with about an inch of water.

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◆ It takes more than six years for the average American residence to use the amount of water required to fill an Olympic-sized swimming pool (660,000 gallons), and more than seven years to use the same amount of water that flows over the Niagara Falls **in one second** (750,000 gallons).



◆ The mighty Mississippi River flows at 4.5 million gallons per second at its mouth in New Orleans, supplying water to about 15 million people.

