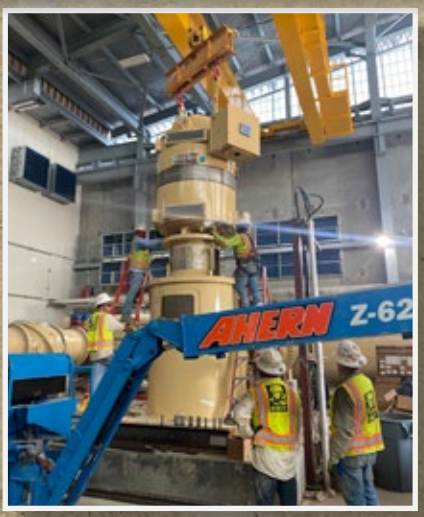
NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY

CONNECTIONS

Securing Water For Our Future

Winter 2022



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REGIONAL WATER Authority

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Capers Ridge Intake & Pump Station on Trinity River


Pigging Removal Station and discharge for dual 96" pipelines into the sedimentation basin


End of sedimentation basin and beginning of Luce Bayou Canal System.

Coastal Water Authority Celebrates the completion of the Luce Bayou Interbasin Transfer Project

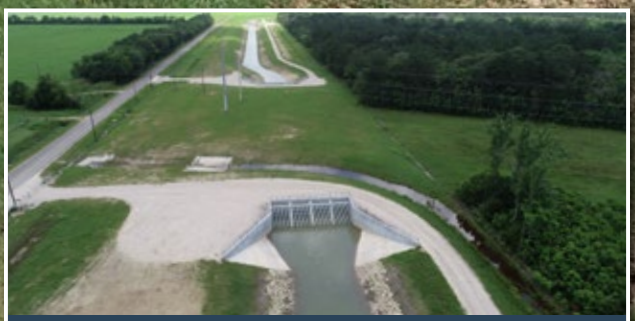
5 Acre Pump station

500 MILLION Gallons a day

(3) MILES Dual 96" Pipeline

23 Miles of Canals

A small portion of the Luce Bayou Canal System

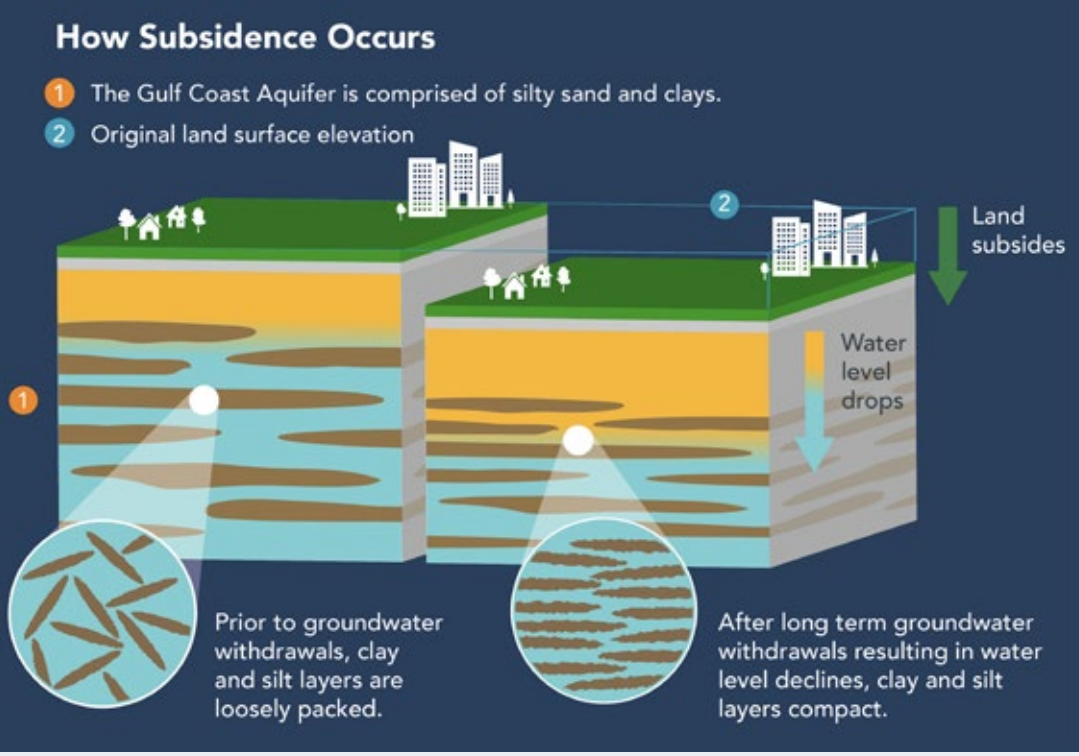


Siphon under pipeline corridor Luce Bayou Canal

Outfall of Luce Bayou Canal into Lake Houston

Watch CWA's video commemorating the completion of the Luce Bayou Interbasin Transfer Project
https://nhcrwa.info/cwa-lbitp

HARRIS-GALVESTON SUBSIDENCE DISTRICT



If Subsidence Is Left Unchecked

The only way to stop subsidence? Curb groundwater use.

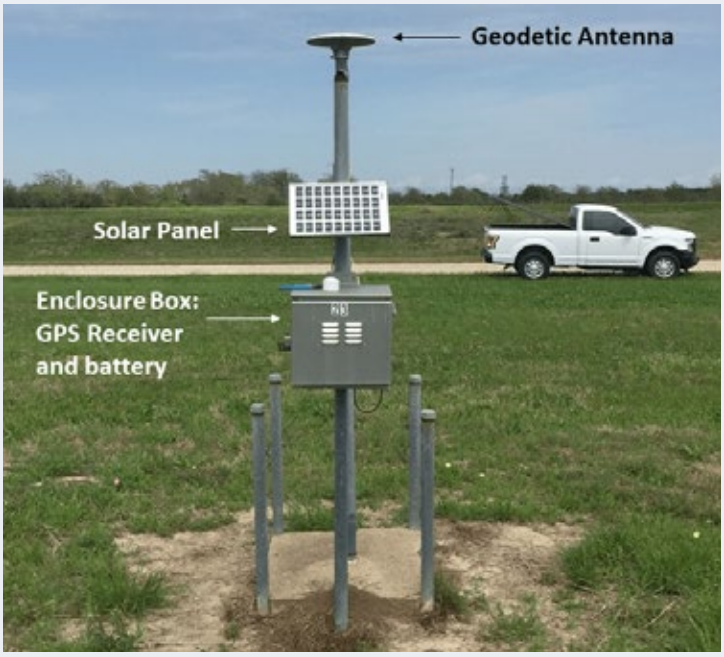
Kelsey Seeker, Communications Specialist, Harris-Galveston Subsidence District

The Harris-Galveston Subsidence District is a regulatory agency that works with regional water authorities and government entities to mitigate the risk of subsidence and provides key data and insights that help drive alternative water infrastructure projects.

Subsidence, the sinking of land, is caused by excessive groundwater withdrawal which results in the lowering of the aquifer water level (an indication of depressurization of the aquifer) that causes the aquifers to compact. This compaction is seen at the surface as subsidence and can cause damage to roads, infrastructure and contribute to flooding.

Every year, the District collects and publishes data that examines aquifer water levels, groundwater usage, and subsidence rates in Harris and Galveston counties.

The annual rates of subsidence observed in Regulatory Areas One and Two are generally stable since both areas have reached their full regulatory conversion level (1990 and 1995, respectively). This level is set by the District based on reasonable regulations informed by research and data. The Chicot/Evangeline aquifer water levels have risen up to 242 feet from their historic benchmarks.



Example of a Permanent GPS Station

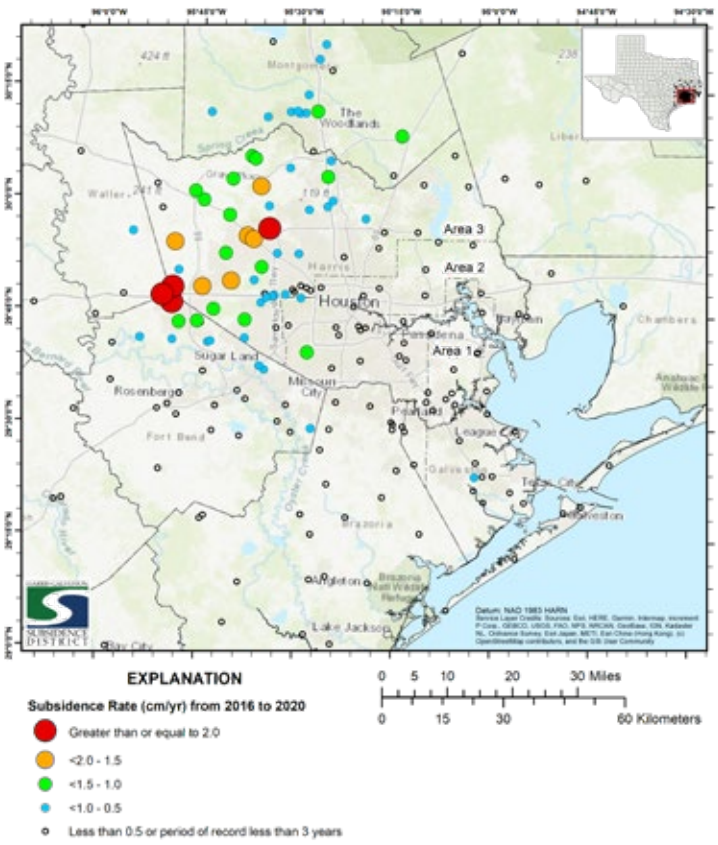
Based on the data from the District's GPS network, areas in northwest/west Harris County are still facing higher subsidence rates until that conversion process is completed. Subsidence rates are generally above 0.5 centimeters (cm) per year throughout Regulatory Area Three.

If regulations and the conversion process had not been implemented in Area 1 and 2, the subsidence rates could have exceeded 2.0 cm per year and approximately one foot of subsidence or more every 15 years.

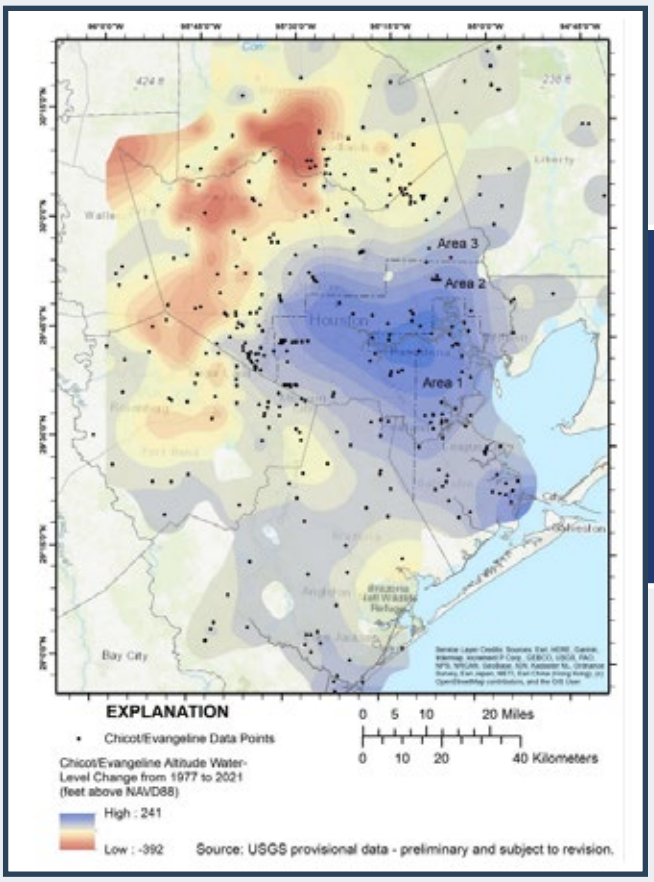
However, this assumes there would be no population changes or new development in the area. Data has shown that as population and groundwater use increases, so do subsidence rates. The potential rate of subsidence could have been much greater, along with its effects like infrastructure damages and increased flooding.

In addition to constantly monitoring subsidence rates, the District regularly invests in additional research such as an upcoming study on flooding impacts related to subsidence in the Spring Creek watershed, which borders Harris and Montgomery Counties.

Ensuring the longevity of alternative water resources is necessary for the region's growth and resiliency. Investing in alternative water infrastructure – like the NHCRWA is doing – will protect communities from subsidence in the decades to come.



Visit HGSD's interactive map showing subsidence rates in Harris, County and surrounding areas.
https://nhcrwa.info/subsidence-rates

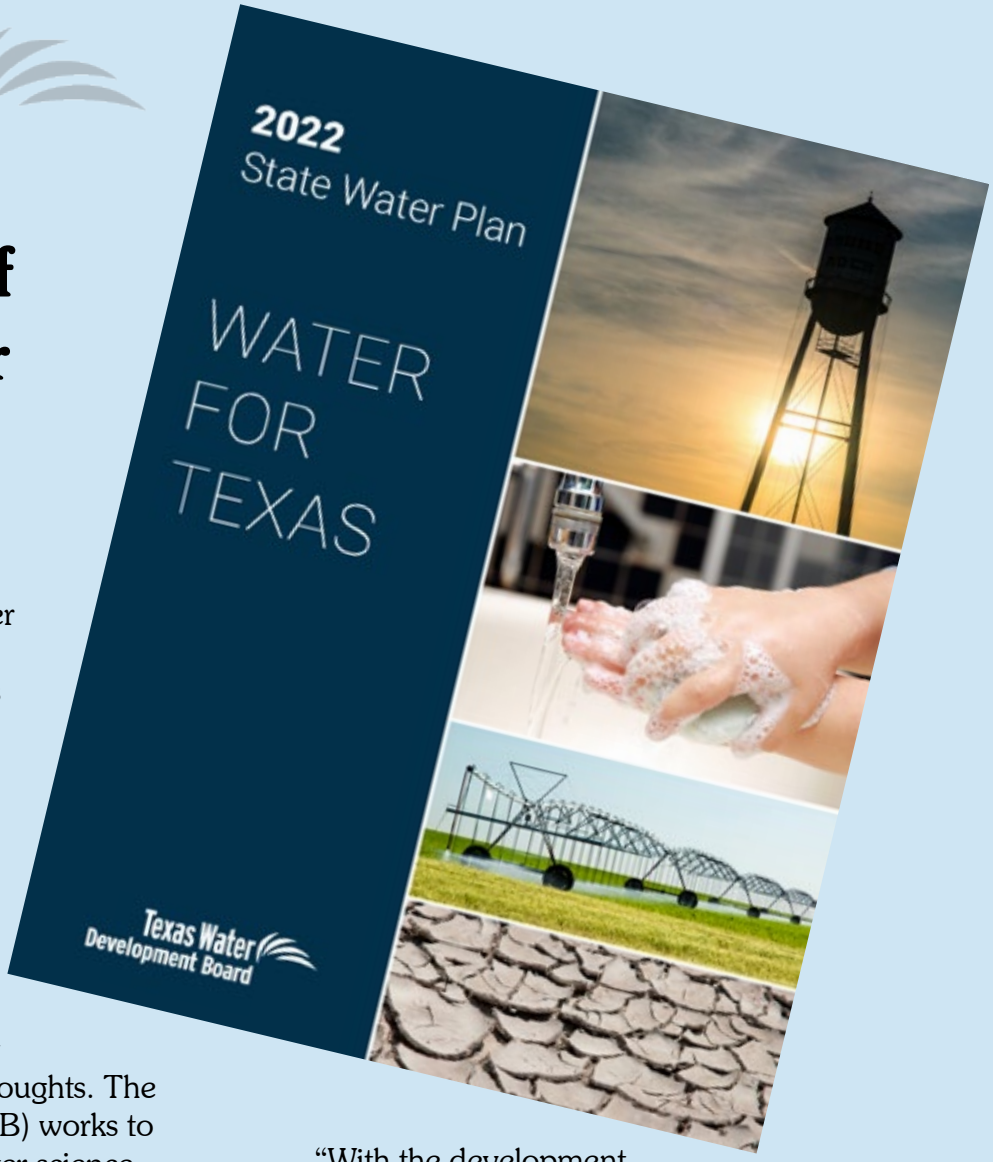


Aquifer water levels have risen in areas with reasonable groundwater regulation and declines where groundwater is the primary source of water. This map depicts water level changes since 1977.

For more information visit hgsubsidence.org.

Texas Water Development Board

The Evolution of Statewide Water Strategies



The 2022 State Water Plan marks a quarter century of Texas' regional water planning process and the fifth state water plan based on the work of hundreds of water planning stakeholders. The state's water planning process is founded on extensive data and science and guided by a state framework that requires the 16 regional water planning groups to address all their water supply needs.

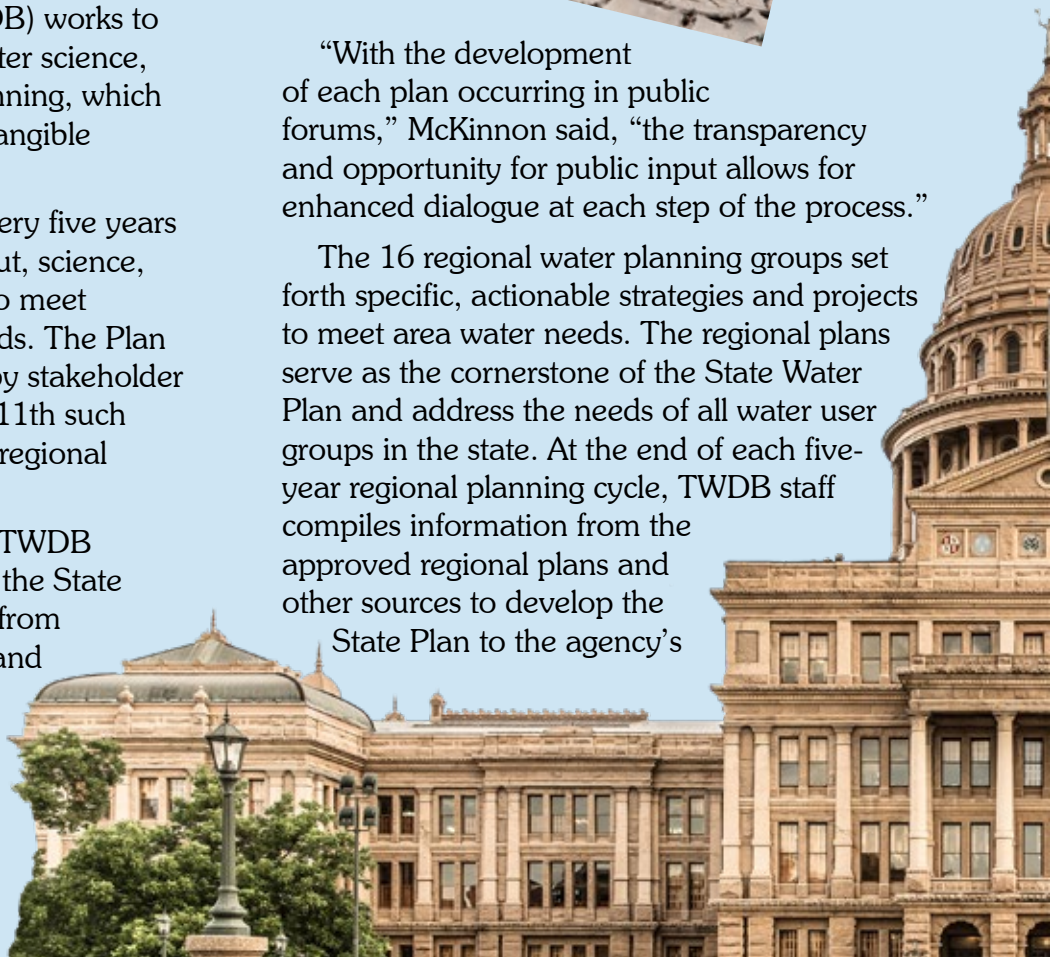
This plan sets forth thousands of specific, actionable strategies and projects—costs and sponsors included—that clearly demonstrate how Texas will be able to withstand future droughts. The Texas Water Development Board (TWDB) works to continually improve data collection, water science, and other tools in support of better planning, which ultimately result in water projects with tangible benefits for the state.

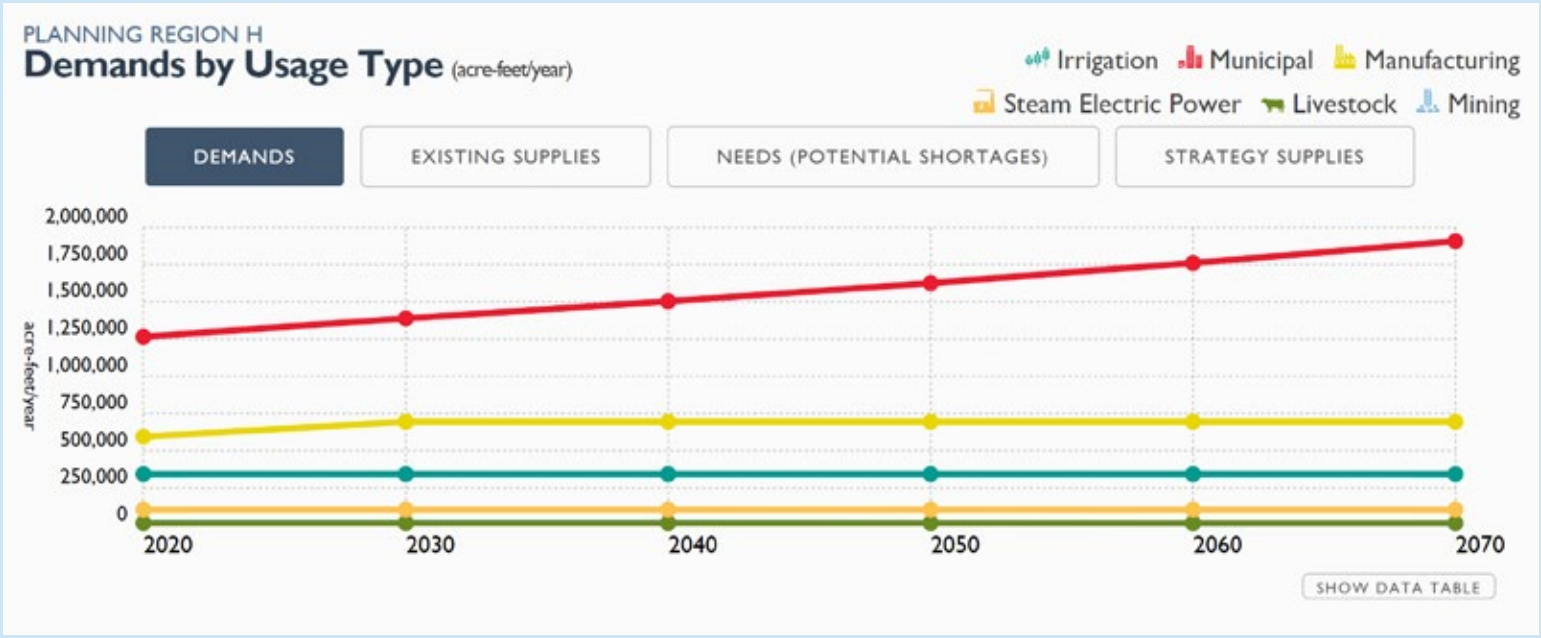
The State Water Plan is produced every five years by the TWDB and integrates public input, science, and local water plans to secure a plan to meet anticipated the state's water supply needs. The Plan reflects a bottom-up process informed by stakeholder and public input. The 2022 Plan is the 11th such effort and is the fifth plan based on the regional water planning process.

According to Temple McKinnon, the TWDB director of Water Supply and Planning, the State Water Plan is built upon the latest data from the entities that manage water sources and implement water-related projects. In addition, regional water planning group meeting are open to the public, and comments were welcome during the public comment period.

"With the development of each plan occurring in public forums," McKinnon said, "the transparency and opportunity for public input allows for enhanced dialogue at each step of the process."

The 16 regional water planning groups set forth specific, actionable strategies and projects to meet area water needs. The regional plans serve as the cornerstone of the State Water Plan and address the needs of all water user groups in the state. At the end of each five-year regional planning cycle, TWDB staff compiles information from the approved regional plans and other sources to develop the State Plan to the agency's



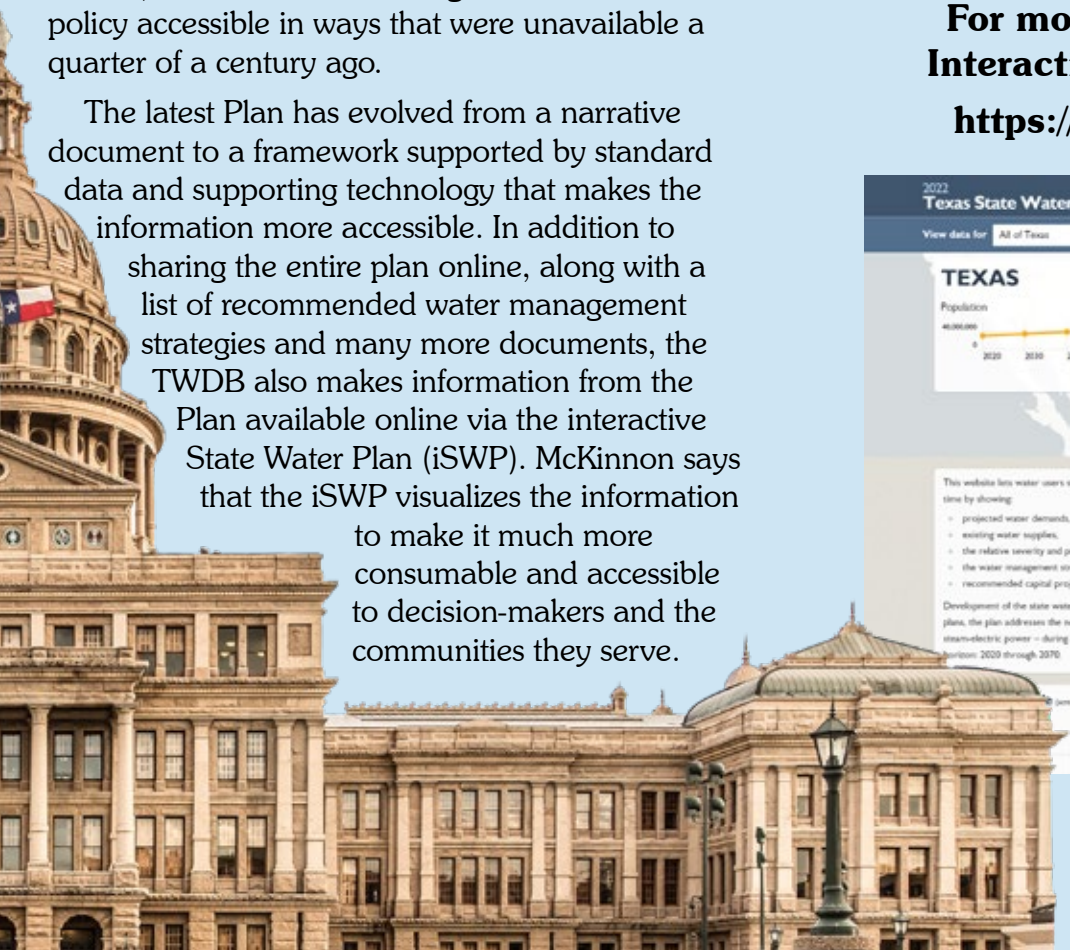


board of directors for adoption. The final plan is then submitted to the Governor, Lieutenant Governor, Speaker of the House, and the Texas Legislature.

What's New With the 2022 State Water Plan?

The latest Plan looks very different from the first Texas Water Plan in its presentation of information. This one reflects an innovative and nationally recognized process based on the work of regional planning groups, local water plans and the input of Texans, and makes this latest guide to state water policy accessible in ways that were unavailable a quarter of a century ago.

The latest Plan has evolved from a narrative document to a framework supported by standard data and supporting technology that makes the information more accessible. In addition to sharing the entire plan online, along with a list of recommended water management strategies and many more documents, the TWDB also makes information from the Plan available online via the interactive State Water Plan (iSWP). McKinnon says that the iSWP visualizes the information to make it much more consumable and accessible to decision-makers and the communities they serve.

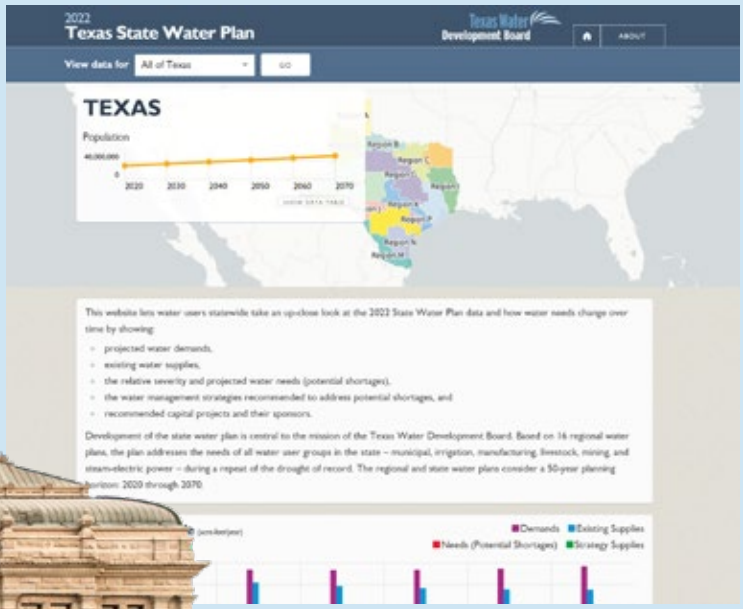


Information can be viewed at the regional, county, and individual utility or water user group levels. Graphs, figures, tables, and maps make the data easier to navigate. In addition, many of the pages are interactive and allow click overs to show more details and other navigation aids.

McKinnon hopes that enhanced accessibility to State Water Plan information will increase public awareness and engagement in the water-planning process and facilitate dialogue about water supply issues.

For more information about the Interactive State Water Plan, visit

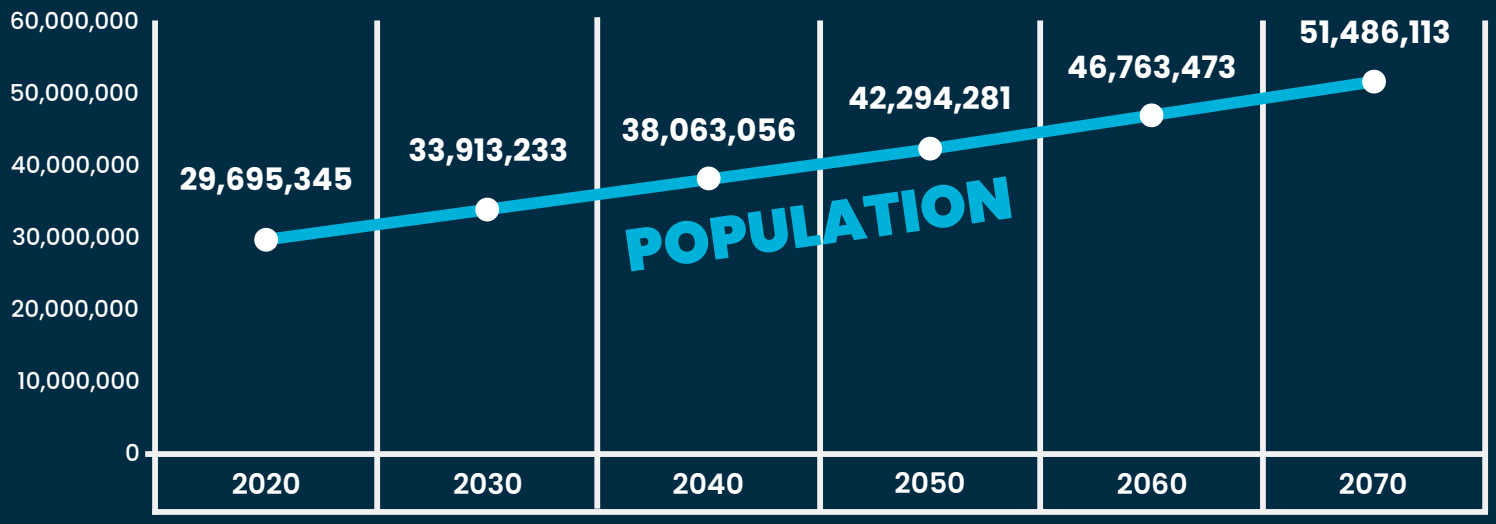
https://texasstatewaterplan.org



Portions of this article are provided by TWDB's texaswaternewsroom.org.

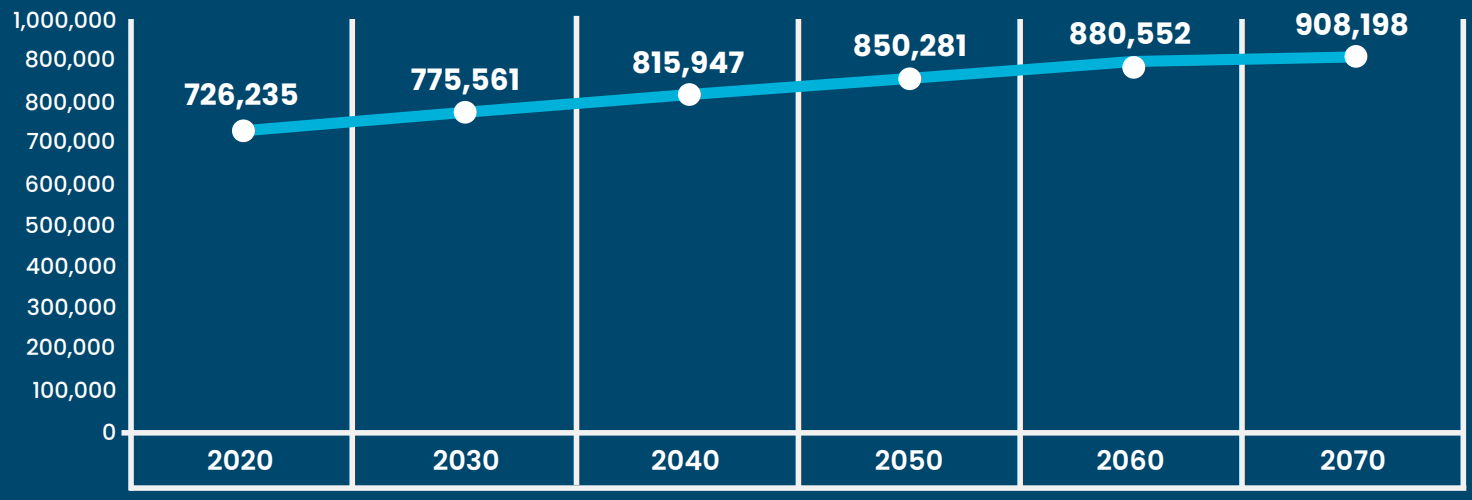
TEXAS POPULATION

TWDB projects a 73% population increase over the next 50 years,
from 29.7 million in 2020 to 51.5 million in 2070



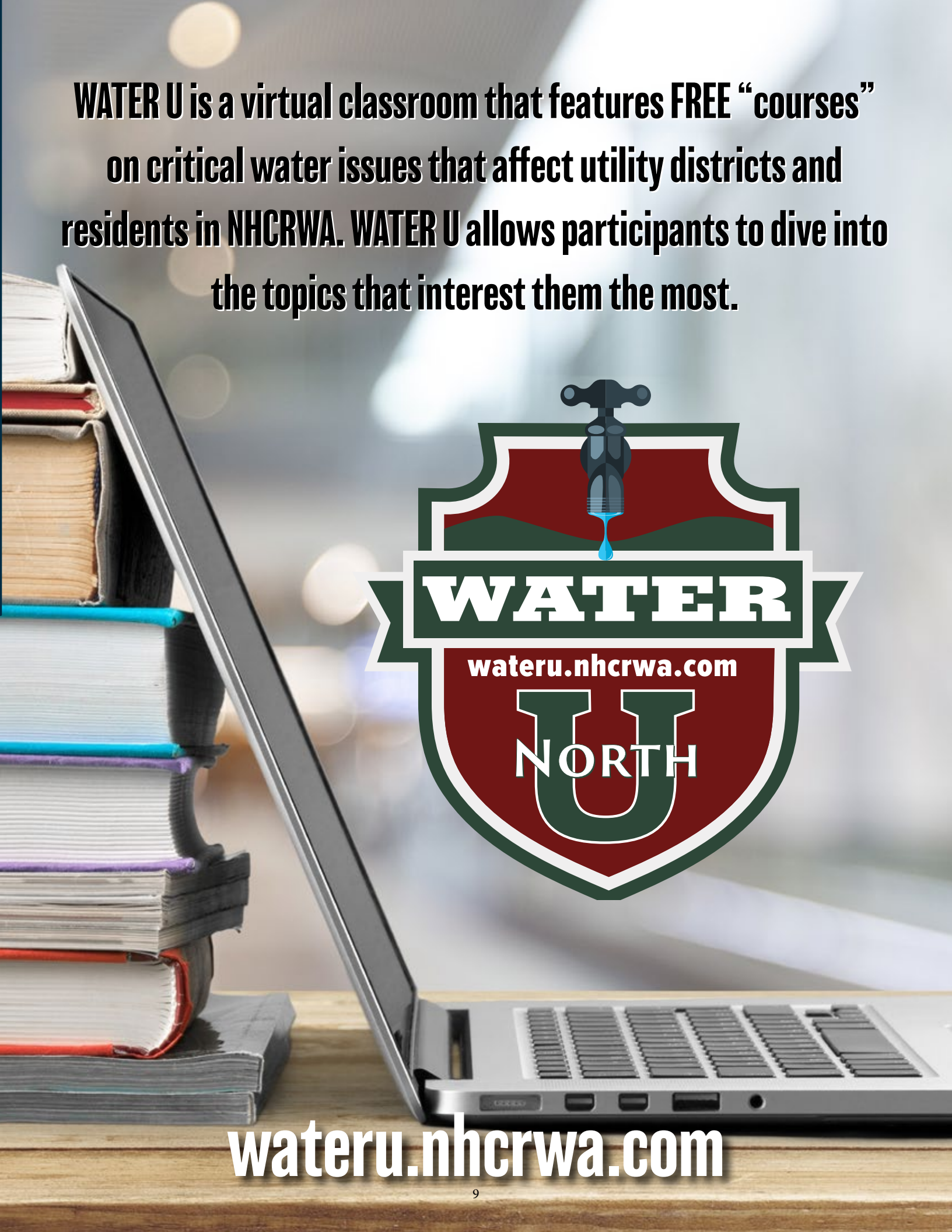
NHCRWA POPULATION

TWDB projects a 25% population increase over the next 50 years in NHCRWA,
from 726 thousand in 2020 to 908 thousand in 2070



Visit nhcrwa.info/twdb-data to learn more

WATER U is a virtual classroom that features FREE "courses" on critical water issues that affect utility districts and residents in NHCRWA. WATER U allows participants to dive into the topics that interest them the most.



wateru.nhcrwa.com

QUICK FACTS ABOUT LAKE HOUSTON'S WATER INTAKE PUMP STATION

Area water providers have come together to finance a major expansion of the Northeast Water Purification Plant, providing fresh drinking water and meeting the mandate to reduce our areas dependence on groundwater.

The expansion will more than triple the plant's output of fresh drinking water and help meet the mandate to reduce our area's dependence on groundwater.

A key aspect of the project includes the design and construction of a new intake pump station located approximately 900 feet from the shore of Lake Houston. The intake station includes underwater screens, pumping, and conveyance to withdraw water from the lake and then deliver it to the treatment facility.

The pump station is connected by a bridge with dual 108" Raw Water Pipelines running on each side of the bridge.

Constructed 1,000 feet off the shoreline, the intake pump station is supported by 192 – 30" Diameter piles.

Lake Houston water is particularly difficult to treat because the lake is shallow. The new intake will alleviate some of the water quality challenges by withdrawing from a slightly deeper depth than the existing intake.

The intake pump station building is 195 feet long and 105 feet wide. The platform on which the intake pump station building sits is 247 feet long and 122 feet wide. The bridge from the shoreline to the intake pump station platform is 940 feet long and 40 feet wide.

Largest (108") Magnetic Flowmeters installed in world to date

SIX (6) – 1000 HP pumps are installed for a firm pumping capacity of 320 Million Gallons per Day (MGD) with room to add an additional 4 pumps for a firm pumping capacity of 560 MGD

Photos courtesy of DEC Houston

Harvesting Rainwater, an Old Idea with a New Following

Collecting rainwater for use during dry months in rain barrels or other depositories is an ancient and traditional practice. Historical records show that rainwater was collected in simple clay containers as far back as 2,000 years ago in Thailand, and throughout other areas of the world after that. With the rising price of water and periodic drought restrictions, today more and more homeowners are harvesting rainwater to save money and help protect this precious natural resource.

Rain barrels can certainly be part of our long-term water supply. Just look outside your window the next time it rains and imagine all the water that's running down your driveway being put to beneficial use in your home and garden!

Why Harvest Rainwater with Rain Barrels?

With an average annual rainfall of 50 inches per year characteristic of the upper Gulf Coast, 1000 square foot of roof surface has the potential to collect over 31,000 gallons of water each year. If this amount could be collected with 100 percent efficiency, it would fill a 50-gallon rain barrel over 600 times and could supply 25% of the annual water use for the average U.S. family. It quickly becomes apparent that even a small rain harvest system attached to a section of a larger roof can collect significant amounts of water. Several rain barrels strategically placed around the home or business can easily provide supplemental water for flowerbeds, small gardens, or hand watering.

Depending on the size of your house and the amount of rainfall in your area, you can collect a substantial amount of rainwater with a simple system. This extra water can have a significant impact on your water bill. The use of rainwater combined with the domestic use of grey water can further increase your savings.

Rainwater stored in rain barrels has many applications, including watering landscapes and gardens. Rainwater can sometimes be used for drinking but requires special treatment with a filtration system. Note that many cities require the filtration system for drinking water to be certified and the water has to be tested on a regular basis. A filtration system is not necessary for landscapes or containers, it can be used directly from rain barrel to garden.

If you're harvesting rainwater with rain barrels to use for watering your flower beds, the rainwater can help to improve the health of your plants, lawns, and trees. Rain is naturally soft water and devoid of minerals, chlorine, fluoride, and other chemicals. For this reason, plants respond very well to rainwater. After all, it's what plants in the wild thrive on!

Rainwater from Rain Barrels Makes Your Garden Smile

Keep your roof clean of debris and potential contaminants to maximize purity. The material

your roof is made of is also important in how much contamination the water will carry. The chemicals and hard water can produce an imbalance in the soil of your garden. Chemical fertilizers, fungicides, pesticides, and drought can also disrupt the balance and harmony of the soil. This imbalance causes trees and plants to weaken and makes them more susceptible to disease. Trees and plants have an efficient immune system; however, that allows them to fend off diseases and other invaders as long as they have a healthy soil environment.

When you look at your yardscape, visualize it as a vast interconnected community of trees, plants and tiny critters that live in the soil, all interacting and affecting each other. Thus, the type of water you use will affect the health of this intricate community.

And speaking of community, one of the best reasons to start harvesting rainwater with rain barrels is that if you teach and encourage others to do the same, you will help to spread the culture of rainwater collection and in turn help your larger community and the environment.

Types of Rainwater Harvesting Systems

There are many possible configurations and degrees of complexity to a rainwater catchment system. Costs vary considerably as well, ranging anywhere from a few dollars to thousands of dollars.

Your best bet is to review the options available to find out what's in your price range and what's a realistic set-up for your home. Perhaps the simplest use of rainwater if you are on a budget or have space restrictions is to put a rain barrel under one of the gutter downspouts and use the water on indoor plants. The plants will appreciate the soft water. Remember that the barrel should always be covered between uses.

A slightly more sophisticated system might be to use several barrels connected together near the bottom with pvc pipes or hose. A small pump can be used in one of the barrels to pump the water to your garden. In this case, all the barrels will drain simultaneously.

Bigger and more complex systems may use gravity to feed water from gutters to a larger cistern, which pumps water to the landscape. Some online gardening sites sell cisterns and other more complex rainwater harvesting equipment.

Whatever you decide, all systems should use covered barrels or cisterns that keep the water from collecting debris and contaminants, with some kind of filter to keep out silt and leaves. Filters can range from a funnel with mesh at the bottom that is covered by gravel, to a rainwater washing apparatus.

Rain Barrel Placement

There are two primary considerations in placing a rain barrel. Where is the water going to come off the roof and where is the collected water going to be used? Although water can be transferred through pipes to any downhill location by gravity, complex arrangements of collection plumbing require complex maintenance. The simplest arrangement is to locate a storage barrel close to or directly beneath a gutter downspout and within a short hose's reach of the flowerbed or garden.

An additional consideration is elevation. Because rain barrels distribute water passively through gravity flow, the higher the barrel, the stronger the flow. Raising the barrel even six to twelve inches from the ground on a sturdy support not only creates water pressure for distribution, but it also makes the outflow at the bottom of the barrel more accessible for buckets, watering cans, or a hose connection.

Water Quality

Rainwater is naturally soft and contains no water treatment chemicals. It is ideal for landscape use, and no special treatment is required to clean the water for outside use. Because the water is not chlorinated and because of the Gulf Coast's moderate climate, it is important to follow some basic maintenance guidelines to keep the barrel clean and water free of insects and algae.

A primary concern is keeping the gutter and downspout clear of debris that could enter the barrel or cause water to back up in the gutter. One solution is to install a roof washer in the downspout that diverts the initial flow of water with accompanying debris and that then redirects the clean water flow into the barrel. If gutters are kept reasonably clear, a simpler solution is to install screens between the gutter and downspout and on the barrel's inlet. The screen will require cleaning periodically, but it also serves as a barrier to mosquitoes and other insects.

Good sanitary practices for managing rain barrels include using the water regularly instead of storing it for long periods. Check screens to ensure that the barrel doesn't become a mosquito breeding zone. If mosquitoes persist, add a product containing Bacillus thurengiensis (Bt) to the barrel. The nontoxic bacteria are delivered in a solid granule or disk that is placed directly in water. Mosquito larvae are killed when they consume the bacteria, but the Bt bacteria are harmless to plants and other animals. Wash the barrel out thoroughly once a year to prevent odor-causing bacteria and algae that can thrive in accumulated organic debris.

In the southern regions of Texas, heat is a bigger concern than freezing temperatures in managing rain barrels. Nearly year-round moderate temperatures can encourage algae growth and accumulate a lot of heat in a barrel sitting in full sun. Selecting a location that is shaded for at least part of the day moderates water temperatures. The plastic material in a rain barrel is also susceptible to UV radiation and may discolor after several years, but cracking has not been a problem.

Some manufacturers recommend that barrels be drained and protected during the winter in extremely cold climates to preserve their appearance. However, in moderate climates a rain barrel will not be damaged by periodic freezes. Plastic rain barrels vented by large, screened openings do not build pressure from expanding ice, and they can be left outside throughout the winter. Further, disconnecting a rain barrel system in the wintertime would reduce the rainwater harvest significantly.

Maintenance Concerns

Any catchment area will pick up some contamination from leaves, bird droppings, dust, and other natural causes. Some roofs, such as old tar and gravel or old asbestos shingle roofs create too much contamination for rainwater harvesting. Treated cedar shakes are also not recommended for water harvesting.

The type of gutter system you have is also important, as many may have lead soldering or lead-based paints. Additionally, if you live in an area that produces heavy industrial pollution, your rainwater itself may contain some undesirable contaminants.

Make sure there is some way to cover the barrel with a screen or a top. Standing water is also where mosquitoes breed best. As the West Nile virus and other diseases are important concerns, take appropriate measures to deter mosquitoes from breeding in your rain barrels. It only takes about ten days for mosquitoes to breed. Use a fine screen over the top of the barrel so the mosquitoes can't reach the water in the first place.

The type of barrel you use is also important. Make sure it's a food-grade container that was made to hold liquid. Don't cut corners and simply use a trashcan because a common trashcan will not withstand the pressure of the water for long.

Rain Barrel Safety

A full, 50-gallon rain barrel weighs approximately 400 pounds. It is essential to place the barrel out of main traffic pathways, and to secure it against tipping or blowing over when empty. Whether the barrel is raised on a platform or placed directly on the ground, the surface must be firm enough to support the barrel and a full load of water.

Many barrel designs have a sealed lid with a small opening. Even heavy-duty trash barrels can be modified for water collection merely by installing a screened top. However, barrels with large-screened openings must be secured against access by curious children. A head-first drowning can occur in a five-gallon bucket, and an adventurous child could fall into an open or lightly screened barrel.

NHCRWA'S MOBILE TEACHING LABS

For more than a decade, the North Harris County Regional Water Authority has sponsored water conservation education programs in our communities and for area students. Those programs include two mobile teaching labs that are offered at no charge to districts and educators in NHCRWA.

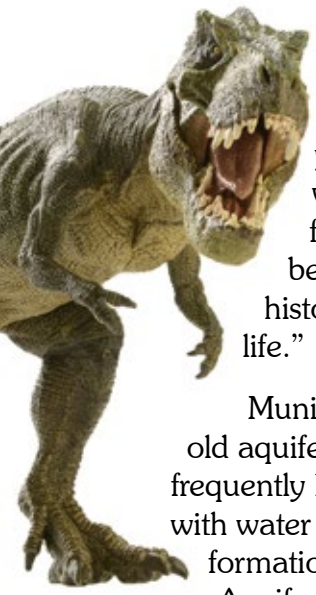
Visit www.nhcrwa.com/education to request the lab at your next event.

Water's taste reflects its journey to the tap...

By Chantal Cough-Schulze, Texas Water Resources Institute Managing Editor Texas Water Journal - Reprinted from CONSERVATION MATTERS, August 18, 2021

A new place can sometimes be so unlike home that even something fundamental, like the taste of tap water, seems different. But it's not just perception; water really does taste different in different places. Though the flavor differences can be jarring at first, it doesn't necessarily mean there is anything to be concerned about.

Water's flavor reflects the journey the water took to get to you, said Lucas Gregory, Ph.D.,Texas Water Resources Institute's assistant director.



"We've got the same water here today that we had when time began. So in theory, we're drinking water that is billions of years old," Gregory said. "The way water tastes is basically a function of what that water has been exposed to in its more recent history and over the course of its life."

Municipal drinking water drawn from old aquifers composed mostly of sand frequently has a salty taste. This is the case with water drawn up from the Simsboro formation, part of the Carizzo-Wilcox Aquifer. The Carizzo-Wilcox Aquifer, which stretches diagonally across a large swath of Texas, supplies drinking water for many other parts of Texas.

"The water has been down there hanging out for a long time, basically, and there are some residual salts in those sands," Gregory said. "That's why the water has a salty taste."

Elsewhere in Texas, local water's flavor has different origins.

Heavily treated surface water sometimes has a mild chlorine taste, especially if you live closer to the point of treatment. Groundwater that has naturally occurring hydrogen sulfide in it, such as near shallow oil fields, smells like rotten eggs, while groundwater with a higher iron content has a slightly metallic taste. Naturally occurring algae and decaying organic matter can give surface water a musty, earthy smell, and traveling through calcium-heavy limestone can give water a sweet aftertaste.

Even the water treatment process itself can cause tastes or odors, said AC Barnett, senior regional technical manager at Inframark Water & Infrastructure Services.

"Disinfected water may retain a faint bleachy odor, for example. Water which resides in pipes for long periods of time through lack of use can develop a stale taste or odor in dead ends on the delivery system," Barnett said.

The water that both Gregory and Barnett grew up drinking in East Texas, meanwhile, had more iron in it. Gregory said the more iron-heavy water also changed the appearance of things it touched over time.

"If the water sits in a fixture that's white, such as the bathtub, you'll get an orange ring where the water sits," he said. "And if you make a pitcher of iced tea, it's nice and brown colored at first, but if it sits for a day, it turns black, though it tastes the same."

Setting the standards

While there are situations where the chemicals in tap water can cause health problems, water having

a noticeable taste or smell does not necessarily mean the water is unsafe. The US Environmental Protection Agency (EPA) sets drinking water standards to keep contaminants below a safe level. All public drinking water systems are required to meet those standards.

"Those standards are there to protect human health," Gregory said. "The science behind them puts those numbers at an acceptable level for the general populace."

The EPA creates both primary and secondary drinking water regulations. Primary drinking water regulations relate to potential health concerns and require that some contaminants be kept below a certain level. Secondary drinking water regulations, meanwhile, relate to cosmetic or aesthetic effects that aren't harmful to human health, like water discoloration or a metallic flavor.

Primary drinking water regulations are legally enforceable, while secondary drinking water regulations are not. Some contaminants, like copper, are subject to both primary and secondary drinking water regulations: one level at which they are unhealthy, and one level at which they can be a nuisance but are not dangerous

Traveling from treatment to tap

To meet primary drinking water standards — and secondary standards where possible — public water systems treat their water in a number of different ways.

"The treatment process depends on the source you're dealing with. The dirtier the initial water, the more you have to do to it in the treatment process," Gregory said. "Each step in the process has its own influence on water quality."

Drinking water that comes from surface water generally requires more treatment, said Shankar Chellam, Ph.D., who is a professor in Texas A&M University's Zachry Department of Civil and Environmental Engineering.

"Surface water has microorganisms, particles, organic matter, inorganic compounds, lots of things that cause problems with human health," Chellam said. "They all need to be removed from the drinking water supply prior to human consumption."

For surface water, the treatment process begins with adding a coagulant, such as iron or aluminum salts. The coagulant helps particles in the water come together, making them large and heavy enough to settle out of the water in a sedimentation basin.

Once the heavier particles have settled out, the water is sent through a filter that removes any leftover smaller particles. Finally, the water is disinfected. Chlorine is the most common disinfectant used in the United States, but chloramine, ozone and ultraviolet light are also used. Because chlorine is both a helpful disinfectant and a contaminant in certain quantities, the EPA maintains standards for using it at a safe level.

Chellam said that the disinfectant is added not only to inactivate microorganisms but also to protect the water from contamination in the distribution system. Having enough disinfectant in the system helps tackle problems that could crop up between the water treatment plant and the point of use.

For groundwater-sourced drinking water, the treatment process is simpler because the ground acts as a natural filter.

"Groundwater is relatively easy — you drill the well and put in the pipeline. That's the minimum," Gregory said.

"Groundwater-sourced public drinking water systems still have to meet the same drinking water standards, so if for some reason they aren't able to meet that standard with just raw water, they're going to treat it. In most situations where you have a public supplier, they're going to disinfect."

Understanding your unique situation

Even if drinking water is coming from a public water system, Gregory said it's worth being aware of any changes in your tap water. After water is piped as far as the water meter, its quality is out of the public system's hands.

"The city is only required to deliver that water quality to the meter. Once it's past that meter, it's up to the homeowner," Gregory said.

He said that homeowners should therefore be aware of what is in their homes and whether their water has changed.

The rotten egg smell of hydrogen sulfide, for example, can sometimes signal a problem. Though the smell can be a result of naturally occurring bacteria in groundwater, Barnett said it can also signify that a chemical reaction is happening inside a water heater.

"If the smell is detected when only the hot water tap is used, draining the hot water heater on a periodic basis can solve the issue," Barnett said.

"If you have a major concern about your water quality and its impact on you, then the only failsafe way to figure that out is to take a sample of water from the point where you get your drinking water and get it tested," Gregory said.

For the most part, the public water system can provide answers. Every year, public water systems publish publicly available water quality reports that can help explain local water's flavor. The reports can be easily downloaded from public water systems' websites.

For questions not answered by the water quality report, Gregory said the public water system may be able to help with tracking down more information.

"If you've got questions beyond the water quality report, they may not have an answer for you, but they should be able to sleuth out the answers you might want," he said.

Public water quality reports can also be used to help make individual decisions, such as for people with compromised immune systems or specific medical concerns, such as high blood pressure.

"If you are immunocompromised or have some extenuating health circumstance and you suspect that your water may be an issue, I would take that report to your doctor and say, 'Hey, this is the water I'm drinking. Is this something to be concerned about?'" Gregory said.

But for most people, Gregory said that tap water — with all of its regionally unique flavors — is considered safe to drink per current EPA standards. Notable exceptions do occur, such as in the widely-publicized issues with Flint, Michigan's water system and other instances of safety standards not being met, but in general EPA standards are designed to ensure broad public safety. And for those who don't like the flavor or smell or want an added layer of purification, adding a filter at the point of use can help.

"The water meets all the required standards, and public water systems do a great job of delivering high quality water. But if you have a big issue with the taste, then putting in a filter can help," Gregory said. "It all boils down to preference. That's the biggest factor in the equation — what do you consider good?"

LET'S TALK ABOUT WATER...

Alan J. Rendl, President, NHCRWA

Let's face it, we have all taken our precious water supplies for granted at one time or another. We're used to turning on the faucet and having the water be there when we need it.

The days of cheap and plentiful water are now behind us and each of us has a responsibility to use this precious natural resource more efficiently.

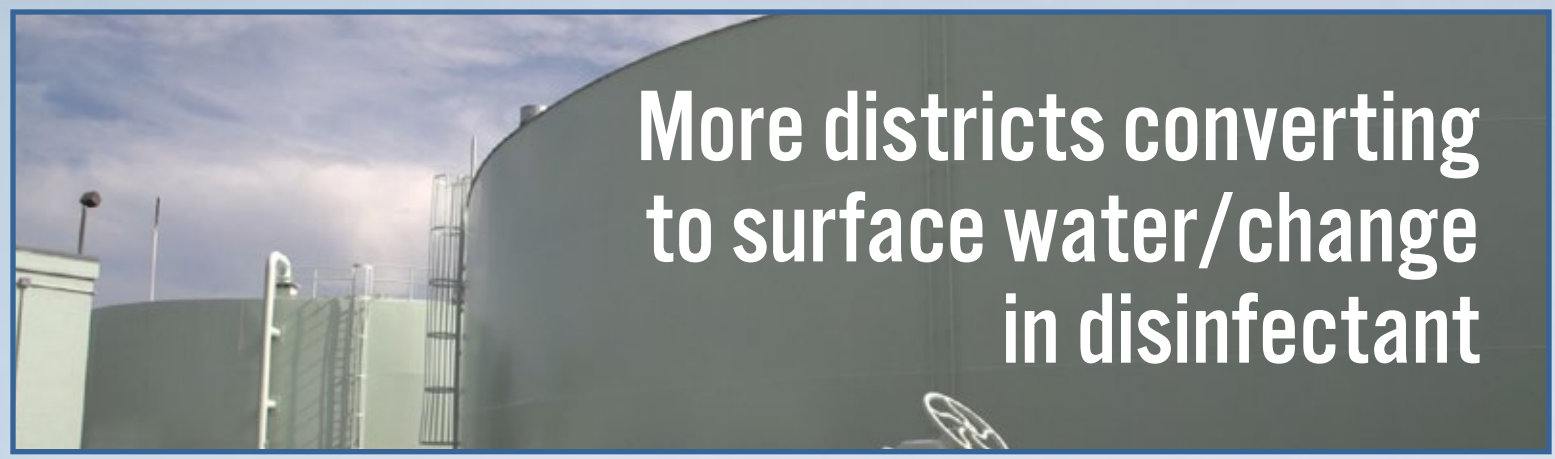
We have all developed some wasteful habits. There are lots of things we can do around the house and in the yard and garden to use water more efficiently.

Water is not only essential to life, but to our lifestyle, as well. It is certainly a topic that deserves our attention.

We have experts -- like Al Rendl -- available to share important information with you on a variety of critical water topics. There is no charge for these presentations or for copies of water conservation materials for your group or organization.

For more information or to request a presentation for your group, contact:

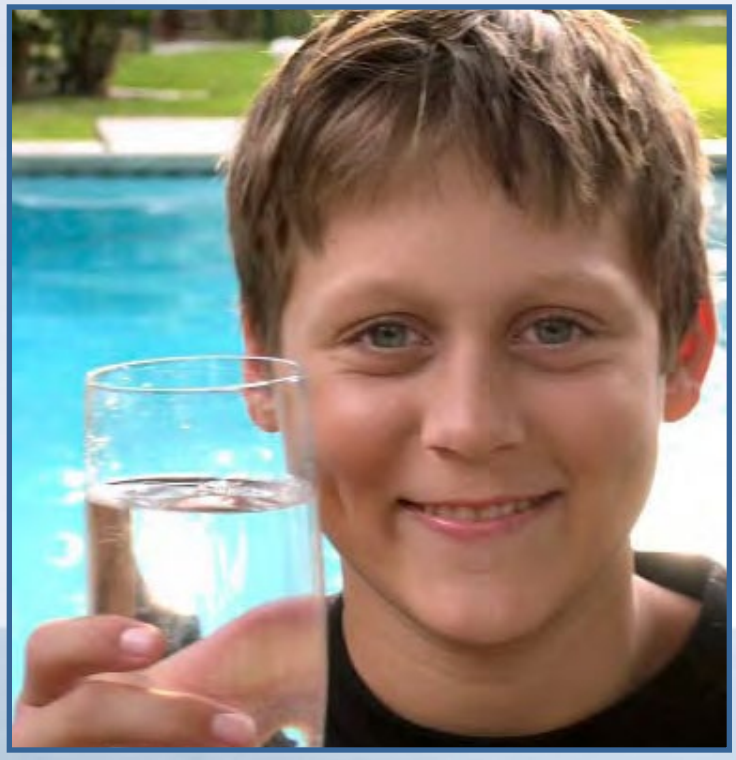
NHCRWA Community Relations
281-440-3924
lisa@nhcrwa.com



More districts converting to surface water/change in disinfectant

Traditionally, residents in northwest Harris County have obtained their drinking water from wells owned and operated by Municipl Utility Districts. The fresh groundwater we have always relied upon has been readily available and free of quality concerns. In the past few decades, however, new environmental regulations, declining aquifers, and a mandate from the Harris-Galveston Subsidence District to reduce the amount of well water pumped out of the ground have combined to change the way we'll get our water in the future.

In 2010, in compliance with this mandate, approximtely 60 MUDs were converted to surface water. That means that while some water will still come from groundwater wells, surface water will gradually become the primary source of water we use in our homes. In 2025, the percentage of surface water will increase to 60 percent as new areas within the NHCWA boundaries are converted.



Water Quality…

When drinking water is to be 'blended' -- some groundwater and some surface water -- there are a number of quality issues that must be addressed before the 'marriage' occurs.

While no one likes to consider that there might be contaminants in our drinking water, the fact is that there are quite a few of them: some that occur naturally (e.g., arsenic and uranium) and some that are manmade (e.g., solvents or pesticides). When chlorine reacts with naturally occurring organic compounds found in the water during the treatment process, disinfection byproducts -- or DBPs -- can occur, which introduces another quality issue that must be addressed.

Groundwater can also be contaminated by fertilizers, septic tanks, naturally occurring minerals, industrial chemicals and metals. Storm drains can carry polluted runoff from neighborhoods and farms into rivers and streams, which in turn can carry harmful microorganisms and bacteria from animals or humans into the source waters of our drinking supplies. Stormwater pollution is an increasingly serious issue that deserves our attention and assistance.

The Chemistry of Blending…

The conversion to surface water in our districts began in 2009, and additional areas will be converted to meet the 2025 mandate. With more than a decade of experience with this process, we have modified the equipment at our water plants, and seamlessly incorporated surface water into our distribution system that has already been disinfected with chloramines at the City of Houston's Northeast Water Purification Plant.

A water chemistry problem occurs when it is necessary to mix surface water disinfected with chloramines with groundwater that has been disinfected with chlorine. This is why the districts that are to be converted are switching to chloramine disinfection to avoid this chemical conflict.

Safe Drinking Water...

The use of both chlorine and chloramines is regulated by the EPA and the Texas Commission on Environmental Quality (TCEQ). Chloraminated water is safe for bathing, drinking, cooking and all normal tasks we have for water every day. There are two situations, however, where special care must be taken: kidney dialysis treatments and tropical fish aquariums.

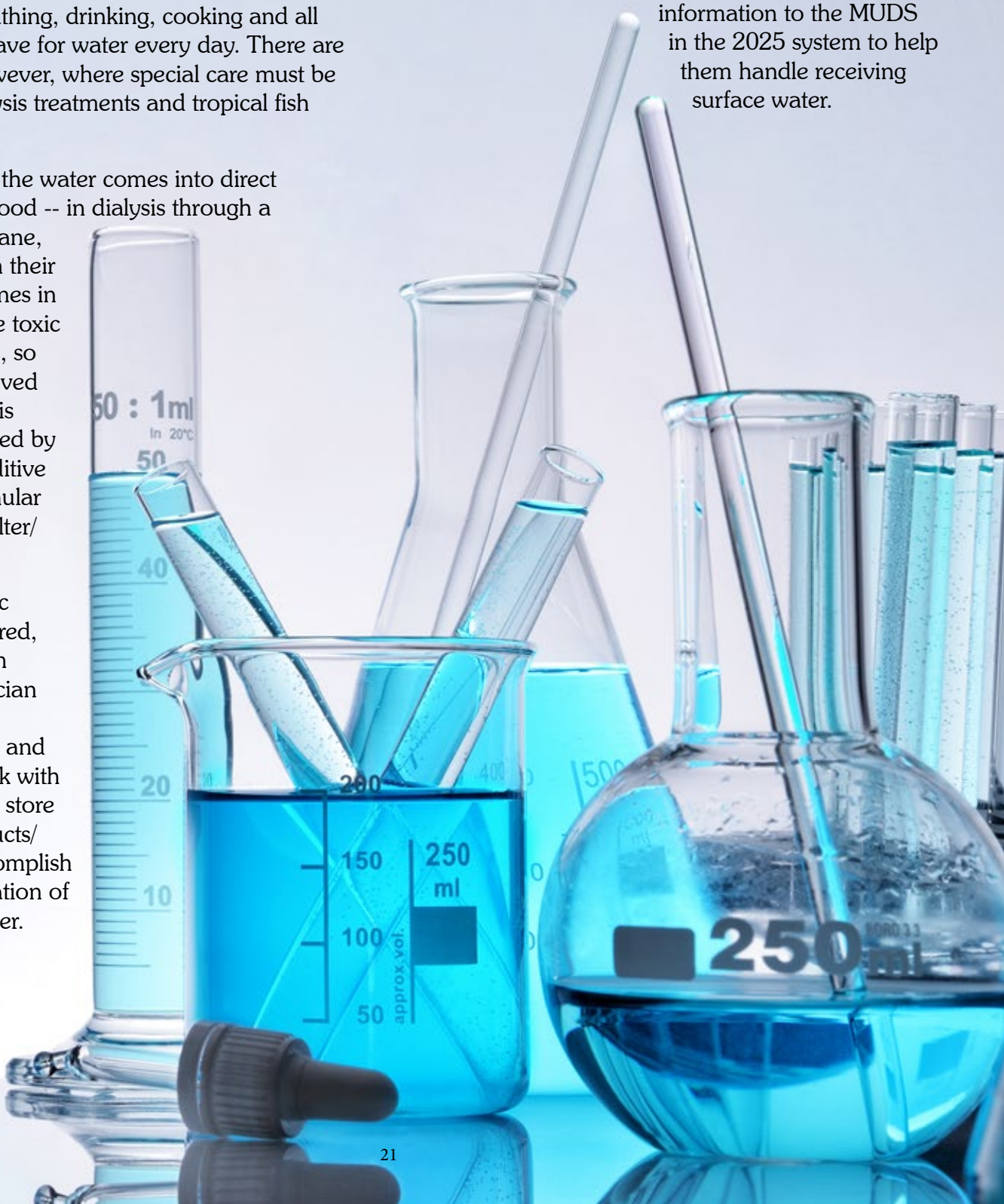
In both cases, the water comes into direct contact with the blood -- in dialysis through a permeable membrane, and in fish through their gills. The chloramines in the water would be toxic in these conditions, so they must be removed from the water. This can be accomplished by introducing an additive or by use of a granular activated carbon filter/ treatment.

If more specific information is desired, kidney patients can consult their physician about any special recommendations, and fish owners can talk with experts at their pet store about which products/ filters will best accomplish the desired elimination of chloraminated water.

There are no other restrictions for kidney patients -- drinking, bathing, cooking -- when using chloraminated water. A problem during dialysis only occurs when the water has the potential to come into direct contact with the blood supply.

As in the past, the Authority continues to be committed to ensuring a sustainable, safe, top quality supply of water for future generations and will continue to meet or exceed state and federal water quality rules and regulations.

The Authority has begun to provide information to the MUDS in the 2025 system to help them handle receiving surface water.



Washing vehicles at home is a huge water-waster and storm water polluter

If washing and polishing your own set of wheels is your idea of fun, at least be environmentally-friendly by minimizing pollution and using water efficiently. Control your water usage by turning the hose off and on only as you need it and pull your car onto the lawn or any other permeable surface to help filter out pollutants from the runoff.

A standard 5/8 inch garden hose running at 50 lbs. per square inch (PSI), uses about 12 gallons of water each minute…that's about 120 gallons in just ten minutes of washing -- and you haven't even finished the wheels! More likely it will take double, or triple that amount of time to get the car clean enough to suit you. Using an automatic hose shutoff nozzle so the water does not flow continuously, can save as much as 70 gallons!

Remember that the water running off your vehicle can contain lots of pollutants – like soap and detergent, mud, rubber and grease. If these substances enter the storm water system, they will eventually find their way into our creeks, rivers, and streams where much of our drinking water comes from today.

Luckily, we now have viable alternatives to this old-fashioned approach to cleaning our vehicles. Consider going to a commercial car wash. The U.S. Clean Water Act requires professional car washes to pipe their dirty water to water treatment facilities or into state-approved drainage facilities. Automatic and self-serve car washes also use water efficient equipment such as computer-controlled systems and high-pressure nozzles and pumps, allowing them to clean cars thoroughly while conserving water. A second choice is to find a do-it-yourself facility that also uses much less water and retains the runoff.

As with everything else…when it comes to washing your vehicle…Remember to

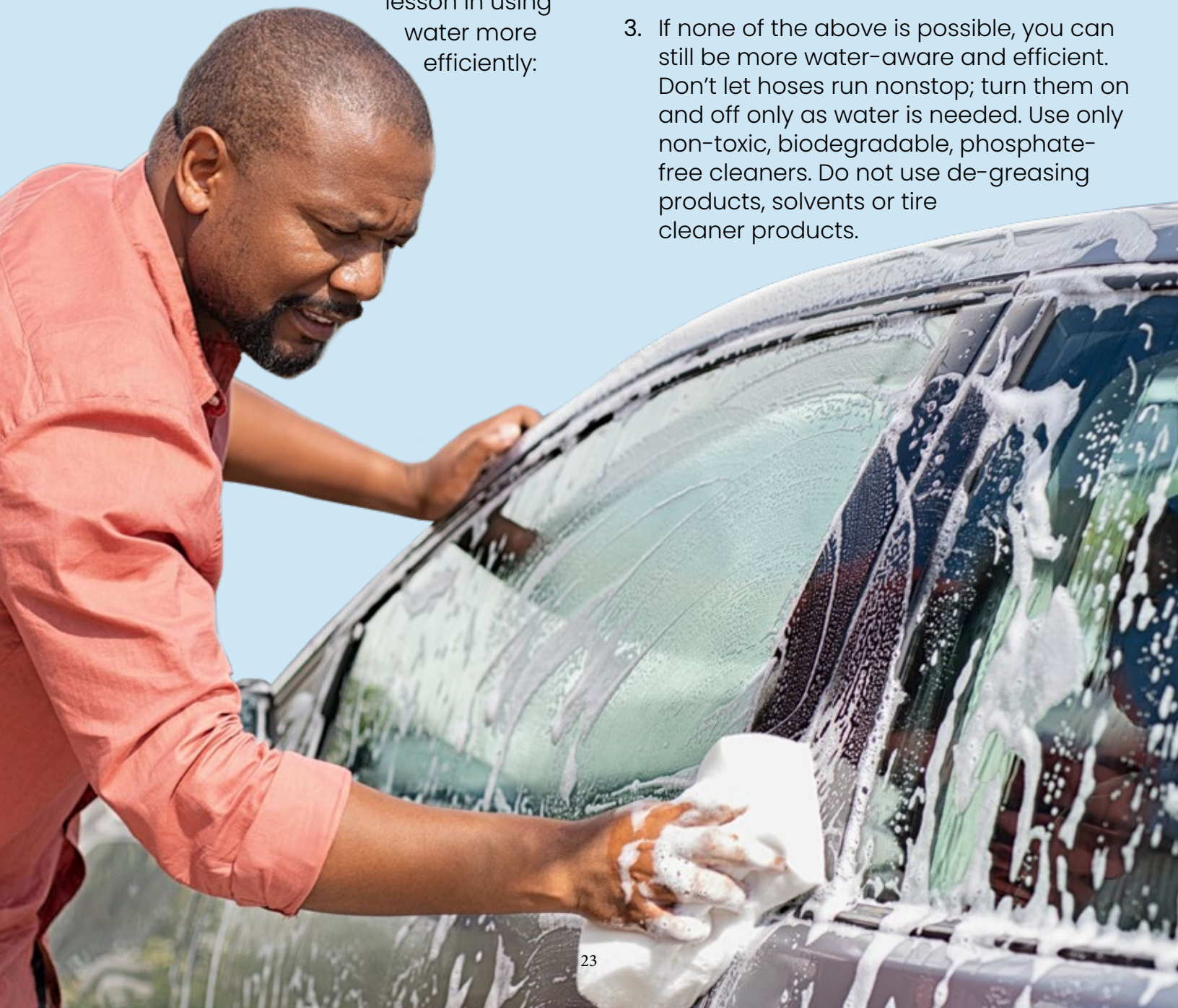
REDUCE REUSE AND RECYCLE.

Planning a Charity Car Wash?

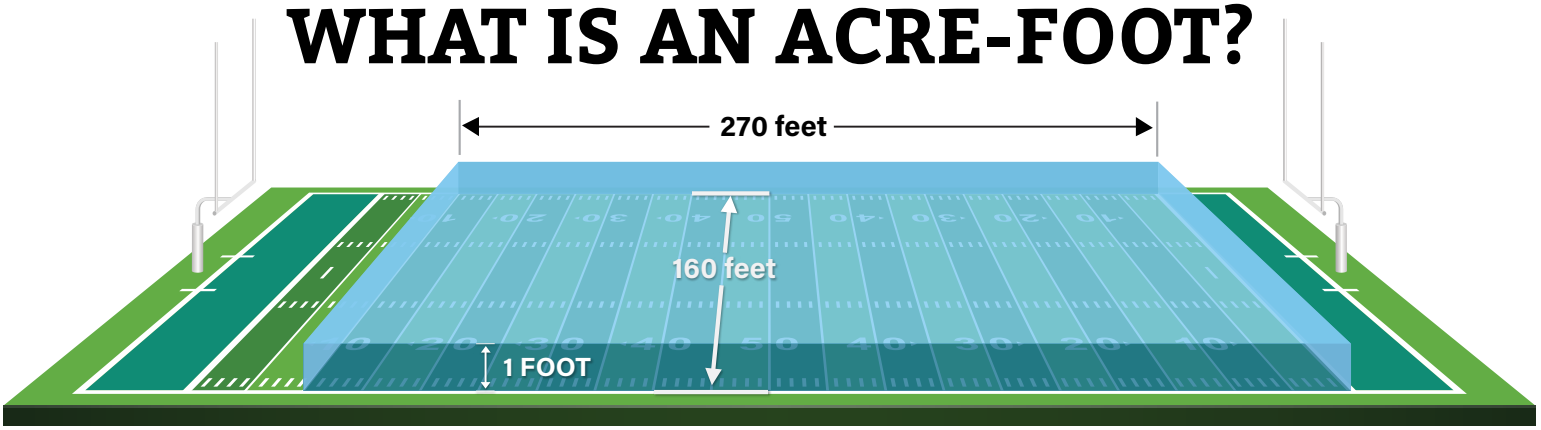
On any given weekend groups of folks raising funds for local events can be seen jumping up and down waving “CAR WASH “signs at shopping center parking lots. Their enthusiasm is hard to resist, but unfortunately these “charity” events waste thousands of gallons of water and send pollutants into the storm drains, too.

Here are some suggestions that will help raise money, but also give the sponsors a positive lesson in using water more efficiently:

1. Hold the event at a commercial car wash. Most local businesses look for ways to support local groups. The kids can still jump up and down with signs to get cars to come in, but the business can do the work and give back a percentage of the sales.
2. Conduct the carwash on a permeable surface. Ball fields or gravel areas can significantly minimize the runoff and pollution from the event.
3. If none of the above is possible, you can still be more water-aware and efficient. Don’t let hoses run nonstop; turn them on and off only as water is needed. Use only non-toxic, biodegradable, phosphate-free cleaners. Do not use de-greasing products, solvents or tire cleaner products.



WHAT IS AN ACRE-FOOT?



An acre foot of water equals about 326,000 gallons, or enough to flood a football field 1-foot deep. (Who knew a football field is roughly the size of an acre?) An acre foot is a common way to measure water volume and usage. As a rule of thumb in U.S. water management, one acre-foot is the planned annual water usage of a suburban family household.

Here are some more interesting facts about acre measurements. The word "acre" comes from the Old English word "aecer" or in German, "acker", and in Latin "ager". An acre is 43,560 Square Feet, but do you know why? Here's an explanation…

Neolithic Megalithic Measurements

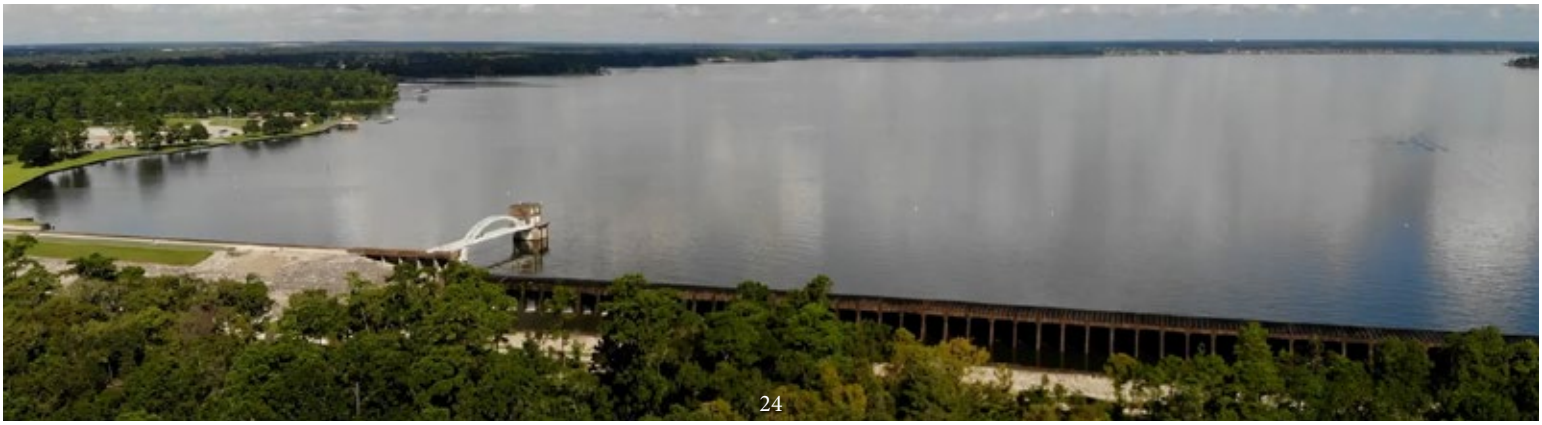
By about 5,000 BC, all sorts of things were being invented, not least among them a standardized unit of measurement, based on the circumference of the Earth.

From experiments and observation, people understood that the earth was a sphere and that it rotated on its axis. Rather than measuring the time of rotation based on either the moon or the sun. The sun and moon rise and set at different times each day and are not constant, so people measured a "day" by the time it took for a star to return to its original position in the sky. Stars do not "move" in the same observable way that the sun and moon do.

Well, when it was decided that stars were better to measure the rotation of the earth, it was observed that the earth rotated around the sun. A star would not return to its original position for 366 days! Thus, in original geometry, the circle had 366 degrees, not 360 because the Sumarians shortened it by 6 degrees to make the math easier.

A person could stand outside at night and divide the horizon into 366 degrees, and then observe the time it took for a star to pass between that one degree by use of a pendulum. If the pendulum's length was "correct" (a standard size), it would take 366 swings for a star to pass between the two degrees on the horizon. They calibrated their pendulums on the "star" (actually, they used Venus because the planet had a changing speed during the year) on the day of the year when Venus moved the slowest.

The length of this pendulum was the foundation of all modern units of measurement and is known to archeologists as the "Megalithic Yard" (MY) which is similar in size to the Meter, and measures roughly 2.722 Feet. The Megalithic Yard was divided into 40 units, called "Megalithic Inches, or MI."



By making a cube with each side the length of 1/10 of these Megalithic Yards and filling the cube, standardized units of volume was developed. This unit of volume is now called the Pint. A cube with a length of 8 MI is called the Gallon. A cube with a length of 16 MI is called the Bushel.

A Sumerian Wheel of 360 Degrees

So where does the modern acre come in? As the Megalithic peoples based all numbers off the 366 degrees of the earth's rotation, the Sumerians based all their numbers off 360 degrees of the earth's rotation.

6 MY described a "Megalithic Rod" (MR). When an area is made measuring 4 MR x 40 MR, you get the modern Acre. ***The modern acre originated from a time after the Sumerian improvement of rounding down from 366 degrees to 360 degrees.***

Further evidence of the modern acre being the result of Sumerian improvement can be seen in how the modern acre of 43,560 Square Feet may be divided evenly into 121 sections of 360 square feet: 11 sections of 360 feet is 3,960 Feet, and 11 sections of 3,960 feet is an Acre.

GLOSSARY

Neolithic -- The Neolithic Period, also called the New Stone Age, is the final stage of cultural evolution or technological development among prehistoric humans. The stage is characterized by stone tools shaped by polishing or grinding, dependence on domesticated plants or animals, settlement in permanent villages, and the appearance of such crafts as pottery and weaving. It is first seen about 12,000 years ago.

Megalithic -- relating to or denoting prehistoric cultures characterized by the erection of monuments made of large stones. (e.g., Stonehenge in the UK)

Sumerian – People/things from Sumer, the earliest known civilization in the historical region of southern Mesopotamia (south-central Iraq), emerging during the early Bronze Ages between the sixth and fifth millennium BC. It is also one of the first civilizations in the world.

DID YOU KNOW?

Richard Fonville
City of Houston Mayor
1937 - 1938

In the 1930's, Houston's Mayor, Richard Henry Fonville, foresaw the value of surface water and purchased the Northeast Harris County property now known as Lake Houston with a personal check. Twenty years later, the San Jacinto River was dammed and Lake Houston was constructed.

The City of Houston owns 100% of the surface water in Lake Houston, a supply fundamental to controlling subsidence in the future.

EXPERT ADVICE

From Jesse Engerbretson, Licensed Irrigator, LI15123 - BP11837

As the weather becomes cooler, it's time to adjust your sprinkler's controller so that your plants and turf are not overwatered. Overwatering can cause flooding and mud throughout lawns.

When temperatures cool down, grass can redirect its energy from photosynthesis to growing deeper roots. Deeper roots make for a stronger plant that needs less water and survives in rough conditions. Give your grass an end-of-season protection boost with lawn nutrients and a nice deep watering.

Next spring, when the weather warms up, it's time to do a seasonal check up to make sure your sprinkler system is functioning properly and efficiently. Sprinkler timers should be set according to the plant material they are watering, preferably set to run multiple short cycles to promote deep root growth.

Consider upgrading to a Wi-Fi controller. Wi-Fi controllers allow you to control your watering from an app on any device. These "smart" timers automatically adjust your watering schedule based on weather conditions, watering only when needed. A Wi-Fi controller can be tailored to the specific needs of your property to deliver the right amount of water, reduce the chances of under/overwatering and minimize runoff. A smart way to conserve water and save money!

Licensed irrigator Jesse Engebretson has been serving the Houston, Katy and Cypress areas since 2004. LI15123 - BP11837

It is 'when' and 'how' you water... not how much

Introducing the Cycle and Soak method. This method of irrigation applies water slowly so the soil actually absorbs all that is applied. Instead of running each sprinkler zone for 15 or 20 minutes each, run each zone only the amount of time that the soil can absorb the water (which means not running off onto the sidewalk or street). Depending on the slope of the yard, this could vary widely from zone to zone. You will have to visually test the zone run times to see when the water begins torun off.

Once you have determined the maximum amount of water each zone can take before runoff, split the total irrigation time into two or three parts. This involves irrigating the zone, shutting it off to allow time for the water to soak in and then watering a similar time to complete the process. Schedule the run times about one hour apart until the soil is moistened to a depth of 6-8 inches. Virtually all sprinkler system controllers can be programmed to automatically run the Cycle and Soak method. You'll know that the lawn has been successfully watered during your test when about an hour after watering, you can push a soil probe (or a very long screwdriver) into the soil. It will slide easily through wet soil but will be impossible to push through dry clay. The landscape has been successfully watered when the probe easily slides to a depth of 6 – 8 inches.

By using the Cycle and Soak method, the plant's root system will reach for moisture deep within the ground and be well protected from the summer heat. It reduces the need to water frequently.

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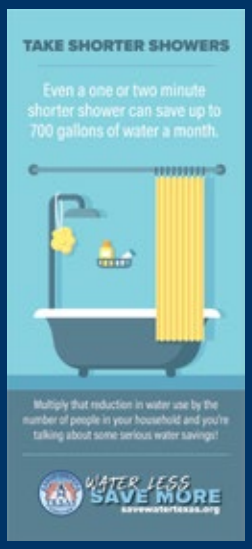

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