LRWA Watershed Report

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*Opinions expressed herein are not necessarily shared by LRWA

REUSE !

(emphasis on the first syllable)

Why and how the Hill Country needs to get serious about water conservation

Excerpts from 1) the recent The Widening Water Gaps of Texas, Javier Lopez (author) and edited by Rachel Hanes, GEAA (Greater Edwards Aquifer Alliance)

The Problem: Texas is growing at a substantial rate. Predicted to be the most populous state in the nation by 2030, Texas has a reputation for being an economic powerhouse, providing opportunities for its roughly 30 million residents. But this economic boom, and the welfare of its residents, is threatened if the state's water infrastructure funding gap and water supply gap continue to widen.

State Sen. Charles Perry, R-Lubbock, and State Rep. Cody Harris, R-Palestine, have taken an important step in bringing a legislative focus to our state's water infrastructure. Their legislation (SB7 and HB16) would make a multi-billion dollar down payment on mostly new water supply infrastructure. State Sen. César Blanco, D-El Paso, is a co-sponsor of the legislation.

Related joint resolutions (SJR66 and HJR7) propose a constitutional amendment to dedicate $1 billion annually to the Texas Water Fund, which Texans overwhelmingly voted to create through Proposition 6 on the Nov. 7, 2023 ballot. If passed and signed by the governor, the new constitutional amendment would also go to voters in November.

There are many Texas communities, especially smaller ones, that could never afford to raise the capital necessary for needed water projects. An adequately funded Texas Water Fund would be extremely beneficial to communities such as these.

These bills address two needs: creating new infrastructure that taps new sources of water, and repairing and upgrading aging water and wastewater infrastructure. A Texas 2036 report assesses the long-term price tag to fix deteriorating water systems at $73.7 billion. It estimates the cost to bring new water supplies online to support the state's population and economic growth at $59 billion.

YEA FOR OUR TEAM!

BREAKING NEWS (5/30)!! the 89th Legislature has just passed the major water bill, Senate Bill 7, and its accompanying constitutional amendment, HJR 7! The final version of SB 7 includes: a 50/50 funding split - 50 percent will go towards the new water supply for Texas fund and 50 percent will be for SWIFT under the Texas Water Development Board. The new water supply fund contains "wastewater and water reuse projects" as part of its definition. Two more steps: governor signs it and we vote for it November!

CURRENT EXAMPLES of new infrastructure that tap new sources of water:

From a recent post in the Texas Tribune by Bryan Morris, chair of El Paso's Public Service Board.

"Necessitated by Texas geography and climate, the **City of El Paso** has already begun water resource management methods that will likely be required of all Texas cities in the near future. Saving water is the least expensive approach to stretching our existing water resources.

Since the mid-1970s, El Paso has reduced its per capita water consumption by more than 40%, from about 225 gallons per person per day to 130 gallons per person per day. The utility has a target to reduce water consumption to 118 gallons per person per day by 2040.

Conservation alone, however, is insufficient to address the combined factors of population growth and long-term drought. Diversification of sustainable water resources also has to be part of the solution.

That's why El Paso Water opened the Kay Bailey Hutchison Desalination Plant in 2007 – the largest inland desalination facility in the U.S. – producing up to 27.5 million gallons of drinking water daily. It's why El Paso Water has for decades treated wastewater to drinking water standards and used it to recharge the Hueco Bolson aquifer.

It's also why, in February, El Paso Water broke ground on its Pure Water Center – set to be the nation's first direct-to-distribution reuse facility. When completed in 2028, it will deliver 10 million gallons of purified drinking water daily. Unlike treated wastewater that filters through the Hueco Bolson, this facility will use **advanced**

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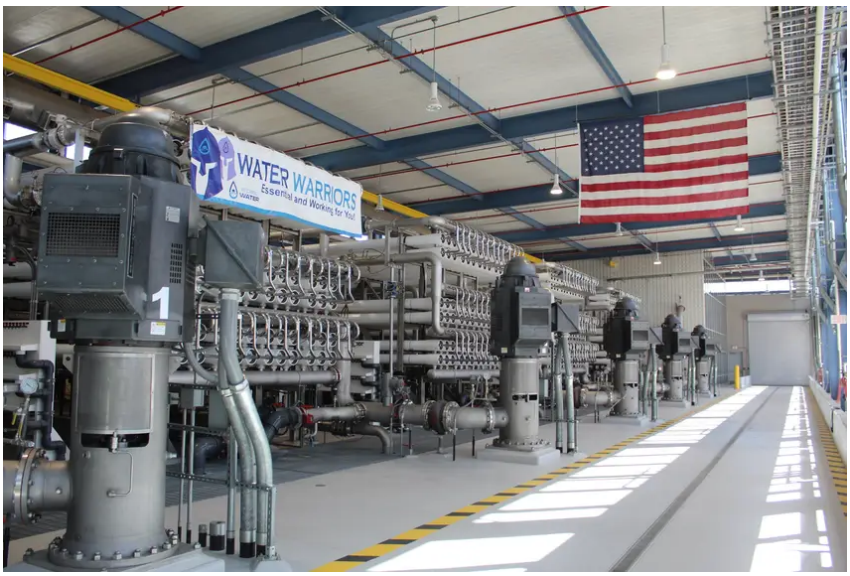
treatment – including membrane filtration, reverse osmosis, UV light with advanced oxidation, granular activated carbon, and chlorine disinfection – before delivering water directly into the city's system.

The **Pure Water Center** sets a new standard for water resiliency and sustainability. If saved water is the least expensive source of existing water, recycled water is the least expensive source of "new" water. El Paso's example demonstrates that every city has the opportunity to treat and reuse wastewater, without the need or expense of building out a secondary infrastructure system, as with the purple pipe system for traditional recycled water.



El Paso's experience demonstrates that innovative water resource management can sustain a growing population and economy – even in a desert – while supporting critical missions like those at Fort Bliss. These solutions take time to plan and implement. ... [Senate Bill 7 and House Bill 16] will position Texas as a national water leader. This investment will give communities an additional funding source to pursue the water solutions that best meet their needs, including recycled water as part of a diversified water strategy."

(BELOW: excerpt from article, April 24, 12News.com):

[ARIZONA is another state in perpetual drought (like central and west Texas are becoming) and has taken another step forward in securing the future of water in the desert.]

"New rules for turning wastewater into drinking water have been approved by Arizona's Department of Environmental Quality (ADEQ, equivalent to our TCEQ), i.e. new advanced water purification (AWP) rules. ADEQ said the rules create a regulatory framework ensuring safe and reliable purification of wastewater for drinking and that Arizona cities and water providers can apply for a permit to use advanced water purification. By doing that, ADEQ said it creates a crucial tool as another option for managing water resources amid ongoing drought and increasing demand.

Already, the City of Scottsdale utilizes what it says is the first permanent facility in Arizona, according to the city. There, up to 20 million gallons of recycled water can be treated per day.

The city said it brings the water up to standards that exceed those of bottled water with its Water Purification plant.

Here's how it works: the City sends the water to golf courses, and also takes the water, cleans it and sends it to the aquifer. In the aquifer, Mother Nature takes *CONTINUED NEXT PAGE*

over, cleaning it even further. Over time, the water is used in wells and sent to residents and customers.

The cleaning process takes treated recycled water and then further treats it through **ozonation, membrane ultrafiltration, reverse osmosis** and **ultraviolet photolysis**.

ADEQ said Scottsdale and Phoenix have both been actively involved in developing and supporting the new Advanced Water Purification rules. Scottsdale said they could see the new rules implemented in the city in late 2029 or early 2030."

ON THE FLIP SIDE, two examples of MISuse that could instead be REuse.

1) Oil and gas companies have used billions of gallons of Rio Grande and Pecos River water for drilling in the past four years as farmers and cities face increasing water scarcity. An exclusive *Inside Climate News* analysis found that drillers used over 31,000 acre feet, or more than 10 billion gallons, of Rio Grande water for drilling and fracking operations in the Eagle Ford Shale 2021 through 2024. Also see the in-depth article by Inside Climate News, May 13; 2) According to the San Antonio Express News (May 23), construction of an artificial intelligence data center on 95 acres in Hays County will begin in July. Data centers consume significant amounts of water, primarily for cooling IT equipment. A single data center can consume up to 5 million gallons of drinking water per day, enough to supply thousands of households. Additional data centers are being planned for locations in other Hill Country counties. This data center (developer: Cloudburst) has been made possible by SB 2038, passed by the TX legislature in 2023, that allows property owners to request removal from a municipality's jurisdiction, therefore severely limiting municipalities' ability to manage growth.

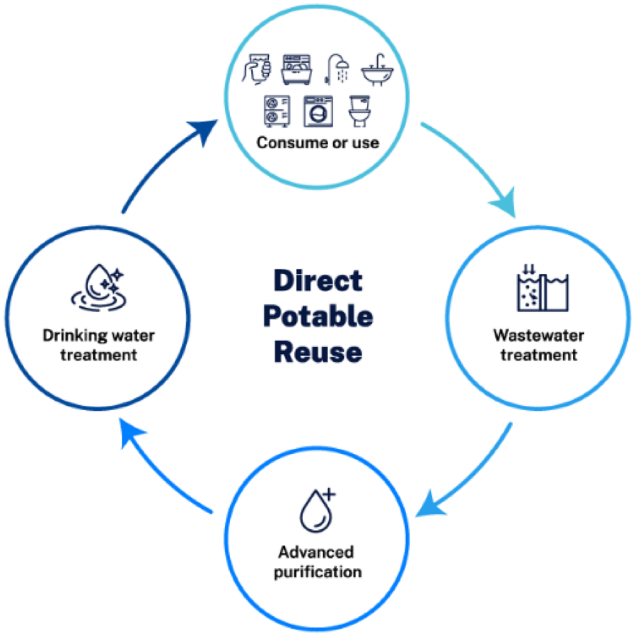
DID YOU KNOW...?

Isn't the extra carbon dioxide in the atmosphere helping plants grow... and doesn't that offset global warming?

Yes, but only up to a point. Plants need several elements to live and grow, including carbon, which they usually draw from the atmosphere in the form of carbon dioxide. Rising carbon dioxide levels in the atmosphere can give most plants a boost in growth. Some of the extra carbon they absorb ends up in wood or soil, where it is locked away from atmosphere for decades. However, climate change also causes droughts, flooding and fires, all of which endanger plants. What's more, high temperatures have been shown to stifle the chemical processes involved in photosynthesis; for instance, hindering the enzymes that bind carbon dioxide to sugars. So while carbon dioxide does help plants grow, the extra carbon in the atmosphere has other effects that may eventually outweigh the benefits. - Patrick Megonigal, senior scientist & deputy director, Smithsonian Environmental Research Center.

A PRIMER ON THE POSSIBLE WAYS TO DISPOSE OF OR REUSE TREATED WASTEWATER

It's important to remember that all water on Earth is recycled, and the journey to reach your tap vary depending on where you live. In a centralized municipality, the wastewater from homes and businesses is treated at a central treatment plant. The treated water can then be discharged into the environment or reused. If the water is discharged into the ocean or another environmental body where recovery of the water is not feasible, that is known as direct release, and not a form of reuse. ***(left below)***



Alternatively, the treated water can be reused: the three options under the umbrella option of "reuse" are known as non-potable reuse, indirect potable reuse, and direct potable reuse.

Non-potable vs. indirect vs. direct reuse

Non-potable, indirect potable, and direct potable reuse are all methods of recycling and reusing treated wastewater, but they differ in how the reclaimed, or treated, water is used, as well as the treatment processes involved.

Direct Potable Reuse *(above, right)*: Direct potable reuse **(DPR)** is the most advanced form of wastewater recycling, where treated wastewater is purified to drinking water standards and then immediately reintroduced into the drinking water distribution system. This means that the reclaimed water is intentionally blended with conventional sources of drinking water and can be used for human consumption. DPR involves highly advanced treatment technologies, including multiple steps of purification and consistent water quality monitoring to ensure the water is safe for drinking.

Indirect Potable Reuse: Indirect potable reuse **(IPR)** ***(next page, left)*** is a form of wastewater recycling where treated wastewater is introduced into an environmental buffer, such as an aquifer or a surface water reservoir, withdrawn after a designated length of time and then treated

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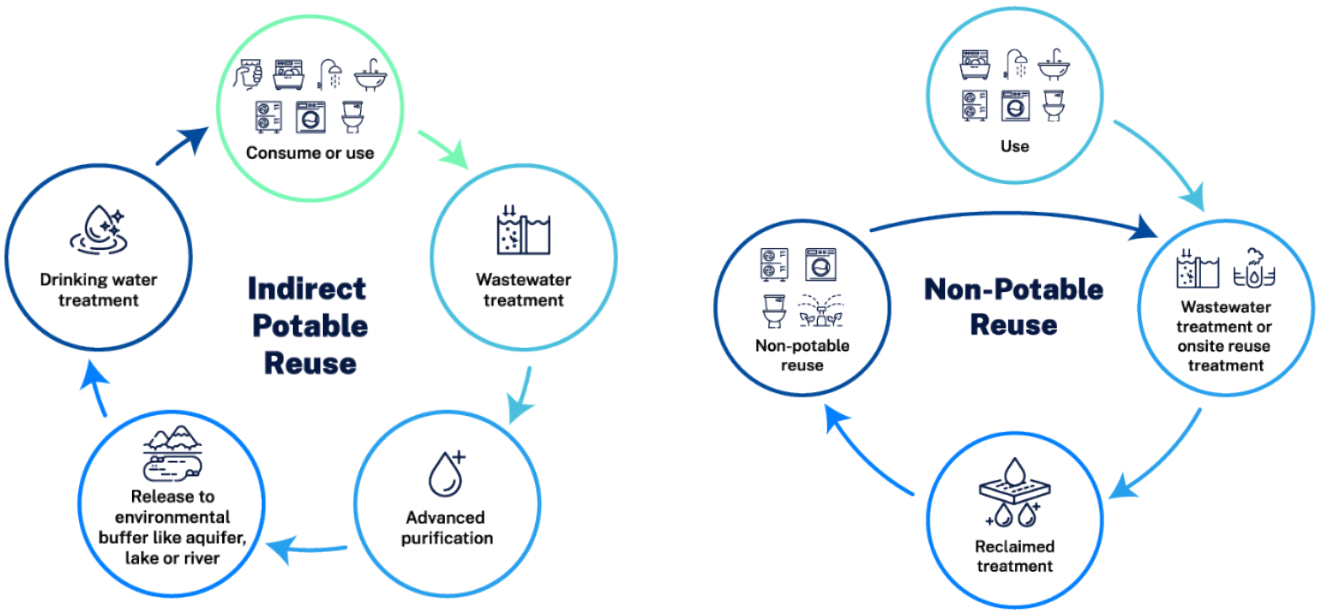
If you think about it: All Water on Earth is RECYCLED

again to meet drinking water quality standards. In IPR, the reclaimed water is mixed with natural water sources and undergoes additional treatment and dilution processes. This approach provides an environmental barrier to ensure the safety of the drinking water supply by mimicking natural dilution processes. Many wastewater treatment plants already use a combination of discharge and indirect potable reuse.

Non-Potable Reuse *(below, right)*: Non-potable reuse **(NPR)** uses treated wastewater for purposes other than drinking water. This type of reclaimed water is typically used for applications like landscape irrigation, industrial processes, laundry, HVAC cooling towers, and toilet flushing. Non-potable reuse uses many of the same treatment processes as direct and indirect reuse, but non-potable reuse is only required to meet water quality standards set for the non-potable end-use, which can vary based on the end-use. Therefore, even if the non-potable water quality exceeds the minimum requirements, it is not monitored to the same rigor and therefore not allowed to be labeled "potable."



The key differences between the three methods of reuse are 1) the allowable end uses, 2) the regulatory requirements, and 3) the time involved in the treatment process. The choice of which method to use depends on factors like the level of water scarcity, the available technology, regulatory requirements, and public acceptance. All three methods can play a crucial role in sustainable water resource management and can help alleviate the pressure on freshwater sources.

TEXAS CITIES SOON TO OR ALREADY USING DPR: Big Springs & El Paso. CITIES WHO HAVE COMMITTED BUT ARE STILL IN THE PLANNING STAGES: Buda, Llano, San Marcos, Dripping Springs, Marble Falls, Liberty Hill, and Austin.

EXAMPLES OF CURRENT WATER COLLECTION STRATEGIES

- Domestic rainwater collection: from just about any catchment device to a string of connected 55 gallon rain barrels for non-potable water (gravity-feed), to large rainwater tanks that receive water from gutter downspouts, using a pump to pull the collected water through particulate and UV filters and then sending the potable water into your home's plumbing.
- Control of run-off from impermeable surfaces and hillside stewardship.
- Aquifer storage & recovery: storage of excess collected water in underground cisterns until needed.
- Collection, cleaning and reuse of wastewater (sinks, toilets, laundry machines, etc).
- Collection and treatment of rainwater, foundation drainage, air-conditioner condensate and evaporative cooling tower blowdown (usually applied to commercial multi-story buildings), treated to the quality needed for human contact but not necessarily always for drinking. Net-Zero example: San Antonio's Credit Human Federal Credit Union Building, a 12-story building located at 1703 Broadway St, completed in January 2021.

TAKE AWAYS FROM OUR LAST REGION F WATER PLAN...

The recently* released **Region F**** Texas Water Planning Group's "Initially Prepared Plan" (a five-year study) predicts that Kimble County and the City of Junction will be running out of water (both ground water and surface water) by 2030 if steps are not taken. The document's suggested solutions include drilling more wells from the Edwards-Trinity aquifer (good luck with that, not sustainable because of low yields and dwindling aquifer levels), and from the Ellenburger-San Saba aquifer, the latter an aquifer not consistent in water quality or well yield (in other words, both these recommendations sound like last ditch efforts).

ALSO, remember that in extreme drought, the City of Junction's water rights are subordinate to the city of Llano downstream (that also gets its drinking water for the Llano).

To mitigate the effects of subordination and because of a consistently low river level, the city of Junction is currently making improvements to both its water plant and wastewater plant, all good, but in addition ...

The LRWA suggests that additional funding be sought (Texas Water Fund, etc), to begin reuse strategies for at least all outdoor applications, and also all industrial applications in the area, such as quarries and Grayden Cedarworks. There is absolutely no reason to use our valuable drinking water for any kind of outdoor purpose. And with the necessary commitment, public education, and financial help, begin to get accustomed to the idea of implementing the latest wastewater cleaning technology to augment drinking supplies.

*(*not so recent, this plan is based on county by county studies concluded in 2022, the next study, in-progress, goes through 2027. **Region F consists of 32 West Texas counties, including Kimble County.)*

Growing evidence of record-breaking drought (just 3 examples) ...

(includes excerpt from the weather page, KSAT.com)

1) "As of April 14, San Antonio's **J-17 index well*** recorded a daily reading of 625.4', making it the lowest since the summer of 1990. Put in perspective: in August of 1957, the same well measurement dipped to 612.5'. Records have been kept at the J-17 well since 1932.

In this case, drought conditions really began to take hold late in 2019. Over the last six years, only 2021 recorded above-average rainfall. It was 2022, San Antonio's second driest year on record, which really pushed the aquifer to dire levels. Minus some blips of heavy rain here and there, the aquifer has been on a steady decline. It has mostly coincided with a La Nina pattern. "

* **The J-17 index well** was drilled in 1913 and is located in the small building at the base of this water tower near the national cemetery at Fort Sam Houston in San Antonio. It is on a major Edwards flowpath and responds quickly to pumpage and recharge, so it has been used for many decades to record changes in the level of the Aquifer in the San Antonio area.

  The level of the J-17 well has ranged from 612 feet during the 1950's drought to 703 feet after historic rains in 1991 and 1992.

  There is much confusion about what the reported Aquifer level means. When weathercasters say the Aquifer stands at 650 feet, it does NOT mean there is 650 feet of water left or that it is 650 feet to the top of the Edwards formation. The number is simply an indication of relative pressure being exerted on water at the location of the test well.

2) The GBRA (Guadalupe-Blanco River Authority) just announced that over the last five years, the average inflows into Canyon Lake have been less than the five-year average inflow from the drought of record (1952-1956).

3) **See current photo below of Medina Lake (2% full)...**

Medina Lake Reservoir
(Medina & Bandera counties)

Some takeaways from GEAA's* latest Water Wonks webinar on May 28: The Future of Water In the Hill Country, presented by Robert Mace, Meadows Center for Water and the Environment (Texas State University).

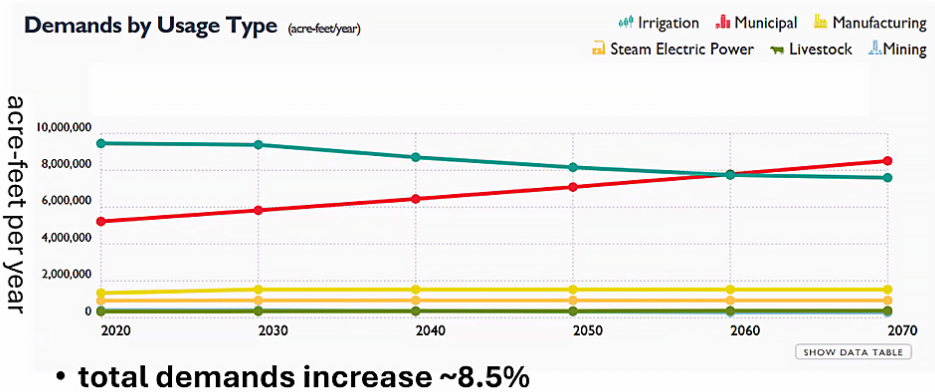
For full recording of the webinar, go to https://aquiferalliance.org/water-wonks-series/

1) Throughout the Hill Country but especially in counties along the I-35 corridor: huge population explosion. According to the current state Water Plan: Texas overall has a 73% projected population increase by 2070.

2) Projected statewide water demands show a decrease in irrigation (because of aquifer depletion - the Ogallala in the High Plains is a prime example, with disastrous results for current agricultural practices), but municipal water needs (expanding population) will increase at about the same rate.

3) Yes, Texas is **Getting Warmer** in every county. Current projected normals date back to 2005, so they are no longer accurate. By 2060, our "normal" will FEEL like the drought of the 1950s. This warming decreases runoff to the Edwards aquifer and deprives its Recharge Zone. In most Hill Country areas, the pattern seems to be: rain 1-2" in a storm, then no rain for at least a week so some of it always dries up before it can run into the aquifer. Heat increase is more damaging than erratic rain amounts.

4) Example: the Pedernales River is now 40% less effective than in 2010. However, lack of rain leading to less productivity is also happening in counties without so much population increase.



5) "Droughts of record" are very specific to a water supply - can vary from aquifer to aquifer. For example, the area around Canyon Lake seems to be currently in a new Drought of Record and probably also in the Nueces River Basin, but the Edwards Aquifer will hang in there a bit longer.

6) Some areas are currently planning to use desalinated ocean water and pipe it in (the Nueces River Authority is an example).

7) What we can do RIGHT NOW: we must ALL use water more efficiently - this will save both water and money. For example, watering the lawn is the biggest culprit in municipal water demand. Xeroscaping and rainwater harvesting need to replace using ground or surface water to water the yard. Regional Water Plans have already been promoting various conservation methods, but there now seems to be a "flattening out" of their effectiveness... the "easy conservation" is over – we're past that – in order to succeed, we need to be willing to make more drastic lifestyle changes.

*Greater Edwards Aquifer Alliance

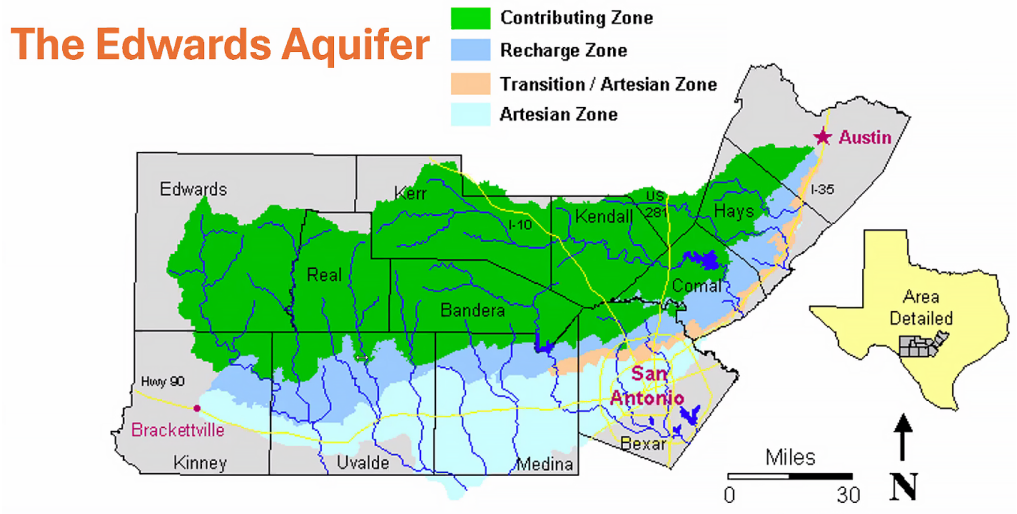
A PRIMER ON THE EDWARDS AQUIFER STRUCTURE

The Hill Country is unique because of its erosional **karst** landscape dominating the aquifer below. A karst aquifer is formed from the dissolution of soluble rocks (mostly limestone) by groundwater, creating characteristics like caves, sinkholes and underground rivers, along with a rocky topographical surface and a relative lack of surface streams and lakes (the latter because so much rainfall can travel straight downward through all those cracks and fissures).

Not surprisingly, karst systems are very important for groundwater recharge and movement because of all the fissures, cracks and cavities that allow water in. The Edwards Aquifer is distinctive because of its relatively fast recharge compared to other aquifers, but for that very reason it is also easily affected by human activities and must be protected from pollution carried by water. Also to keep in mind: water travels fast through this aquifer and is highly reactive to pumping.

(See picture below.) The three crucial hydrologic and geologic zones that divide the Edwards Aquifer are: 1) the **Contributing Zone,** also known as the Drainage Area or Catchment Area; 2) the **Recharge Zone**, where the water seeps through and reaches the aquifer below, and noteworthy: about 75-80% of recharge occurs when streams and rivers cross the permeable formation and go underground; and 3) the **Artesian Zone**. Once recharge water works its way by gravity down into an artesian zone, there are other rock formations lying over the Edwards Aquifer, and water is trapped inside.

The Artesian zone of the Edwards is confined between two relatively impermeable formations - the Glen Rose formation below and the Del Rio clay on top. The sheer weight of new water entering the Aquifer in the recharge zone puts tremendous pressure on water that is already deeper down in the formation.



Flowing artesian wells and springs exist where hydraulic pressure is sufficient to force water up through wells and faults to the surface. Springs are a form of natural discharge, but as seen too often recently in drought, **they can easily dry up with too much pumping of groundwater**.

TEXAS HILL COUNTRY conservation network

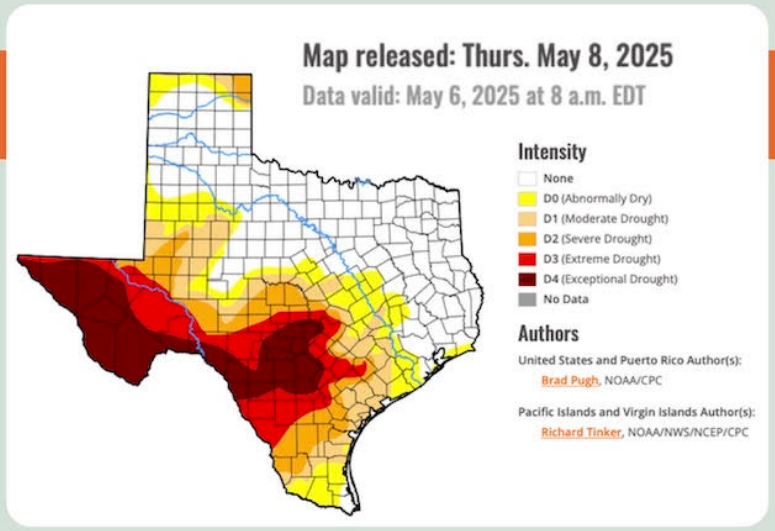
WEBINAR & MEDIA BRIEFING

Drought Updates: Current & future conditions in the Edwards Aquifer Region

The current drought has been persistent, intense, and is impacting our water supplies and spring flows. Learn the current data and projections that describe this drought.

Topics

- Rainfall Deficits
- Groundwater Levels
- Changes in Springflows
- Comparison to Past Droughts
- Trends & Projections

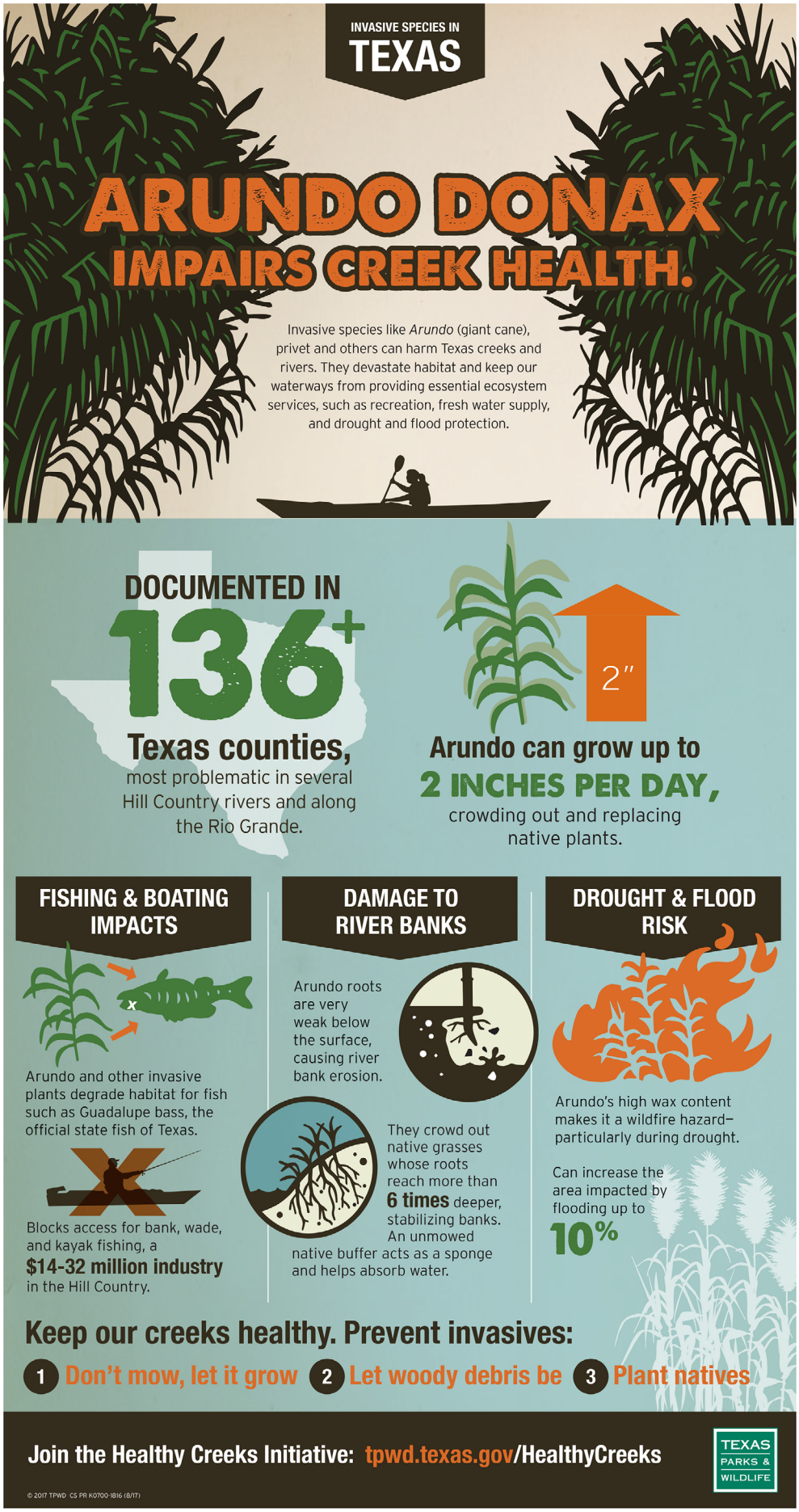


JUNE 4, 2025
11AM-12PM

Speaker:
Paul Bertetti
Edwards Aquifer Authority
Senior Director -
Aquifer Science Research & Modeling

This webinar will be recorded and shared after the event.

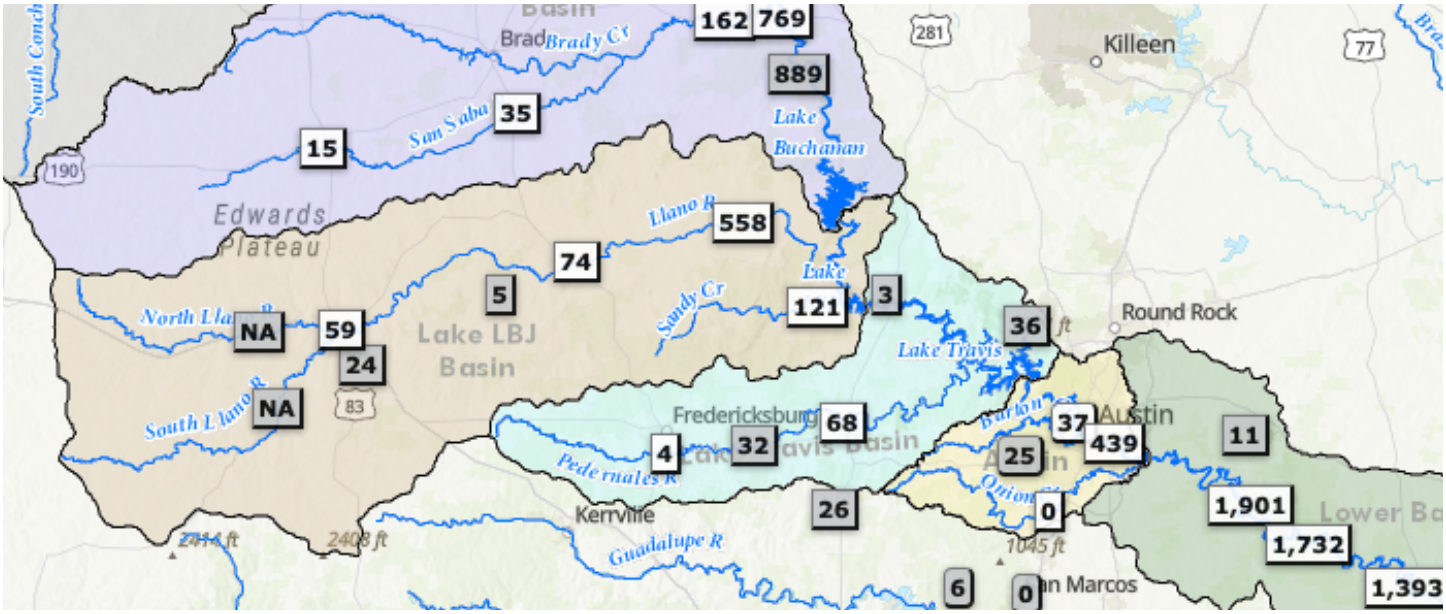
RSVP for free at https://bit.ly/HCDrought25



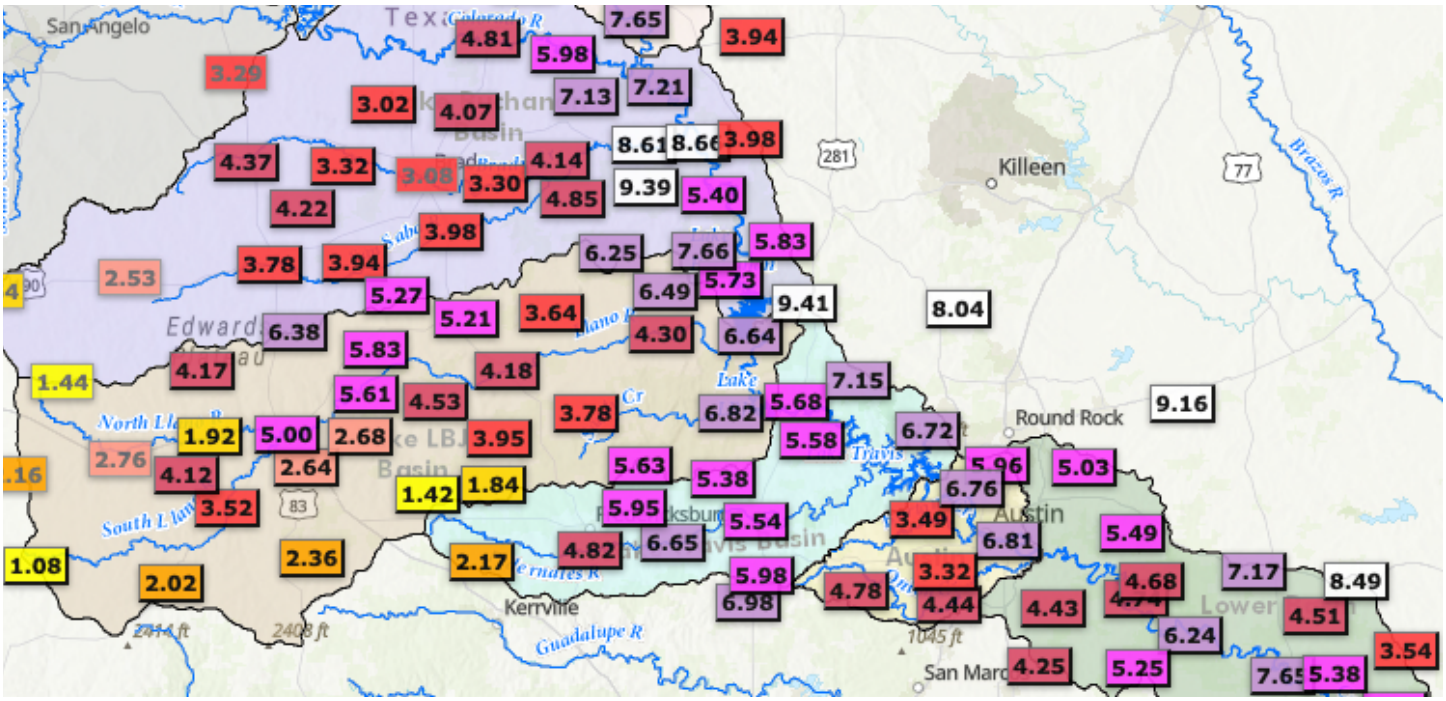
Healthy Creeks Initiative to Combat Invasive Arundo

FOR COMPLETE INFORMATION, Please go to https://www.llanoriver.org and then click on the link that reads: **Healthy Creeks Iniative to Combat Arundo**

LCRA Hydromet Stream Flow as of 5.30.25



Lower Colorado River Authority's Hydromet is a system of more than 275 automated river and weather gauges throughout the lower Colorado River basin in Texas. The website displays gauges maintained by the City of Austin and USGS. The Hydromet provides near-real-time data on stream-flow, river stage, rainfall totals, temperature and humidity. https://hydromet.lcra.org



LCRA Hydromet Rainfall last 30 Days as of 5.30.25