

Water Reuse in the Hill Country: Analyzing Opportunities in Comal County, Texas

September 27, 2023

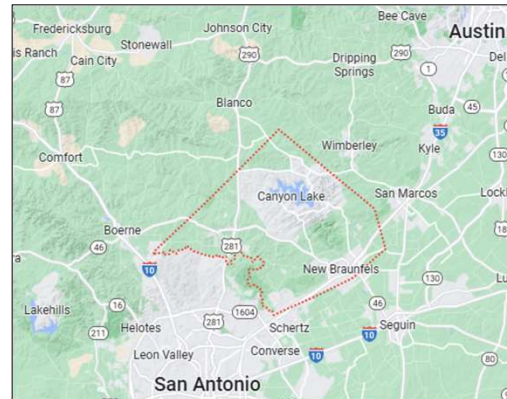
Rachel Hanes, Policy Director
Greater Edwards Aquifer Alliance



- We are excited to be releasing our report “Water Reuse in the Hill Country: Analyzing Opportunities in Comal County, Texas.” The purpose of the report is to provide an argument for the development of water reuse districts in the Texas Hill Country, using the status of water reuse in Comal County as a case study.
- Water reuse is an integral step in ensuring there will be the water supplies necessary to protect the health, safety, and quality of life of Texans in the years to come.

Presentation Outline

1. Comal County Growth
2. Geography and Climate
3. Water Supply Sources and Demands
4. Current State of Reuse Water
5. Current Impacts to Water Sources
6. Need for Water Reuse
7. Case Studies from Across Texas
8. Authority and Funding Opportunities
9. Implementation Option
10. Recommendation



Reuse Water

- Water Reuse: Using wastewater treated to an appropriate quality for beneficial use
- The terms reuse/recycled/reclaimed water are treated as interchangeable

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- I am going to provide an overview of the major points of the report this morning, but greater detail can of course be found in the report. Please don't hesitate to ask questions this morning or at a later time.
- Before we jump in to the presentation, I just want to note that I will be using the terms reuse water, recycled water, and reclaimed water interchangeably, as is the industry standard. These terms refer to wastewater treated to an appropriate quality for beneficial use.

Comal County Growth
 → In ten years, population grew nearly 50%
 → One of the fastest growing counties in the U.S.
 → Growing faster than projected
 → Projected to have second greatest growth in water demand in South Central Texas

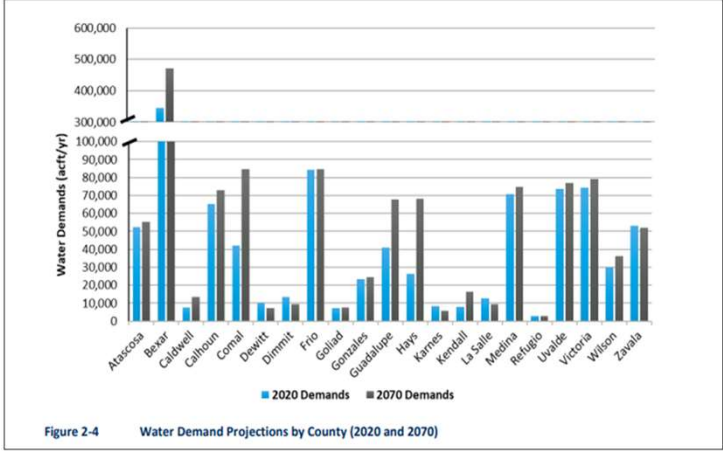
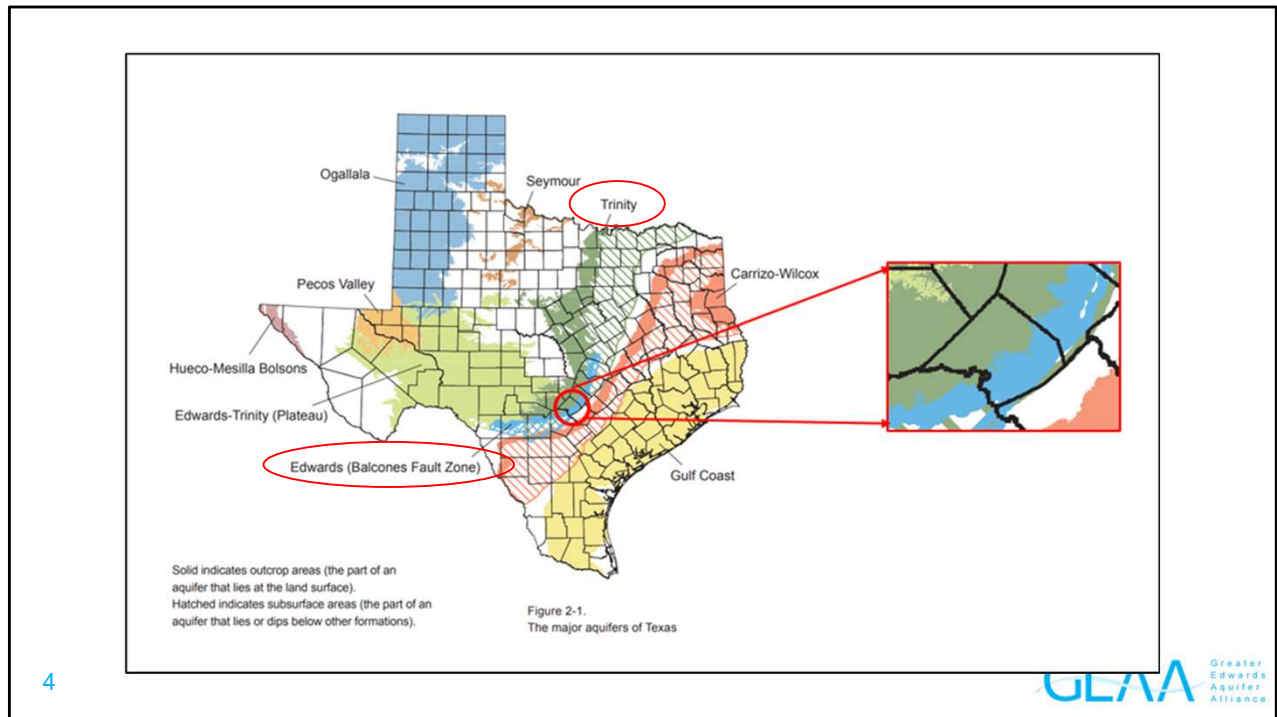


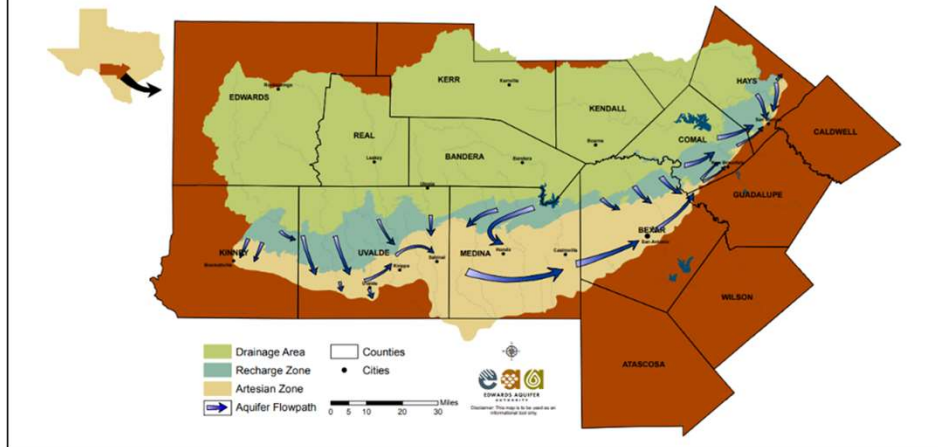
Figure 2-4 Water Demand Projections by County (2020 and 2070)

- Between the 2010 and 2020 Census, Comal County grew 48.9 percent and is currently one of the fastest growing counties in the United States.
- By last summer, as of July of 2022, Comal County had already surpassed the Texas Water Development Board’s 2030 population projection, 8 years early.
- This population growth shows few signs of slowing, as TWDB now predicts the county will grow by nearly 94 percent by 2070, to over 350,000 residents.
- Increasing population leads to increasing water demand, and Comal County is expected to have the second greatest growth in water demand in the water development board’s South Central Texas Region, and that’s second only to Bexar County.



- Comal County is an arid county located along the Balcones Escarpment in the Texas Hill Country.
- It lies within the San Antonio River and Guadalupe River Basins and overlays both the Trinity and Edwards Aquifers.
- The Trinity and Edwards Aquifer are at least partially hydrologically connected – water from the Trinity has been shown to contribute some of the recharge of the Edwards and vice versa.

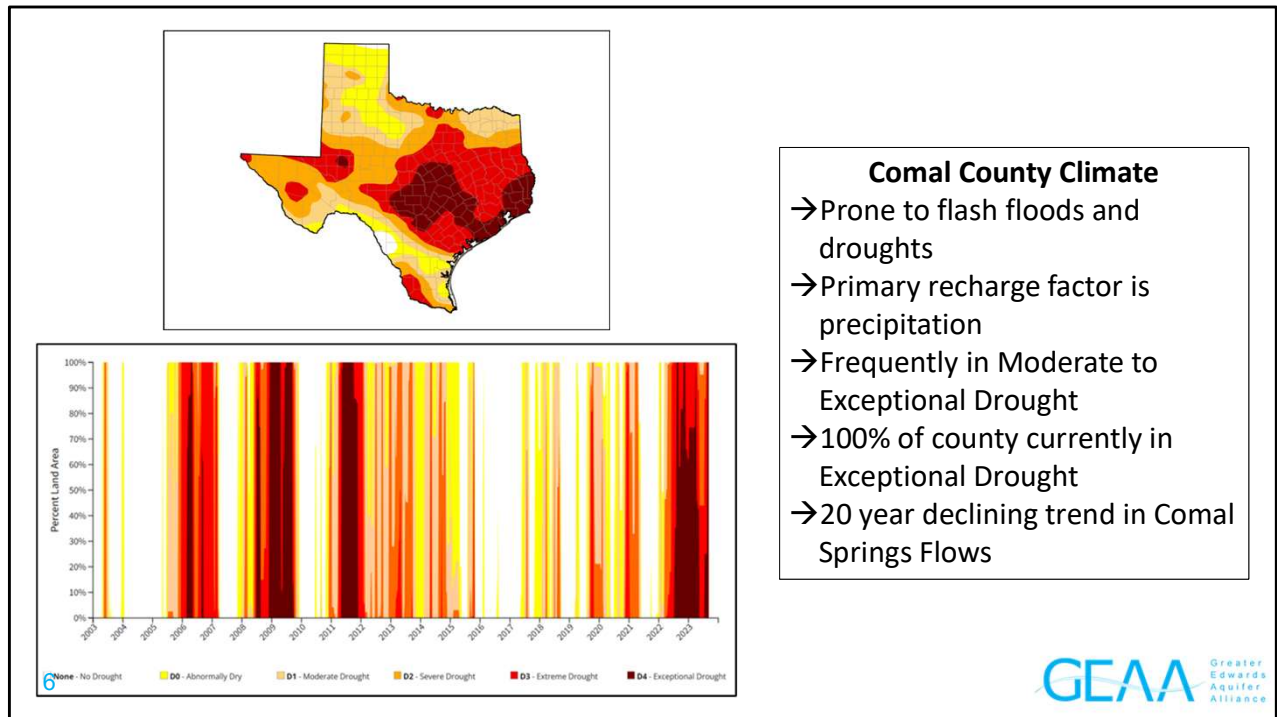
General Aquifer Flowpath



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- All three zones of the Edwards Aquifer – the Contributing (or Drainage), Recharge, and Artesian Zones – are present within Comal County.



- Comal County is located in “Flash Flood Alley” and is prone to both floods and periods of intense droughts.
- Precipitation is the primary source of aquifer recharge for both the Edwards and Trinity aquifers, leaving both aquifers at risk of being greatly impacted by drought.
- In 6 of the last 20 years, the county has been categorized as being in Exceptional Drought and has been in moderate to exceptional drought more often than not.
- Currently, 100 percent of the county, and much of the hill country, is categorized as being in Exceptional Drought conditions.
- Expected future increases in temperature, frequency of drought, and population growth are expected to lead to an increase in water demand while lowering water supply.
- You can see the impact of drought and increasing water demand at Comal Springs – the largest springs in the state.
- Over the last 20 years, there has been a long term declining trend in the spring flows.



These two photos were taken at Comal Springs on September 15th of this year and show the impacts of declining aquifer levels on spring flows.

The picture in the middle here shows what the springs should look like with higher aquifer levels.

Water Supply Sources and Demands

- Three major water suppliers
- 62.5% of water use was groundwater
- 1.5% of water use was recycled water
- 1/3 of water use could potentially be served by non-potable sources

Comal County Total Water Use 2020 (acre-feet)*	29,700
Groundwater: Total Use (af)	18,558
Mining: Total Water Use (af)	3,967
Mining: Groundwater Supply (af)	3,967
Groundwater/Total Mining Water Use (%)	100
Mining Water/Total Groundwater Use (%)	21.4



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- There are currently three major water suppliers in Comal County:
 - New Braunfels Utilities
 - Texas Water Company
 - SouthWest Water Company
- Water in the county is drawn from Edwards Aquifer wells, Trinity Aquifer wells, the Guadalupe River, and Canyon Lake.
- The majority of the water in the county is sourced from groundwater while just 1.5 percent of the total water use was sourced from recycled water in 2020, the latest year for which county-wide totals are available from TWDB.
- For mining water use alone, groundwater made up 100 percent of the supply in 2020, accounting for around one-fifth of the total groundwater use in the county.
- Based on estimates from across the state, roughly one-third of the county's water use could be served by a non-potable water supply such as recycled water.

Current State of Reuse Water

- New Braunfels Utilities: irrigation of rights-of-way and common area landscaping, plan for sports complex
- Texas Water Company: golf club, elementary school, office building
- City of New Braunfels One Water Roadmap: reuse prioritization



City of New Braunfels planning for use of reclaimed water to irrigate fields at new sports complex

By Hannah Thompson The Herald-Zeitung
Sep 25, 2023



Shown is a rendering of Zipp Family Sports Park by Norris Design.

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- While preparing the report there appeared to be just two main instances of consistent water reuse in the county.
- New Braunfels Utilities operated a reclaimed water system that provided water to one development as of 2011 for irrigation
- Texas Water Company also used some recycled water for field irrigation
- The City of New Braunfels' One Water Roadmap does highlight water reuse by calling for the creation of a reuse water master plan and the prioritization of reuse options for providing a reliable water supply
- And as of this Monday, it looks like the City of New Braunfels is planning on using reclaimed water for irrigating fields at a new sports complex.
- Like many of the case studies I highlight in the report and will briefly cover here, the monthly rate for this recycled water is expected to be lower than the potable water rate.



Current Impacts to Water Sources

- Unique Hill Country water sources
- Lower recharge rates from impervious cover and development
- Contaminated runoff from impervious cover and development
- Degraded creeks and streams from wastewater and contaminated runoff

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- As land in Comal County is developed, less of that land is available to facilitate the recharge of integral groundwater supplies.
- The increase in impervious cover associated with increasing development means less water can reach key recharge locations and creates greater volumes of stormwater runoff, contributing to floods downstream.
- Stormwater runoff that flows over impervious cover also has a greater risk of becoming contaminated, as it picks up pollutants such as oil, pesticides, and gasoline.
- Rivers and creeks in the Texas Hill Country naturally have very good water quality.
- However, increases in population and water use lead to more wastewater which can degrade high quality bodies of water.
- Wastewater disposal into creeks and streambeds can be linked to increased nitrates, pharmaceuticals, metals, chemicals, and phosphorous in the receiving waters. Phosphates and nitrates can lead to algae blooms, sickening and killing existing vegetation and aquatic life.

Wastewater Administration

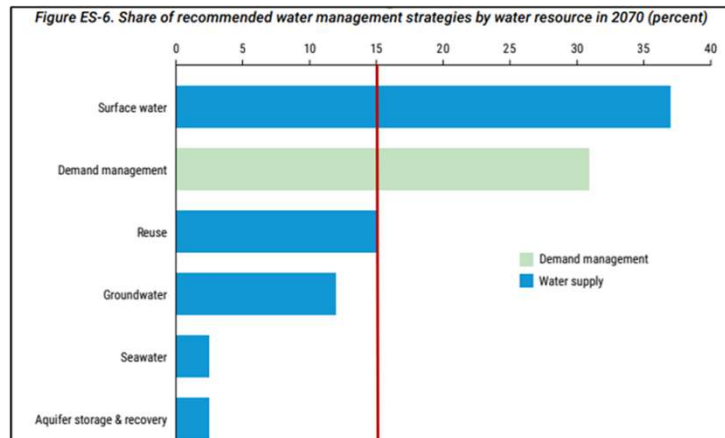
- TCEQ: Permitting Authority
- TAC Rule 213.6 and 213.8
- Texas Pollutant Discharge Elimination Systems (TPDES)
- Texas Land Application Permits (TLAP)
- 2023: Senate Bill 1289 for onsite non-potable reuse



- The Texas Commission on Environmental Quality is the agency in charge of issuing permits for the discharge of wastewater effluent in the state. Application of these permit in the Recharge Zone is constrained by the rules outlined in the Texas Administrative Code Rule 213.6 and 213.8
- There are two permits, the Texas Pollutant Discharge Elimination Systems (TPDES) permit and the Texas Land Application Permits (TLAP).
- TPDES Permits are for facilities where effluent from Wastewater Treatment Plants may be disposed of into waterways, including surface waters and dry creek beds.
- Land Application Permits are for facilities where effluent may be disposed of by applying it to ground surface through irrigation
- Of the two permitting systems, land application provides a greater measure of assurance that contaminants from wastewater effluent will not reach water supplies, though of course it does not eliminate this risk.
- The beneficial reuse of wastewater for purposes such as municipal irrigation or industrial use could allow for greater oversight, higher treatment standards, and more targeted approaches to land application than traditional TLAP and definitely TPDES discharges.
- This year the Texas State Legislature passed Senate Bill 1289 which removes some regulatory barriers for the onsite treatment and non-potable reuse of rainwater, stormwater, and wastewater within a building or across multiple buildings which is great news for the uptake of recycled water.

Need for Water Reuse

- TWDB calls for 15% reuse by 2070
- State sits at 4%, Comal County sits at 1.5%
- No comprehensive system in place in Comal County
- Potable water for non-potable demands
- Reuse reduces demand on groundwater supplies
- Reuse protects water quality of surface and groundwater



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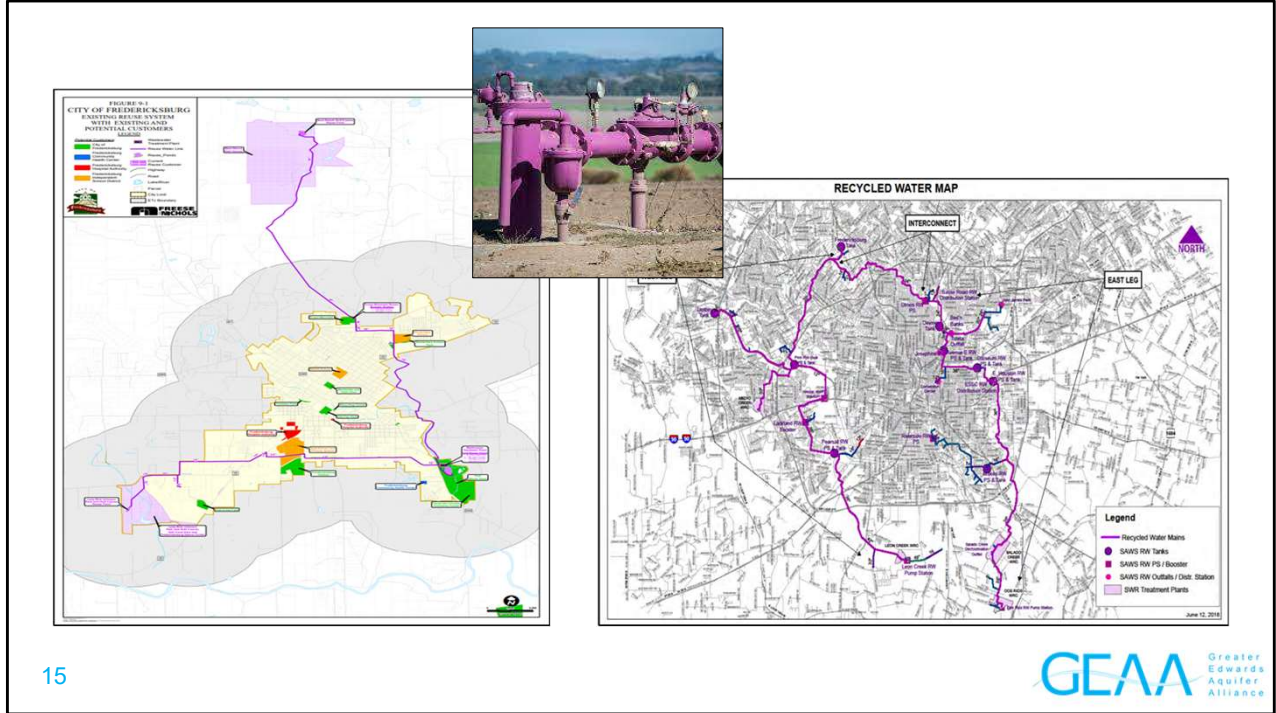
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- The Texas Water Development Board estimates that reuse water will need to make up about 15% of the state's total water supply by 2070 in order to adequately meet demand.
- Currently it makes up 4 percent of the state's supply, and just 1.5% of Comal County's supply
- There does not appear to currently be a comprehensive system in place for the use of recycled water in Comal County or across the Hill Country. Instead, high quality potable water is being used for demands that don't require it, like landscape irrigation, parks and fields irrigation, and mining. All of these uses place unnecessary demand on groundwater supplies.
- Reusing treated wastewater not only safeguards existing water supplies, it also protects water quality by reducing the drawdown of aquifers and by keeping wastewater effluent out of streambeds in the first place.

Case Studies from Across TX

- San Antonio, Boerne, Fredericksburg, Lakeway Round Rock, Big Springs, El Paso
- Imitable implementation and authority
- Affordable alternatives to potable water
- Fewer water use restrictions
- Effective purple pipe systems
- Consideration of Edwards Aquifer recharge ability and quality

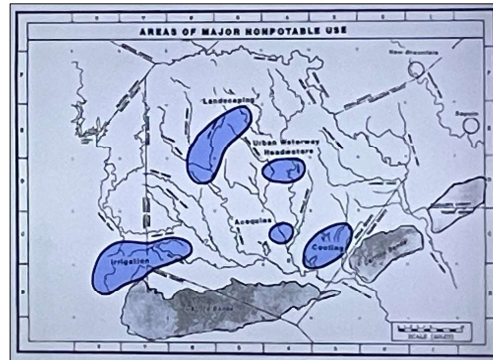
- Many different communities across the state have implemented water reuse systems to provide a sustainable supplemental water supply, including those analyzed as case studies in our report.
- Each case study is described in greater detail in the report, but there are some overarching takeaways that popped up throughout.
 - Many of the water providers were able to provide reuse water at a lower price to customers than potable water
 - Many of the water providers placed no restrictions on the use of recycled water, which can incentivize its use
 - Purple pipe systems, when implemented, are often located to maximize their geographic and financial effectiveness, which you'll see on the next slide
 - To protect the Edwards Aquifer supply, various cities and water authorities have restrictions or guidelines on how reclaimed water can be used over the Recharge and Transition Zones



- These are maps of the purple pipe system in Fredericksburg as of 2017 and in San Antonio as of 2018.

Opportunities for Authorization




- Distinct Water Reuse Districts
 - Similar to Alamo Water Conservation and Reuse District, San Antonio
- Guadalupe-Blanco River Authority Reuse Systems
- Coordinate wastewater infrastructure, treatment, and distribution across various jurisdictions



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- We examined two opportunities for the authorization of a water reuse system or district in Comal County, and by extension the Hill Country. Again, greater detail can be found in the report, but I'll summarize them quickly here.
- The first is having the State Legislature authorize the creation of one or more water reuse districts similar to the Alamo Water Conservation and Reuse District, which was authorized by Senate Bill 1667 in 1989.
 - This would grant the new district or districts the authority to buy and collect wastewater, treat it, then distribute it for reuse, selling within or outside the district's boundaries
 - It could locate its reuse infrastructure near large water demand industries or in the fast growing areas of the county before those areas are built out
- The second opportunity would be to have the Guadalupe-Blanco River Authority implement a more comprehensive reuse system or systems within its boundaries, which encompasses all of Comal County.
 - The GBRA already operates multiple wastewater treatment plants, one of which provides reuse water to the City of Buda.
 - In its 2023-28 Strategic Plan, the GBRA calls for the implementation of the first direct reuse facility in the river basin, signaling support for reuse within the authority's boundaries.
- Because there are many different and sometimes overlapping water and wastewater


jurisdictions in a region, the districts could facilitate water reuse by buying wastewater and then coordinating its treatment and distribution across these various jurisdictions. This could allow current wastewater providers to continue to operate with a revenue stream without taking on the burden of coordinating wastewater reuse treatment or infrastructure planning and construction.

Opportunities for Funding

- Texas Water Development Board
 - Clean Water State Revolving Fund
 - State Water Implementation Fund for TX
 - State Participation Program
 - TX Water Development Fund
- U.S. Bureau of Reclamation
 - Title XVI Water Reclamation and Reuse Program
 - Large-Scale Water Recycling Program
- U.S. Environmental Protection Agency
 - Water Infrastructure Finance and Innovation Act
- Rates and Taxes
- Byproduct Sales

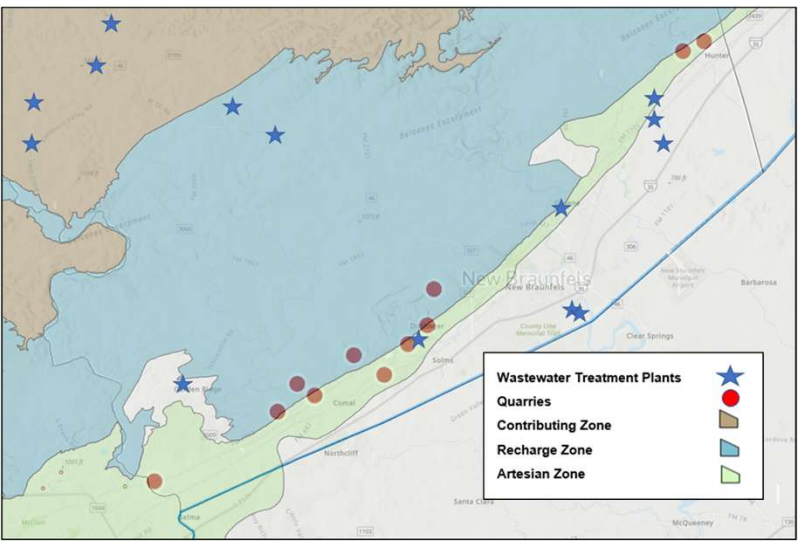
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- There are a variety of state and federal funding opportunities which could be available to supplement the funds needed for the creation of new water reuse districts or additional water reuse systems. The list is not exhaustive and not every funding source may be appropriate for each iteration of a reuse district or system.
- The state of Texas offers funding through the Texas Water Development Board, and the federal government offers it through the Bureau of Reclamation and the Environmental Protection Agency.
- Depending on the manner in which the reuse district or system is set up, it could be funded by rates, charges, bonds, or fees. If granted the ability to levy and assess taxes – similar to the San Antonio River Authority – the district or system would better be able to implement and maintain the reuse infrastructure, treatment, and distribution.
- The San Antonio Water System uses the byproducts of its wastewater treatment process to provide affordable water services; it sells the biosolids as compost and the biogas to a partner energy company which is a funding source others could copy.

Implementation Option

- Top 3 County for aggregate mining water use – primarily groundwater
- 40,000 acres in Comal County
- Expected growth in water use
- Quarry Row along I-35
- “Intuitive Project” – high water demand quarries located next to wastewater treatment plants



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- In Comal County specifically there is a unique opportunity to efficiently implement a water reuse district or system.
- Comal County is one of the top 3 water users in the state for aggregate mining use.
- There are roughly 40,000 acres of quarries in the County, which use around 21 percent of the county’s groundwater.
- The annual water use by this industry is expected to increase around 10 percent per decade over the next 50 years, which represents a significant opportunity to immediately protect groundwater supplies by implementing water reuse.
- Along I-35 alone, in a 30 mile stretch referred to as Quarry Row, there are eleven quarries. Some of these are already located next to existing wastewater treatment plants as you can see on this map.
- A purple pipe network could take advantage of this linear cluster of high water demand operations near wastewater treatment plants to provide recycled water as a supplement to groundwater used by these quarries.

Recommendation

The Greater Edwards Aquifer Alliance recommends that, in preparation for the 2025 legislative session, **the Texas House of Representatives Natural Resources Committee conduct an interim study for the creation of wastewater reuse districts for irrigation use in the fast-growing areas of Comal County and the Texas Hill Country and for industrial use at sites such as the aggregate production operations.** The study should analyze the possibility of implementing multiple water reuse districts with flexible boundaries throughout the study area, given variations at different locations in the volume of potential reuse water generation and the need for that water. **We encourage Texans interested in increasing the use of recycled water in the Texas Hill Country to share the report with their elected representatives and advocate for the interim study.**

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- The status of water reuse in Comal County underscores both the long way Hill Country counties have to go in implementing water reuse systems to take advantage of this vastly underutilized water source and the unique opportunities present to do so within their boundaries.
- Based on our research we recommend the Texas House of Representatives Natural Resources Committee conduct an interim study in preparation for the 2025 Legislative Session.
- The study would be for the creation of wastewater reuse districts for irrigation and non-potable uses in the fast-growing areas of Comal County and the Texas Hill Country and for industrial use at sites such as aggregate production operations.
- It should analyze the possibility of implementing multiple water reuse districts with flexible boundaries throughout the study area, given variations at different locations in the volume of potential reuse water generation and the need for that water.
- We encourage Texans interested in increasing the use of recycled water in the Texas Hill Country to share the report with their elected representatives and advocate for an interim study for the creation of wastewater reuse districts.

Greater Edwards Aquifer Alliance website:
aquiferalliance.org

Report accessible here:
<https://aquiferalliance.org/2023/09/https-aquiferalliance-org-wp-content-uploads-2023-09-water-reuse-in-the-hill-country-comal-county-analysis-09-25-2023-pdf/>

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Please feel free to email me at the address here.

You can visit our website at aquiferalliance.org where you can also find the report and its summary under wastewater publications.

Thank you again!