



2022 ANNUAL REPORT

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Letter from the General Manager



Kathy Turner Jones
General Manager

We all face many kinds of changes and challenges in our lifetime. Whether it's the COVID-19 pandemic that we as a country faced head-on for two years, and still in some capacity must face today, or the drought many regions across the state of Texas battled for several months this past year, we all weather many storms. Despite the trials and tribulations we all continue to face; it is our responsibility to protect groundwater resources for future generations. The Prairielands Groundwater Conservation District (District) board and staff collaboratively identified and developed several enhancements that were implemented throughout the service area to better serve the current and future residents as the District footprint continues to grow.

2022 DISTRICT ACCOMPLISHMENTS

- In the summer of 2022, one of the major accomplishments the District put into place was an amendment to the Rules. The amendment occurred as a result of findings from a Drought Study that concluded in June. The District authorized a Drought Study to examine, monitor, and assess drought impacts on aquifer outcrops and subcrops, including the effects of increased pumping. Findings from the study concluded that all aquifers in all areas of the District appear able to tolerate short-term periods of increased authorized pumping without severe long or short-term ramifications to promote achievement of desired future conditions (DFCs). Therefore, the Board adopted an amendment to the District Rules giving the Board permissive authority, on a year-by-year basis, to authorize by resolution an increase in pumping by a certain percentage for all permittees in cases of extreme drought.
- The District received the Texas Water Development Board's (TWDB) Texas Rain Catcher Award, in October of 2022, for incorporating rainwater catchment system(s) into the design of our new building and landscape area. Please refer to page 25 of this report for additional information on this TWDB honor. We also encourage you to visit the system in person!
- 2022 brought to fruition the first of several Historic Use Permit (HUP) hearings. This occurred following the accumulation of numerous technical reviews and meeting with applicants and well owners in order to finalize HUP applications for the District's Board of Directors. The Board began hearing and approving HUP applications last September.
- In July of 2022, the District begun collaborating with county leaders and local platting authorities to establish interlocal agreements to review Groundwater Availability Certifications (GAC). These certifications are particularly relevant to subdivisions that plan to rely on groundwater as their primary water source. The purpose of a GAC is to ensure that the land in question can provide an adequate supply of groundwater to meet the needs of the proposed subdivision.
- From a financial standpoint, last year saw a continued increase in fees generated from well registrations and permit applications. This increase is directly related to the incredible growth that our four counties have experienced. The result of increased revenues allowed our Board of

Directors to establish a “Operating Reserve Guidance Resolution” to set aside funds to ensure the District can continue to operate during times when financial revenues are not as robust or in the event of an unplanned fiscal emergency.

- Additionally, the Board was able to make a one-time debt reduction payment on our building to help reduce the annual interest costs and shorten the life of the debt. The District’s desire is to continue debt reduction payments, manage our operation expenses effectively, and most importantly to be good stewards to our permittees.
- The District worked with INTERA to develop a Groundwater Monitoring Program (Program). This Program was strategically designed over a period of several years and through an analysis of water level data from monitoring wells. Through this Program the District can evaluate options for managing groundwater permits and production in the different geographical areas and aquifers across the service area. The primary objective of the Program is to provide data required to track progress in order to achieve the District’s DFCs.
- Another accomplishment occurred on November 21, 2022 when the District formally adopted the DFCs. The District held a special hearing, in conjunction with the November Board of Directors meeting, to receive reports from the consulting hydrologist and public comments on the DFCs.
- Also in 2022, the District reviewed the existing Hydrogeological Assessment of Aquifer Storage and Recovery and Aquifer Recharge Suitability within the District’s boundaries. This study has taken place over the past decade throughout Texas and has prompted several bills in the last two legislative sessions encouraging further development and use of Aquifer Storage and Recovery and Aquifer Recharge projects.
- 2022 brought about the 88th Session of the Texas Legislature. In preparation for the legislative session, the District was actively involved with legislative committees through statewide water associations and organizations to stay in front of any potential impacts to the District and its constituents.
- As the District continues to grow, so does the staff. During 2022, the District added two new staff positions: (1) a Well Registration Specialist and (2) a Field Technician.

BEYOND 2022

As you can see from the list above, this past year was a busy and productive time for the District. It is obvious that good planning creates good results.

Moving into 2023 and beyond, protecting our groundwater resources remains the top priority for the District board, staff, and consultants. I look forward to continuing to develop relationships with our communities, business leaders, and local and state officials on water conservation practices and protecting our groundwater resources for the next generation.

Sincerely,



Kathy Turner Jones
General Manager

Mission Statement

The Mission of the Prairielands Groundwater Conservation District (“District”) is to develop rules to provide protection to existing wells, prevent waste, promote conservation, provide a framework that will allow availability and accessibility of groundwater for future generations, protect the quality of the groundwater in the recharge zone of the aquifer, insure that the residents of Ellis, Hill, Johnson, and Somervell Counties maintain local control over their groundwater, and operate the District in a fair and equitable manner for all residents of the District.

Brief District History

Prairielands Groundwater Conservation District was formed in response to a finding by the Texas Commission on Environmental Quality (TCEQ) that groundwater shortages were expected in Ellis, Hill, Johnson, and Somervell counties over the next 25 years. The TCEQ finding required local residents to create a groundwater conservation district, or else the TCEQ would mandate one, enabling legislation for the Prairielands GCD to be created in 2009 by the 81st Texas Legislature.

The Prairielands GCD is located in the north prairies of Texas, encompassing a four-county area. The District spans 2,870 square miles and overlays the Woodbine Aquifer and Trinity Aquifer.

District Creation

The Prairielands Groundwater Conservation District (“District”) was created by the 81st Texas Legislature under the authority of Section 59, Article XVI, of the Texas Constitution, and in accordance with Chapter 36 of the Texas Water Code (“Water Code”), by the Act of May 3rd, 2009, 81st Leg., R.S., Ch. 1208, 2009 Tex. Gen. Laws 3859, codified at TEX. SPEC. DIST. LOC. LAWS CODE ANN. Ch. 8855. (“The District Act”). The District is a governmental agency and a body politic and corporate. The District was formed to serve a public use and benefit and is essential to accomplish the objectives set forth in Section 59, Article XVI, of the Texas Constitution.

Board of Directors

The Prairielands Groundwater Conservation District's Board of Directors is composed of two members per county, appointed by the counties' Commissioners' Courts. The 2022 directors are:

President – Charles Beseda

Term Expires August 31, 2023

Represents Hill County

Director – John Curtis

Term Expires August 31, 2023

Represents Somervell County

Vice-President – Randel Kirk

Term Expires August 31, 2025

Represents Ellis County

Director - Brad Daniels

Term Expires August 31, 2025

Represents Hill County

Secretary/Treasurer – Maurice Osborn

Term Expires August 31, 2023

Represents Ellis County

Director – Marty McPherson

Term Expires August 31, 2025

Represents Somervell County

Director – Barney McClure

Term Expires August 31, 2023

Represents Johnson County

Director – Paul Tischler

Term Expires August 31, 2025

Represents Johnson County

District Staff

Kathy Turner Jones

General Manager

Karol Bowers

Permitting & Compliance Specialist

Brian Watts

Comptroller

Sinclair Newby *(January - June)*

Public Relations and Education Director

Michael Heath

Field Operations Coordinator

Rusty Zent

Field Technician

Kaylin Garcia

Well Registration Specialist

Jose Sarmiento

Field Technician

Annette Kinney

Permitting & Compliance Specialist

Robert Spencer

Cartographic Assistant

Amendments to District Rules

The Board of Directors for Prairielands GCD held a public hearing on July 18, 2022 to adopt amendments to the District Rules regulating water wells within the boundaries of the District effective immediately. Over the months leading up to the meeting, the District staff and directors worked diligently to identify the needed rules improvements in the course of implementing the District Rules that were adopted on December 17, 2018 and previously amended on October 21, 2019, November 16, 2020, and December 20, 2021. The Board's Rules and Bylaws Committee, chaired by Director Randel Kirk, worked to develop recommended amendments to the District Rules to address such improvements.

Publication of the proposed amendments to the District Rules were made available to the public on June 28, 2022 and a public notice of a hearing on the consideration of adopting the amended rules was published in newspapers across the four-county district no less than 20 days prior to the public hearing. At the public hearing, which was held in person at the meeting room inside the District office in Cleburne, the Board considered any oral and written comments from the public on the proposed amendments to the District Rules, and after taking up and considering the proposed amendments to the District Rules, the Board adopted the amendments as presented.

The adopted amendments to the District Rules include giving the Board permissive authority to increase groundwater production by Board resolution during periods of extreme drought by authorizing permittees to overproduce their permits by a certain percentage designated by the Board in any calendar year in a collective total amount that will still promote achievement of the desired future conditions for the aquifers, requiring permittees that are required by law to have drought contingency plans in order to be eligible for the increased groundwater production, granting the Board similar permissive authority to increase production for a calendar by resolution for a specific public water system or other permittee that is experiencing an emergency or other unforeseen event that could cause imminent public health or safety risks, and other minor clarifying or non-substantive changes.

The adopted amendments to the District Rules are necessary to support the District's efforts in managing the groundwater resources within the District. Information about the public hearing and copies of the amended District Rules are available on the District's website at www.prairielandsgcd.org, and physical copies can be obtained by visiting the District's office at 208 Kimberly Drive in Cleburne.

Management Plan Objectives, Performance Standards, and Annual Activity Report

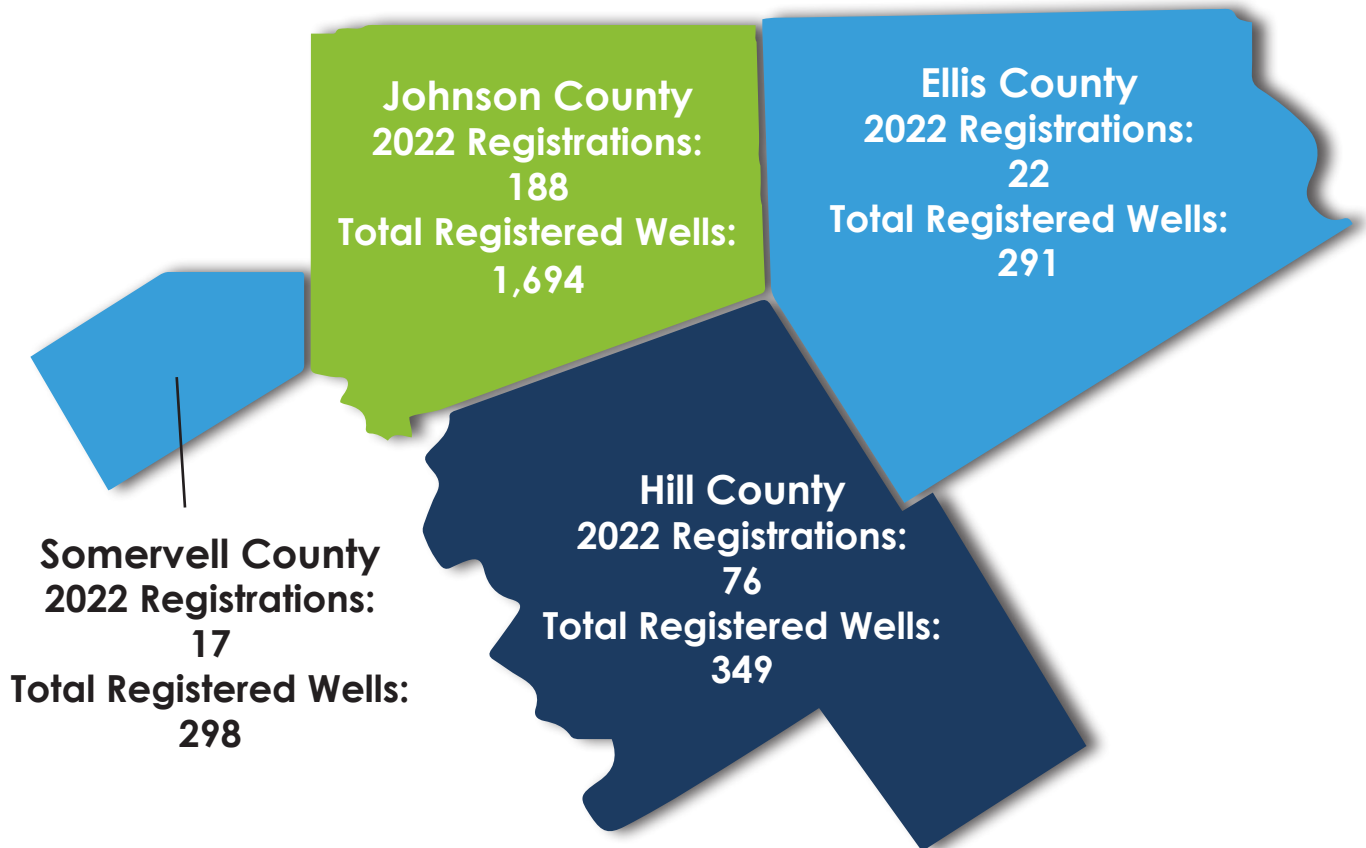
Providing the Most Efficient Use of Groundwater

Well Registration

A.1. Management Objective: *The District will require that all wells be registered in accordance with its rules.*

Performance Standard: *Each year the staff will report well registration statistics. A summary of registration activity by county and aquifer will be included in the District's Annual Report.*

By December 31, 2022, a total of 303 additional wells were registered with the District in 2022, bringing the total number of registered wells to 2,632 at the end of the year. Of the new registrations, there were 271 new wells, 8 replacement wells, and 24 existing wells. These 2022 well registrations were comprised of 296 exempt wells, and 7 non-exempt wells.



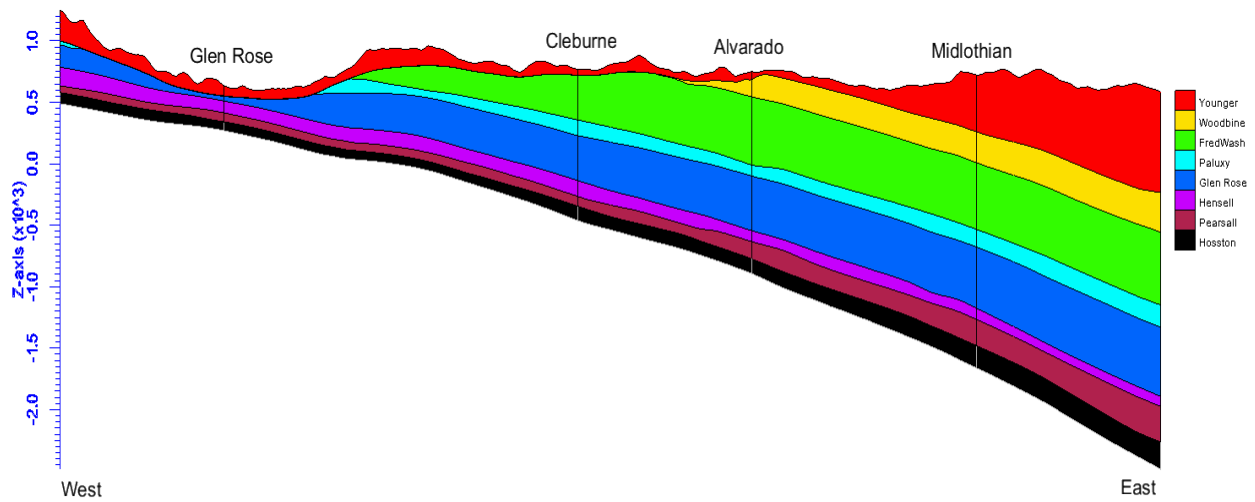


Figure 1. West to East Cross Section Stratigraphy Map of the District

Stratigraphy map provided by Aquaveo, 2018

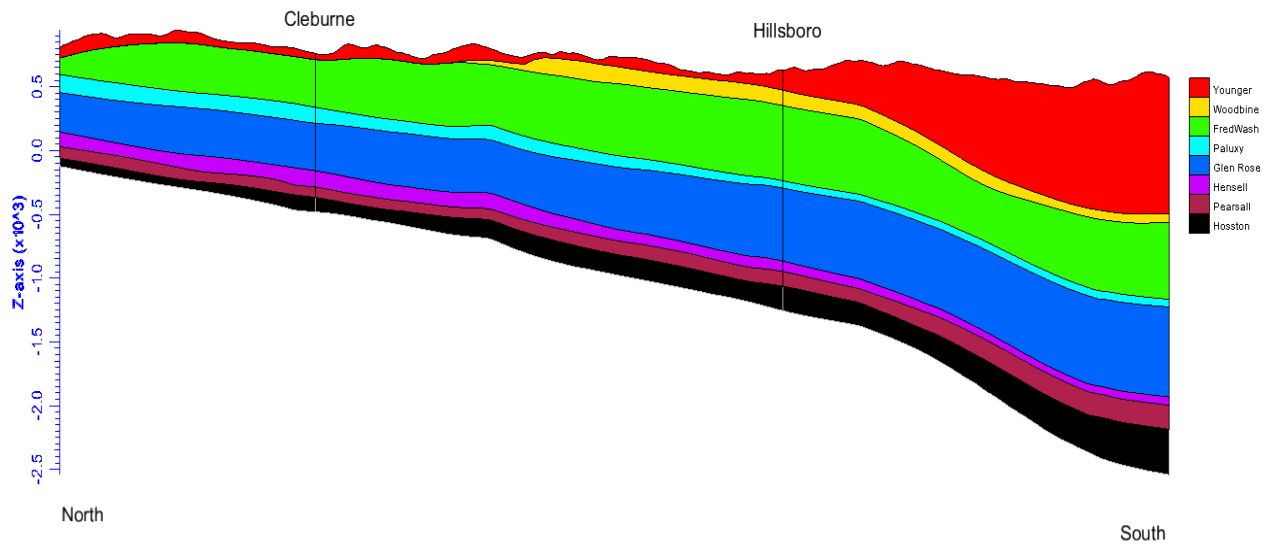


Figure 2. North to South Cross Section Stratigraphy Map of the District

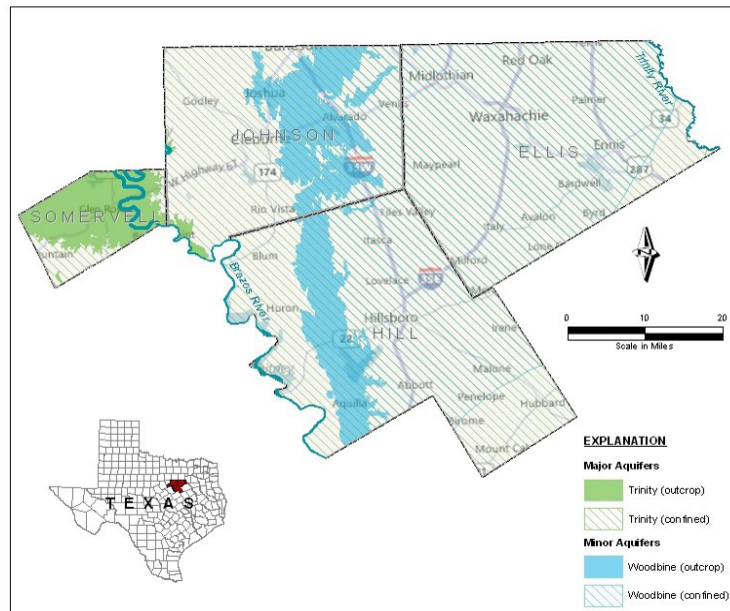
Stratigraphy map provided by Aquaveo, 2018

Well Registrations by Aquifer

To register wells by aquifer formation, the District used data from the update of the Northern Trinity/Woodbine Groundwater Availability Model (NTWGAM). Figures 1 and 2 display the stratigraphy across the District. The District uses the data in its online registration and reporting geo-database to apply aquifer formations to registered wells based on location, depth, and screen interval. Many wells, however, are screened across multiple formations in the Trinity aquifer. For this report, the layer with largest percentage of the screened area was chosen for those wells. The breakdown of wells with available screen interval data registered in 2022 by stratigraphy is as follows:

Younger Aquifers – 3 <ul style="list-style-type: none"> • Ellis County – 2 • Hill County – 1 	Woodbine Aquifers – 72 <ul style="list-style-type: none"> • Ellis County – 13 • Hill County – 24 • Johnson County – 35
Washita/Fredericksburg Group – 66 <ul style="list-style-type: none"> • Ellis County – 2 • Hill County – 11 • Johnson County – 53 	Paluxy Aquifer – 58 <ul style="list-style-type: none"> • Hill County – 23 • Johnson County – 33 • Somervell – 2
Glen Rose Formation – 53 <ul style="list-style-type: none"> • Hill County – 8 • Johnson County – 43 • Somervell – 2 	Hensell Aquifer – 2 <ul style="list-style-type: none"> • Somervell County – 2
Pearsall Formation – 0	Hosston Formation – 18 <ul style="list-style-type: none"> • Ellis County – 1 • Hill - 1 • Johnson County – 6 • Somervell County – 10

Note: 31 wells registered in 2022 were existing and pull from an unknown aquifer or have not been drilled at the time of publication.



Installation of Meters and Annual Production of Groundwater from Non-Exempt Wells

A.2. - Management Objective: *Each year the District will monitor annual production from all non-exempt wells within the District. The District will compile records and develop a database of non-exempt wells to help assess the aquifer units from which groundwater production occurs.*

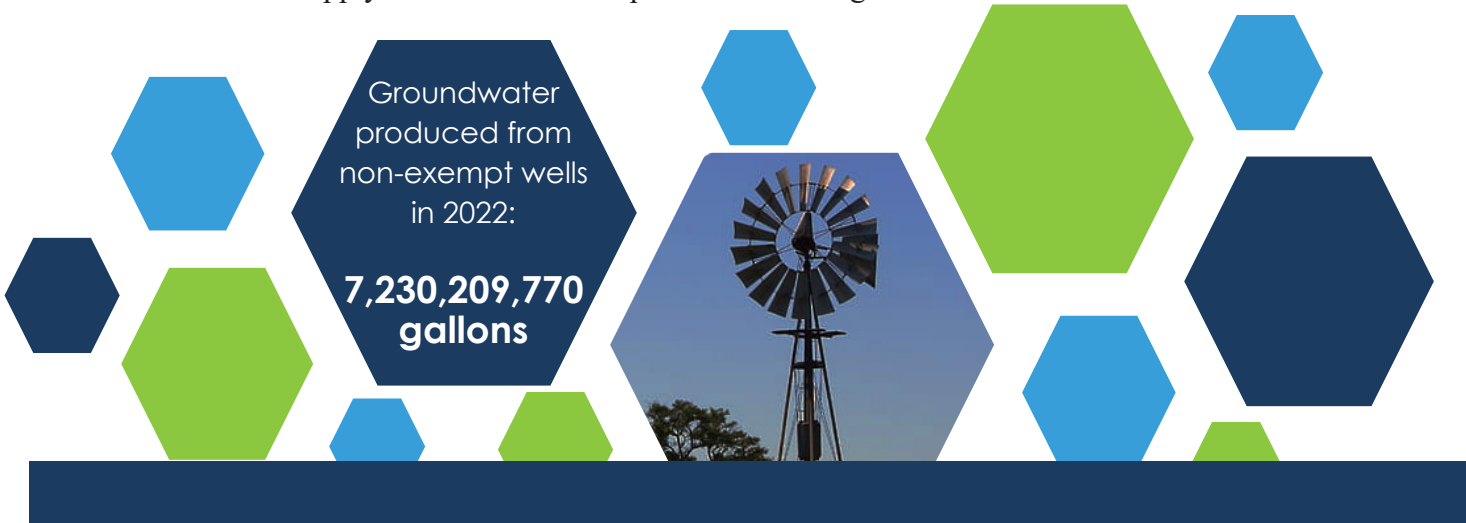
Performance Standard: *The District will require installation of meters on all non-exempt wells and reporting of production to the District.*

The District’s Rules require all non-exempt well owners to install and maintain accurate water meters on their wells. Based upon the meter readings, the Rules further require well owners to record the amount of groundwater produced from their wells and to report the amount of groundwater production to the District on a monthly basis. Beginning in 2019, the District required all non-exempt wells to either hold an Operating Permit or a Historic Use Permit to help regulate groundwater usage.

A.3. - Management Objective: *The District will compile records and develop a database of non-exempt wells to help assess in which aquifer units groundwater production occurs.*

Performance Standard: *The District will require installation of meters on all non-exempt wells and reporting of production to the District. The annual production of groundwater from non-exempt wells will be included in the Annual Report provided to the Board of Directors.*

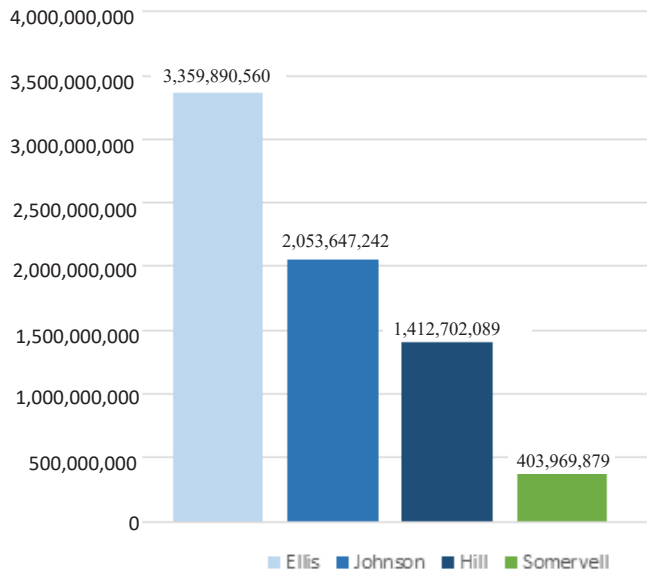
The Districts Groundwater Management System houses all the Districts well and water usage information, allowing users 24/7 access to their meter reading production, state well reports, and field inspections. This database is used by District to classify wells as exempt or non-exempt, verify coordinates of well locations, input and verify meter readings, easily assess the quantity of water pumped by county, aquifer, well owner, or use, locate wells, and approve new well registration. It is also available for non-exempt well owner to pay for their water usage, and for well drillers and well owners to apply for new wells or report meter readings.



District Non-Exempt Well Production

Non-exempt well owners in the District reported that they pumped a total of 7,230,209,770 gallons of groundwater in 2022. In Ellis County well owners pumped the most of the four counties followed by Johnson, Hill, and Somervell. Compared to 2021 production totals in all four counties showed an increase in groundwater production in 2022 due to increased population growth and extreme drought conditions experienced throughout the District. *The breakdown of 2021 production numbers presented in this report differ from those in 2021's report. This difference can be attributed to the adjustments made by permittees and District staff to the meter readings after the production numbers were compiled for the 2021 report.*

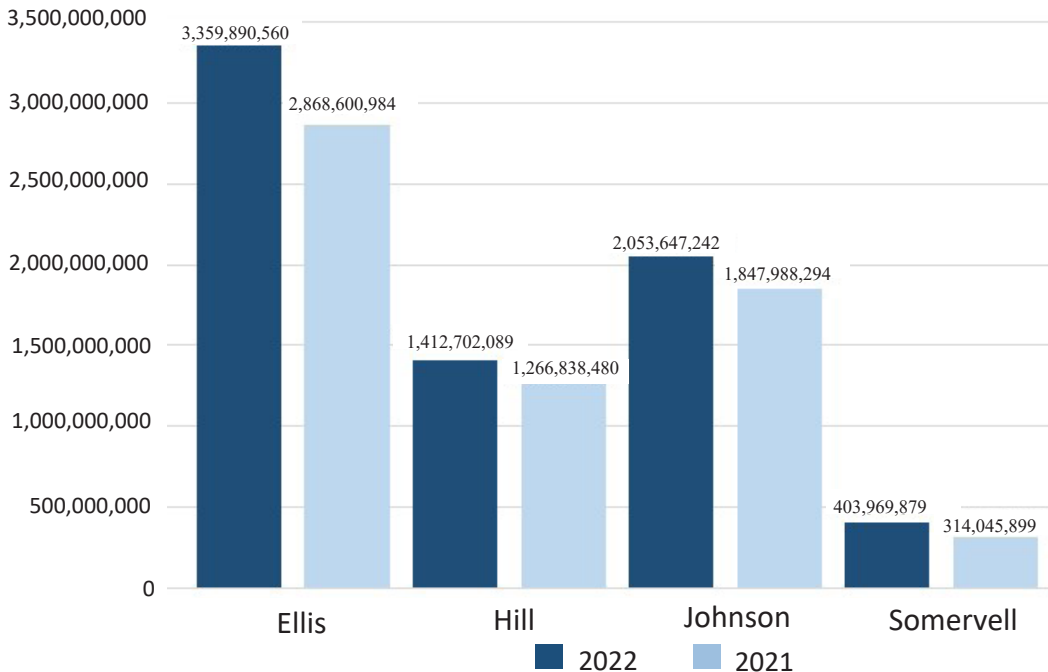
2022 Water Use by County (Gallons)



2022 Permitted Amount:
9,383,166,063 gallons

2022 Actual Amount Produced:
7,230,209,770 gallons

2022 vs 2021 Annual Water Usage by County (Gallons)



District Water User Groups

Most of the groundwater used in the District is for municipal/public water supply systems with a reported 5,952,482,534 gallons pumped in 2022. The industrial/manufacturing sector reported the second greatest usage at 998,953,393 gallons. Due to the drought, there was an increase in groundwater production amounts for all user groups except. *The breakdown of 2021 production numbers presented in this report differ from those in 2021's report. This difference is attributed to the District redefining the purpose of use categories on well registrations.*



Municipal/Public Water Supply

2022 Usage: 5,952,482,534 gal
2021 Usage: 5,326,109,690 gal



Industrial/Manufacturing

2022 Usage: 998,953,393 gal
2021 Usage: 762,892,160 gal



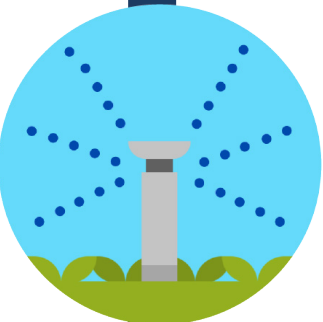
Filling a Pond or Surface Impoundment

2022 Usage: 75,828,677 gal
2021 Usage: 71,506,329 gal



Commercial/Small Business

2022 Usage: 44,006,490 gal
2021 Usage: 43,309,410 gal



Non-Agricultural Irrigation

2022 Usage: 108,944,794 gal
2021 Usage: 51,482,795 gal



Oil & Gas Production

2022 Usage: 3,221,446 gal
2021 Usage: 1,302,370 gal



Recreational

2022 Usage: 46,772,436 gal
2021 Usage: 40,870,903 gal

2022 Water User Group Pumping Amounts by County



Ellis County

Commercial/Small Business: 804,036 gal
Filling a Pond or Surface Impoundment: 13,552,929 gal
Non-Agricultural Irrigation: 21,582,900 gal
Industrial/Manufacturing: 817,864,123 gal
Municipal/Public Water Supply: 2,495,372,472 gal
Recreational: 10,714,100 gal

Hill County

Non-Agricultural Irrigation: 3,926,500 gal
Municipal/Public Water Supply: 1,404,042,489 gal
Recreational: 4,733,100 gal



Johnson County

Commercial/Small Business: 6,977,174 gal
Filling a Pond or Surface Impoundment: 57,717,713 gal
Non-Agricultural Irrigation: 80,459,894 gal
Industrial/Manufacturing: 42,316,060 gal
Municipal/Public Water Supply: 1,853,733,473 gal
Oil & Gas Production: 3,221,446 gal
Recreational: 9,221,482 gal



Somervell County

Commercial/Small Business: 36,225,280 gal
Filling a Pond or Surface Impoundment: 4,558,035 gal
Non-Agricultural Irrigation: 2,975,500 gal
Industrial/Manufacturing: 138,773,210 gal
Municipal/Public Water Supply: 199,334,100 gal
Recreational: 22,103,754 gal



Methodology to Determine Production from Exempt Wells

A.4. - Management Objective: *The District will develop a methodology to quantify current and projected annual groundwater production from exempt wells.*

Performance Standard: *The District will provide the TWDB with its methodology and estimates of current and projected annual groundwater production from exempt wells. The District will also utilize the information in the future in developing and achieving desired future conditions and in developing and implementing its production allocation and permitting system and rules. Information related to implementation of this objective will be included in the Annual Report to the Board of Directors.*

The District utilizes the same methodology and estimates of current and projected annual groundwater production from District-defined exempt wells as was used in the TWDB-adopted Northern Trinity/Woodbine Groundwater Availability Model (“NTWGAM”). This methodology is consistent with that used by the TWDB, and based on projected changes in population and the distribution of domestic and livestock wells in the area using census block data to estimate population distribution.

In the NTWGAM, estimates of rural domestic pumping were developed using census block data from 1990, 2000, and 2010, total population data for 1980 to 2010, and an assumed per capita water use. Historically, the TWDB has provided this data in support of estimating rural domestic pumping for GAM models. This coverage includes an identifier in each census block that indicates whether the population in the block represents an urban or rural population. The rural domestic pumping for each county was then calculated as the rural population times an assumed per capita use of 110 gallons per day.

The District is in the process of documenting the development of updated exempt use estimates and will provide the estimates to the Board of Directors and TWDB once finalized. These estimates are also being used to evaluate the relationship between total pumping in each of the aquifers in the District (both exempt and permitted) and modeled available groundwater consistent with the District’s newly adopted desired future conditions.



Controlling and Preventing Waste of Groundwater

Metering, Reporting, Usage Fees, and Compliance Monitoring

B.1. - Management Objective: *Each year the District will monitor annual production from all non-exempt wells within the District.*

Performance Standard: *The District will require installation of meters on all non-exempt wells and reporting of production to the District. The annual production of groundwater from non-exempt wells will be included in the Annual Report provided to the Board of Directors.*

The District requires all non-exempt wells to have meters installed and maintained on each wellhead. The District Rules require well owners to record the amount of groundwater produced from their wells and to report the amount of groundwater production to the District on a monthly basis. For a well that requires a meter under District's rules, the permit holder must provide a certificate verifying the accuracy of the meter within the previous five-year period as a condition of permit renewal. A non-exempt well owner or operator who is not a public water system and does not exceed ten million gallons of groundwater per year may apply and receive approval from the District to take meter readings and submit Water Production Reports to the District semiannually. To date we have two small volume non-exempt users who report semiannually.

B.2. - Management Objective: *The District will encourage the elimination and reduction of groundwater waste through the collection of a water use fee for non-exempt wells within the District.*

Performance Standard: *Annual reporting of total groundwater used and total water use fees paid by non-exempt wells will be included in the Annual Report provided to the Board of Directors.*

Prairielands GCD encourages elimination and reduction of groundwater waste by collecting water use fees for non-exempt wells, identifying and investigating compliance issues, and looking for instances of potential waste of groundwater. The District charges a water use fee rate of \$0.20 per 1,000 gallons for non-exempt usage. There is an additional \$0.10 per 1,000 gallons for transporting groundwater out of the District. The District collected an estimated pre-audit total of \$1,909,080 in water use fees in 2022.

Beginning in 2022, the District established permitting requirements and increased fees for average system water loss by public water systems above certain percentages to promote conservation of water and prevent waste. For purposes of this rule, "wasteful system water losses" of a retail public utility are any real water losses greater than twenty-five percent (25%), based on a five-year rolling average.

**2022 Authorized Permitted
Production:**

9,383,166,063 gallons

**2022 Non-Exempt
Production:**

7,230,209,770 gallons

B.3. - Management Objective: *The District will identify well owners that are not in compliance with District well registration, reporting, and fee payment requirements and bring them into compliance.*

Performance Standard: *The District will compare existing state records and field staff observations with the well registration database to identify noncompliant well owners.*

There were twenty compliance issues encountered in 2022, two of which were for failure to pay water use fees on time. There were eight instances related to failure to submit a complete and accurate water production report within the required period. And two cases of failure to file a well completion report in a timely manner. Eight cases were related to exceeding authorized production amounts for 2022. All cases of compliance issues related to fee payment and registrations were resolved amicably, and the cases of overpumpage for 2022 aim to be resolved by the end of the first quarter of 2023.

B.4. - Management Objective: *The District will investigate instances of potential waste of groundwater.*

Performance Standard: *Report to the Board as needed and include the number of investigations in the Annual Report.*

During 2022, the District investigated one (1) instance in Ellis County of potential groundwater waste involving a well pumping into a pond and the pond overflowing into a ditch. District staff performed a field inspection of the well and confirmed the float shut-off was not set properly allowing excessive water in the pond to overflow. The well owner was sent a “notice of violation” and a copy of the District’s rules regarding filing a pond. The well owner is working with District staff to amicably resolve the instance. The District continues to monitor the situation.

Addressing Conjunctive Surface Water Management Issues

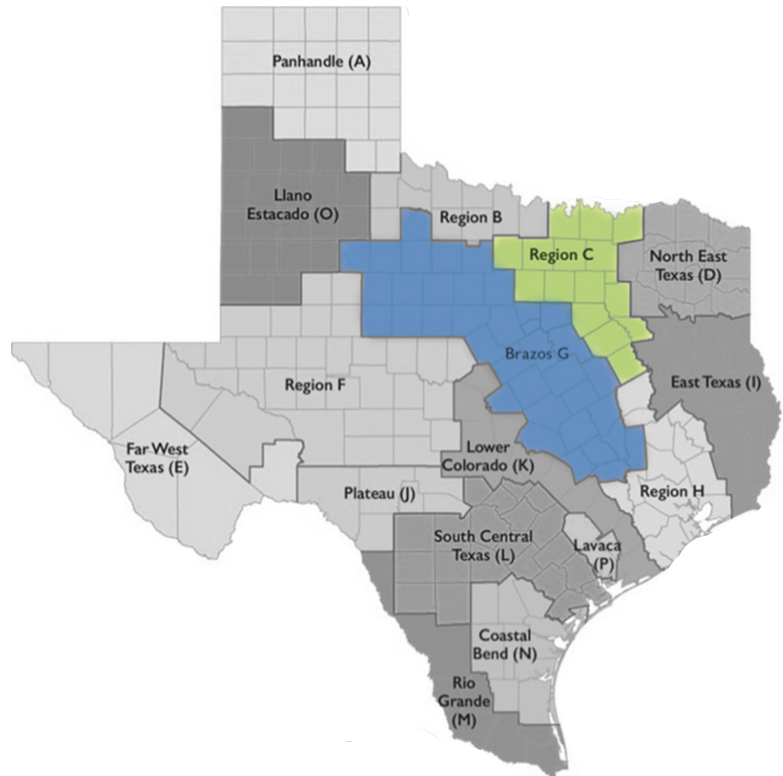
State and Regional Water Planning Review and Participation

C.1. - Management Objective: *The District will actively participate in the Region C and Region G regional water planning processes to stay abreast of water demand projects and supply strategies in the District and to coordinate the District’s groundwater management strategies with the regional water planning groups and foster an understanding of regional management practices.*

Performance Standard: *The District will review the most recently approved State Water Plan to gain an understanding of water demand projections and supply strategies in the District. The District will monitor future proposed amendments to the Region C and Region G regional water plans as they pertain to the District and ensure that supply strategies impacting groundwater resources in the District are identified in the appropriate regional water plan. The District’s General Manager or designated representative will attend meetings of the Region C and Region G regional water planning groups when feasible. A summary of the District’s interactions with the regional water planning groups will be included in the Annual Report provided to the Board of Directors.*

The Board of Directors, General Manager, and District staff strive to stay informed on any matters related to groundwater supply in Ellis, Hill, Somervell and Johnson counties. Critical sources of pertinent information include familiarity and understanding of regional and state water plans. The Board President and General Manager continued to stay abreast of proposed amendments to the Region C and G regional water plans so that supply strategies impacting groundwater resources in the District were properly identified.

The General Manager serves as a voting member of the Brazos G Regional Water Planning Group and attended meetings on March 23, June 13, and November 2. The General Manager also participated Region C Regional Water Planning Group meetings on May 23 and November 7.



C.2. - Management Objective:

The District will: 1) seek to better understand groundwater and surface water interactions, including groundwater base flow discharges to surface water courses and aquifer recharge from surface water flows; 2) identify existing and planned surface water and other alternative supplies to meet anticipated demand growth; 3) explore possible groundwater to surface water conversions in the District and facilitate the process, and 4) understand current and planned surface water supplies and how they affect groundwater demands.

Performance Standard: *A summary of the progress and interaction with RWPGs will be included in each Annual Report.*

The District's groundwater regulations directly impact the planning activities of the RWPGs, so the District works collaboratively with the RWPGs and its consultant team to incorporate the District's groundwater management goals into the regional water planning process. The District's interactions with the RWPGs not only included participation in meetings but coordination with the groups to keep them up-to-date on groundwater-related activities in Ellis, Johnson, Hill and Somervell counties as well.



Addressing Natural Resource Issues

Injection Wells and Oil and Gas Compliance

D.1. - Management Objective: *The District will develop a program to monitor and assess injection well activities in the District.*

Performance Standard: *The District will monitor and review injection well applications filed with the Railroad Commission of Texas and the Texas Commission on Environmental Quality that propose injection wells to be located within the boundaries of the District to identify contamination threats to groundwater resources in the District. The General Manager will bring to the attention of the Board any applications that the General Manager determines in their discretion threaten the groundwater resources in the District, and any outcomes of actions taken by the District will be included in each Annual Report.*

In 2022, Prairielands GCD addressed natural resource issues that impacted the use and availability of groundwater and which are impacted using groundwater. District activities fell into three categories:

1. Monitoring and assessing injection well activities in the District;
2. Monitoring compliance by oil and gas companies with District registration, metering, production reporting, and fee payment requirements; and
3. Participating in interim activities prior to the 88th Session of the Texas Legislature.

The District utilizes an effective Underground Injection Control (“UIC”) monitoring program that included the review of all applications for injection wells proposed to be located within the District’s boundaries to ensure injection well activities do not endanger groundwater resources.

In June 2021, the District received notice from the Texas Commission on Environmental Quality (“TCEQ”) regarding their receipt of a UIC permit application filed by Republic Industrial and Energy Solutions, LLC (“RIES”) for a new Class I injection well to be located in Hill County to dispose/inject municipal landfill leachate and Class 1 and 2 industrial wastewaters. The application was forwarded to District’s legal counsel and submitted to the District’s UIC technical consultant to perform an in-depth technical review of the application to determine whether the proposed injection well served as a possible source of contamination of protected groundwater resources.

On September 2, 2021, the District received notice from the TCEQ, stating the application had been deemed administratively complete, and that a technical review of the application would be conducted. On December 10, 2021, the TCEQ issued a technical notice of deficiency letter to RIES, stating the need for extensive clarifications, revisions, and additional information with respect to the application. RIES’s responses to these technical deficiencies were due January 9, 2022; however, RIES requested an additional 90-day extension to respond. The TCEQ granted RIES’s extension request, and thus RIES was required to respond and submit all necessary information by April 9, 2022.

The District’s legal counsel continued to monitor the correspondence between the TCEQ and RIES as well as RIES’s submission of additional information. Ultimately, by letter dated April 29, 2022, RIES withdrew its application from TCEQ. In its letter withdrawing the application, RIES stated that it would complete a confirmatory seismic study over the next few months and resubmit the application. However, as of the date of this report, RIES has not submitted a new application to TCEQ.

Although the TCEQ is required to notify the District of certain injection well operations proposed within the District, current law does not require the Railroad Commission of Texas (“RRC”) to provide notice to the District of a Class II injection well application proposed within the District’s jurisdiction. For this reason, the District has engaged the services of Statewide Plat, a monitoring company, to notify the District of all Class II injection well applications filed with the RRC for injection within the District.

In 2022, the District was notified of one application filed with the RRC for a Class II injection well within the District. The application was filed by FDP Operating , LLC, and file stamped by the RRC on January 10, 2022. The application was forwarded to the District’s legal counsel and submitted to the District’s technical consultant to perform a technical review of the application. Untimely, this application met all well construction standards and the proposed operational parameters did not appear to endanger shallow freshwater aquifers; thus the District did not protest this application.

D.2. - Management Objective: *The District will monitor compliance by oil and gas companies of the well registration, metering, production reporting, and fee payment requirements of the District’s rules.*

Performance Standard: *As with other types of wells, instances of non-compliance by owners and operators of water wells for oil and gas activities will be reported to the Board of Directors as appropriate for enforcement action. A summary of such enforcement activities will be included in the Annual Report.*

The oil and gas companies have continued to comply with the well registration, metering, production reporting, and fee payment requirements of the District’s rules. In 2022, with the continuation of the District’s new permitting program, the oil and gas companies have generally complied with the requirements of the District Rules to the best of the District’s knowledge. Only one enforcement action was initiated in 2022 for an oil and gas company who had either failed to report and/or pay water use fees. The enforcement case was resolved amicably and was closed prior to the end of 2022.

Addressing Drought Conditions

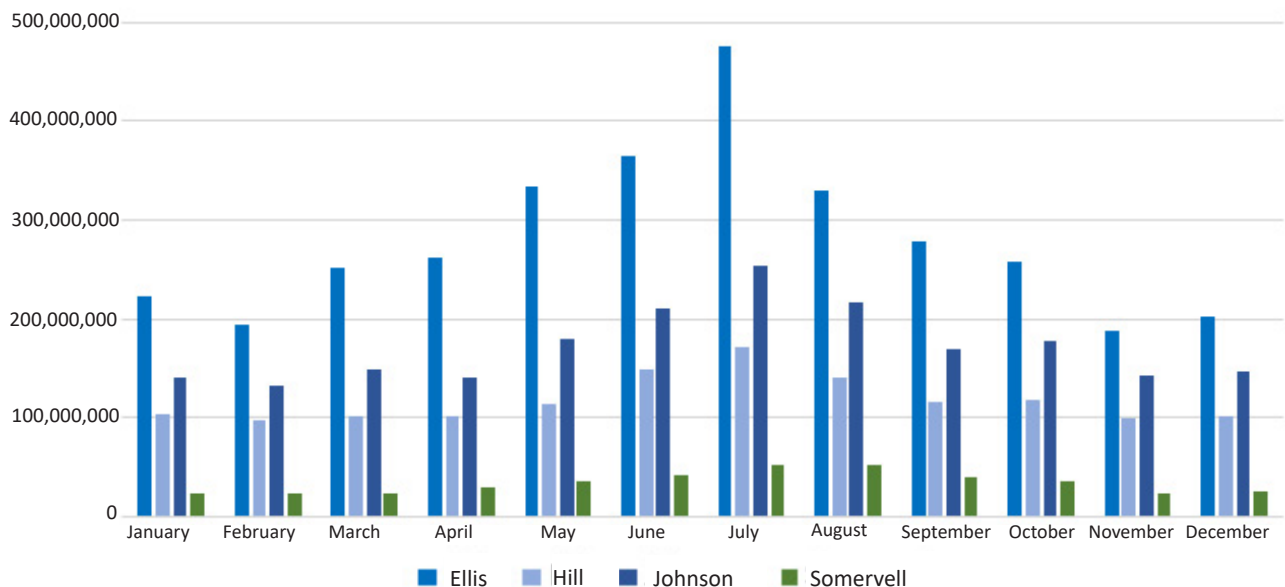
Drought Conditions and Monitors

E.1. - Management Objective: *Monthly review of drought conditions within the District using the Texas Water Development Board’s Monthly Drought Conditions.*

Performance Standard: *An annual review of drought conditions within the District will be included in the Annual Report provided to the Board of Directors. Reports will be provided more frequently to the Board as deemed appropriate by the General Manager to timely respond to drought conditions as they occur.*

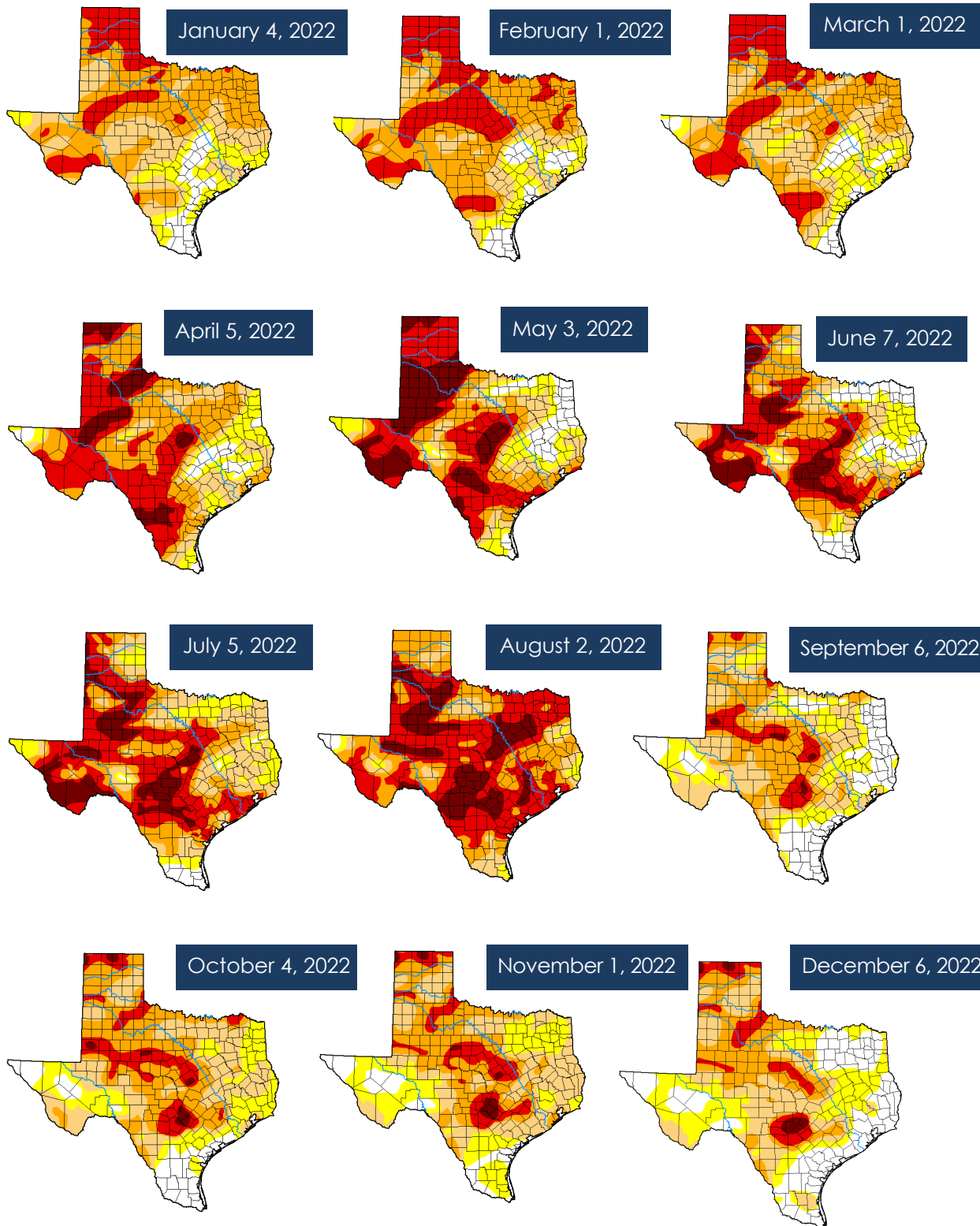
The monitors and usage reports were compared periodically to look for correlation between the drought conditions and pumping amounts within the District. In the monthly drought maps shown on the next page, the District was in various stages of severe or worse drought through most of the 2022, including reaching “Exceptional Drought” stage in August. In the graph of monthly water use in each county below, pumping amounts follow seasonal trends in water demand, but also mirror the severity of drought within the District. The District will continue to monitor the correlation between drought conditions, pumping, and aquifer levels to ensure aquifer management remains appropriate.

2022 Monthly Water Use by County



2022 Monthly Texas Drought Monitor Maps

None D0 Abnormally Dry D1 Moderate Drought D2 Severe Drought D3 Extreme Drought D4 Exceptional Drought



<https://droughtmonitor.unl.edu/Maps/MapArchive.aspx>

E.2. - Management Objective: *The District will develop information to understand the relationships between drought conditions, increased pumping, and the impacts of both on water levels and shallow wells in the outcrops and subcrops of the aquifer subdivisions in the District. The District will also determine areas where it may be suitable for the District to implement pumping restrictions during drought times in order to protect public safety and welfare, as well as areas in which the District may wish to allow overpumping during drought periods to promote conjunctive management when surface water supplies become unavailable to water user groups due to drought conditions.*

Performance Standard: *The District will monitor and assess drought impacts on aquifer outcrops and subcrops, including effects of increased pumping. By 2022, the District will complete studies and rules and regulatory plan development for drought pumping restrictions or over-pumping allowables.*

In 2022, the District studied the relationship between drought, water use and aquifer levels in the Trinity and Woodbine aquifers. Based on the results of this evaluation, the District developed and adopted amended rules that allow for additional pumping in the aquifer during times of extreme or worse drought while ensuring long-term production is consistent with the District’s desired future conditions and modeled available groundwater. To be eligible to produce over the permit allowance, permittees must also have implemented their drought contingency plans. Additional information is available in Rule 5.10 of the District’s rules.



Addressing Conservation, Recharge Enhancement, Rainwater Harvesting, Precipitation Enhancement, and Brush Control

Conservation and Public Awareness Articles

F.1. - Management Objective: *The District will annually submit at least one article regarding water conservation, rainwater harvesting, or brush control for publication to at least one newspaper of general circulation in the District counties.*

Performance Standard: *Each year, a copy of each conservation article will be included in the District's Annual Report to be given to the District's Board of Directors.*

Press releases of various District activities were sent to newspapers in all four counties throughout the year: Cleburne Times-Review, Glen Rose Reporter, Hillsboro Reporter, and the Waxahachie Daily Light. A copy of the conservation-related articles are included in the following pages.

Press Release #1: Typically, during a drought water demand increases making water conservation even more important. This educational article promotes the importance of efficient watering methods during drought conditions and emphasizes the significance of participating in conservation approaches that will help protect and maintain our local water resources.

Press Release #2: Annually, the Texas Water Development Board (TWDB) awards individuals, companies, organizations, municipalities, and other local or state governmental entities with the Texas Rain Catcher Award. Those who promote technology, educate the public, and recognizes excellence in the application of rainwater harvesting systems. This article acknowledges the District being awarded the Texas Rain Catcher Award in the governmental category. The District offsets the demands and potential environmental impacts of its new office facility by using the rooftop footprint to capture rainwater and a strong educational program which promotes rainwater harvesting.

Press Release #3: Texas winter weather events are highly unpredictable and being prepared for potential prolonged freezing temperatures will help alleviate future stress. This article highlights the importance of preparing your wells and focuses on preventative steps to help well owners prepare for extreme cold weather snaps.

In addition to submitting the following articles, the District also continued with its digital and social media initiative in 2022 with the District's Facebook, Twitter, and LinkedIn profiles and utilizing email campaign software to distribute e-blasts to non-exempt and exempt well owners, elected officials, business owners, educators, and media contacts and anyone in the public who had requested to receive them. The content in these social and digital media posts include conservation tips, groundwater awareness, important meetings or events in the District, education event information, and general information about the District. These approaches provide an excellent resource for distributing educational materials, sharing important news and information, and building identity and recognition among the public.



Help Make the Most of Every Drop During Drought

May 25, 2022 – For Immediate Release

With rising temperatures and record-breaking winds, paired with the lack of precipitation historically seen during this time of year, it is very evident that drought conditions have gripped a large portion of the state, including Cleburne and Johnson County. Stage 1 Watering Restrictions have been mandated for residents of Cleburne, and it is important now more than ever to be efficient with the watering residents do during the allotted times and days. According to the Texas Water Development Board, outdoor water use can account for 50 to 80 percent of home water use during the summertime.

One of the best ways you can help conserve water outdoors is to know the most efficient approaches to applying water to your lawn, flowerbeds, trees, and shrubs. Sprinkler systems are popular because they are convenient and supply large areas of a landscape with plenty of water. With careful timing of zone watering and proper selection of spray nozzles, these systems can be adjusted to water in a reasonably efficient manner. Monitor the zone settings and adjust throughout the year to meet changing weather conditions and landscape needs. Be sure that water is not applied to non-pervious areas such as sidewalks and driveways, and areas with different watering needs are on separate zones.

Drip irrigation systems are very efficient (use up to 60% less water) at supplying water to smaller areas of a landscape. Drip irrigation places a small, steady amount of water close to the roots. Drip irrigation can nearly eliminate water loss caused by evaporation and drift, as well as reduce erosion and runoff. The City of Cleburne does allow for watering via drip irrigation at any time on any day during the watering restrictions, but the watering schedule still needs to be appropriate for weather conditions and landscape needs.

Within the City of Cleburne’s Stage 1 Watering Restrictions, another exception is listed for irrigation using a hand-held hose equipped with a spray nozzle that can be adjusted so water flows only as needed. Hand watering plants allows you to precisely apply water where it is needed, and control how much is being applied. This is a good option for outdoor potted plants and hanging baskets.

While there has not been a steady amount of precipitation seen in recent months, there are methods that can be used to maximize the precious rainfall that we do receive. Rainwater harvesting is an innovative alternative water supply approach that captures, diverts, and stores rainwater for later use. Implementing rainwater harvesting is beneficial because it reduces demand on existing water supply, and reduces run-off, erosion, and contamination of surface water. Rainwater is superior for landscape use and plants thrive on rainwater. Rainwater harvesting also reduces flow to storm sewers and lowers the threat of flooding. Additionally, rainwater harvesting helps create

conservation-minded behaviors which can allow utilities to reduce peak demands during summer months. However, it is important to check any city or county ordinances regarding the use of harvested rainwater.

Lastly, opting to plant native and adapted plants is the ideal choice for water efficient landscapes in Texas. Some of the characteristics that lead Texans to incorporate native or adapted plants include their tolerance for drought and heat, water efficiency, and low pesticide and fertilizer requirements. Vitex, lantana, and red yucca are just a few of the native plants that have low water demands and provide a gorgeous pop of color to your landscaping while only requiring the fraction of the water that non-native plants require. A bonus is that native plants can attract pollinators and hummingbirds.

Applying water efficiently, utilizing harvested rainwater, and opting to landscape with native and adapted plants will allow you to make the most of the water use outdoors during this critical time. Your participation in these conservation approaches will help protect and sustain our local water resources. To learn about more ways to conserve water, please visit www.prairielandsgcd.org.

Press Release #2



Prairielands Groundwater Conservation District receives the Texas Water Development Board's Texas Rain Catcher Award

October 11, 2022 - For Immediate Release

The Texas Water Development Board (TWDB) announced October 5, 2022 the recipients of its annual Texas Rain Catcher Award, a rainwater harvesting competition and recognition program. Prairielands Groundwater Conservation District in Cleburne, Texas, was recognized in the governmental category.



PGCD receives TWDB Texas Rain Catcher Award

From left to right, George B. Peyton V, TWDB Board Member; PGCD General Manager, Kathy Turner Jones; PGCD Board President Charles Beseda; and TWDB Chairwoman, Brooke T. Paup

The TWDB's Texas Rain Catcher Award recognizes excellence in the application of rainwater harvesting systems in Texas, promotes rainwater harvesting technology, and educates the public on this critical water-saving practice.

Prairielands Groundwater Conservation District offsets the demands and potential environmental impacts of its new office facility by using the rooftop footprint to capture rainwater. The District installed two metal cisterns along with a rain garden and native plant beds that use the rainwater harvesting system for irrigation. Additionally, the District promotes rainwater harvesting with a robust education program to correspond with the onsite utilization. The District's Water Education Trailer includes a rainwater harvesting model with a rainfall simulator, water collection calculator, and diorama of a traditional residential rainwater harvesting system.

Between the cisterns and rain garden, an average of 80,000 gallons of water is captured over the course of a year. The system has proven useful and cost effective by providing a dependable water source that allows the District to water efficiently through drip irrigation instead of relying on the public water supply.

The Texas Rain Catcher Award competition began in 2007 and is open to all individuals, companies, organizations, municipalities, and other local and state governmental entities in Texas. It recognizes entities and individuals in the rainwater harvesting community and beyond and establishes award recipients as dedicated water conservation leaders in Texas. Prairielands Groundwater Conservation District is one of five awardees being recognized statewide this year.

"We are honored to be recognized from the Texas Water Development Board," stated PGCD General Manager, Kathy Turner Jones. "We look forward to continuing to educate the community about ways to conserve water."

The TWDB is the state agency charged with collecting and disseminating water-related data, assisting with regional water and flood planning, and preparing the state water and flood plans. The TWDB administers cost-effective financial assistance programs for the construction of water supply, wastewater treatment, flood control, and agricultural water conservation projects.



Preparing Your Wells for the Unpredictable Winter Weather

November 30, 2022 – For Immediate Release

Those freezing nights (and days) have arrived in the Prairielands GCD area, and even though we cannot predict the weather, let's take the necessary steps to be ready and alleviate future stress. Extreme cold weather, like the prolonged cold snap in February 2021, can take a toll on private water systems. Simple preventative steps can help well owners prepare for potential prolonged freezing temperatures.

Inspecting and Preparing Your Water Well

Take the time now, while the weather is decent, to inspect your water well, pump house, and anything that is adjoining them.

Cleaning out your enclosures provides you with room to insulate your above-ground water lines and other components, such as the pressure tank. Wrap any plumbing from the well to the storage tank with insulating material. The smaller the pipe in diameter and closer to the ground, the more vulnerable it is to freezing. Remember, covering the electrical control components with foam insulation or draping with blankets is not recommended.



Please take this opportunity to inspect your well casing and the ground around it. Ensuring that there are no holes in or around your well casing, including at the ground level, so that burrowing critters have no pathway to contaminate your well. By adding dirt or concrete around your well, you are protecting them from rain and other runoff water and making sure there is a pathway for it to move away from your well and not pool up around it.

Preparing Well Houses

If you have a well house, check to ensure that it is adequately enclosed to prevent cold air from getting inside, and add heat sources such as a heat lamp or space heater for when the temperatures dip below freezing. Also, remember that heat lamps and space heaters can potentially cause fires, so please use them cautiously!





You can also add insulation to the well houses' walls and ceiling, providing even more protection to your well house.

Winterizing Irrigation Systems

Before the freezing temperatures hit and stay for a bit, it is important to winterize any irrigation system and outdoor spigots, whether you are on a private water well or not. Drain your irrigation system and unhook any hoses from outdoor faucets or fixtures.

Most plants, trees, and turfgrass go dormant during the winter months. They do not require much watering if any, so turning off irrigation systems during the upcoming winter weather is perfectly fine. These precautionary steps will help prevent damage to your irrigation systems so they will be ready to work properly for you in the spring.



Other Factors to Consider

While winterizing your well and well house is the main objective, there are other essential preparations to consider as well. Be sure that you check your generator. Making sure that it is in working order, and that you have plenty of fuel in case of extended power outages. It is also beneficial to store several large containers of potable water for household use as a backup option whether you have a water well or not.

If you need work completed on your water well, pump, or other related equipment, be sure to hire a licensed water well driller, pump installer, or plumber so that it's done safely and up to code. Prairielands GCD staff can provide resources to help you contact a well driller if necessary.

Preparing your water well for winter might be the last thing on your mind with the abnormally dry and severe drought the District has experienced the last several months, but the more you prepare now, the better off in the long run.

For more information on water wells and our local groundwater resources, visit the District's website at www.prairielandsgcd.org, contact the Prairielands GCD office at 817-556-2299, or follow us on Social Media.

F.2. – Management Objective: *Each year, the District will include at least one informative flier on water conservation, rain water harvesting, or brush control within at least one mail out to groundwater non-exempt users distributed in the normal course of business for the District. The District will also consider additional fliers or initiating other public awareness campaigns and outreach efforts on water conservation during drought conditions.*

Performance Standard: *Each year, a copy of each mail-out flier and a summary of all other public awareness water conservation campaigns and outreach efforts will be included in the District’s Annual Report to be given to the District’s Board of Directors.*

A step-by-step guide detailing updated steps for reporting meter readings to the District was mailed to non-exempt well owners on November 30, 2022 as well as an e-blast directing them to the information posted on the District website (see <https://www.prairielandsgcd.org/well-registration/permitting/>). Non-exempt well owners are required to submit monthly production reports, meter readings and meter logs through the District online database and this resource provides well owners with a step-by-step guide to submit their reports. Each year, the District produces a quarterly newsletter, the Prairielands eLine, that is distributed in print and electronically and made available to the public in the District’s office. For copies of our newsletter visit our website at <https://www.prairielandsgcd.org/news/>.

Water conservation topics and other items covered in the Prairielands eLine issues in 2022 included the following:

Winter 2022

- Ellis County Rural Heritage Farm Promotes and Protects Natural Resources
- Expanding the Toolbox: Free Water Loss Resources for Public Water Systems and Operators
- Prevent and Manage Water Leaks at Home During Fix-A-Leak Week 2022
- Rainwater Harvesting 101 Workshop Planned for March 19
- Now Scheduling the Water Education Trailer for Spring 2022

Spring 2022

- Texas Well Owner Network “Well Educated” Workshop Hosted by Prairielands GCD Scheduled for May 4, 2022
- Native Plant Gardens in Hill County Provide Rest and Replenishment for Pollinators and People
- Reminder: Meter Accuracy Verification of Permitted Wells Required Every Five Years 2022
- Prairielands GCD General Manager Recognized by Texas Water Conservation Association
- Texas 4-H Youth Water Ambassador Program Applications for 2022-2023 Now Open
- Rainwater Harvesting 101 Workshop Planned for May 7

Summer 2022

- Make the Most of Every Drop During Drought
- Conservation in Action at Prairielands GCD
- Summary of Spring 2022 Educational Outreach
- 4-H Water Ambassadors Complete Leadership Academy

Fall 2022

- Prairielands GCD Receives Texas Water Development Board’s Texas Rain Catcher Award
- Schedule the Water Education Trailer for Your Next Event Today
- Prairielands GCD Board of Directors Set Water Use Fee Schedule Rates for 2023
- How to Accurately Read a Water Meter
- Steps to Reporting Batch Readings, Meter Rollover, or Replacement Readings to the District



District staff also made several presentations to community and civic groups, as well as making appearances at public events. These outreach initiatives with public organizations and events are a productive way to educate individuals about water conservation, promote awareness, and build relationships and recognition within the four counties of the District. A summary of public events and presentations is listed below:

Date	Event	Location	County	Participants
1/12/22	Cleburne Lions Club	Cleburne	Johnson	22
1/17/22	Johnson County Master Gardner Meeting	Virtual	Johnson	25
3/9/22	Leadership Cleburne	Cleburne	Johnson	17
3/11/22	Dinosaur Valley State Park	Somervell	Public	8
3/17/22	Dinosaur Valley State Park	Somervell	Public	93
3/26/22	Ellis County Master Gardner Expo	Waxahachie	Ellis	400
4/23/22	Native Landscaping Workshop	Cleburne	Johnson	15
4/24/22	Ellis County Prairie Adventure & Wildflower Walk	Waxahachie	Ellis	50
5/3/22	Tuesday Forum	Cleburne	Johnson	30
5/4/22	Texas Well Owner Network “Well Educated” Workshop	Cleburne	Johnson	16
6/4/22	Outdoor Community Day	Cleburne	Johnson	300
6/13/22	Natural Resources Camp	Whitney	Hill	49
9/15/22	Cleburne Rotary Club	Cleburne	Johnson	20
12/7/22	Ellis County Well 101 Workshop	Waxahachie	Ellis	7
			Total	1,052



F.3. - Management Objective: *The District will investigate the feasibility of recharge enhancement and aquifer storage and recovery projects in the District.*

Performance Standard: *By 2022, the District will complete studies and an initial assessment regarding the feasibility of recharge enhancement and aquifer storage and recovery projects in the District.*

During the past decade in Texas there have been multiple years of extreme drought and extended periods of above normal temperatures, which has decreased inflows to, and increased evaporative losses from surface water reservoirs. This increased water stress has driven a need for more water storage in many areas of Texas, but it often takes decades to plan, permit, design, and construct new surface water reservoirs. Given the near-term water supply demands there has been increased interest in managed aquifer recharge (MAR) techniques that can increase the quantity and quality of groundwater available in the near-term. There are two general types of MAR, aquifer storage and recovery (ASR) and aquifer recharge (AR) sometimes referred to as artificial recharge.

The Texas Water Development Board (TWDB, 2018) defines aquifer storage and recovery (ASR) as “the storage of water in a suitable aquifer through a well during times when water is available, and the recovery of water from the same aquifer during times when it is needed.” ASR facilities have been increasingly recognized as a viable option to help communities and industries in Texas address water supply needs. When comparing ASR systems to surface water reservoirs, there are several key benefits:

- No water loss to evaporation
- No surface inundation with its associated condemnation, environmental impacts, and years of permitting/regulatory issues
- No loss of storage capacity due to sedimentation
- Scalability: capital costs start at \$1-2 million, rather than \$10s to \$100s of millions.

Aquifer recharge, as defined by HB 721 and amended Section 11.155 of the Texas Water Code, “involves the intentional recharge of an aquifer by means of an injection well authorized under Chapter 27 of the Texas Water Code or other means of infiltration, including actions designed to (a) reduce declines in the water level of the aquifer; (b) supplement the quantity of groundwater available; (c) improve water quality in an aquifer; (d) improve spring flows and other interactions between groundwater and surface water; and (e) mitigate subsidence. The key difference between ASR and AR as defined in the Texas Water Code is in ASR there is intent to recover recharged water, while in AR there is no specific intent to recover recharged water.

The potential benefits that ASR and AR may provide have prompted several bills in the recent legislative sessions. In 2018, the Texas 86th Legislature passed three bills aimed at encouraging further development and use of ASR and AR projects. HB 721 directs TWDB to conduct studies on ASR and AR projects in the State Water Plan and required TWDB to conduct a survey to identify the relative suitability to various aquifer for use in ASR and AR projects (Shaw and Others, 2020). The statewide study suggests there are large swaths of the District that are considered “most suitable” for both ASR and AR. However, these suitability rankings were evaluated on a grid with a resolution of 50,000 feet x 50,000 feet (or 89.5 square miles), which is too coarse to evaluate the feasibility of ASR/AR strategies at the District level. The District initiated a study focused on refining the techniques used in the statewide TWDB study so that ASR and AR suitability could be evaluated over a better geographic resolution.

The method used to evaluate the relative suitability of ASR and AR within the District largely followed the methods used in the statewide ASR and AR study (Shaw and Others, 2020), but was modified to use the higher resolution data available at the District scale. All suitability metrics were evaluated on the NTGAM grid, which consists of quarter-mile by quarter-mile grid cells. The refined study applied a scoring methodology that scaled each suitability parameter important for a successful ASR and AR project (e.g., hydraulic conductivity, sand thickness, aquifer storativity, etc.) onto a zero to one scale where the most suitable parameter score is set to one and the least suitable parameter score is set to zero. All suitability parameters were then summed giving the total for ASR and for AR suitability for each aquifer. For display and discussion purposes the total suitability scores were normalized again onto a zero to one scale.

The results from this refined analysis indicate that ASR suitability scores of the five aquifer units studied (i.e., the Woodbine, Paluxy, Hensell, Pearsall, and Hosston) show the Paluxy, Hensell, and Pearsall fell completely within the medium suitability category (Figure 2, Figure 3, Figure 4). The Woodbine and Hosston also fell mostly within the medium suitability category, but there are large portions within Ellis County, which are considered highly suited for ASR (Figure 1 and Figure 5). These highly suited regions coincide with the areas where sand thickness is greatest in the Woodbine and Hosston. There are no areas within the District that are considered to be of low suitability for ASR.

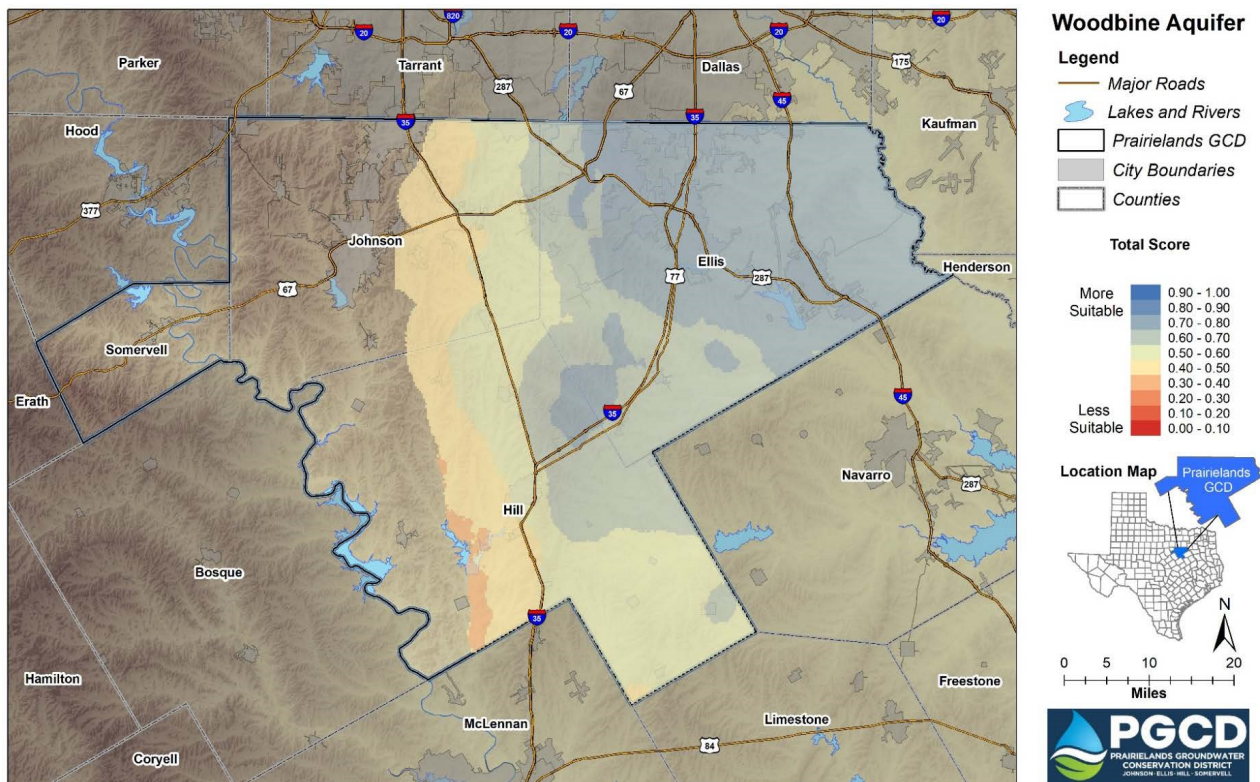


Figure 1. ASR suitability score for the Woodbine aquifer.

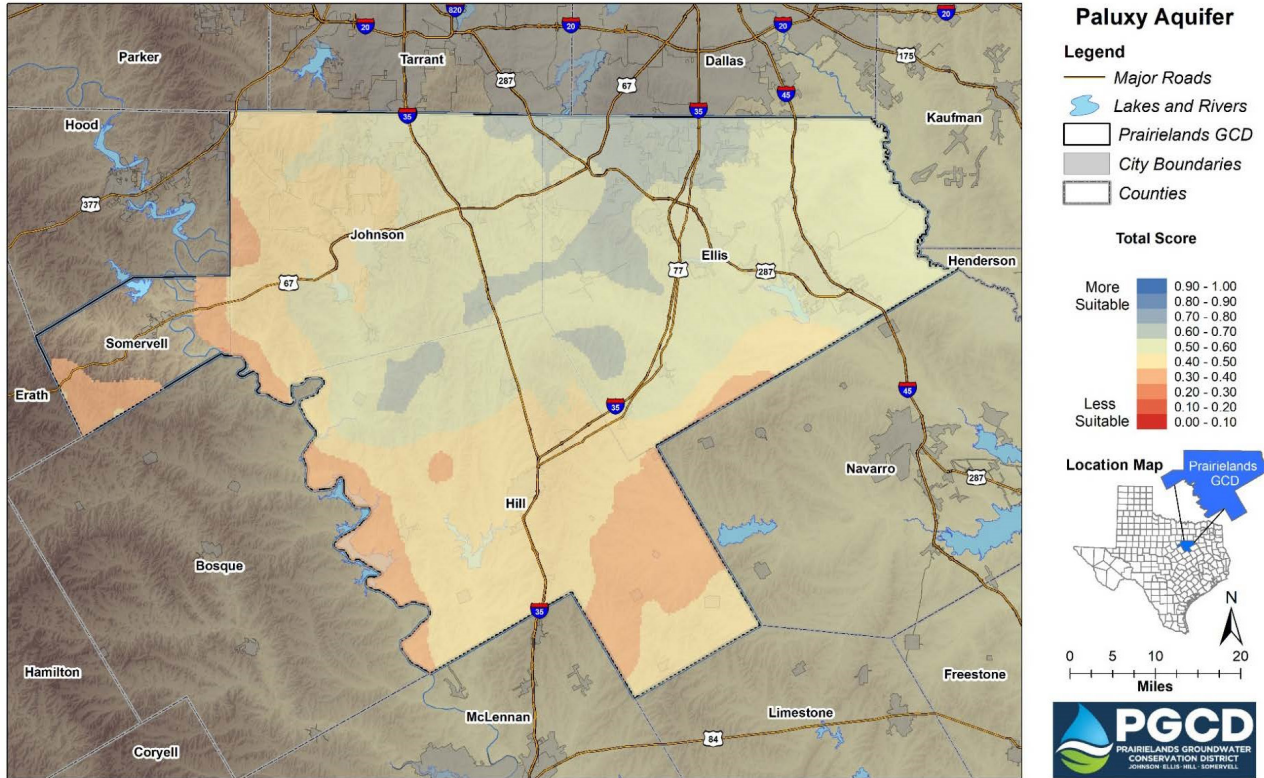


Figure 2. ASR suitability score for the Paluxy aquifer.

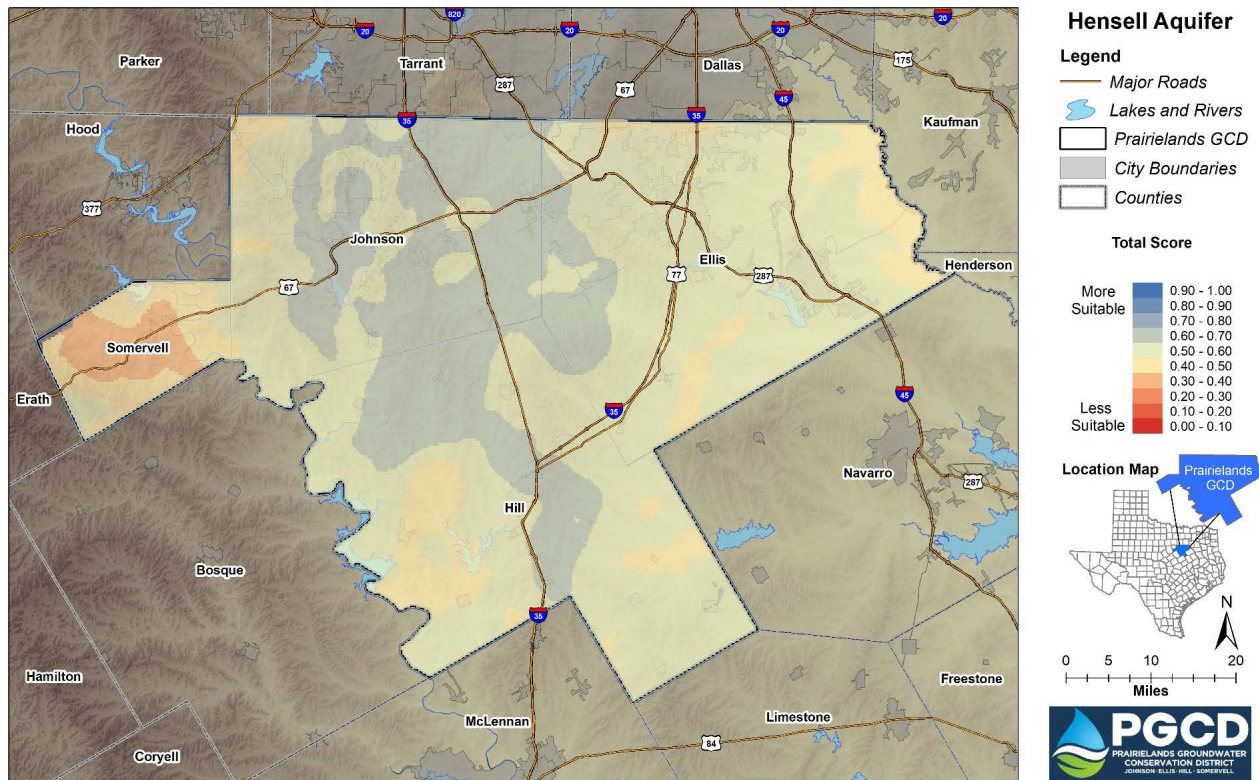


Figure 3. ASR suitability score for the Hensell aquifer.

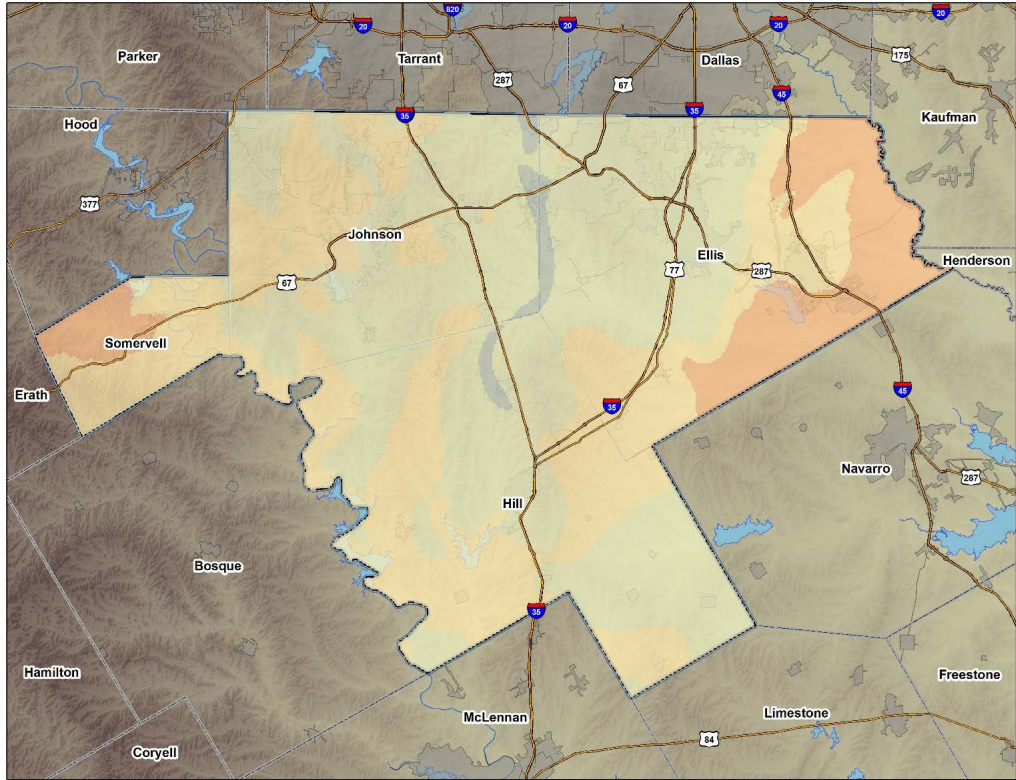


Figure 4. ASR suitability score for the Pearsall aquifer.

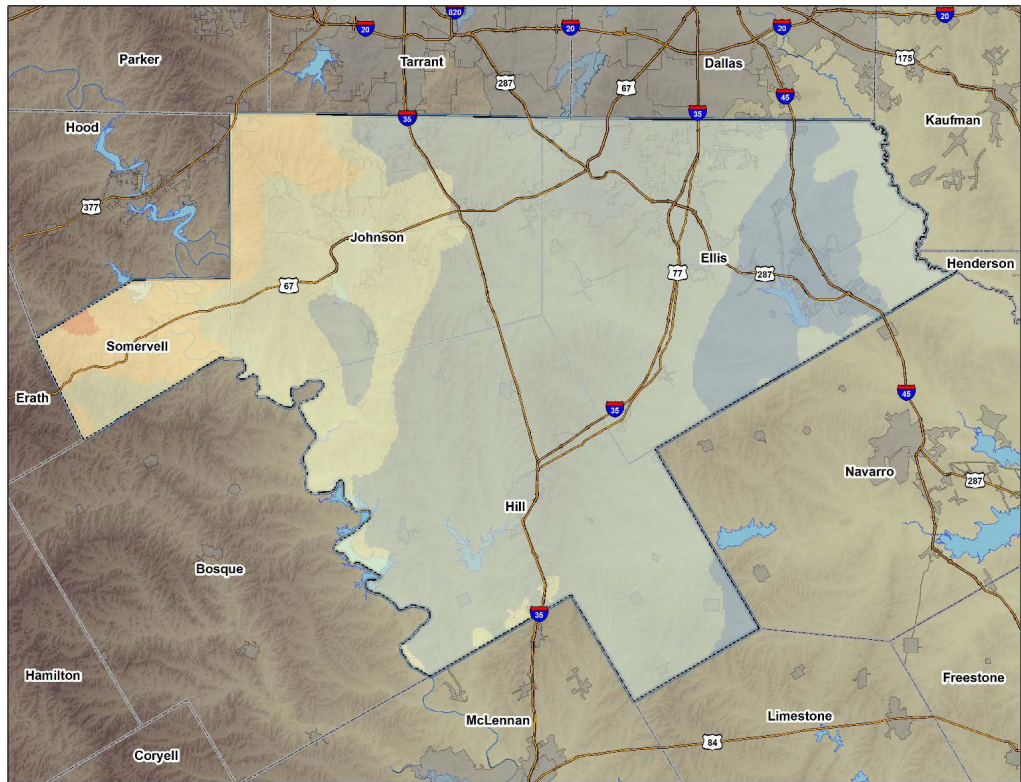


Figure 5. ASR suitability score for the Hosston aquifer.

All aquifers, except for the Pearsall, have large areas that fell just below highly suitable (i.e., within 0.6-0.7). The Pearsall aquifer generally has the lowest relative ASR suitability, which is expected given the hydrogeologic characteristics of the unit. While this study focused on evaluating ASR suitability individually for each aquifer, in practice one could install an ASR well that targets multiple aquifers. For example, if a stakeholder wanted to site an ASR well in the Lower Trinity aquifer system, the ASR suitability maps for the Hensell, Pearsall, and Hosston could be summed. The areas with the highest sum would have the greatest potential for a successful ASR operation.

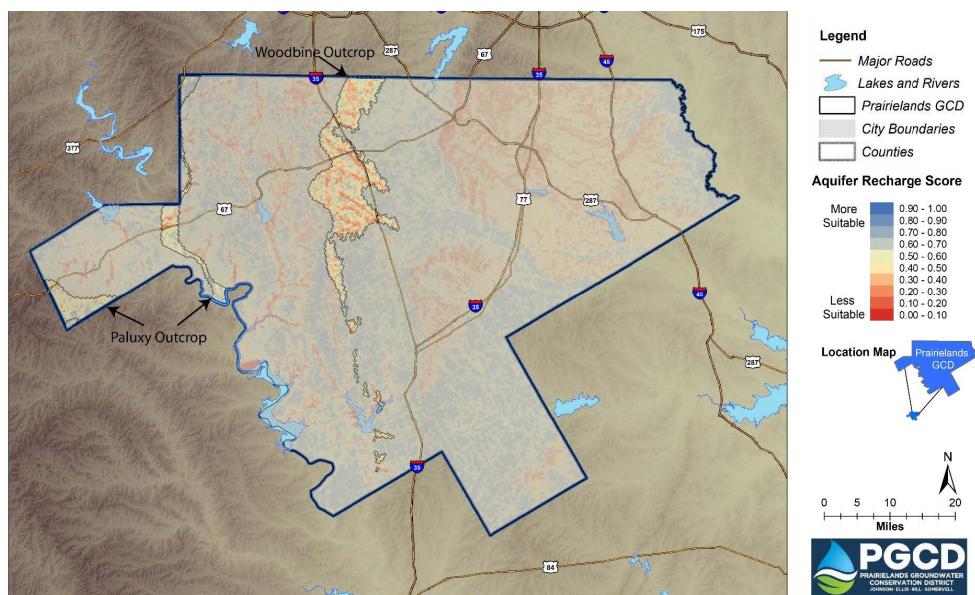


Figure 6. AR suitability score.

The final AR suitability scores are shown in Figure 6. The shaded vs. unshaded areas in Figure 5-6 distinguish areas where the primary aquifer units are in subcrop from areas where they are in outcrop. The Woodbine and Paluxy are the only two aquifers that outcrop within the District. If the primary goal of an AR project is to offset groundwater pumping by increasing recharge to an aquifer, then it is important that these projects be located in areas where the aquifer units' outcrop. Areas where the primary aquifers are in subcrop can still benefit from an AR project, but the recharge potential will depend on the hydraulic connectivity between the shallow subsurface and the underlying aquifer units. In areas where the shallow subsurface is comprised of homogeneous, uncompacted coarse-grained sediments, which tend to have the greatest vertical hydraulic conductivity, the recharge potential would be greater than areas with dense fine-grained units or intact limestone (i.e., units with much lower vertical hydraulic conductivity values). The site-specific hydrogeology of the area between the top of the shallowest aquifer and ground surface is key to applicability of AR projects.

The results discussed above are part of an ASR and AR feasibility assessment report that was presented to the Board and available on the District website. This analysis has resulted in creation of datasets that will help guide siting of ASR and AR projects which have the potential to improve groundwater supplies and quality within the District.

Results from the ASR and AR suitability analysis can be used for preliminary screening of potential ASR and AR sites, but should be considered in a relative context. The siting and design of ASR and AR projects is very site-specific and considers many factors in addition to the factors considered in this study (geology, hydrogeology and geography). Other factors that may need to be taken into account when considering development of new ASR and AR projects, including: source water, access to land, interest of landowners and tenants, possible ancillary benefits (e.g., improvements to streamflow or wetland conditions), and engineering and operations costs. The ASR and AR suitability analysis is a precursor to the typical phased ASR and AR design and implementation process which is adaptive in nature and is driven by collection of site-specific data and information.

F.4. Management Objective: *The District will periodically support or sponsor an education seminar addressing conservation, recharge enhancement, rainwater harvesting, precipitation enhancement, or brush control.*

Performance Standard: *The District will support or sponsor such a seminar at least once every other year. A summary of such educational activities will be included in the District's Annual Report.*

The District was a Signature Sponsor for the Texas 4-H Youth Water Ambassador program in 2022. This is a program for high school students to encourage their interest in the water industry. The program seeks to bring students of varying backgrounds together to gain advanced knowledge and practice leadership skills related to the science, technology, and management of water in Texas. Through an application process, up to 30 high school youth are selected each spring to participate in a summer 4-H2O Leadership Academy and commit service hours annually in a variety of ways. Ambassadors gain insight into water law, policy, planning, and management as they interact with representatives from state water agencies, educators, policy-makers, and water resource managers. Water Ambassadors commit a minimum 40 hours of service over a 12-month period following the Academy. Service hours include delivering water education at local 4-H clubs, schools, fairs, and community events. The District had three students serve as Water Ambassadors in 2022.

The District also hosted three rainwater harvesting workshops for residents of Ellis, Hill, Johnson, Somervell, and surrounding counties on March 19, April 2, and May 7, 2022 at the District office. There were eleven attendees for the March event, thirteen attendees for the April event and eleven at the May event. On May 16 a rainwater harvesting workshop was held in Somervell County for 21 attendees. Participants received a presentation from District staff about the basic components of rainwater harvesting systems, benefits and uses of rainwater harvesting, and how to maximize efficiency of a rainwater harvesting system. Attendees then assembled their own 55-gallon rain barrel to take home and implement. Following the events, several participants emailed photos showcasing their use of their new rain barrels. The District hosted a native landscaping workshop for residents of Ellis, Hill, Johnson, Somervell, and surrounding counties with fifteen attendees on April 23. Participants received a presentation about TexasSmartscape landscape design principles with hands-on design lessons. Participants learned how to utilize plants adapted to the Texas heat that are drought tolerant, pest and disease resistant, pollinator-friendly, help conserve water, reduces stormwater runoff, prevent water pollution, as well as save time and money. The District also hosted a Texas Well Owner Network "Well Educated" half-day training for sixteen attendees on May 4, 2022 for domestic well owners to learn about water well basics and maintenance, water quality, and pollution prevention. The District seeks to continue this educational workshop program in 2023 and onward.

In 2022, The District was also a sponsor for the Texas Alliance of Groundwater District's 11th annual Texas Groundwater Summit on August 30 through September 1, 2022. The Texas Alliance of Groundwater Districts was established in 1988 to provide groundwater conservation districts the opportunity to exchange ideas and develop or influence programs for the management, conservation, protection, and development of groundwater within Texas. The Texas Groundwater Summit is the premier groundwater event in the state, bringing together a diverse group of groundwater professionals over three days to discuss emerging trends and new research.

F.5. - Management Objective: *Each year, the District will seek to provide an educational outreach regarding water conservation to at least one elementary school in each county of the District.*

Performance Standard: *Each year, a list of schools that participate in the educational outreach will be included in the District's Annual Report to be given to the District's Board of Directors.*

Increasing public awareness about groundwater conservation through education and outreach is one of the main goals of the District. The WET, or Water Education Trailer, is a mobile classroom that features exhibits that provide demonstrations about rainwater harvesting, indoor water conservation tips, pollution prevention, how a water well works, and features a working aquifer model. The presentations included in the WET meet TEKS standards and provide STEM-based learning activities. The District saw a positive implementation of Tinker, LLC Water Conservation Education Program during Spring of 2022 with seven schools/teachers and reached 617 fifth-grade students predominantly in Johnson County. During the September Board of Directors meeting, the Board approved to extend and increase sponsorship of the Tinker, LLC Education Water Conservation Program for the Fall 2022 with focus on Ellis and Hill counties.

Date	School	County	Grade	Participants
1/24/22	Keene Elementary	Johnson	5 th	76
2/11/22	Grandview Elementary	Johnson	5 th	174
3/10/22	Rio Vista Elementary	Johnson	5 th	74
3/25/22	Hubbard Elementary	Hill	1 st – 5 th	140
4/19/22	Wilemon STEAM Academy	Ellis	2 nd and 5 th	138
4/22/22	Venus Elementary	Johnson	5 th	149
4/27/22	Hill County Water Days (Various Schools)	Hill	4 th and 5 th	111
4/28/22	Hill County Water Days – Whitney Intermediate	Hill	5 th	106
5/10/22	Alvarado South Elementary	Johnson	K-2 nd	291
5/17/22	Godley Middle School	Johnson	7 th	150
5/23/22	Glen Rose Intermediate	Somervell	5 th	136
6/23/22	Santa Fe Elementary – Summer classes	Johnson	K-2 nd	100
11/16/22	Grandview Junior High	Johnson	7 th	112
11/17/22	Grandview Junior High	Johnson	8 th	95
			Total	1,852

Addressing Desired Future Conditions

Groundwater Monitoring Program and Desired Future Conditions

G.1. - Management Objective: *The District will develop a Groundwater Monitoring Program within the District to monitor water well levels (and baseline water quality) in wells in each aquifer and subdivision thereof in the District. The District will review the geographic and vertical distribution of existing monitoring wells in the District with historical data from the TWDB, USGS, TCEQ, and other agencies and develop a plan to partner with those agencies as appropriate to ensure continued availability of the monitoring wells and data from them to the District. The District will also develop a plan to acquire or install new monitoring wells to fill in gaps in geographic or vertical distribution. The District will then develop an annual goal of how many monitoring wells it will add each year and a priority system for their installation based upon data deficiencies and needs for the geo-database. The District will take periodic readings from the monitoring wells and input the data into the District's geo-database. The District will utilize the information to help implement its regulatory and permitting program and monitor water level trends and actual achievements of DFCs.*

Performance Standard: *Upon development, a summary of the District Groundwater Monitoring Program will be included in the District's Annual Report to be given to the District's Board of Directors.*

To help manage groundwater resources prudently, the District monitors groundwater conditions via groundwater wells distributed throughout the District. As of December 2022, there are 242 monitoring wells within the District, which is 64 more wells than were in the monitoring program in 2021. A fundamental requirement of any monitoring program is that it must be able to monitor the aquifer resources within the District at a scale consistent with the management objectives of the District. Two of the Districts' key management objectives are: (1) the ability to quantitatively track progress towards DFCs, and (2) the ability to generate accurate annual District-wide water level change maps for each aquifer.

When developing a water level monitoring program there are many technical characteristics that must be considered in tandem with practical and policy considerations. Some of the characteristics include the number of wells that are monitored, how frequently water levels are measured, and how to spatially distribute wells across the county. The concepts that generally guide the practical and policy considerations are: the value of simplicity, flexibility, and the law of diminishing returns. Simplicity, is both a benefit for the District staff, who must implement the monitoring approach, and also for the public, who may want to understand the monitoring approach. The monitoring approach must also be flexible enough to easily handle situations that are inevitable when monitoring over several decades. Wells will be added to, and removed from, the network periodically. The concept of diminishing returns generally refers to getting less incremental benefit from each additional item added. For well monitoring, more wells results in a higher confidence in calculated District- and county-wide average drawdowns, but beyond a certain point the cost and effort of adding more wells to the network and regularly monitoring their water levels outweigh the benefit.

During 2022, the District has been working to expand the current monitoring network as part of a comprehensive monitoring program. To ensure that the wells in the monitoring network are distributed approximately evenly throughout the county, the U.S. Geological Survey 7.5-minute quadrangles were used as a standard grid. TWDB also uses these quads to guide water well numbering (e.g., the

first four digits of a State Well Number correspond to the quad in which the well lies).

One of the primary challenges of expanding a monitoring program is the sheer amount of data that must be analyzed and then organized in a manner that allows for strategic and efficient monitoring network expansion. Using data from the District’s well registration database, the TWDB groundwater database (GWDB), and the TWDB Submitted Drillers Reports (SDR), Figure 7 shows the distribution of groundwater wells colored by aquifer in the District and within a 3-mile buffer of the District boundaries. Wells within the 3-mile buffer were included because they inform regional groundwater trends at no cost to the District. In total there were 1,164 identified wells with screen information. Screen information is critical because aquifer specific water levels can only be measured in wells that are screened solely within a single aquifer. Of the 1,164 identified wells, 632 were screened over a single aquifer (Table 1). The remaining 532 wells were screened over multiple aquifers

The results from analysis were incorporated into a master spreadsheet intended to help the District:

1. Identify gaps in the monitoring network that must be filled by an existing well or by installation of a monitoring well
2. Prioritize incorporation of existing wells using a spatial ranking system
3. Readily access all relevant well information made available by the TWDB in the GWDB and the SDR

Because of the costs and large amount of coordination and logistics associated with developing a well monitoring network, INTERA recommended the District consider developing the monitoring network over a period of several years. The expansion strategy focuses on prioritizing additions of existing wells into the monitoring program because it is more cost-effective and a quick way to expand the monitoring network over the near term. However, INTERA also recommends installing observation wells strategically throughout the District in order to increase the overall reliability of the network through time. Over the next decade, the proposed expansion strategy is to install two new observation wells each year and identify ten existing wells per year to add to the network. Monitoring well additions will initially be focused on aquifers that produce most of the water supply within the District. The Hosston aquifer currently provides the majority of groundwater used throughout the District, so under the proposed expansion strategy it will be first aquifer to have a complete monitoring network (estimated completion is 2028). The Woodbine and Paluxy aquifers will reach 80% completion by 2030 and 2035. The proposed expansion strategy timeline considers the significant resources the District must put forth each year to make progress towards completing the monitoring program.

Aquifer	Total Single Aquifer Wells	Actively Monitored
<i>Woodbine</i>	141	6
<i>Paluxy</i>	198	12
<i>Glen Rose</i>	135	2
<i>Hensell</i>	22	5
<i>Hosston</i>	114	39
<i>Twin Mountains</i>	22	1
Total	632	65

Table 1. Identified wells screened in a single aquifer.

G.2. - Management Objective: Upon approval of the District Monitoring Program, conduct water level measurements within the District as specified in the Monitoring Program.

Performance Standard: Annual evaluation of the water-level trends and the adequacy of the monitoring network to monitor aquifer conditions within the District and to monitor achievement of applicable desired future conditions. The evaluation will be included in the District's Annual Report to be given to the District's Board of Directors.

The District has focused its monitoring program efforts during 2022 on expanding the network of wells that are monitored. Figures 1 through 6 below show the long-term water level trends in the District. These figures also demonstrate how the density and spatial distribution of wells monitored in each aquifer is not sufficient for creating reliable water level surfaces across each aquifer. As the District expands the network of water level monitoring wells and collects data over multiple years, the trends will be reported to the Board and in the Annual Report.

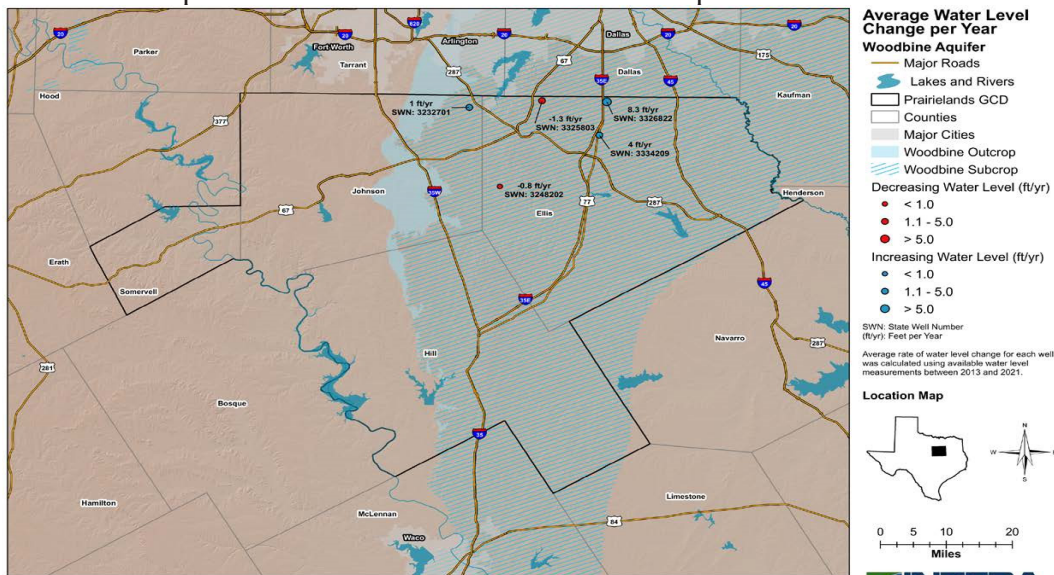


Figure 1. Average water level change in Woodbine aquifer between 2013 and 2021.

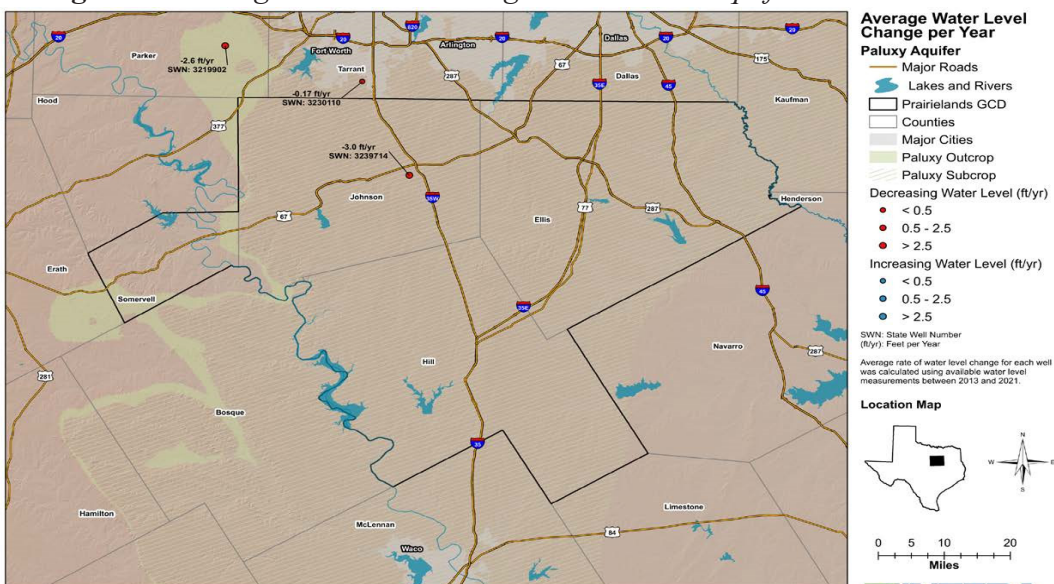


Figure 2. Average water level change in Paluxy aquifer between 2013 and 2021.

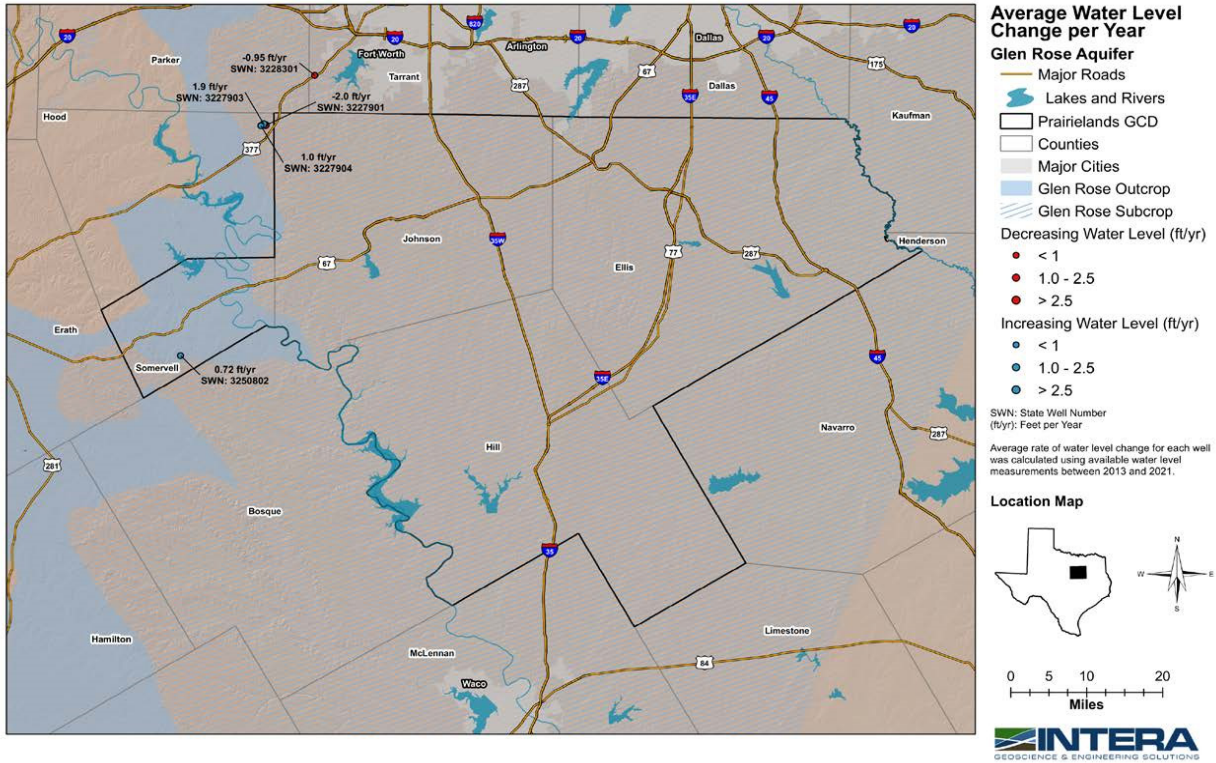


Figure 3. Average water level change in Glen Rose aquifer between 2013 and 2021.

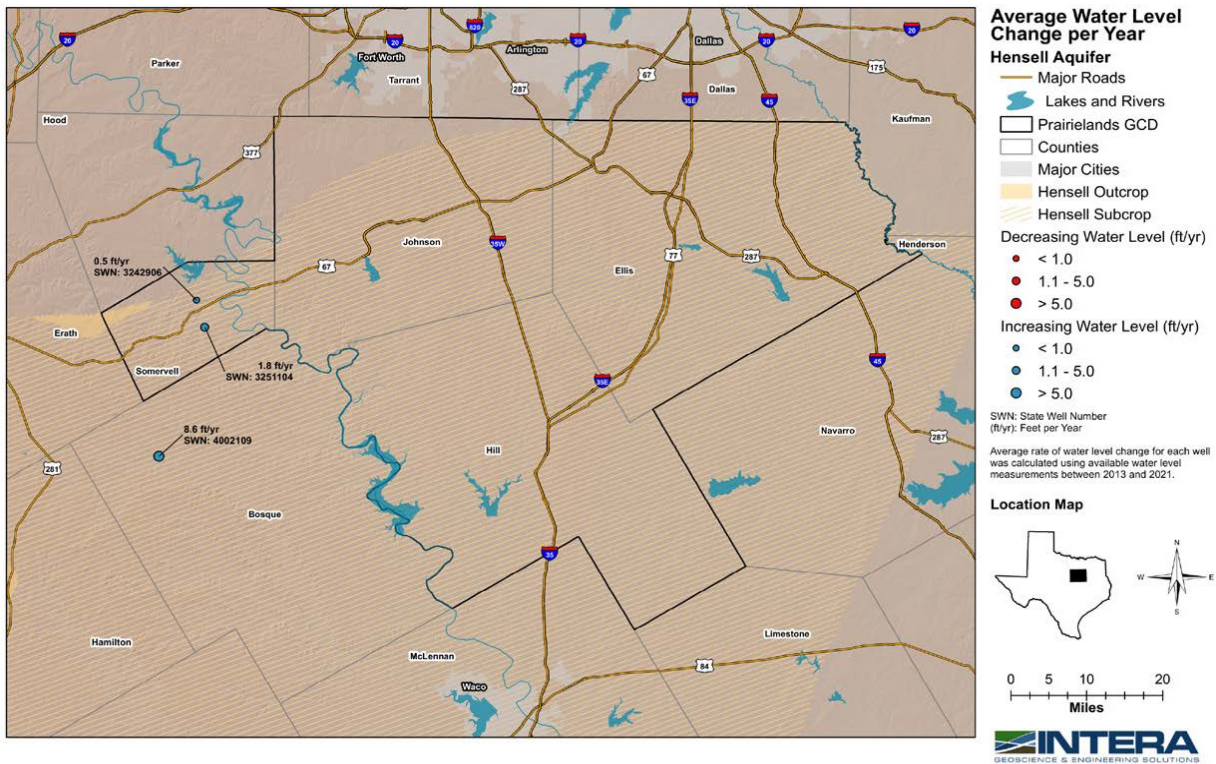


Figure 4. Average water level change in Hensell aquifer between 2013 and 2021.

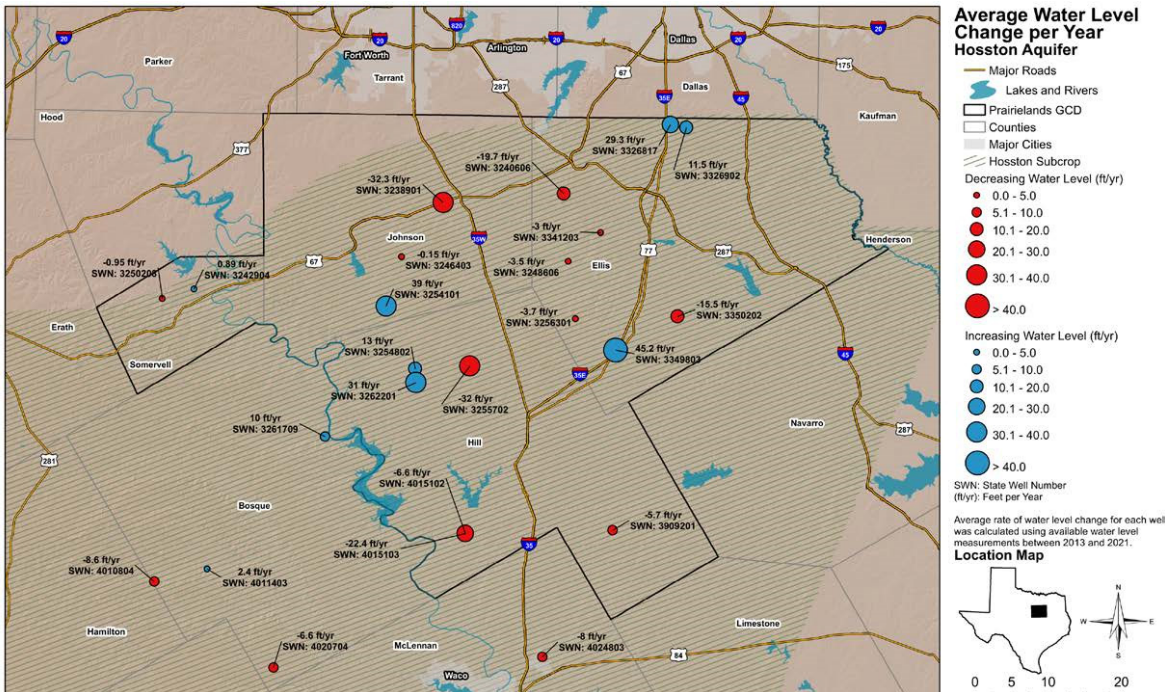


Figure 5. Average water level change in Hosston aquifer between 2013 and 2021.

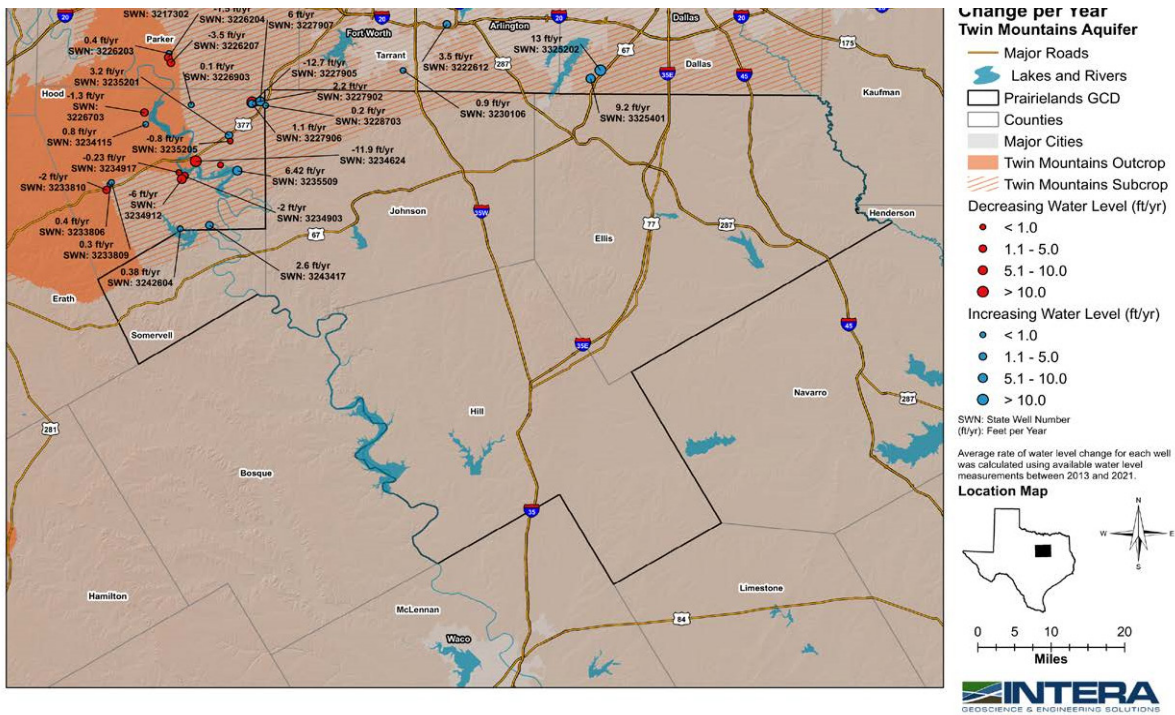


Figure 6. Average water level change in Twin Mountains aquifer between 2013 and 2021.

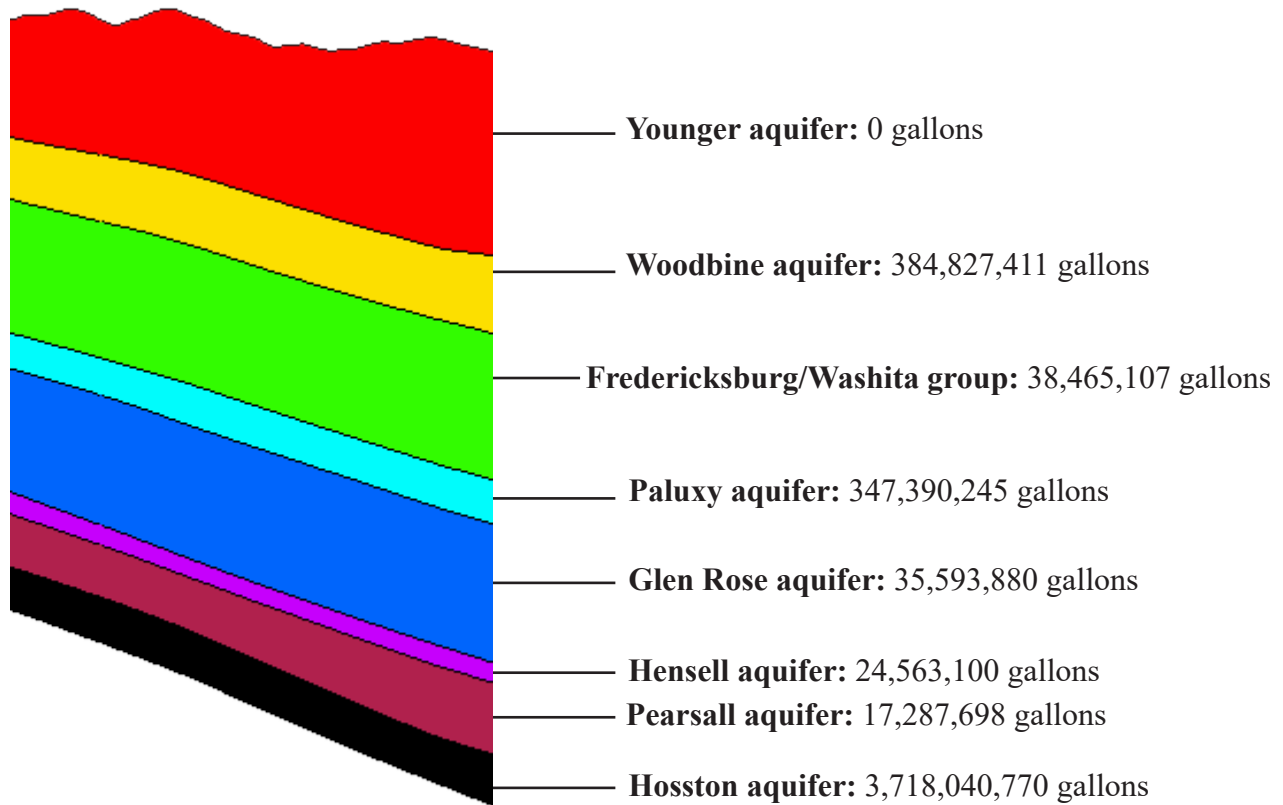
2022 Water Usage by Aquifer

G.3. - Management Objective: *The District will monitor non-exempt pumping within the District for use in evaluating the District’s compliance with aquifer desired future conditions.*

Performance Standard: *Annual reporting of groundwater used by non-exempt wells will be included in the Annual Report provided to the District’s Board of Directors.*

In 2022, non-exempt wells in the District reported groundwater use of 7,230,209,770 gallons. With the district’s Groundwater Management System, groundwater production can be tracked to specific aquifers and aquifer groups. Gallons produced by formation are listed below:

Note: Although non-exempt wells do not withdraw water from the Younger formation, the District has a number of registered exempt domestic wells producing water from this formation. However, these wells are not required to be metered and reported on.



Stratigraphy map provided by Aquaveo

**Some assumption is used on wells where aquifer formation production is not available.*

Production by Aquifer Groups:

Woodbine/Fredericksburg: 60,996,504 gallons

Hensell/Hosston: 68,257,396 gallons

Fredericksburg/Washita/Paluxy: 71,841,074 gallons

Hensell/Pearsall/Hosston: 633,596,002 gallons

Paluxy/Glen Rose: 62,441,200 gallons

Pearsall/Hosston: 1,753,694,304 gallons

Hensell/Pearsall: 13,215,079 gallons



PGCD

**PRAIRIELANDS GROUNDWATER
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