Strategic Water Vision 2021

Stakeholder Engagement Process Summary Report

Produced for the

Hays Trinity Groundwater Conservation District

Produced by:

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ABBREVIATIONS

AC	acre
AF	acre-foot
AFY	acre-feet per year
Carollo	Carollo Engineers, Inc.
Cfs	cubic feet per second
F	Fahrenheit
Ft	feet
GAM	Groundwater Availability Model
GCD	groundwater conservation district
GMA	Groundwater Management Area
Gpcd	gallons per capita daily
HTGCD	Hays Trinity Groundwater Conservation District
MAG	Modeled Available Groundwater
MG	million gallons
Mgd	million gallons per day
Msl	mean sea level
PWS	Public Water System
Region K	Lower Colorado Regional Water Planning Group
Region L	South Central Texas Regional Water Planning Group
RWPG	Regional Water Planning Group
sq. mi.	square miles
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TDC	Texas Demographic Center
TWC	Texas Water Code
TWDB	Texas Water Development Board
WMS	Water management strategy
WSC	Water Supply Corporation
WWTP	wastewater treatment plant
WTP	water treatment plant

EXECUTIVE SUMMARY

INTRODUCTION

Due to significant continuing growth and limited groundwater supplies in Hays County, there is a growing concern that water providers and their customers may be approaching the limits of available groundwater supply within the Hays Trinity Groundwater Conservation District (the District). During the record-setting drought of 2011, a significant number of wells were reported to go dry within the District. Since then, the District has identified almost 6,000 new households and businesses that rely solely on groundwater. When severe drought returns, there is the potential that groundwater users in the community could face widespread consequences.

In the interest of ensuring the long-term security of this important regional resource, the District implemented its Strategic Water Vision 2021 initiative - a three-month interactive stakeholder engagement process undertaken from October – December 2020 to encourage participation and solicit input on an appropriate path forward for the District. The Strategic Water Vision 2021 represents a collaborative groundwater planning process to effectively continue the management and regulation of the aquifer in a manner that will continue to support the ever-growing population of the area while providing for the health and safety needs of existing and future users of groundwater in Hays County. Importantly, the District has recognized that the engagement of stakeholders, formally or informally, does not end with the present effort. Indeed, the District has communicated a keen awareness of the need for collaboration with all groundwater users in order to most effectively ensure appropriate groundwater management and regulation.

STRATEGIC ENGAGEMENT PROCESS

The goal of the stakeholder engagement process has been to build a foundation based on input from identified stakeholders, focusing upon first developing a common understanding of the issues facing the District and groundwater users within the District. The process has focused on identifying sustainable water management solutions and feedback to meet the increasing local water needs and support the District's statutory objectives.

A comprehensive, categorized stakeholder contact list was developed categorizing Non-Exempt Stakeholders (Permittees), Exempt Stakeholders (Non-Permittees), and Elected/Public Officials. Engagement activities consisted of an online survey, two separate rounds of virtual stakeholder working group meetings for the dissemination of available information and solicitation of feedback, and a project hotline email for any other input. The online survey was emailed to 157 stakeholders from the initial contact list with an approximately 27% participation rate overall. The survey was live from Oct. 14 – Oct. 27, 2020 and generated valuable feedback on several water resource topics. In addition to the online survey, two rounds of virtual stakeholder working groups were conducted. Stakeholders from the project contact list were invited each meeting and were divided into groupings based on their respective categories, with elected/public officials invited to both group meetings. This allowed for a greater focus on the different

categories for stakeholders to discuss their views. Informative presentations, summaries of prior stakeholder feedback and open-ended discussion on a variety of groundwater management topics were offered at each round of meetings. Input collected from each engagement activity was used to develop a path forward and identify recommendations for the District. All materials and documented stakeholder feedback referenced herein can be found on the District's website, http://haysgroundwater.com/.

TECHNICAL SUMMARY

An extensive technical review was performed to summarize available information regarding recent groundwater use, projected water demands, supply availability, and water management strategies within the District. These technical drivers provide a context for current actions and inform the potential path forward necessary for the District's continued resource management per its legislative mandate.

Hays County has experienced unprecedented population growth over the last decade, and has been recently identified by the U.S. Census Bureau as having the second-highest growth rate of any county *in the nation*. Water providers and users in the District have historically relied upon groundwater supplies, but have increasingly needed to utilize additional alternative sources to meet their rapidly growing water demands. With greater attention to groundwater supplies has come the increased awareness of arising issues warranting increased study and regulation. Numerous studies suggest recent growth is expected to continue to increase, with water demands increasing accordingly. However, modeling of the aquifer performed by the State suggests that under present management conditions the current demands on the aquifer may be approaching the extent of the availability of water from the aquifer. While more refined modeling efforts supported by the District are underway, anecdotal evidence of increasing reports of dry wells suggest an immediate concern of availability.

Needs developed from the regional water planning process are projected to increase significantly for water user groups located within the HTGCD, from 2,200 AFY to 19,000 AFY over the 2020 – 2070 period. Such needs may exceed the present availability of groundwater resources as presently managed and regulated. Regional plans contemplate and recommend a broad suite of alternative water management strategies to meet these needs, with cost effective groundwater well construction and conservation strategies comprising near-term solutions.

FINANCIAL ANALYSIS

A high-level financial review of funding mechanisms established for local Groundwater Conservation Districts (GCDs), within the region was performed, including those of the District. Underlying legislative drivers forming the statutory basis for funding of these GCDs have been reviewed, and consideration given to similar potential revenue sources. A comparative assessment of the District's present funding mechanisms to the funding mechanisms of these other GCDs in the region indicates that the District is more limited in its ability to generate revenue than any neighboring GCDs. In fact, all other Central Texas GCDs have the ability to either levy taxes, assess fees, or both, whereas the District is currently unable to recover costs through either of these options (as shown in Figure 40). For those GCDs unable to assess ad-valorem taxes,

production fees (from non-exempt users) are the primary means of generating revenue to maintain a balanced budget and those districts' operations. Our limited research and analysis indicate that the District is the only groundwater conservation district in Central Texas that cannot utilize ad-valorem taxes or production fees for funding operations.

RECOMMENDATIONS/PATH FORWARD

As the District moves forward in continuing to uphold its charge and mission to make sound regulatory decisions and ensure that groundwater is used efficiently and at sustainable rates, it is anticipated that the stakeholder engagement efforts initiated as part of the *Strategic Water Vision 2021* process will continue. The valuable information gained from ongoing collaboration amongst all groundwater users can serve as a basis for the District to continue to serve the area through their mission. Six policy recommendations developed over the course of this process have been identified for the District's consideration:

1. Seek changes to enable legislation to allow for other forms of usage fees
2. Work with county and city officials to craft waterwise development ordinances, rules, incentives and supporting studies
3. Continue to promote and support state-of-the-art groundwater modeling and technical analyses to better inform water resource management
4. Explore and support studies investigating alternative groundwater management strategy projects beyond the construction of additional wells
5. Seek opportunities to promote conservation through educational efforts in support of the District's groundwater management plan
6. Increase educational efforts and outreach in the community

INTRODUCTION

The administration of groundwater management in Texas has been established by the Texas Legislature within the Texas Constitution, Article III, Section 52 or Article XVI, Section 59, which establishes a groundwater conservation district (GCD) as a district that has the authority to regulate the spacing of water wells, the production from water wells, or both. Chapter 36 of the Texas Water Code (TWC) provides the statutory provisions of Texas law relating to groundwater management in the state. GCDs are created either by the Texas Legislature, or by the Texas Commission on Environmental Quality (TCEQ) through a local petition process established via TWC §36.013 – §36.015. GCDs cover approximately 70 percent of the surface area of the state.

In 2001, the 77th Texas Legislature passed Senate Bill 2, forming the Hays Trinity Groundwater Conservation District ("HTGCD" or "District"). The District's boundaries (**Figure 1**) are coextensive with the boundaries of Hays County, Texas, excluding any area in Hays County that was, on the effective date of the legislation, within another GCD with authority to require a permit to drill or alter a well for the withdrawal of groundwater. However, "the legislation creating the District did not provide full Chapter 36 powers and placed limitations on district funding (only fees for well registration and connections to water systems) …" (HDR Inc., 2011).

The administration, powers, duties and financial provisions of the District's operation are established in Chapter 8843 of the Special District Local Laws Code. As established in this code, the District was created to serve a public use and benefit. Landowners must notify the District before the construction of a new well completed after September 1, 2013. The District may regulate withdrawals from wells, but may not regulate, permit or meter the following exemptions specified in Chapter 8843:

> "(1) a well used for domestic use by a single private residential household and incapable of producing more than 25,000 gallons per day; and
> (2) a well used for conventional farming and ranching activities, including such intensive operations as aquaculture, livestock feedlots, or poultry operations.
> (b) The District may not charge or collect a well construction fee for a well described by Subsection (a)(2).
> (b-1) A well owner must obtain a permit and pay any required fees, including a well construction fee, before using any groundwater withdrawn from a well for purposes other than those exempted by this section.
> (c) A well used for dewatering and monitoring in the production of coal or lignite is exempt from permit requirements, regulations, and fees imposed by the District.
> (d) The District may not enter property to inspect an exempt well without the property owner's permission."

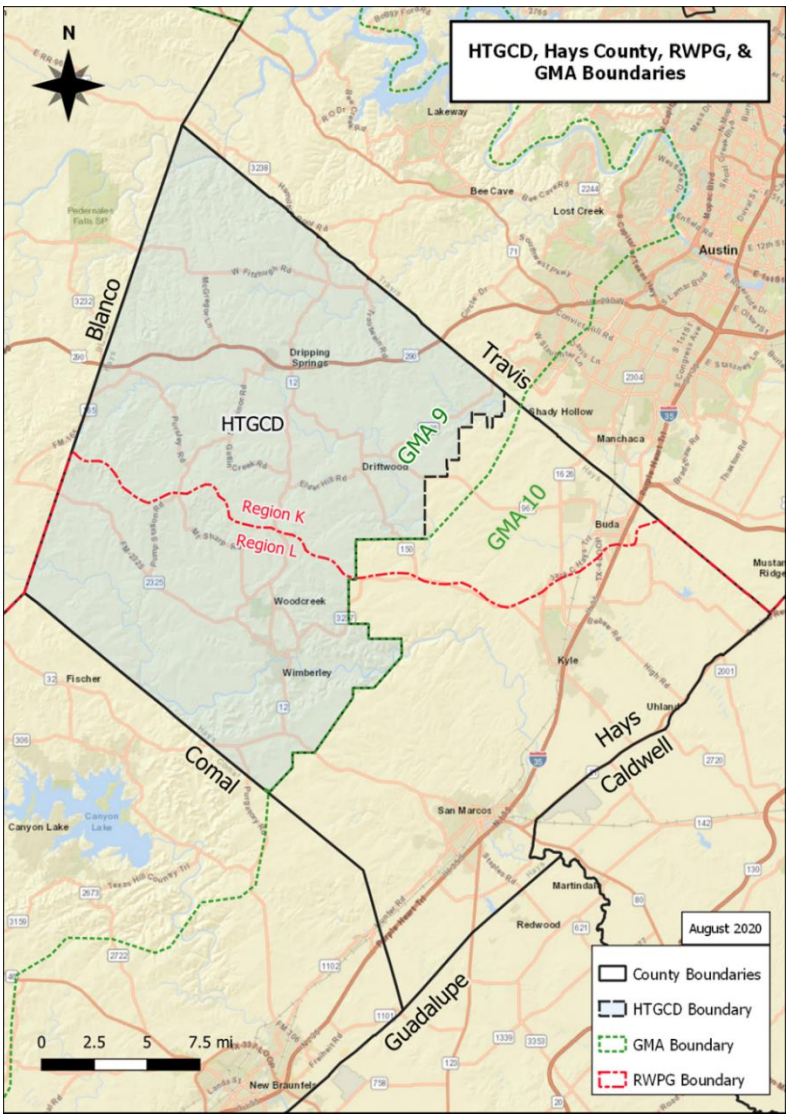


Figure 1 – Hays Trinity Groundwater Conservation District Boundaries
(Map data provided by TWDB GIS Datasets, ESRI, & HTGCD Staff.)

The aforementioned exemptions establish domestic and livestock wells that are referred to as “Exempt Wells” that are not required to be permitted by the District and are thus exempt from pumping restrictions.

OBJECTIVES OF STRATEGIC WATER VISION 2021

Due to significant ongoing growth and limited groundwater supplies in Hays County, there is a growing concern that the District may be approaching the limits of its available groundwater. During the record-setting drought of 2011, a significant number of wells were reported to go dry within the District. Since then, the District has identified almost 6,000 new households and businesses that rely solely on groundwater. When severe drought returns, there is the potential that groundwater users in the community could face widespread consequences.

Thus, in the interest of ensuring the long-term security of this important regional resource, the District implemented its *Strategic Water Vision 2021* initiative - a three-

month interactive stakeholder engagement process undertaken from October – December 2020 to encourage participation and solicit input on an appropriate path forward for the District. The *Strategic Water Vision 2021* represents a collaborative groundwater planning process to most effectively continue the management and regulation of the aquifer in a manner that will continue to support the ever-growing population of the area while providing for the health and safety needs of existing and future users of groundwater in Hays County.

Importantly, the District has recognized that the engagement of stakeholders, formally or informally, does not end with the present effort. Indeed, the District has communicated a keen awareness of the need for collaboration with all groundwater users to most effectively ensure appropriate groundwater management and regulation.

This report documents the implementation of the *Strategic Water Vision 2021* effort, reporting upon the process of engaging the District's stakeholders, summaries of the planning-level reviews of technical and financial information of relevance, and the conclusions and recommendations drawn over the course of this initiative. Based on the feedback received from stakeholders during the engagement process, and with the expectation of continued communication and collaboration in the future, it is anticipated that the District will consider moving forward with specific *Strategic Water Vision 2021* actions and/or recommendations identified herein.

STAKEHOLDER ENGAGEMENT PROCESS

A Stakeholder Engagement Plan was initially developed to provide an effective and efficient outreach and communication strategy for the District's *Strategic Water Vision 2021* effort. The goal of this process was to build a foundation based on input from stakeholders, focusing upon first developing a common understanding of the issues facing the District and groundwater users within the District, then discussing and identifying sustainable water management solutions and feedback to meet the increasing local water needs and support the District's statutory objectives. Broadly, the goals and objectives of the stakeholder engagement process were to:

- Establish a framework for stakeholder identification;
- Create an efficient, productive, and safe outreach schedule;
- Provide supplemental materials that offer readily accessible, meaningful information to stakeholders;
- Provide stakeholders the opportunity to be fully engaged and informed throughout the process; and
- Consider input from stakeholders.

Throughout the duration of this effort, safety guidelines were followed to ensure public safety given the ongoing COVID-19 pandemic. The engagement process thus necessarily included implementing several outreach tools to engage stakeholders virtually through the process. Those tools included:

- Creation of a stakeholder contact list utilized and updated throughout the process;
- Creation of a project email for notifications and project related questions and comments;
- Development of an online survey to garner baseline stakeholder feedback on issues related to limited groundwater in the area; and
- Development of public information materials including material for two presentations with visualizations that were presented at stakeholder working group meetings.

The full engagement plan can be referenced in **Appendix A.**

STAKEHOLDER IDENTIFICATION

In collaboration with District staff, a comprehensive, categorized stakeholder contact list was developed at the outset of this effort. This stakeholder list was updated throughout the project's duration and revised after engagement events based on the list of attendees or other requests for inclusion that were received. This list was categorized as follows:

Non-Exempt Stakeholders

- Permitted (including Water Supply Corporations, Industrial, etc.)

Exempt Stakeholders (non-permitted)

- Agricultural businesses such as irrigated farming and vineyards
- Residential areas and/or properties keeping livestock on property
- Environmental/Advocacy Groups

Elected and Public Officials

- Elected and Public officials from Hays County having constituents within the Groundwater Management Zone
- Independent School Districts
- Utility Districts and City staff

The stakeholder list was used to distribute notifications of upcoming stakeholder engagement opportunities and served as a foundation for categorizing and grouping stakeholders for the respective working group meetings. These groupings are discussed in greater detail in the section on *Stakeholder Working Group Meetings* presented later herein.

PUBLIC ENGAGEMENT OPPORTUNITIES

The *Strategic Water Vision 2021* stakeholder engagement process provided stakeholders multiple input opportunities. Those efforts included an online survey, two separate rounds of virtual stakeholder working groups and a project email hotline for comments and feedback provided outside of those engagement activities. Notifications were sent in advance of each engagement opportunity by email.

All notifications to stakeholders, engagement activities performed, and input received from each activity were documented and summarized throughout the process. In the sections below, additional details are provided for each public engagement activity along with a summarization of the results of that activity.

Letters

At the start of the process, introductory letters were drafted and approved by the District announcing the stakeholder engagement effort. These letters were sent to stakeholders comprised of elected officials, policy staff, homeowner associations, school board members and advocacy groups within the District area. The letters were mailed on October 9, 2020 to 46 recipients. The full distribution list and a copy of the introductory announcement letters can be found in **Appendix B.**

Online Survey

An online survey was created to obtain and share initial opinions from stakeholders on a number of water resources topics, which could then be shared at the initial working group meetings to better understand the breadth and extent of opinions held by participants. Invited participants for the survey included permitted and non-permitted groundwater users within the District area, as well as local resource organizations. The purpose of the survey was to provide an initial interaction point for identified stakeholders that were interested in engaging in a conversation with the District. The 20-question online survey was created requesting feedback on issues and concerns

regarding groundwater use, future demand and key issues to consider while planning for future growth in the area. The online survey was created using SurveyMonkey. The questions covered a range of topics related to groundwater, utilizing mostly multiple choice and ranking questions, with a few questions requesting open ended responses or requests for individual information by the survey participant. All questions were considered optional and participants could skip a question if desired or if it did not apply to them.

The survey went live on Oct. 14, 2020 and remained open until Oct. 27, 2020. The survey was closed for feedback at 11:59 p.m. on Oct. 27, 2020.

Notifications were sent to 157 stakeholders via email informing them of the stakeholder engagement process, the online survey (which included a direct link to the questionnaire) and how/where to provide additional questions or comments. The survey was open for participation and allowed for forwarding by the stakeholders (who received the original notifications) to their own constituents as they deemed appropriate. It is important to note that there were no controls on the survey for identifying stakeholders who participated. As previously stated, the purpose of the survey was to start the conversation with stakeholders interested in engaging with the District over the issues of water in the area. Dates of the notifications are outlined below in ***Table 1.***

Because certain contact information may have been initially unavailable, missing, or incorrect on the distribution list, some stakeholders were not able to participate in the online survey. If a request to take the survey (within the designated time frame) was made from someone outside of the contact list, a survey link was provided in response, and that contact was added to the stakeholder list for future notifications. Those that requested to take the survey outside of the live survey period were notified accordingly and subsequently offered the opportunity to provide feedback during the working groups and/or project hotline.

Table 1 – Timeline of Survey Notifications

Email Description	Date of Email
Intro email with survey link	Oct. 14, 2020
Reminder email with survey link	Oct. 22, 2020

The distribution list and sample copies of both email notifications can be found in **Appendix C.**

The survey results were recorded, analyzed and presented to the stakeholder working groups and posted to the District website. The survey questions and raw survey data can be found in **Appendix C**. A total of 41 participants took the survey putting the participation rate around 27 percent. The survey did not ask for direct contact information but requested that permittees identify that they had taken the survey in order to provide a better context for some of the answers to each question. It is important to note that the data and results derived from the survey may not represent all stakeholders who were invited to participate, as there was not 100 percent participation from all requested parties. As noted previously, the objective of the survey was to

provide an initial, general characterization of the opinions on stakeholder respondents in order to provide greater context for the facilitated discussions to occur during the working group meetings. A graphical representation of survey participants is provided below in **Figure 2**. Note with each graph, the number of participants who answered that specific question is provided in the bottom left corner.

Online Survey Results

Question 1: Zip Codes of Survey Respondents

**In what zip code do you live and/or operate your business?*

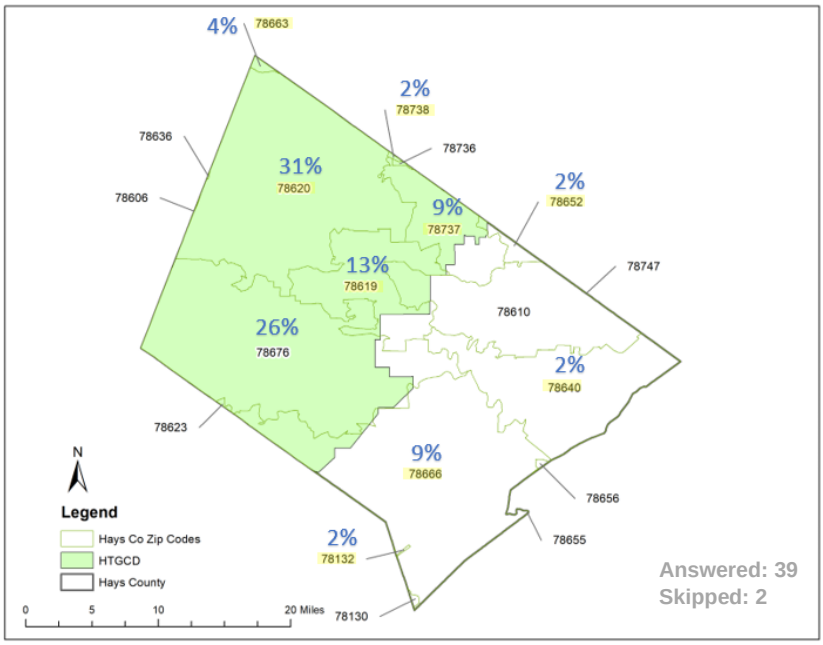


Figure 2 – Question 1 zip codes

As seen in the map above, a majority of the survey respondents (85 percent) lived and/or operated their businesses within the District boundaries as shown in **Figure 3**. The remainder of the respondents lived and/or operated their businesses within Hays County or represented elected officials or environmental organizations.

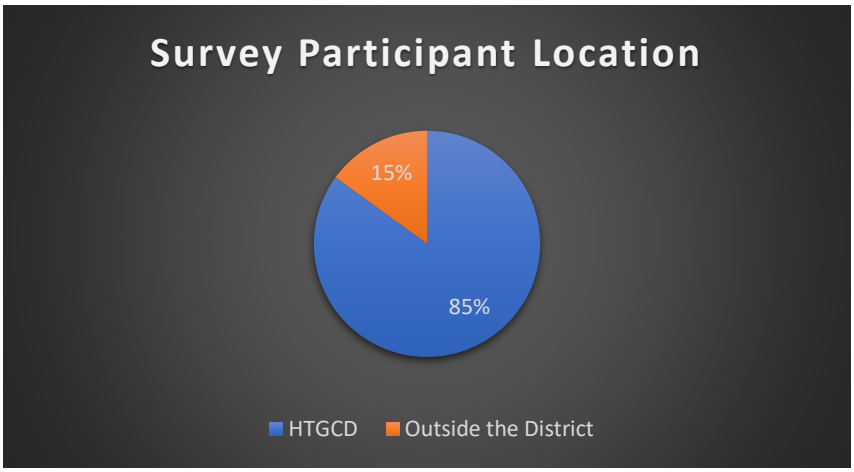


Figure 3 – Question 1 proportion of survey respondents with zip codes located within the HTGCD's jurisdictional area

Question 2: Water Use

**What is your primary use for water?*

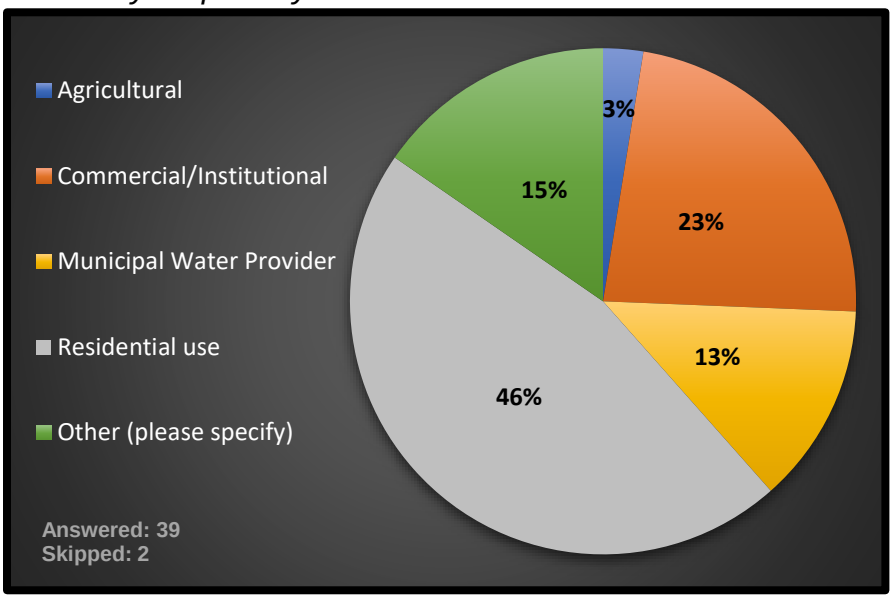


Figure 4 – Question 2 on Survey Respondent Water Use

As seen in the graph in **Figure 4**, the most notable source of water use is for residential purposes, with 46 percent of the response from survey participants. Of the surveyed respondents, 23 percent selected commercial/institutional, 13 percent specified municipal water provider, 3 percent specified agricultural and 15 percent stated other. The other sources included use for schools, recreation, environment and other businesses.

Question 3: Property Ownership

**How much property do you own/lease?*

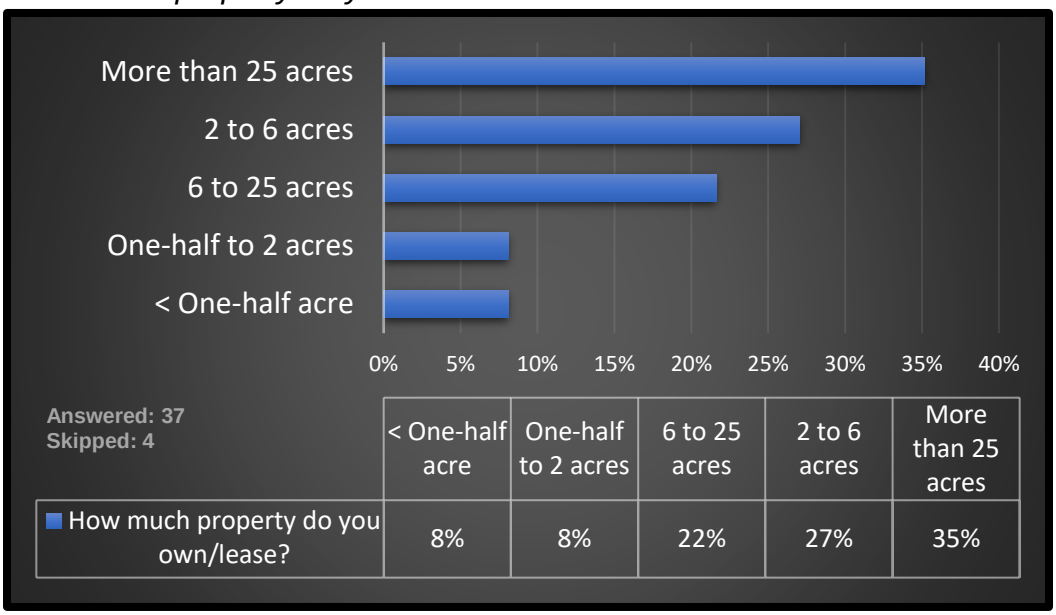


Figure 5 – Question 3 on extent of property leased by survey respondents

Approximately 35 percent of the respondents owned 25 acres or more, 27 percent owned 2 to 6 acres, 22 percent owned 6 to 25 acres, 8 percent owned one-half to 2 acres and the remainder owned less than one half acre.

Question 4: Primary Drinking Water Source

What is your primary drinking water source? *please specify

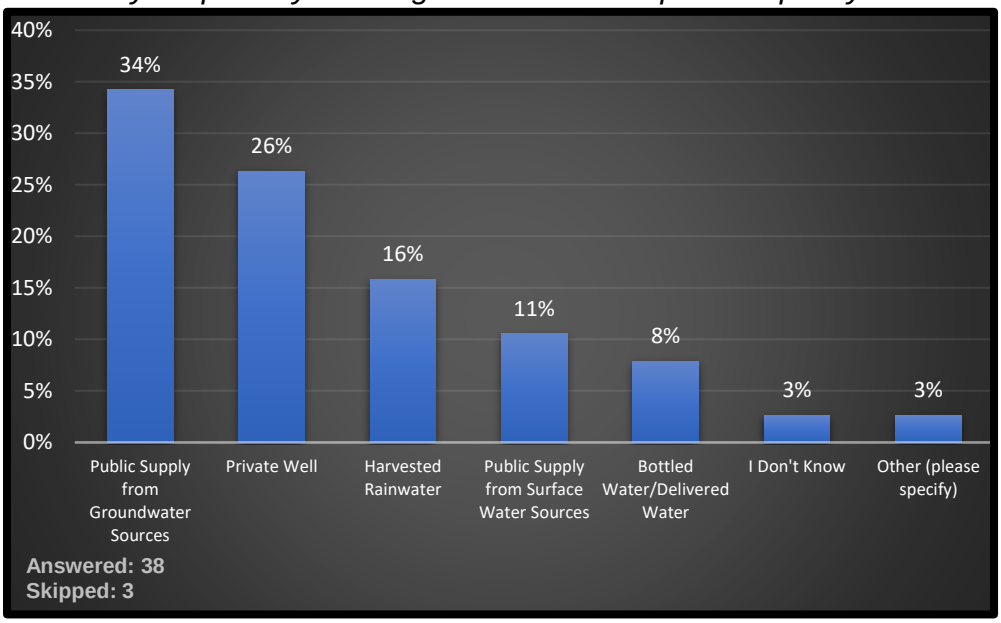


Figure 6 – Question 4 primary drinking water sources of survey respondents

Over half of the survey participants obtain drinking water from a public supply utilizing groundwater resources or a private well. As seen from these results, various other

sources were noted such as harvested rainwater, public supply from surface water, bottled or delivered water or those that receive water from multiple public sources.

Question 5: Current or Future Groundwater Resources

**Do you believe that plentiful groundwater resources exist to provide for the needs of our community for the following scenarios?*

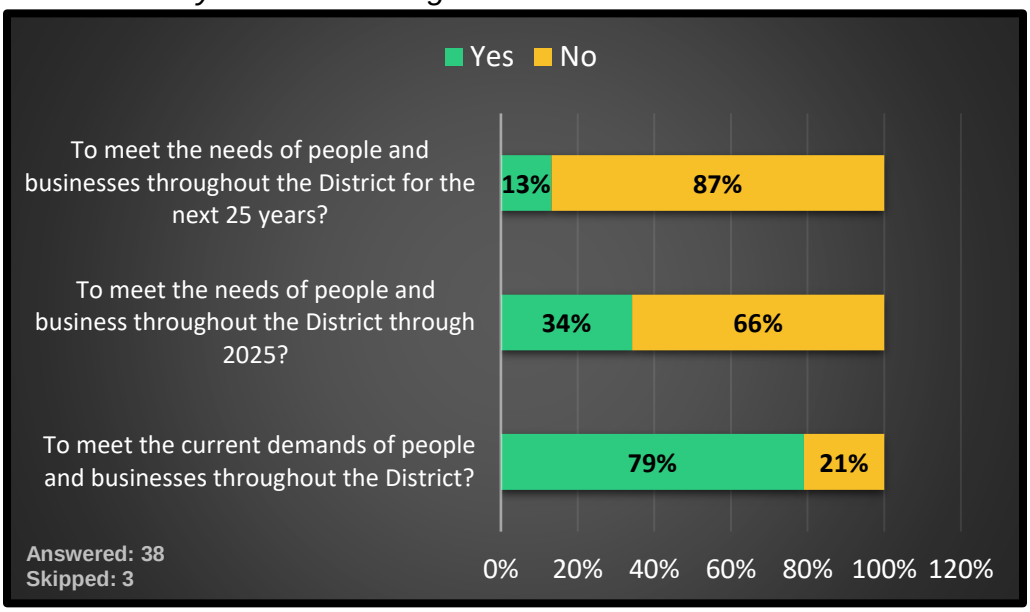


Figure 7 – Question 5 extent of sufficiency of groundwater resources from survey respondents

This question focused on opinions regarding groundwater resources to help address the stewardship of the District's groundwater moving forward. The respondents indicated that there are plenty of groundwater resources to meet current demand, with 76 percent feeling this confidence. That confidence decreases significantly to almost 66 percent believing groundwater will not be sufficient in the next 5 years and 87 percent believing that resources will not be able to meet needs of the community in the next 25 years.

Question 6: Groundwater Availability

What do you feel is the primary reason for overuse and/or decreasing availability of water resources in this District? *Select all that apply

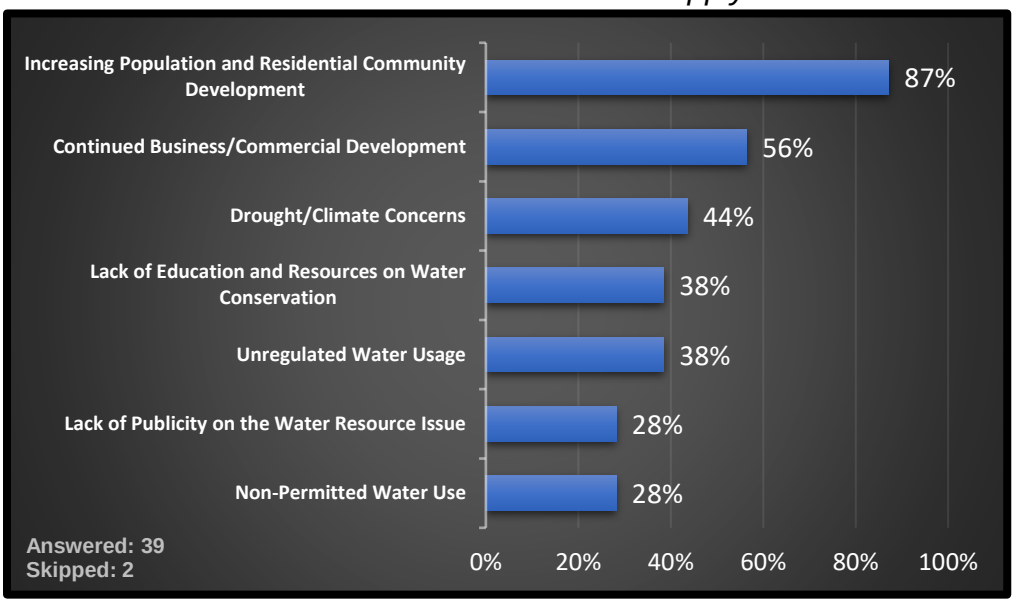


Figure 8 – Question 6 reasons for decreasing availability from survey respondents

Survey participants could mark more than one option and almost 90 percent of survey respondents noted that the increasing population in the area and the increase in community development are a major impact on water supplies. It was noted by 56 percent of the respondents that continued business/commercial development were also an issue.

Question 7: Alternate Water Supplies for Future Growth

**Should residents and businesses of the District be considering alternate supplies for future growth?*

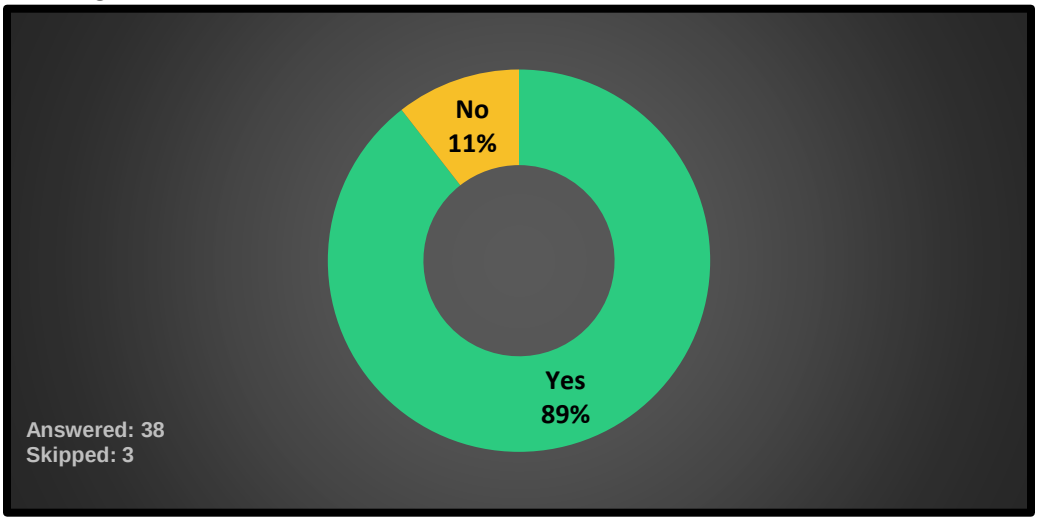


Figure 9 – Question 7 survey respondents' consideration of alternate water supplies

Of the surveyed respondents, 89 percent noted that alternate supplies should be considered. Where participants could provide more information, the respondents noted:

- Rainwater harvesting as the most favored with (21 out of 38 responses)
- Various emerging technology methods such as Desal, aquifer storage and recovery, and reuse (5 responses)
- Additional surface water acquisition (4 responses)
- Conservation, regulatory and contractual methods

Question 8: Water Decline Effect on Wells

**Did your well(s) go dry or suffer from water quality declines during the drought of 2009-2011?*

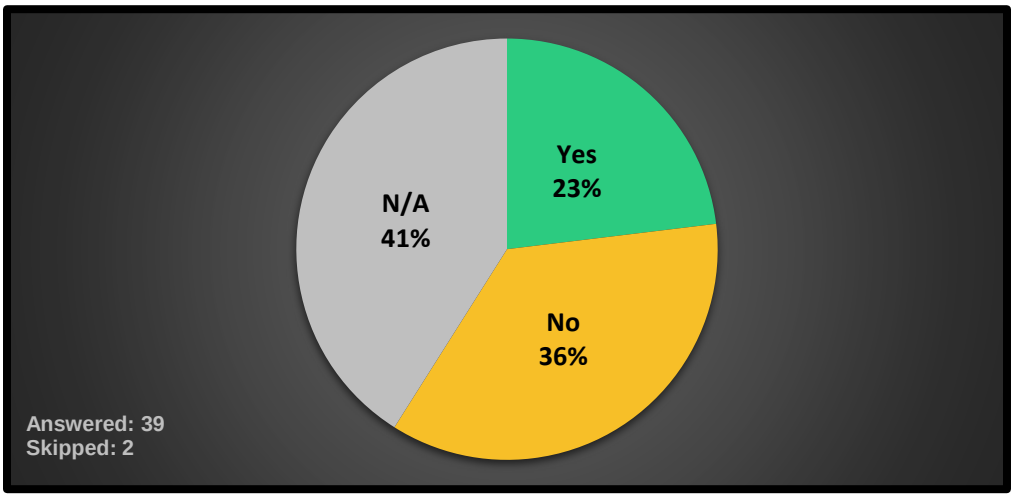


Figure 10 – Question 8 adequacy of survey respondents wells during drought conditions

In the drought of 2009-2011, 23 percent of respondents noted that their water quality suffered, 36 percent said theirs did not and 41 percent noted it was not applicable to them.

Question 9: Water Management Strategies During Drought/Scarcity

During drought or scarcity of groundwater, adequate groundwater supply may not be available for all groundwater uses.

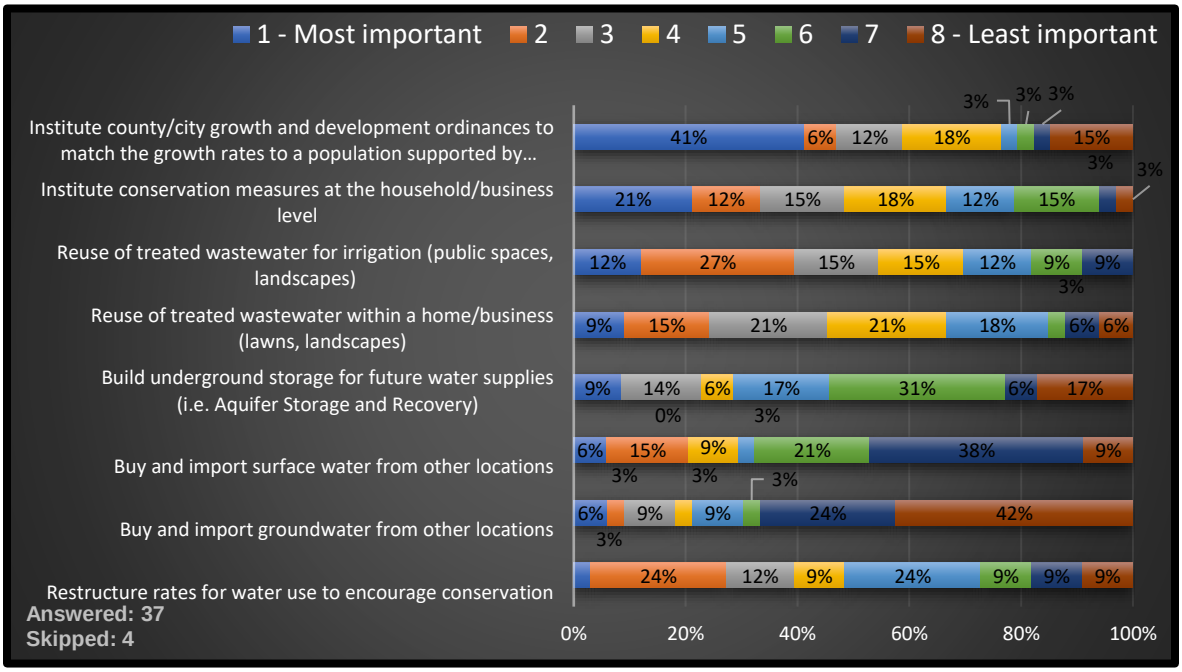


Figure 11 – Question 9 feasible water management strategies identified by survey respondents

Respondents were asked to rank strategies for the community to consider when faced with limited groundwater. The eight strategies presented included:

- Institute county/city growth and development ordinances to match the growth rates to a population supported by existing water supply
- Institute conservation measures at the household/business level
- Reuse of treated wastewater for irrigation (public spaces, landscapes)
- Reuse of treated wastewater within a home/business (lawns, landscapes)
- Build underground storage for future water supplies (i.e., Aquifer Storage and Recovery)
- Buy and import surface water from other locations
- Buy and import groundwater from other locations
- Restructure rates for water use to encourage conservation

Instituting county/city growth and development ordnances to match the growth rates to the population supported by existing water supply was ranked number one the most, however it was also ranked number eight the third most. Growth controls and buying and importing groundwater was considered least important to consider.

The results of this survey question suggest stakeholders' awareness that no single solution will address water supply issues in the District, but rather a suite of solutions will likely be important. Trying to prioritize and find complimentary efforts to provide workable solutions will be critical.

Question 10: Water Use Prioritization When Resources Are Stressed

In cases where groundwater availability becomes stressed due to either increases in water demand or decreases in supply, rank (#1 being most important) the following groundwater uses that should be prioritized after allocation of limited supplies for drinking?

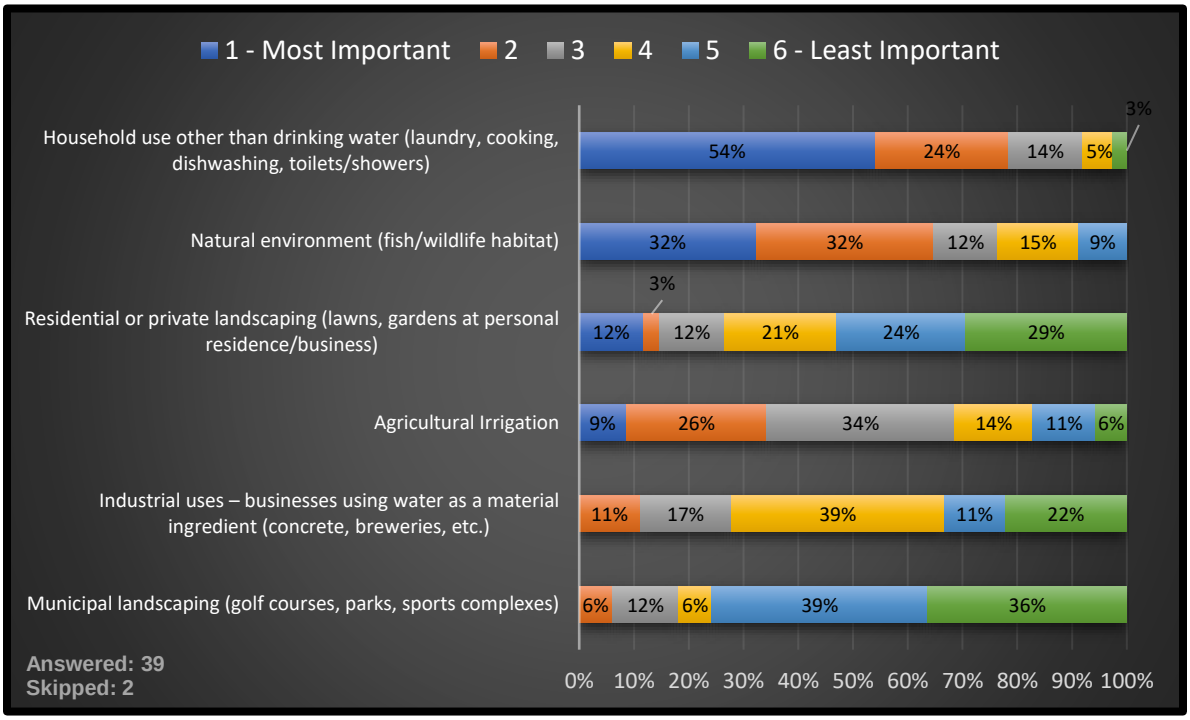


Figure 12 – Question 10 ranking of groundwater uses by survey respondents

The six strategies noted included:

- Household use other than drinking water (laundry, cooking, dishwashing, toilets/showers)
- Natural environment (fish/wildlife habitat)
- Residential or private landscaping (lawns, gardens at personal residence/business)
- Agricultural irrigation
- Industrial uses – businesses using water as a material ingredient (concrete, breweries, etc.)
- Municipal landscaping (golf courses, parks, sports, complexes)

Household use was ranked highest by 54 percent of participants and 92 percent ranked it in the top three. Municipal landscaping was noted as the lowest, with 75 percent of respondents ranking it five or six – the lowest ratings. With residential coming up next in the lowest rankings overall.

Question 11: Exemptions from Conservation Activities

*Which activities should be exempt from water conservation activities? *Select all that apply**

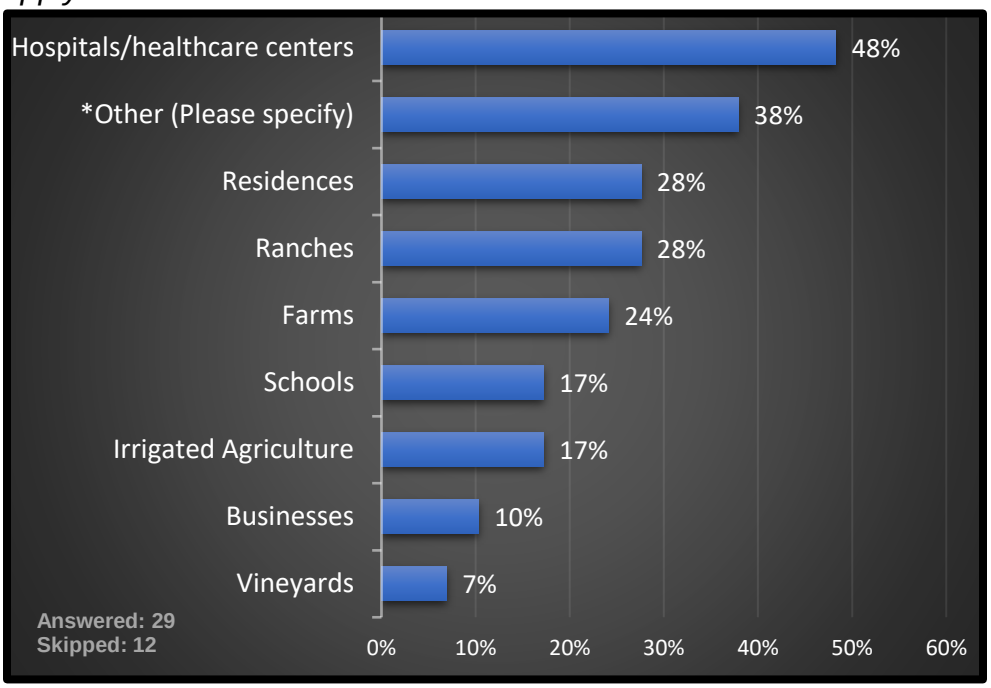


Figure 13 – Question 11 potential exemptions from conservation identified by survey respondents

Participants were asked to note which activities should be exempt from water conservation noting that respondents can select more than one activity:

- 48 percent said hospitals and healthcare centers
- 38 percent (or 11 total participants) selected “Other.” Conclusively, 100 percent of those 11 participants specified that “no one should be exempt” from conservation activities.
- 28 percent noted residences and ranches, respectively
- 24 percent noted farms
- 17 percent noted schools and irrigated agriculture, respectively
- 10 percent noted businesses
- Seven percent noted vineyards

Question 12: Drought Conservation Options

*What are the best options for conserving groundwater in a drought? *Select all that apply**

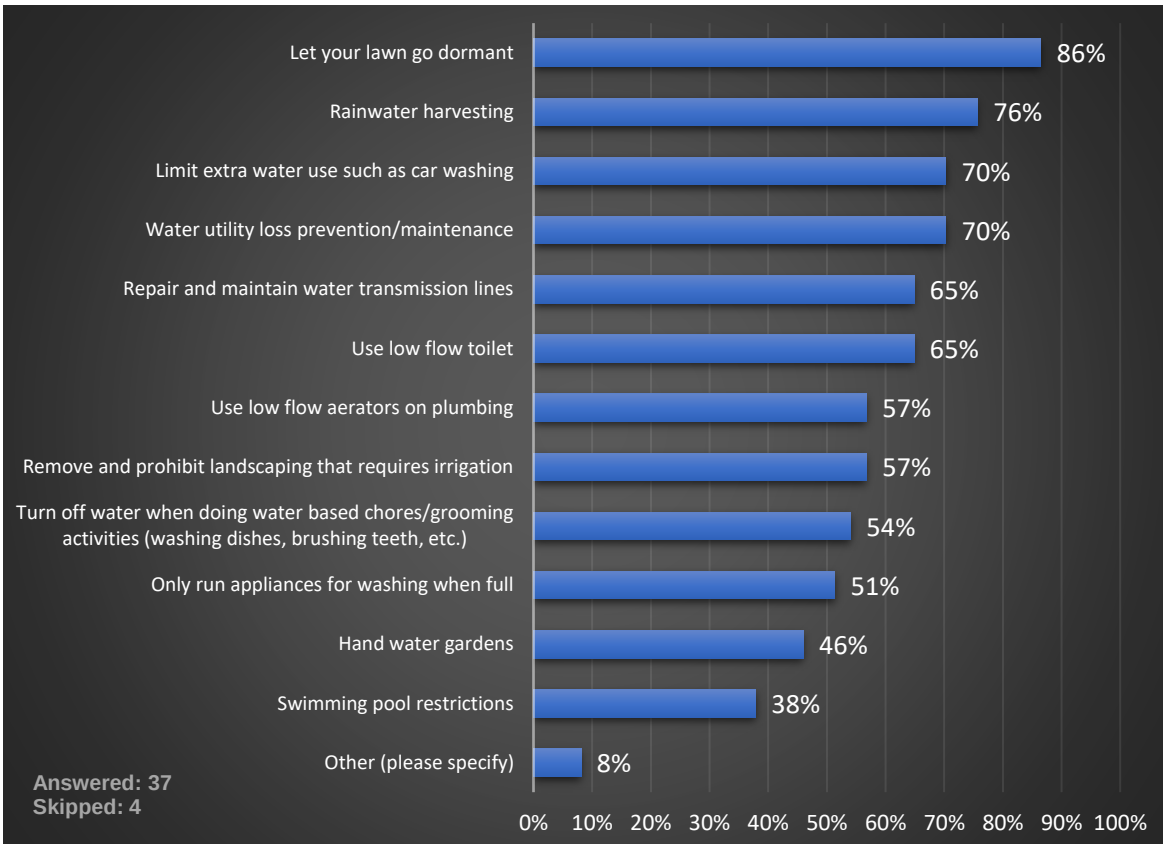


Figure 14 – Question 12 options for conservation identified by survey respondents

The top five most selected options from the survey were:

- 86 percent said let your lawn go dormant (32 of the 37 respondents selected this option)
- 76 percent said to harvest rainwater (28 of the 37 respondents selected this option)
- 70 percent said limit extra water use such as car washing (26 of the 37 respondents selected this option)
- 70 percent also said water utility loss prevention/maintenance (26 of the 37 respondents selected this option)
- 65 percent said to repair and maintain water transmission lines (24 of the 37 respondents selected this option)

Eight percent said other which included responses such as:

- New construction incentivizing low flow water conserving appliances and replacement in older homes/businesses
- Limit agricultural irrigation (there are too many vanity farms growing grapes/olives)

Question 13: Well Protection

Do you feel that your well has been protected as a result of the District's rules and regulation?

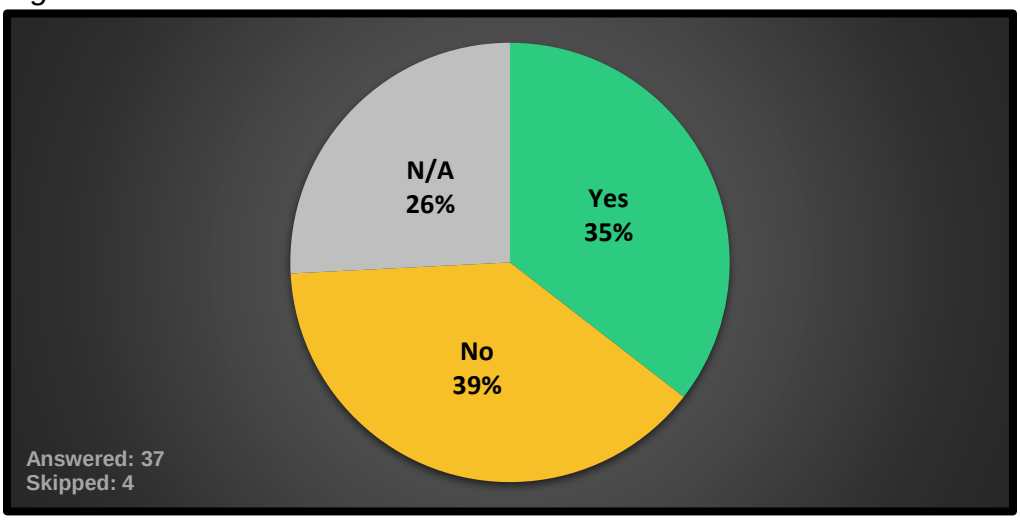


Figure 15 – Question 13 extent of well protection identified by survey respondents

Survey participants were fairly equally split by either yes or no. Approximately one-quarter of the respondents indicated that this question was not applicable to them.

Question 14: Fairness of Rules

Are the Districts' rules fair to all users?

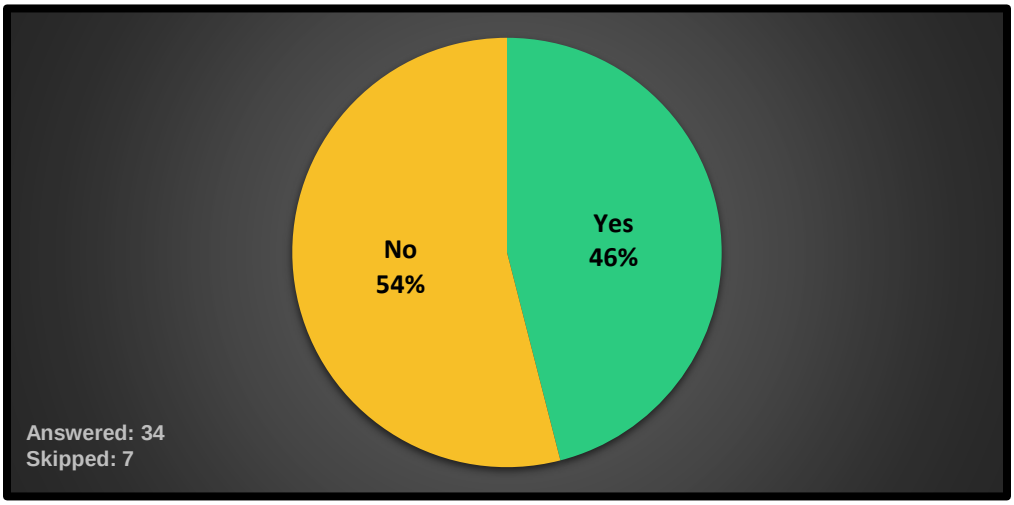


Figure 16 – Question 14 fairness of District rules identified by survey respondents

This question was focused on the direct impacts of the District and how the current rules and regulations impact the participants' current practices. Regarding the opinion of fairness of the District's rules, 46 percent of survey participants believed the rules were fair, while 54 percent did not feel the rules were fair.

Question 15: Future District Permit Issuance

Once the quantity of groundwater allocated in issued permits and estimated exempt use equals the allocated groundwater that protects existing wells from extensive drawdown, should the District continue to issue permits?

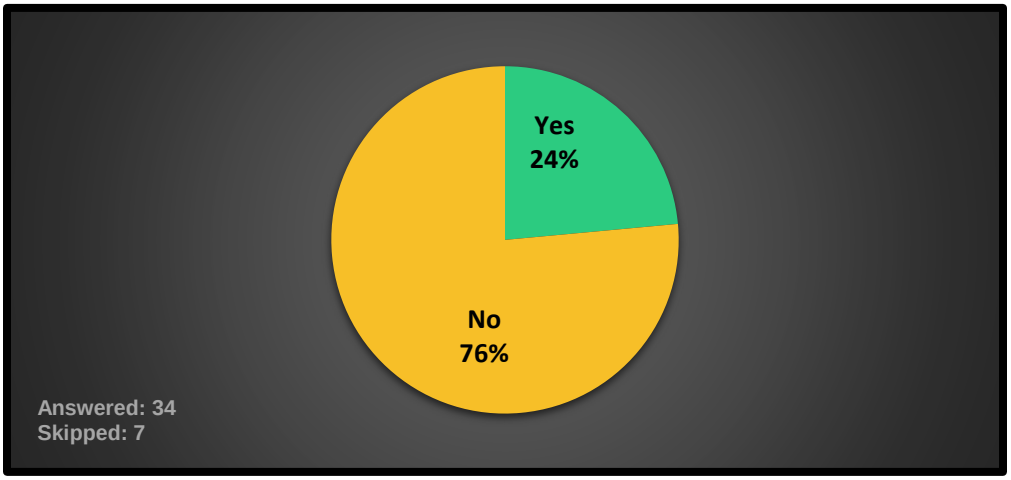
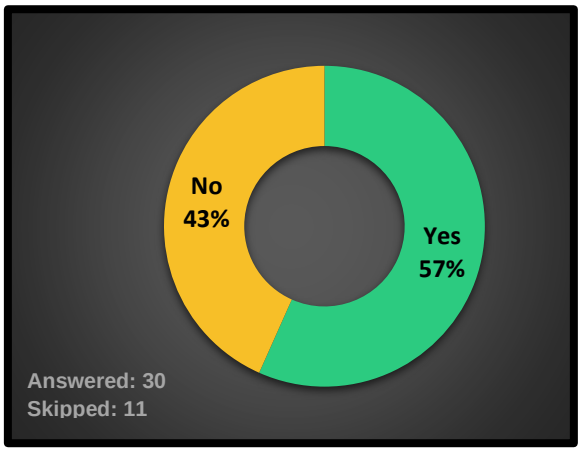


Figure 17 – Question 15 potential for future issuance of permits identified by survey respondents

As seen from the results, 76 percent of survey respondents noted that additional permits should be prohibited once the estimated exempt use and existing permitted use and existing permittee use equals the allocated groundwater, while 24 percent noted they believed the District should continue to issue permits.

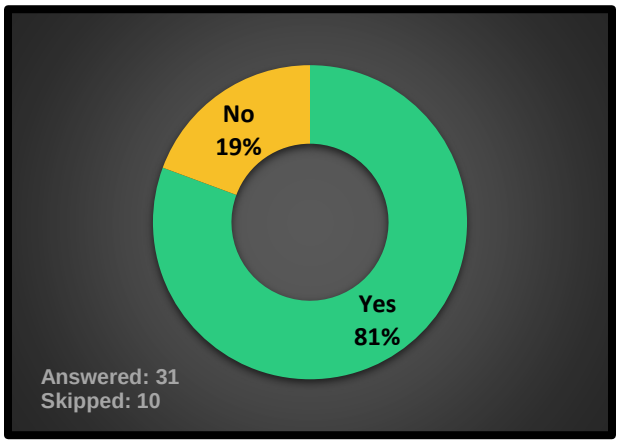
Question 16: Groundwater Cost

Should groundwater continue to be free?



Question 17: Groundwater Cost

If groundwater was not free, do you think people would be more likely to conserve it?



Figures 18 & 19 – Question 16 and Question 17 price and value of groundwater as identified by survey respondents

The set of questions above noted if groundwater should still be free. The results concluded that 57 percent believe groundwater should continue to be free, while 43

percent said no. However, 81 percent of survey respondents indicated that if groundwater were not free, users would be more likely to conserve it.

Question 18: Management Fees

Are the District's management fees equitability distributed among permitted and non-permitted users?

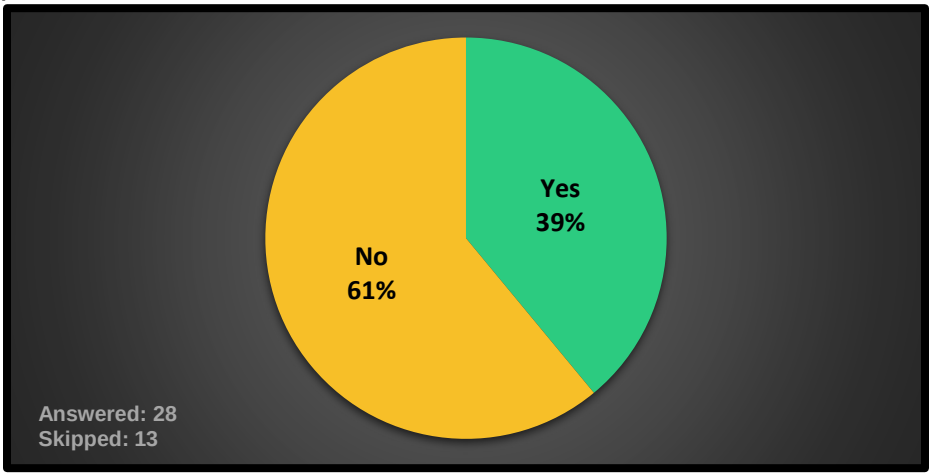


Figure 20 – Question 18 distribution of District management fees as identified by survey respondents

Regarding the management fees of the District, 61 percent of respondents believe that the fees are not equally distributed among permitted and non-permitted users, 39 percent do believe they are equally distributed.

Question 19: Fee Structure

If groundwater is not free, what is your vision of a fair fee structure?

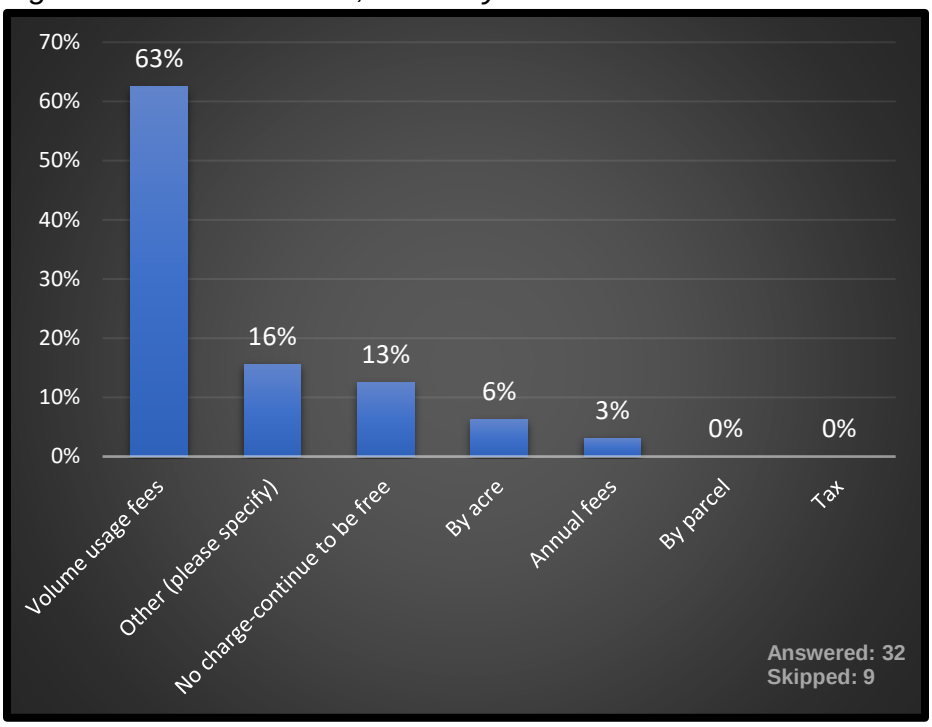


Figure 21 – Question 19 fairness of alternative fee structures as identified by survey respondents

Of the respondents, 63 percent noted that volume usage fees would be the fairest structure, the other fee structures included by acre at six percent and by annual fees at three percent. Some respondents also noted additional ways such as:

- Having an annual fee based on maximum allocated usage in a graduate level would allow for a tiered system
- Educate users and/or regulate usage, but keep water free
- Charging rates based on local value of other regional water

Question 20: Permittees

This question asked for Permittee contact information if applicable.

Stakeholder Working Group Meetings

Subsequent to the initial survey, two rounds of stakeholder working group meetings were held as part of the *Strategic Water Vision 2021* initiative. The first round of meetings was held on Nov. 9 – 10, 2020, and the second round of meetings were held on Dec.1 – 2, 2020. Two meetings were held each round, representing different groups of stakeholders, for a total of four meetings. As noted previously, these meetings were held virtually using the Zoom webinar platform.

Each virtual meeting was scheduled in the evening, at 5:30 p.m. CST, to allow for the best opportunity for participation outside of normal business hours. The meeting time was budgeted for approximately two hours but was left open-ended for discussions that lasted longer than that time frame. The format of each virtual meeting used visualizations and informative content presented via PowerPoint, along with a question-and-answer discussion period. The purpose of these virtual stakeholder working group meetings was to provide informative content then allow participants to provide feedback in a collaborative manner. The meeting agendas, meeting materials, and meeting minutes from each meeting can be found in **Appendix D.**

The stakeholder working group meetings included inviting previously identified stakeholders to provide feedback during each meeting. As noted above, the stakeholders were categorized and aggregated into two groups. The purpose of the groupings was to obtain distinctive feedback from both the non-permitted/non-exempt and exempt/advocacy groups, respectively. Elected officials/policy staff within the District area and other local representatives were invited to participate in both group meetings to allow for greater opportunity to observe the breadth of stakeholder views. Groupings were created to provide commonalities among participants. The categories of stakeholders that were involved in Group 1 and Group 2 are outlined below in **Table2**.

Table 2 – Stakeholder Groupings

Group 1 (Non-Exempt)	Group 2 (Exempt)
Permittees	Advocacy Groups
HOAs	Agricultural/Ranches
Schools/ISDs	Residential
	Vineyards
	Government Entities
Elected Officials/Policy Staff	Elected Officials/Policy Staff
Other Groundwater District Representatives	Other Groundwater District Representatives

The information and materials presented at each group meeting for both rounds were identical - although the discussion points did vary from group to group. A high-level summary each the discussion highlights from each round and group is presented later in this section.

Notifications

Invitations were sent by email to 137 identified stakeholders for Group 1 and 49 identified stakeholders for Group 2. Copies of each email notification sent, along with the distribution lists for Group 1 and Group 2, are provided in **Appendix D**.

Table 3 below outlines each notification email sent, to whom it was sent, and the date of each email notification.

Table 3 – Email Notification Schedule and Dates Sent

Email Description	Sent to	Date of Email(s)
Round 1 Stakeholder Working Group Invite for Nov. 9	Group 1 ALL	Oct. 27, 2020
Round 1 Stakeholder Working Group Invite for Nov. 10	Group 2 ALL	Oct. 22, 2020
Nov. 9 Meeting Details	Group 1 RSVPs	Oct. 27 – Nov. 9, 2020*
Nov. 10 Meeting Details	Group 2 RSVPs	Oct. 28 – Nov. 10, 2020*
Reminder - Round 1 Stakeholder Working Group Invite for Nov. 9	Group 1 ALL	Nov. 4, 2020
Reminder - Round 1 Stakeholder Working Group Invite for Nov. 10	Group 2 ALL	Nov 4, 2020
Reminder – Nov. 9 Meeting Details with agenda	Group 1 RSVPs	Nov. 6 – Nov. 9, 2020*
Reminder – Nov. 10 Meeting Details with agenda	Group 2 RSVPs	Nov. 6 – Nov. 10, 2020*
Round 2 Stakeholder Working Group Invite for Dec. 1	Group 1 ALL	Nov. 19, 2020
Round 2 Stakeholder Working Group Invite for Dec. 2	Group 2 ALL	Nov. 19, 2020
Dec. 1 Meeting Details	Group 1 RSVPs	Nov. 19 – Dec. 1, 2020*
Dec. 2 Meeting Details	Group 2 RSVPs	Nov. 19 – Dec. 1, 2020*
Reminder 1 - Round 2 Stakeholder Working Group Invite for Dec. 1	Group 1 ALL	Nov. 24, 2020
Reminder 1 - Round 2 Stakeholder Working Group Invite for Dec. 2	Group 2 ALL	Nov. 24, 2020
Reminder 2 - Round 2 Stakeholder Working Group Invite for Dec. 1	Group 1 ALL	Nov. 30, 2020
Reminder 2 - Round 2 Stakeholder Working Group Invite for Dec. 2	Group 2 ALL	Nov. 30, 2020
Reminder – Dec. 1 Meeting Details with agenda	Group 1 RSVPs	Nov. 30 – Dec. 1, 2020*
Reminder – Dec. 2 Meeting Details with agenda	Group 2 RSVPs	Dec 1 – Dec. 2, 2020*

**dates are reflective of individual response emails sent over a period of time prior to the meeting date*

Round 1 Stakeholder Working Group Meetings

The purpose of the first round of meetings was to provide stakeholders with a high-level technical summary of groundwater usage, future demands, recommended water strategy types and knowledge gaps/needs for improved information. In addition, a summary of the survey results was presented to characterize stakeholders' responses to the surveyed questions. The same presentation was given to both Group 1 (Nov. 9, 2020) and Group 2 (Nov. 10, 2020).

The presentation for the Round 1 meeting included a summarized presentation on technical information to help inform stakeholder deliberations and discussion. The technical analysis characterized the recent history of groundwater use in the District, utilizing historical data on reported non-exempt groundwater pumping in the context of monthly and annual use by category in relation to exempt and permitted (but not yet used) amounts. Also noted were uncertainties in the characterization of exempt use and source availability, relative to the modeled characterization of availability of water from the Hays County portion of the Middle Trinity aquifer developed by the State for the joint groundwater planning process. The increasing reports of dry well incidents from 2009-2015 were presented along with recent information from regional water planning efforts, with particular attention given to the characterization of projections of future water demand and its derivation, the quantified availability of existing supplies, projections of need over the 2020-2070 regional water planning horizon, and a general characterization of the recommended water management strategies for various water providers within the District.

After the presentation of the technical summary, an open Q&A discussion period was held to allow for stakeholders an opportunity to provide feedback and ask questions (discussed in more detail below).

The meeting materials presented at both meetings included a meeting agenda, the Technical Analysis presentation slides and the Survey Analysis Presentation slides. The meeting agenda, presentations and meeting minutes can be found in **Appendix D.**

Round 1 Meeting for Group 1 (Nov. 9, 2020)

Highlights of Q&A Discussion

The Group 1 attendees discussed issues surrounding different conservation measures, incentives and ideas for groundwater management practices that can be explored. Some of those ideas included:

- Recommendations for artificial turf, reuse and indirect reuse for irrigation
- Projected growth in Hays County, increasingly limited resources, the uncertainties in water use for exempt users and how that would impact water availability projections in the future
- More rigorous and defined modeling would be needed to project more accurate projections of future use, aquifer levels, future demand, etc.

- Utilizing modeling such as the Blanco River Aquifers Tool for Water and Understanding Resiliency and Sustainability Trends (BRATWURST) model to better understand the specifics of the aquifer would need to be implemented
- Water strategies like conservation would not be enough and multiple water management practices would need to be executed to make a significant impact and preserve the groundwater
- Two different types of irrigation are done within the District, one is residential and the other agriculture (the District does not manage or regulate irrigated agriculture like many other groundwater districts in the State)
- Potential need for additional authority from the District
- Aquifer storage and recovery (ASR) feasibility in this District

The full notes from the meeting can be found in **Appendix D.**

Attendance

There was a total of 18 attendees present at the Nov. 9, 2020 meeting, including two elected officials, as shown in **Table 4** below.

Table 4 – Attendees of Round 1, Group 1 Meeting (November 9, 2020)

Name	Organization
Attendees	
*Commissioner Lon Shell	Hays County, Precinct 3
*Commissioner Walt Smith	Hays County, Precinct 4
Eugenie Schieve	Office of Rep. Erin Zwiener
Becca Mlenar	Driftwood Recovery
Chip Schwamb	Skyline Estates WSC
Cliff Finley	Radiance WSC
Danny Ross	Camp Young Judea
Garrett Allen	Wimberley WSC
Jennifer Riechers	West Travis County PUA
JJ Rivera	Radiance WSC
Kurt Holman	Lauren Concrete
Kent Killough	Vista Brewing
Kyle Dannhaus	Dripping Springs WSC
Max Cleaver	Hays CISD
Paul Kennedy	Stay N Play Ranch
Roger Moore	Cottonwood Creek RV Park
Scott Way	Seven A Ranch Resort
Terry Shaw	Radiance WSC
HTGCD Staff, Board, and Consultants	
Charlie Flatten	HTGCD (General Manager)
Keaton Hoelscher	HTGCD (Staff)
Philip Webster	HTGCD (Staff)
Holly Fults	HTGCD (Board)
John Worrall	HTGCD (Board)
Mitzi Ellison	NLA (Public Involvement Lead)

Name	Organization
Lauren Canales	NLA (Public Involvement Support)
Dr. David Harkins, PH. D, P.E.	Carollo Engineers, Inc. (Engineer)
Tony Smith, P.E.	Carollo Engineers, Inc. (Engineer)

**elected official*

Round 1 Meeting for Group 2 (Nov. 10, 2020)

Highlights of Q&A Discussion

The Group 2 attendees discussed sustainable desired future condition (DFC) levels and the environmental and economic impacts of the current 30 ft. DFC level. Items noted included:

- It would be helpful to better define where the water from the aquifer originates, and that more refined modeling is necessary to capture the specific geospatial characteristics of the aquifer with higher resolution and refined detail
- The BRATWURST modeling effort could shed light and detail which could inform management decisions both locally, as well as regionally
- The feasibility of ASR (Aquifer Storage and Recovery) was also noted as worthy of attention, which is a water management strategy the District has and will continue to study
- Reviewed exempt well use and reuse analysis and how more detailed data would be needed to better characterize existing supply
- Noted that it is important to understand what the motivating factors are for residents/businesses in order to better educate and potentially change past behavior; understanding concerns helps to create more buy-in and willingness to cooperate in conservation efforts
- Other alternative sources discussed were the extent of conjunctive use of groundwater with surface water sources – as well as working with other groundwater utilities to determine additional data and information needs
- Flood mitigation and the flood planning process were discussed; the District is currently aggregating information for that process and are going to pursue whatever recharge capacity they can to assist and inform the flooding discussion, looking for water supply opportunities as a part of that process
- Support for the investigation of new, innovative solutions for alternative groundwater sources, evaluating new ways and technologies to utilize surface water, re-use and harvested water

The full notes from the meeting can be found in **Appendix D.**

Attendance

There was a total of 16 attendees present at the Nov. 10, 2020 meeting, including three elected officials, as shown in **Table 5** below.

Table 5 – Attendees of Round 1, Group 2 Meeting (November 10, 2020)

Name	Organization
Attendees	
*Commissioner Walt Smith	Hays County, Precinct 4
*Commissioner Lon Shell	Hays County, Precinct 3
*City Council Member Christine Byrne	City of Wimberley, Place 3
Eugenie Schieve	Office of Rep. Zwiener
Annalisa Peace	Great Edwards Aquifer Alliance
Christy Muse	Citizen
David Baker	Wimberley Valley Watershed Association
Joe C Day	Citizen
Robin Gary	Wimberley Valley Watershed Association
David Tuckfield	Representing City of Dripping Springs
Jeanine Christianson	Secretary Friendship Alliance Texas
Ray Don Tilley	Wimberley Valley Watershed Association
Patrick Cox	Trinity Edwards Springs Protection Association
Richard Beggs	Protect Our Water
Vanessa Escobar	Barton Springs Edwards Aquifer Conservation District
Vanessa Puig-Williams	Environmental Defense Fund
HTGCD Staff, Board, and Consultants	
Charlie Flatten	HTGCD (General Manager)
Philip Webster	HTGCD (Staff)
Holly Fults	HTGCD (Board)
Linda Kaye Rogers	HTGCD (Board)
Mitzi Ellison	NLA (Public Involvement Lead)
Lauren Canales	NLA (Public Involvement Support)
Dr. David Harkins, PH.D, P.E.	Carollo Engineers, Inc. (Engineer)
Tony Smith, P.E.	Carollo Engineers, Inc. (Engineer)

**elected official*

Round 2 Stakeholder Working Group Meetings

The second round of working group meetings started with an overview of the previous stakeholder input from the online survey, an overview of the first round of stakeholder working group meetings and comments received to date. Additionally, the presentation offered a preliminary financial analysis that provided information comparing financial mechanisms available to neighboring groundwater conservation districts, how the recovery of operational expenses is typically accomplished, and how the District is presently structured to generate revenue for its operations.

Thus, presented with information regarding the extent of groundwater supply and financial issues, the majority of the Round 2 meetings were dedicated to a lengthy

discussion on draft recommendations and a path forward for the District. The goal of the Round 2 meetings was to garner input from participating stakeholders regarding how the District could best continue to meet its statutorily defined mandate to provide for the most efficient use of groundwater within its jurisdiction. That goal could be accomplished by having a detailed understanding of the aquifer, preventing waste, collecting data, educating people about water conservation, and preventing irreparable harm to the aquifer. The six recommendations presented to the group for consideration were as follows:

- Seek changes to enabling legislation to allow for other forms of usage fees;
- Work with county and city officials to craft waterwise development ordinances, rules, incentives and supporting studies;
- Continue to promote and support state-of-the-art groundwater modeling and technical analyses to better inform water resource management;
- Explore and support studies investigating alternative groundwater management strategy projects beyond the construction of additional wells;
- Seek opportunities to promote conservation through educational efforts in support of its groundwater management plan; and
- Increase educational efforts and outreach

The agenda and presentation material for these meetings can be found in **Appendix D**. A summary of the discussions from the Round 2 meetings is presented below.

Round 2 Meeting for Group 1 (Dec. 1, 2020)

Highlights of Q&A Discussion

The group discussion portion of the meeting was focused on providing feedback on the draft recommendations for the District in its path forward. These recommendations, reflecting stakeholder input, are presented in more detail in the **Conclusions and Recommendations** section later herein.

<u>Discussion on Recommendation 1</u>

- There were comments regarding the fee structure, and that production fees would be a good legislative change, but should consider ad valorem taxes as well. It was noted that ad valorem taxes would be more difficult to achieve in the short-term.
- The group believed that these fees should continue to be pursued by the District, especially if other districts in the State are utilizing this fee structure.
- There was discussion regarding the opinions of other non-exempt users about fees, and that more investigation into that feedback would be needed, as presently the District does not have an adequate amount of information to determine.

<u>Discussion on Recommendation 2</u>

- There was some discussion from the group and an elected official regarding city/county vision for the future in the area. It was noted that the county is looking to find a balance of what developers can do and how to take some off

some of the burden from the groundwater supplies since the growth rate in the area will continue to climb.

Discussion on Recommendation 3

- The comments were incredibly supportive of needing additional modeling and questions asked surrounding permit issuance once allocation is reached.
- It was noted that it is not legal to stop issuing permits even though the District has challenged that in the past. There is only a certain amount of groundwater available, and it may come down to production vs. allocation.

Discussion on Recommendation 4

- There was discussion regarding alternative surface water supply such as using reservoirs from LCRA, City of Austin, West Travis County Public Utility Agency to supplement and pipe water in conjunction with or to replace groundwater.

Discussion on Recommendation 5

- Stakeholders indicated that conservation is important and is something that has to be done as part of the plan.
- There were additional comments about how the current legislation is poorly written for the District and that additional resources would be needed to help get changes made.

Discussion on Recommendation 6

No comments made on Recommendation 6. The full notes from this meeting are found in **Appendix D**.

Attendance

The Dec. 1, 2020, meeting had 11 attendees present, including one elected official, as shown in **Table 6** below.

Table 6 – Attendees of Round 2, Group 1 Meeting (December 1, 2020)

Name	Organization
Attendees	
*Commissioner Lon Shell	Hays County, Precinct 3
Eugenie Schieve	Office of Rep. Zwiener
Cliff Finley	Radiance Water Supply Corporation
Danny Ross	Camp Young Judea
Frank Curtis	Wimberley Alliance Club/Mountain Crest Community Association
Jeff Shaw	Protect Our Water
Kurt Holman	Lauren Concrete
Kyle Dannhaus	Dripping Springs Water Supply Corporation
Maxine Price	Citizen
Robert Mace	Meadows Center
Scott Way	Seven A Ranch Resort
HTGCD Staff, Board, and Consultants	
Charlie Flatten	HTGCD (General Manager)
Toby Shelton	HTGCD (Director)
Philip Webster	HTGCD (Staff)
Holly Fults	HTGCD (Board)
Mitzi Ellison	NLA (Public Involvement Lead)
Lauren Canales	NLA (Public Involvement Support)
Dr. David Harkins, PH. D, P.E.	Carollo Engineers, Inc. (Engineer)
Tony Smith, P.E.	Carollo Engineers, Inc. (Engineer)
Toby Shelton	HTGCD (Director)

**elected official*

Round 2 Meeting for Group 2 (Dec. 2, 2020)

Highlights of Q&A Discussion

The group discussion portion of the meeting was focused on providing feedback on the draft recommendations for the District in its path forward. Those recommendations are presented in more detail in the **Conclusions and Recommendations** section later herein.

<u>Discussion on Recommendation 1</u>

- There was conversation about how the increase in production values would impact the District's revenue and how it is critical to investigate the fee structure that would appropriately sustain the District's operations.
- Some indicated that assessing an ad valorem tax would be beneficial, although typically disliked by legislators, but it could be a long-term solution.
- It was noted that it is important for users to understand what a tax or fee would be used for, explicitly; otherwise, it will not be acceptable to the public.
- There was additional discussion on how to preserve spring flows.

<u>Discussion on Recommendation 2</u>

- It was mentioned that modeling will help with maintaining water quality.

Discussion on Recommendation 3

- The comments were supportive.

Discussion on Recommendation 4

- Comments were made about working with cities on potable re-use and utilizing a centralized approach for the region.
- Additionally, a comment was made regarding ASR, conjunctive use, using rainwater long-term and using surface water from the Carrizo Aquifer.

Discussion on Recommendation 5

No comments on Recommendation 5.

Discussion on Recommendation 6

- Stakeholders commented that partnering with existing programs would take coordination and outreach, but could stretch funds quickly, and to potentially tag onto other resources and partner with others.
- There was additional discussion on the outreach efforts to non-exempt/permittees and their involvement and buy-in on these recommendations. The conservation efforts implemented were reiterated and additional engagement will continue to try to get more participation from those stakeholders.

The full notes from this meeting are found in **Appendix D**.

Attendance

The Dec. 2, 2020 meeting had 15 total participants, including two elected officials, as shown in **Table 7** below.

Table 7 – Attendees of Round 2, Group 2 Meeting (December 2, 2020)

Name	Organization
Attendees	
*Commissioner Lon Shell	Hays County, Precinct 3
*Commissioner Walt Smith	Hays County, Precinct 4
Eugenie Schieve	Office of Rep. Zwiener
Annalisa Peace	Greater Edwards Aquifer
David Baker	Wimberley Valley Watershed Association
Ginger Fought	City of Dripping Springs
Jeanine Christiansen	Secretary, Friendship Alliance
Jennifer Riechers	West Travis County Public Utility Agency
Joe C Day	Wimberley Valley Watershed Association
Nathan Pence	Guadalupe-Blanco River Authority

Name	Organization
Nick Dornak	Meadows Center
Richard Beggs	Protect Our Water
Ray Don Tilley	Wimberley Valley Watershed Association
Robin Gary	Wimberley Valley Watershed Association
Vanessa Puig-Williams	Environmental Defense Fund
Staff and Board	
Charlie Flatten	HTGCD (General Manager)
Philip Webster	HTGCD (Staff)
Holly Fults	HTGCD (Board)
Linda Kay Rogers	HTGCD (Board)
Mitzi Ellison	NLA (Public Involvement Lead)
Lauren Canales	NLA (Public Involvement Support)
Dr. David Harkins, PH. D, P.E.	Carollo Engineers, Inc. (Engineer)
Tony Smith, P.E.	Carollo Engineers, Inc. (Engineer)

Project Hotline (Email Account)

A project email account was created to track comments received from stakeholders outside of the online survey and stakeholder working groups. It was additionally used for notifications and other email correspondence, as needed. Just one comment was received outside of other stakeholder outreach activities. This comment provided supportive feedback of the current effort and further provided commentary on drivers of water consumption, such as climate change and overproduction. Within the same email, questions were provided to the District to consider during the ongoing process of identifying successful strategies to meet future water demand.

Comments received through the project hotline email address can be referenced in **Appendix E.**

TECHNICAL SUMMARY

Presented herein is a summary of readily available information on groundwater use, supplies, projected demands and water management strategies within the District's jurisdictional area. This high-level inventory and summary of water availability, along with physical and legal supply constraints upon these sources was initially developed to inform stakeholder dialogue in the assessment of present and potential future supplies in relation to projected water demands within the District to the extent such information is available. The objective herein is to present a planning-level characterization of the technical drivers providing context for current actions and the potential path forward necessary for the District's continued management of this resource.

OBSERVED GROUNDWATER USE

Non-exempt well use of groundwater from the Middle Trinity Aquifer in Hays County has been observed and records have been maintained by the District for each permitted

user. These records have been reviewed, and users categorized into eight categories, namely: agricultural, business, individual, industrial, irrigation, municipal, public water supplies (PWS) and water supply corporations (WSC).

Table 8 presents the presently permitted water users within the District, aggregated by the aforementioned categories.

The monthly pumping amounts for each user were aggregated by category with the resultant time series presented in acre-feet per year (AFY) within **Figure 22**. Monthly permitted groundwater use within the District is significantly dominated by use from the WSC category. PWSs are the second-largest groundwater use by category, followed by the Business category. The remaining categories comprise only a small portion of the monthly water use. The intra-annual variation in groundwater use is also observed in **Figure 22**, with larger amounts of groundwater use observed to occur during the summer period. It is important to acknowledge this variation when considering water supply, as the summer peaking of water demand represents the largest need during the calendar period, establishing what must be met by water supply. This peaking is also observed through comparison of the average monthly reported pumping over the 1998 – 2019 period by month, as depicted in **Figure 23**. The largest magnitude of variation again is observed for the WSC category, although similarly proportioned variations are observed in the other categories (albeit smaller in overall magnitude).

Annual permitted groundwater use by category over the last decade (2009 - 2019) is shown in **Figure 24**. This depiction of pumpage from permittees displays the annual year-to-year variation in reported permitted use, and again the preponderance of use consistently being reflected in the WSC and PWS categories in brown and light blue are observed. This usage approaches approximately 2,000 AFY by 2019.

It must be noted, however, that while these depictions are informative, they do not capture the entirety of groundwater use in the area, since they only represent the reported permitting pumping. Such a depiction notably excludes two additional considerations, namely:

1. Groundwater that has been permitted by the District, but not yet used; and
2. Groundwater use from Exempt Wells.

Table 8 – Permitted Water Users in the Hays Trinity Groundwater Conservation District by Category

Permitted Water Users	
Agricultural	**Industrial**
El Rancho Cima (Sam Houston Area Council, BS)	Atlantis Realty Easy Mix
Business	Howard Land & Cattle: Twisted X Brewery
1521 Holdings LLC	Lauren Concrete
7-Eleven, Inc	Roughhouse Brewing
Asante	Vista Brewing

Permitted Water Users	
Bannockburn Baptist	**Irrigation**
Black Market Investments	Belterra-Hays WCID #1
Camp Ben McCulloch	Caliterra
Camp Young Judaea	Creek Road Ranch
Center Canyon Business Park	Liney Moon
Center Lake Business Park	**Municipal**
Creekside Pavilion	Blue Hole Regional Park
Darden Hill Business Park	Cottonwood Creek RV park
Dr. Ron White	Danforth-WISD
Driftwood Methodist Church	Gateway I
Driftwood Recovery	Gateway III
Dripping Springs Dental Center	Gateway TX DS, LLC
Epic Communications, Inc	Heatherwood Condominiums-Papalote Homes
Fall Creek Vineyards at Driftwood	Henly RV Park, LLC
Firehouse Business Center	Highpointe
H & H Tile	Prochnow Country Homes
HHS	Ranch Park - City of DS
Ivory Oak	Roger Hanks Park
K Bar 5 Properties, LLC	Shady Oaks RV Resort & Park
Lucky Arrow Retreat	PWS
Lutheran Church of the Resurrection	Brownson Lane Cottages
Mentis Neuro Austin	Cardinal Valley
Miller and Bangs Design	Cedar Oak Mesa WSC
Mountain View Lodge	Cielo Azul Ranch
New Canaan Farms	
Nutty Brown Business Park	
PAWS Shelter	
PGM of Texas	
Prima Vista	
Pro Star Water	
Prowd House	
Right Step	
Royal Oaks Business Center	
Salt Lick BBQ	
Salt Lick PWS	
Eagles Nest	
Elder Hill Cottages	
Fitzhugh Corners Well 1	
Fitzhugh Corners Well 2	
Fitzhugh Corners Well 3	
Fitzhugh Corners Well 4	

Permitted Water Users	
Fitzhugh Corners Well 5	
Getaway Austin	
Goldenwood West WSC	
Hill Country Casitas	
La Tierra WSC	
La Ventana Subdivision	
Lost Spring Ranch WSC	
Mountain Crest / Aqua Texas	
Radiance WSC	
Re-subdivision of Lot19D, Douglas Estates	
River Oaks Ranch- Monarch Utilities	
Signal Hill Water System 24	
Signal Hill Water System 30	
Skyline Ranch Estates WSC	
Serenity Farmhouse Inn	
Seven A Ranch Resort	
Sports Country Camp	
Stay N Play Pet Ranch	
Tingari Ranch	
Trattoria Lisina Restaurant	
Unity Church of Wimberley	
Wimberley Springs Partners Ltd.	
Wimberley VFW	
Wizard Academy	
Individual	
B. Mayhew	
Dr. Guy Hodgson	

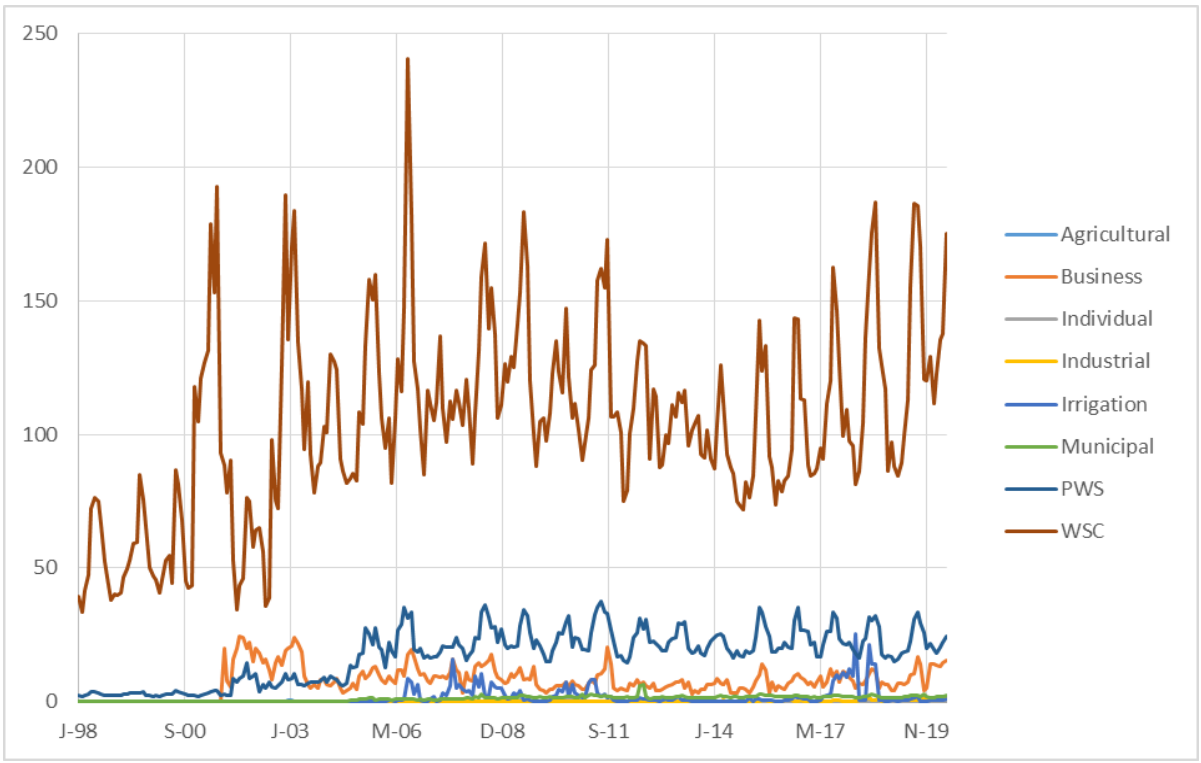


Figure 22 – Monthly Non-Exempt Reported Pumping by Category (1998-2019; AFY)

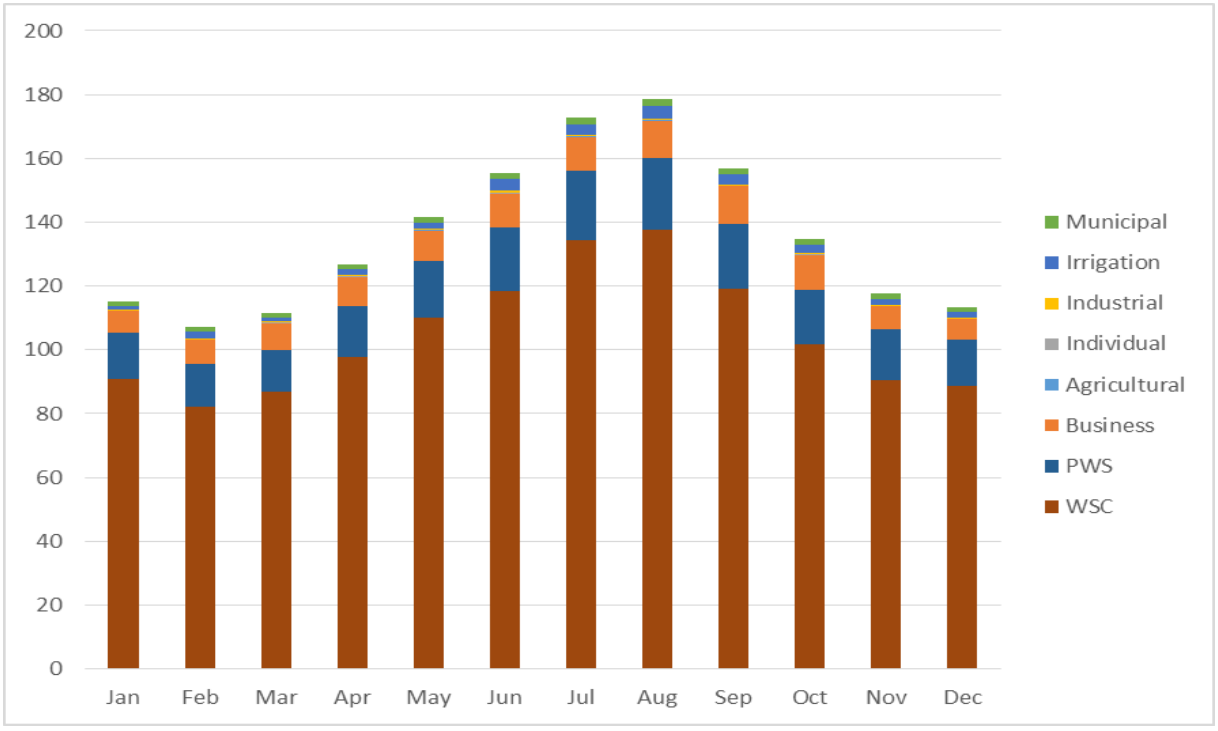


Figure 23 – Average Monthly Reported Non-Exempt Pumping by Category (1998-2019; AFY)

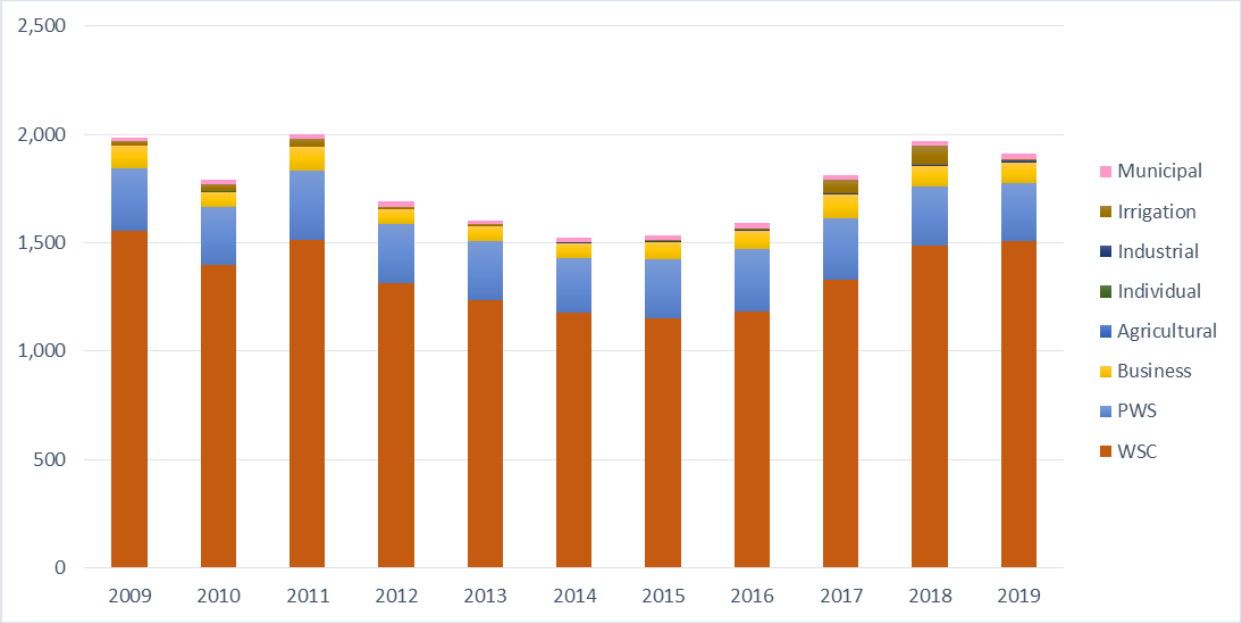


Figure 24 – Annual reported non-exempt groundwater use in the Hays Trinity Groundwater Conservation District (2009-2019; AFY)

As noted previously, as part of the responsibilities for the management of the groundwater resource, the District reviews applications and may grant permits for groundwater use. Such permits may contain requirements related to peak pumpage, and/or an annual maximum pumping amount permitted for use. Once such a permit is granted however, it does not mean that the permittee is required to use the maximum pumping amount allowed – a lower amount may be utilized. Water users may obtain a permit for a maximum amount larger than its present expected use, in anticipation of future planned or projected growth, or other factors.

Thus, for a more comprehensive picture of the extent of allocation of the groundwater resource within the District, it is necessary to further incorporate the amount of water that has been permitted by the District, but not yet used. When these permitted, but currently unused, amounts are incorporated along with the reported use, as shown in **Figure 25**, the increasing amount of allocated supply is observed to approach nearly 4,000 AFY by 2019. Year over year growth of the permitted amount is also observed over the recent period.

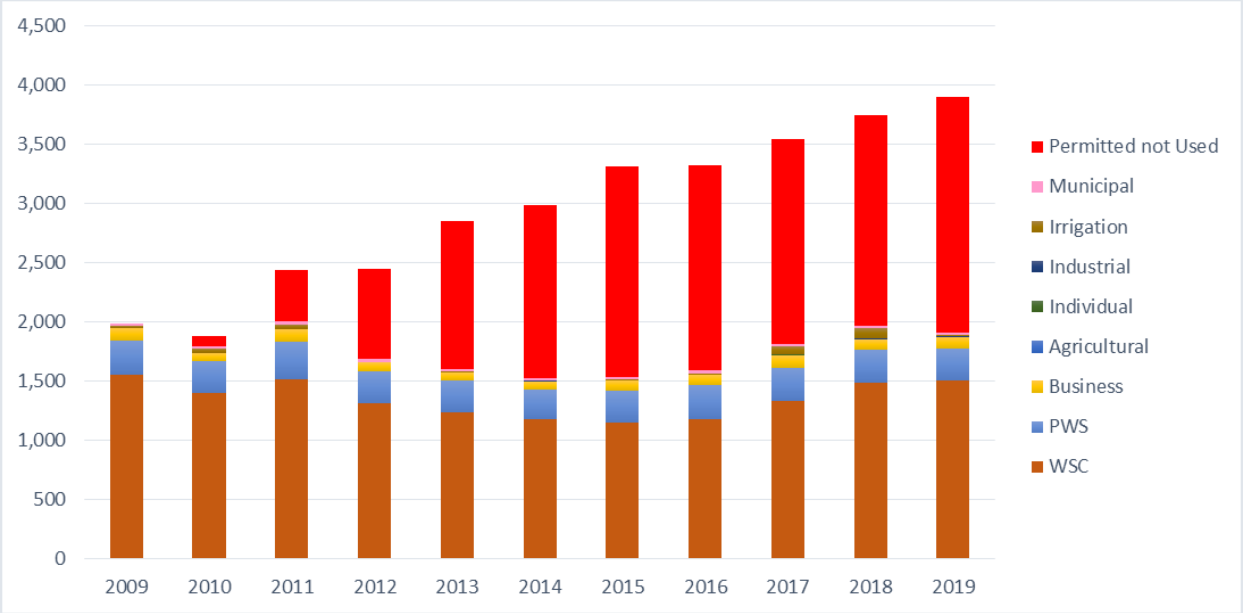


Figure 25 - Annual reported non-exempt groundwater use in the Hays Trinity Groundwater Conservation District along with permitted, but not yet used, amounts (2009 – 2019; AFY)

It is further important to characterize, and to the extent possible quantify, the exempt use of groundwater within the District. The most recent Hays Trinity Groundwater Conservation District 2021 Groundwater Management Plan provides official estimates as to the extent of exempt wells within the District. As reported therein, on April 25, 2011, the District Board of Directors approved an estimate of 3,300 AFY of exempt well use. The District has since recorded annual amounts of well construction notifications in order to track the extent of annual growth in the number of exempt wells. To derive an estimate of exempt use, this annual growth is then multiplied by an assumed per capita usage of 330 gallons per capita daily (gpcd), as the precise quantity of per capita use is unknown since exempt users are not required to submit or report their usage to the District.

The resultant estimations of annual exempt groundwater use can then be included along with the more certain representations of permitted use, and the amount of groundwater permitted but not yet used, as shown in **Figure 26**.

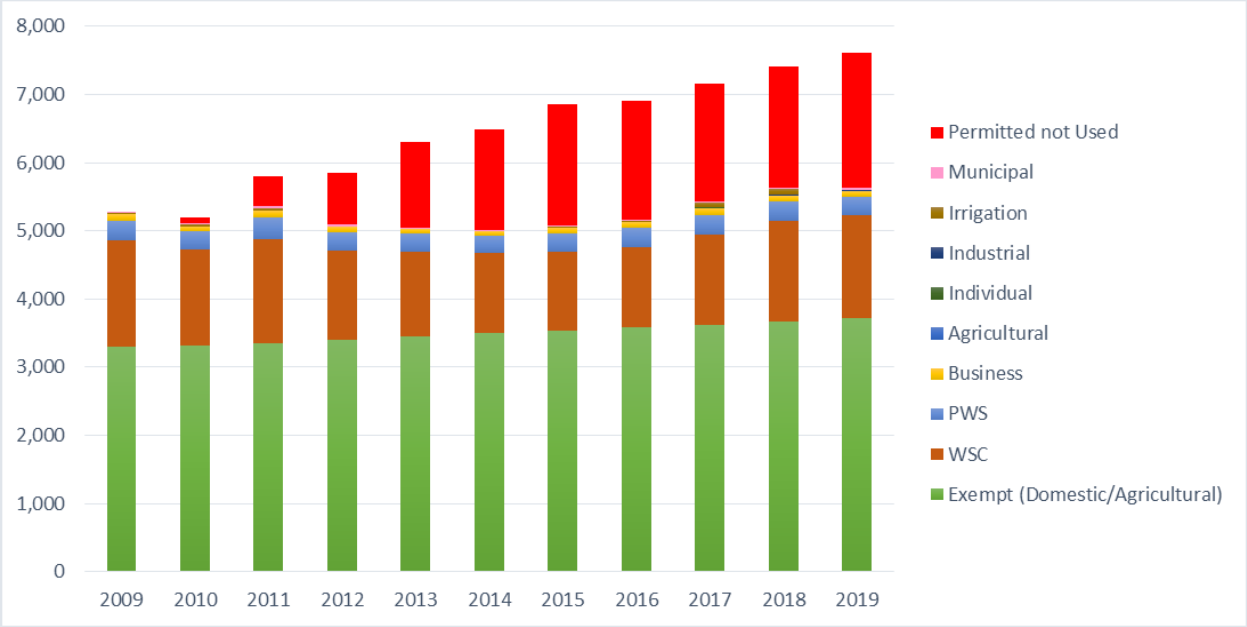


Figure 26 – Annual reported non-exempt and estimated exempt use along with permitted, but not yet used, amounts within the Hays Trinity Groundwater Conservation District (2009 – 2019; AFY)

The last decade of estimated exempt use is compared to the reported non-exempt groundwater use in **Figure 27**. It is noteworthy that it appears that only relatively recently has the permitted, non-exempt, pumping now exceeded the estimated exempt pumping within the District.

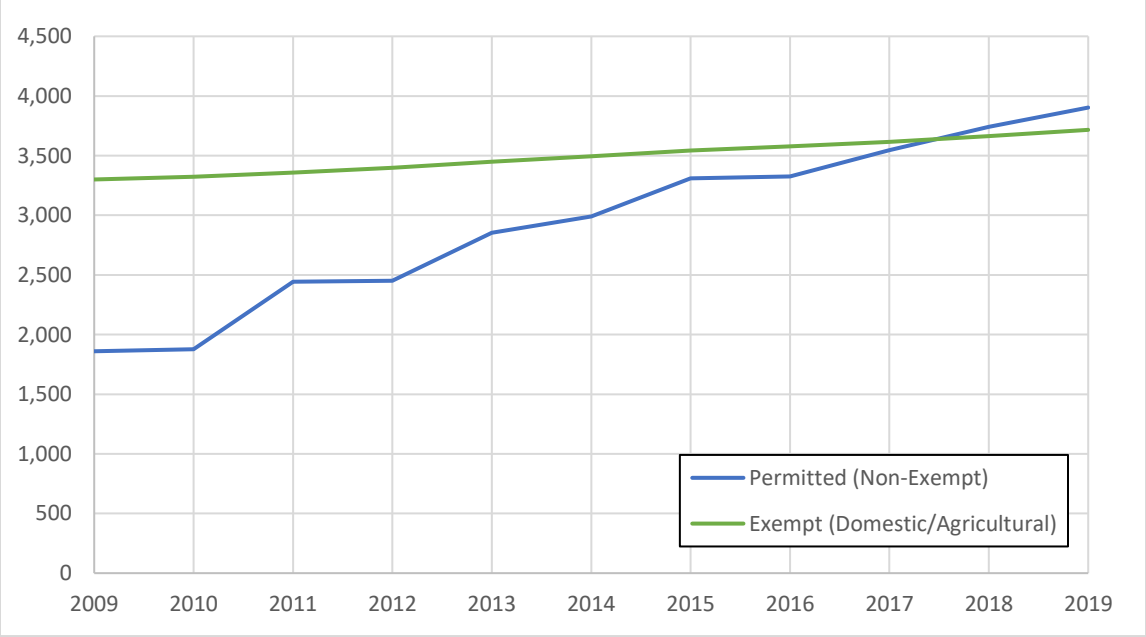


Figure 27 – Comparison of permitted (non-exempt) annual groundwater use with estimated exempt (domestic/agricultural) annual pumping amounts (2009 – 2019; AFY)

This depiction now encapsulates a more complete picture of the use and allocation of use of the groundwater resource within the District. It is further important to note that the

increasing total amounts of used/allocated groundwater now approach 7,600 AFY. The significance of these totals is particularly informed when viewed in the context of the source groundwater availability, discussed in the next section below.

SOURCE AVAILABILITY

The characterization of the availability of water from a source requires quantitative evaluations considering physical, legal and other relevant characteristics of the source under consideration. For surface water, availability entails the consideration of the hydroclimatology of the contributing watershed, the geomorphology of the waterbody, the physical storage characteristics and importantly an application of prior appropriations to ensure the characterization of availability reflects the protection of senior water rights. For example, the availability of water from a reservoir may begin with observation of the lake level.

For groundwater availability, where direct observation is more limited, the accordant characterization of availability from an aquifer is more complex. Per the TWDB, "[g]roundwater is difficult to observe and measure because it resides below the land surface and responds to rainfall much more slowly than rivers and lakes do. Aquifer systems are complex due to flows into and out of the aquifer, the interaction between surface water and groundwater, and the uncertainty of aquifer properties."[1]

Groundwater Management Areas (GMAs) were created in Texas "in order to provide for the conservation, preservation, protection, recharging, and prevention of waste of the groundwater, and of groundwater reservoirs or their subdivisions, and to control subsidence caused by withdrawal of water from those groundwater reservoirs or their subdivisions, consistent with the objectives of Section 59, Article XVI, Texas Constitution…" (TWC §35.001). Within each GMA (there are presently 16 within the State of Texas), a joint groundwater planning process is undertaken in which GCDs in GMAs develop desired future conditions (DFCs) for aquifers in the state. These DFCs can take alternate forms, but one common characteristic is the adoption of some form of average drawdown of aquifer levels, often established for a period of time. TWC §36.1132 establishes that the management of groundwater production on a long-term basis is required to achieve applicable DFCs.

The State employs Groundwater Availability Models (GAMs) as a means to assess the effects of pumping and droughts on groundwater availability, quantifying trends in availability in aquifer-based observations, hydrogeology and stakeholder input reflecting management objectives. The primary output from such modeling are estimates of Modeled Available Groundwater (MAG), which are based on management objectives as the DFCs for aquifers developed for the various GMAs. GCDs and regional water planning groups are required by Texas law to use estimates of the MAG in their respective management plans and regional water plans. These modeling efforts and the resultant MAGs represent a high-level characterization of the aquifer that represents the

[1] https://www.twdb.texas.gov/groundwater/models/index.asp

specific modeling, policy and management decisions derived from the State's Joint-Planning process.

The District's jurisdictional area lies within GMA #9, as shown in **Figure 28** below. The joint-planning process for GMA#9 produced GAM Run 16-023 MAG calculations to meet established DFCs within the GMA.

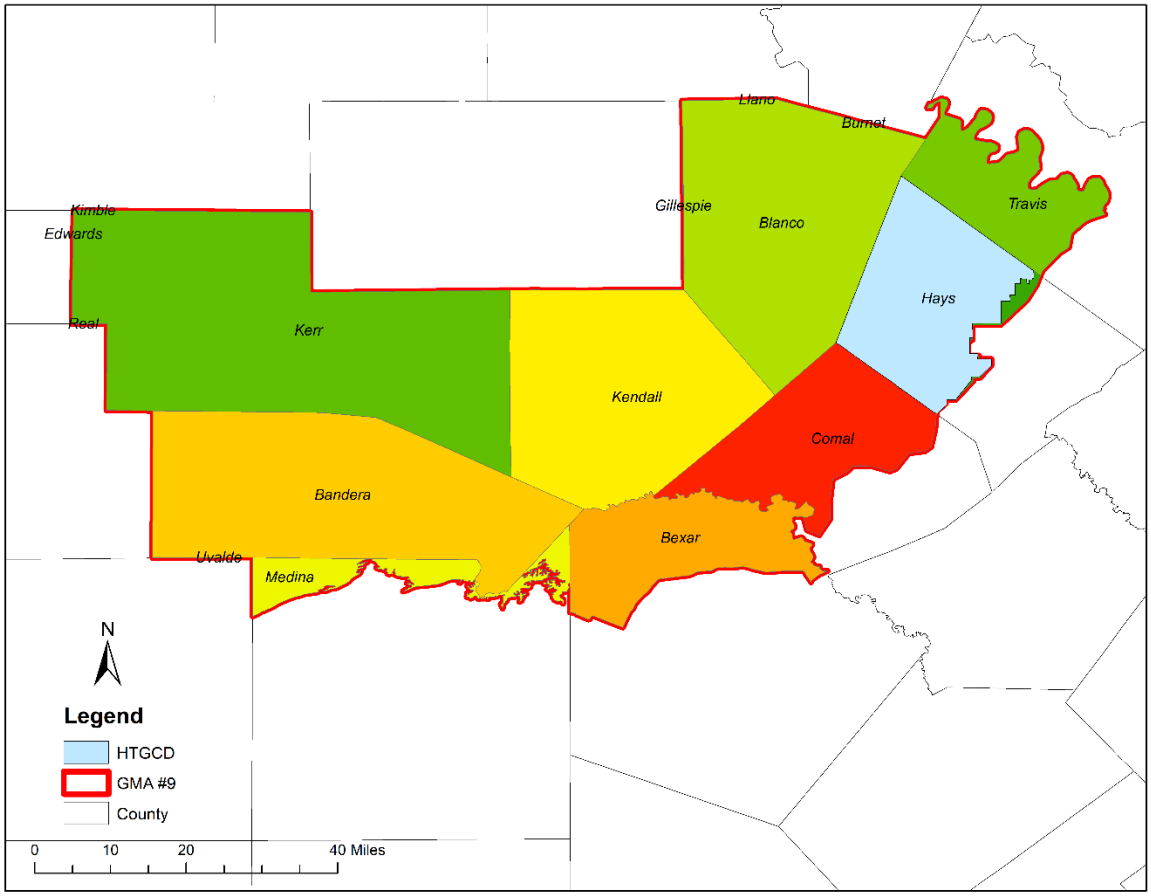


Figure 28 – Hays Trinity Groundwater District location within Groundwater Management Area #9

The DFCs established by the joint-planning process for GMA #9 were adopted on April 18, 2016, which establish an increase in average drawdown of approximately 30 feet through 2060. The resultant decadal MAG amounts developed through the State's models are shown in **Table 9**, which show that the modeled availability of groundwater within the portion of the Trinity Aquifer located within the District is estimated to be approximately 9,100 AFY when desired future conditions target an overall average drawdown of approximately 30 feet. It is critical to understand that the specific modeled characteristics of the aquifer, along with the specific management objective of the DFC, play a substantial role in the resultant characterization of availability.

Table 9 – Modeled Available Groundwater for the Hays Trinity Groundwater Conservation District (2010 – 2070; AFY)

Aquifer	Modeled Available Groundwater (MAG)						TWDB Report
	2010	2020	2030	2040	2050	2060	
Trinity	9,109	9,098	9,095	9,094	9,094	9,094	GR16-023 MAG

This characterization of available supply offers an opportunity to compare recent past use within the District to the amount of available groundwater under these specific model assumptions and management conditions (DFCs). Such a comparison, as presented in **Figure 29**, warrants additional consideration. As with all models, there are uncertainties relating to various aspects of the modeling, from the characteristics of the aquifer, to the representation of the hydrogeology, to the spatial and temporal variability in pumping characteristics. While such uncertainties have not been readily quantified, it is important that such uncertainties be recognized when interpreting the below comparison of existing use to the estimate of available groundwater supply.

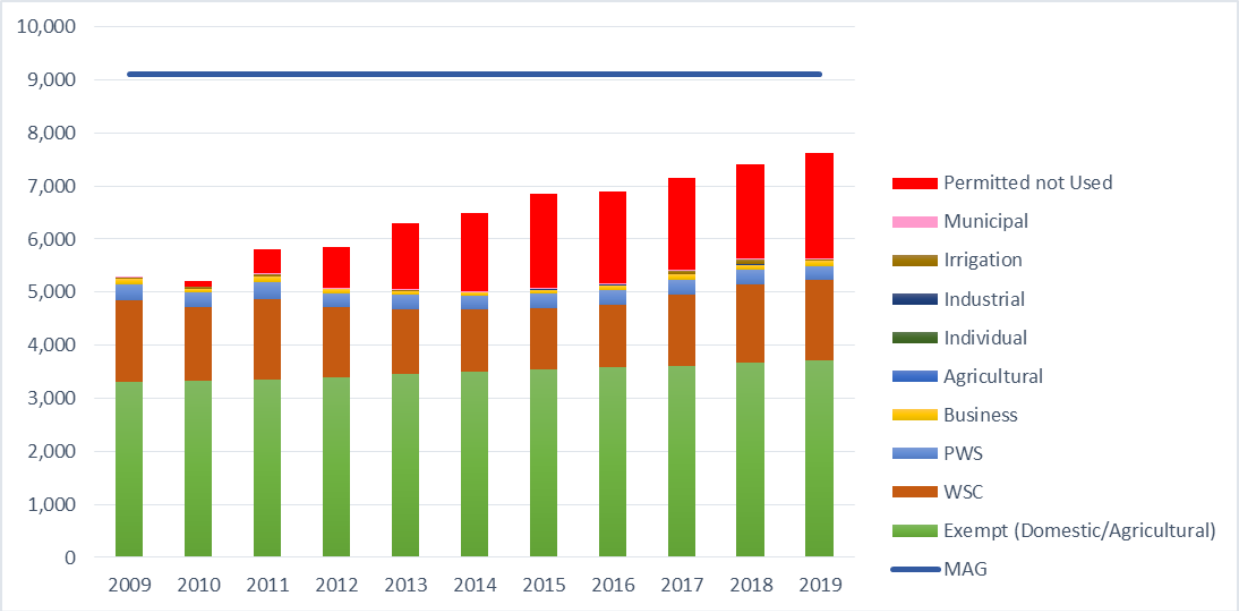


Figure 29 – Comparison of reported and exempt use along with permitted but unused groundwater to Modeled Available Groundwater for the portion of the Trinity Aquifer within the Hays Trinity Groundwater Conservation District (2009 – 2019; AFY)

As evidenced above, recent past use of groundwater in the District (approximately 7,600 AFY) is approaching the MAG amount of approximately 9,100 AFY. Recalling the uncertainties embedded within the characterization of the MAG, it is apparent that this groundwater use and allocation have ventured into the realm where the uncertainty in the quantification of the available groundwater supply is growing increasingly relevant. There exists the possibility that with different management goals, or alternatively different model assumptions regarding a more specific delineation of the aquifer, could indicate recent use and allocation may have already approached the availability of water from the Trinity Aquifer in the District.

Indeed, anecdotal evidence collected by the District suggests such a reality. **Figure 30** below presents the annual count of dry well reports received by the District over the 2009 – 2015 period where data are available. While the data are insufficient to make a detailed statistical trend analysis, or inferences regarding their cause, the increasing trend in such reports is suggestive that limitations in the availability of groundwater are an increasing concern, irrespective of model assumptions or their results.

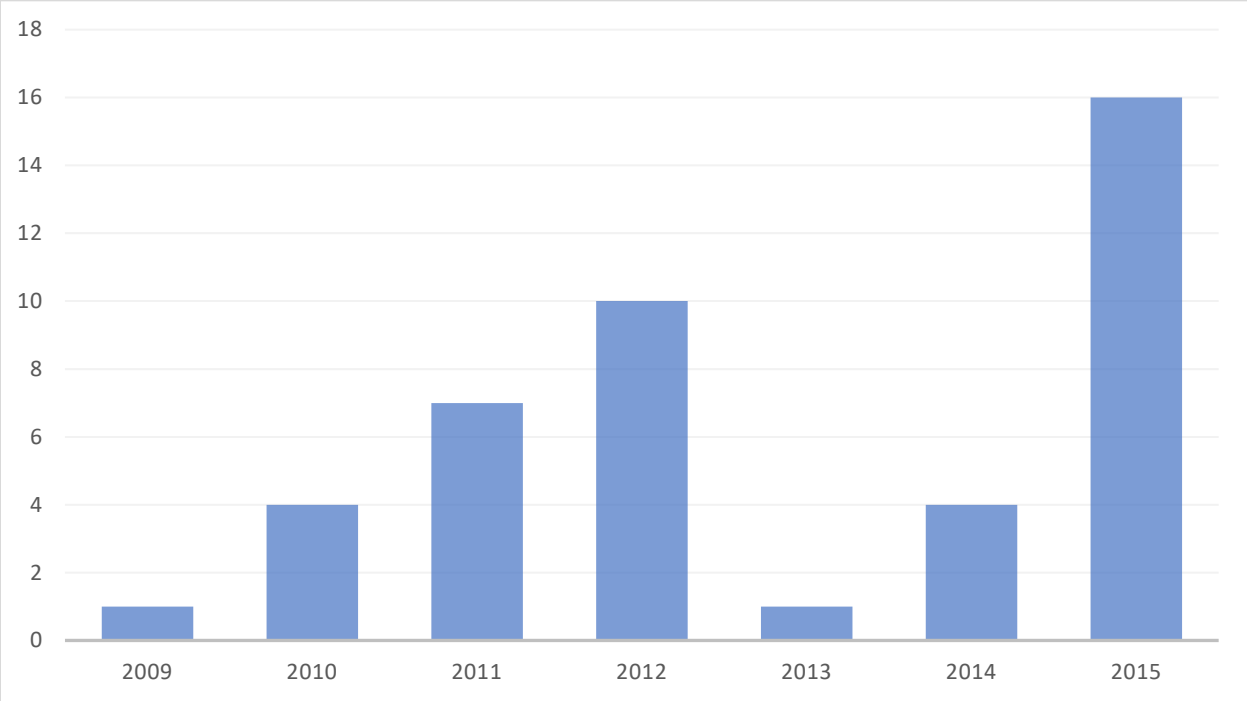


Figure 30 – Count of recent Dry Well Reports by year submitted to the Hays Trinity Groundwater Conservation District (2009 – 2015)

PROJECTIONS OF FUTURE GROWTH IN POPULATION

After considering the extent of recent past use and the present availability of the groundwater source, it is then important to evaluate anticipated projections of future demand. Given the primary water demand sector in Hays County is for municipal use (WSC and PWS), it is first important to consider projections of potential population growth in the area. This population growth, along with the per capita consumption of water, serve as the drivers for the resultant projections of water demand.

Population growth in Hays County over the last decade has been significant. According to the U.S. Census Bureau, Hays County has the second-highest growth rate of all counties in the U.S. over the past decade, as shown in **Table 10**.

Table 10 – Top 10 Counties in Percentage Growth (2010 – 2019) Source: U.S. Census Bureau, July 1, 2019

Rank	State	County	Percent Growth
1	North Dakota	Williams County	67.8 %
2	Texas	Hays County	46.5 %
3	Utah	Wasatch County	44.9 %
4	Texas	Comal County	43.9 %
5	Texas	Kendall County	42.1 %
6	Florida	Sumter County	41.7 %
7	Iowa	Dallas County	41.3 %
8	Florida	Osceola County	39.8 %
9	Texas	Williamson County	39.8 %
10	Florida	St. Johns County	39.3 %

Several previous studies have been performed in which projections of population growth have been developed for the area. While the specific methods employed have varied over time, and in some instances the specific target demographic may vary, these studies are presented herein to provide greater context as to the range of growth rates that have been projected for the area. One noted consistency, however, is the expected increase in population growth. While the magnitude of the increase may vary, no study reviewed herein suggests an expectation of decreases in population within the county.

HDR, Inc. (2011) developed and employed a suite of three increasing levels of growth projections over the 2010 – 2060 and presented this information along with projections developed for the 2011 regional water planning effort. Each of these projections, along with their accordant average annual growth rates, are presented in **Table 11** below. Estimated average annual growth rates range from 3.2 – 4.1 percent in 2010, to 0.2 – 1.4 percent by 2060. Note that the decrease in growth rate suggests this study projected growth would slow over time but remain positive through 2060.

Table 11 – Projections of population and average annual growth rate by decade for Hays County Area (2010 – 2060; AFY)

Projection	2010	2020	2030	2040	2050	2060
HDR 2011 NA Case	65,520	86,626	100,762	110,453	117,101	119,434
Avg. Annual Growth Rate		3.2 %	1.6 %	1.0 %	0.6 %	0.2 %
HDR 2011 MID Case	65,520	89,997	110,873	128,266	143,557	154,877
Avg. Annual Growth Rate		3.7 %	2.3 %	1.6 %	1.2 %	0.8 %
HDR 2011 HI Case	65,520	92,390	115,960	139,529	163,098	186,667
Avg. Annual Growth Rate		4.1 %	2.6 %	2.0 %	1.7 %	1.4 %
TWDB Regional Planning (2011)	57,244	80,396	102,651	124,987	151,822	172,924
		4.0 %	2.8 %	2.2 %	2.1 %	1.4 %

Population and Survey Analysts (PASA,2019) more recently completed a demographic analysis for the Dripping Springs Independent School District, developing projections for the next decade (through 2029) of student population using new housing, relocation trends, and local and national economic factors. Again, a range of three growth scenarios were developed for low, moderate and high rates. While targeted at factors affecting student population growth, such an analysis does provide an alternative perspective on the near-term average annual growth projected for the area. The resultant average annual growth rates, presented in **Table 12** below, project significant growth in the area within the next decade, ranging from 6.4 – 8.5 percent.

Table 12 – Projections of average annual growth rate in Dripping Springs ISD student population from PASA 2019, (2020 – 2029)

Category	2012 – 2018	2020 - 2028
Low	6.2 %	6.4 %
Moderate	6.2 %	6.9 %
High	6.2 %	8.5 %

The Texas Demographic Center (TDC) periodically produces projections of annual and decadal population growth within the state. These county-level population projections utilize census information and form the baseline from which the TWDB then develops population projections for the regional water planning process. As shown in **Figure 31**, the HTGCD is located within both the Region K and Region L water planning areas. Also notable is that the HTGCD's jurisdiction does not represent the entirety of Hays County. Thus, county-level estimates or projections must be further adjusted to represent that portion of the county within the HTGCD. Historically, this has been accomplished through the use of the areal proportion of the county within the district (i.e., 55.15 percent), which represents approximately 370 sq. mi. of Hays County (HTGCD 2020). While there is the potential for more refined means of disaggregating county-level amounts (e.g., number of connections), for the present effort this 55.15 percent has been utilized in order to characterize amounts relevant to the HTGCD.

The TWDB utilizes reported connections from annual surveys of water users and providers, along with geographic analyses (employing GIS data) and the aforementioned estimates from the TDC to develop projections of population growth at the utility level (i.e., for individual water providers for their utility service area above a set threshold based on population and/or use). For water user groups below these thresholds, estimates are aggregated at the county-level and referred to as "County-Other". Projections of demand for other water demand sectors (e.g., industrial, agricultural) are similarly grouped at the county level.

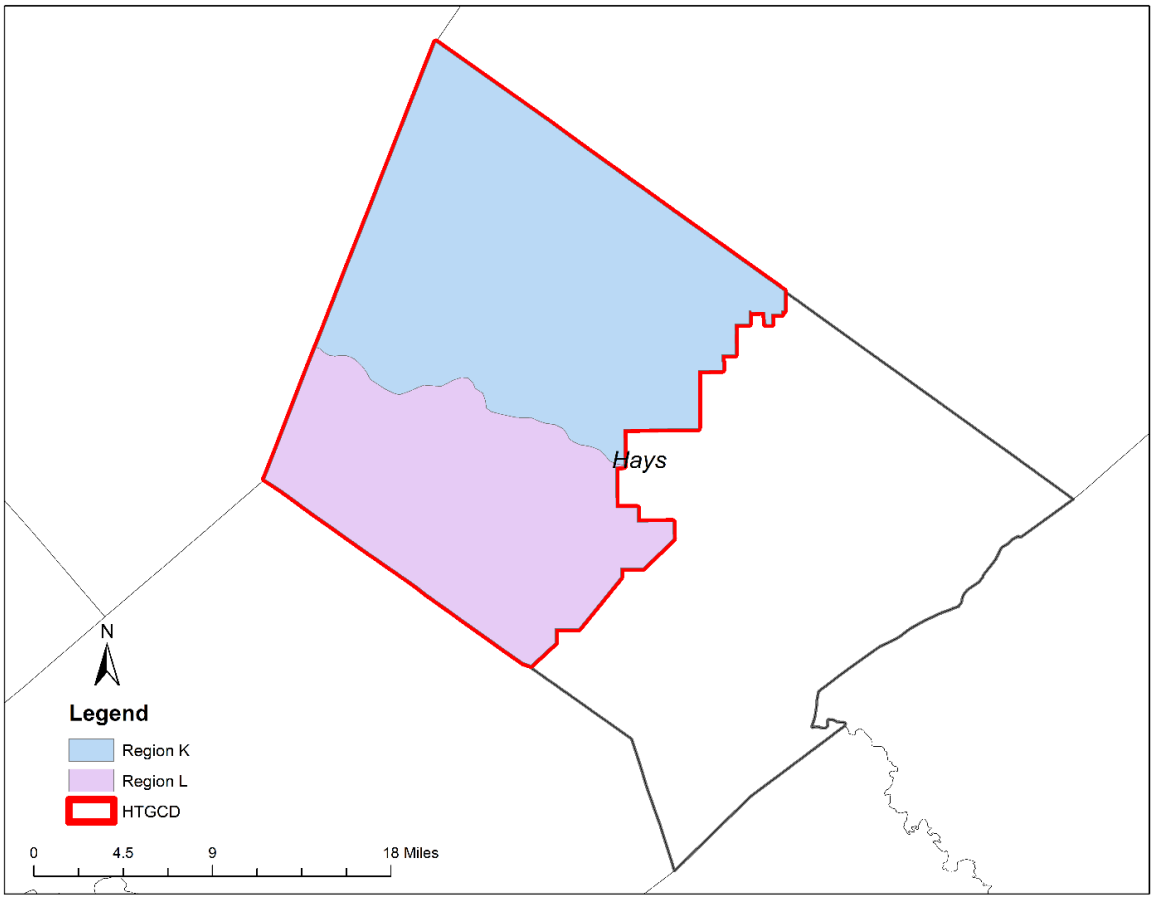


Figure 31 – Portions of Hays Trinity Groundwater Conservation District within Regional Water Planning Areas K and L

Figure 32 presents a comparison of the TDC estimates of annual population growth for Hays County along with the amounts from the TWDB Water Use Surveys and the amounts ultimately derived for the purposes of the 2021 Regional Water Planning process. As would be expected, these amounts are similar, given their mutual use for developing and implementing the projections for water planning. These estimates, based fundamentally on survey information and the census, form the basis for future decadal projections at the county level.

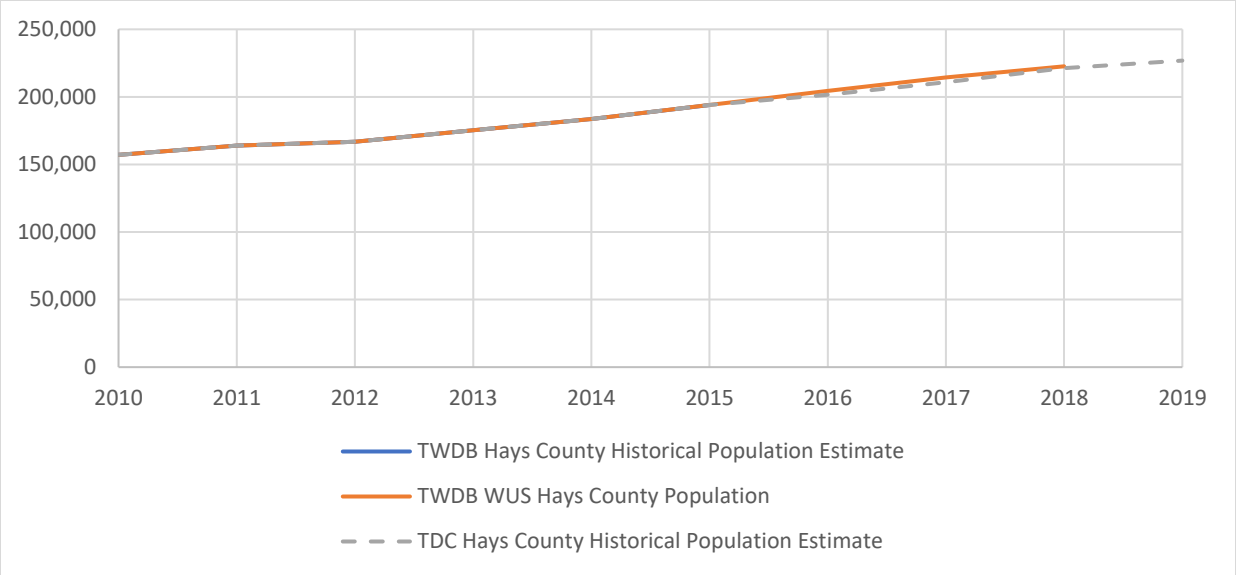


Figure 32 – Comparison of recent population growth in Hays County as represented by Texas Data Center, TWDB Water Use Surveys, and resultant estimates utilized for 2021 Regional Water Planning (2010 – 2019; AFY)

The population projections utilized for regional water planning are developed decadally; thus, for the present planning cycle amounts are estimated over the 2020 – 2070 planning horizon. While developed and adopted as the 2021 Regional Water Plans, each plan represents the culmination of a 5-year planning cycle. The projections of population are typically adopted early within the planning process, and may be dated by several years (barring more recent adjustments as deemed appropriate by the Regional Water Planning Group (RWPG) and TWDB). The TDC has more recently published county-level projections through 2050.

In order to develop a population projection for municipal water users located within the District's jurisdiction, population projections from the 2021 Region K and Region L planning efforts for water user groups with utility areas within the HTGCD's jurisdiction (i.e., Deer Creek Ranch, Dripping Springs WSC, Hays County Water Control & Improvement District (WCID)s 1 & 2, West Travis County PUA, Wimberley Water Supply Corporation (WSC) were aggregated with the proportional (55.15 percent) amount of projected population for the "County-Other" category.

Figure 33 thus presents the compilation of projections for Hays County, as well as the reduced projections for those water user groups within the HTGCD jurisdiction. Also displayed are suite of projected populations from the other aforementioned studies herein. Recall that these previous studies in some instances were based on information from the 2000 census (i.e., HDR Inc. 2011 and the 2011 Regional Plans' estimates) as that was the best available information at the time.

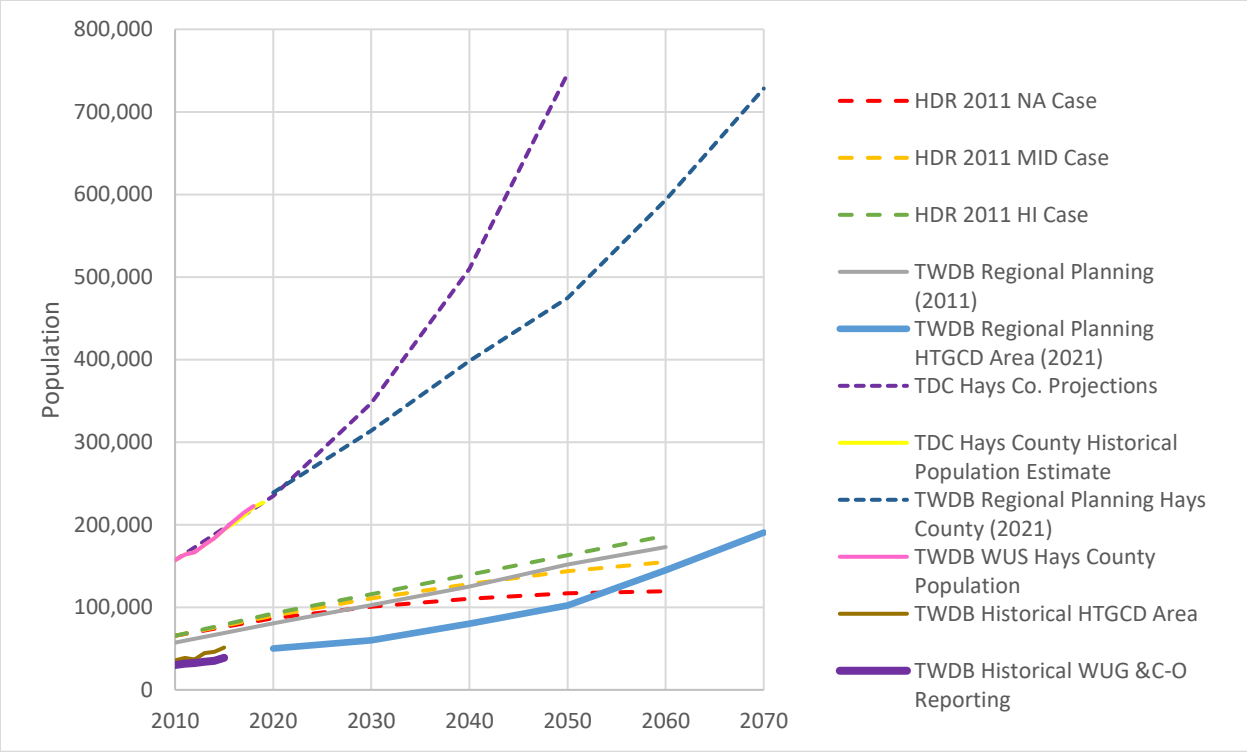


Figure 33 – Compilation of projections of population for both Hays County and the HTGCD area (2010 – 2070; AFY)

Several items of note are offered from inspection of **Figure 33**:

- At the county level, TWDB's 2021 regional planning amounts project continued significant growth over the planning horizon. The more recent TDC projections suggest even more rapid growth occurring in Hays County by 2050.
- The TWDB 2021 regional planning amounts project a population of approximately 50,000 people in the HTGCD area by 2020, increasing to nearly 190,000 people by 2070.
- While HDR Inc. (2019) presented a range of estimates for the area that did not appear to manifest as quickly as projected, the rate of projected growth does appear consistent with recently observed conditions and current projections.
- The variation in the slopes of the county-level projections and the projections for water users in the HTGCD suggests that more significant growth is expected to occur within Hays County, but not within HTGCD. This does not mean the HTGCD area is not growing at a significant rate, but rather that the area outside of the HTGCD area is projected to grow even more.
- The observed differences in the estimated historical population in the HTGCD area, both of which come from TWDB sources, are likely due to adjustments made by TWDB and the RWPGs to estimated populations at the individual water user group level toward developing projections at the individual water user group level. Estimated population from Water Use Survey information

typically adjusted by TWDB and aligned to the overall county-level projected population.

The various projections developed for several efforts fluctuate, but the consistent message is continued significant projected growth in Hays County and within the District. It is further observed that the more recent projections, while significant, are derived from estimates of county-level growth based on the 2010 census. Given the recent significant growth in the area as recently reported by the U.S. Census Bureau, information from the forthcoming 2020 census may reflect observations of an even higher growth rate, which could result in even higher decadal projections of future population.

PROJECTIONS OF FUTURE GROWTH IN WATER DEMAND

In order to translate the projections of population growth for municipal water user groups in the HTGCD, it is first necessary to identify per capita water usage, i.e., the amount of water used per person, referred to as gallons per capita daily (gpcd). Per capita use can then be multiplied by the decadal projections of population to calculate total projected water demand; however, an assumption must be made in designating an appropriate per capita use. Municipal gpcd can vary seasonally and annually with climatological conditions, i.e., higher municipal use during summer periods as evidenced previously in **Figure 34** increased use during drought conditions and/or decreased use due to implementation of conservation management practices.

The gpcd amounts employed for regional planning have been developed based on the assumption that the higher per capita use during “dry year” conditions allows for a conservatively high characterization of municipal water necessary during drought conditions. For the purposes of the 2021 Regional Water Plans, the calendar year 2011 per capita usage amounts derived from the aforementioned Water Use Surveys were typically employed for planning across the state, as 2011 represented the single worst single-year drought for many parts of the state. The estimated annual gpcd developed by the TWDB over the 2010 – 2015 period for municipal water user groups within the HTGCD, along with the estimated annual gpcd for the “County-Other” category, are shown in **Figure 34**. Note again the higher per capita usage in the 2011 calendar year.

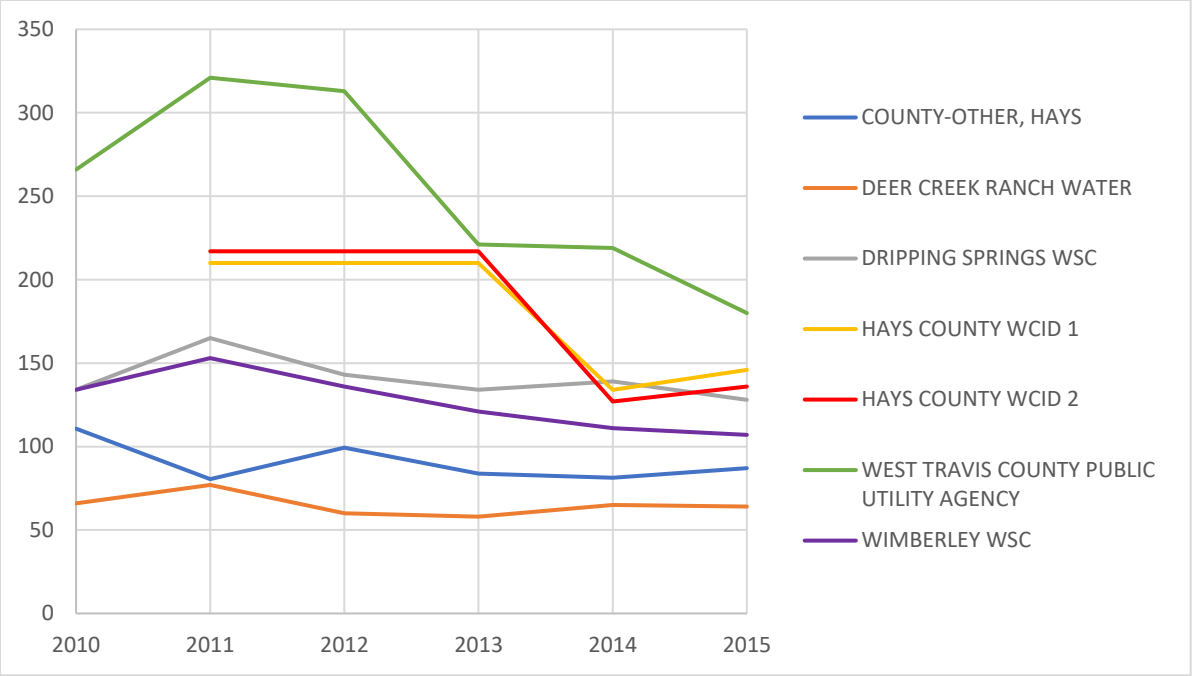


Figure 34 – Per capita water use (gpcd) for municipal water user groups in the Hays Trinity Groundwater Conservation District developed for the purposes of the 2021 Regional Water Plans (2010 – 2015)

These gpcd amounts are then utilized along with the population projections to calculate projected water demand for each decade over the 2020 – 2070 planning horizon for each municipal water user group.

As mentioned previously, projected water demands for non-municipal water user groups (i.e., manufacturing, agricultural, mining, livestock and steam-electric power generation) are estimated by the TWDB using a variety of methods at the county level[2]. Thus, it is necessary to disaggregate these estimates to a proportion appropriately specific to the HTGCD's area. For the purposes of the present effort, again the 55.15 percent areal proportion identified within HTGCD (2020) has been employed for this purpose. The resultant estimates of non-municipal use can then be aggregated along with the municipal projections in order to characterize the total projected water demand over the 2020 – 2070 planning horizon for the HTGCD area, shown as the solid blue line in **Figure 35** below.

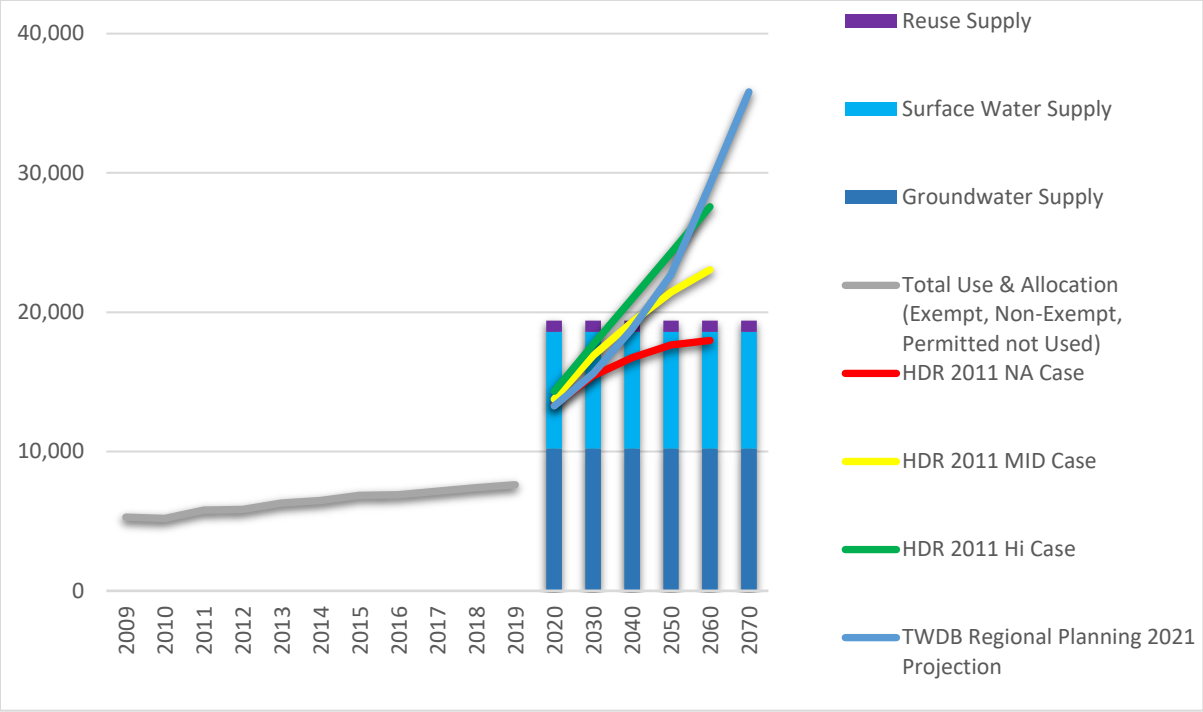


Figure 35 – Comparison of past use (exempt, non-exempt, and permitted but not used) to projections of total water demand and existing water supply in the Hays Trinity Groundwater Conservation District (2009 – 2070; AFY)

Along with the projection of total water demand derived from the 2021 Regional Plans, **Figure 35** further provides the suite of past demand projections for the area over the 2020 – 2060 period developed by HDR Inc. (2011), which for the earlier decades of the planning horizon span the projection derived from regional planning. As evidenced here, the projection derived from the more recent regional planning shows a higher growth rate, eventually projecting higher demand in latter decades. Recall again that the underlying population projections from the regional planning may indeed be low, as the more recent TDC estimation of population growth in Hays County projects an anticipated higher growth rate.

Also included within **Figure 35** is the past observed total of reported groundwater use from non-exempt, permitted groundwater pumping, the estimated exempt use, and the permitted, but unused, allocated amount of groundwater – shown as the solid grey line. For reference, this is the same total of the amounts presented in Figure 6, wherein 2019 amounts approach 7,600 AFY. It should be further noted that the jump between the 2019 amount (the end of the grey line) with the 2020 amount (the start of the solid blue line) reflects the previously mentioned difference between past use vs. the assumed conservative, “dry year” demand assumption forming the basis for the future projections employed for regional planning. This is important, as planning must accommodate sufficient supply to meet the higher demand during drought of record conditions. Lastly, **Figure 35** displays the present total water supply available to entities within the District area as represented in the 2021 Regional Plans. These water supply amounts, categorized as groundwater, surface water and reuse, have not been disaggregated to

present solely the supply available from sources within the HTGCD, but rather represents all supplies available to water user groups within the HTGCD, even if such sources are external to the district. This is appropriate since water users within the district have increasingly utilized external sources of water supply.

When compared to the projected total demand, it appears total water demand within the District is projected to exceed existing total supplies by 2050. While informative, it is noted that this aggregated, "total" comparison only provides a high-level characterization. In reality, each individual water user has projected demands, with separate and distinct supplies available to each, driven by legal and infrastructure constraints that determine their individual supplies. Thus, for a more complete comparative assessment of supply availability to demand, it is necessary to perform such an analysis individually by water user/provider.

IDENTIFIED NEEDS IN THE HAYS TRINITY GROUNDWATER CONSERVATION DISTRICT

Comparisons of projections of demand to supply are performed for individual water user group as part of the respective Region K and Region L planning processes. For each comparative analysis, a water "need" is identified when projected demand for a water user group exceeds the existing supply legally and physically available for that water user group. In those instances where supply exceeds demand a surplus is identified.

A review of needs and surplus amounts identified from the 2021 Region K and L planning processes was performed in order to identify those water user groups located within the HTGCD with identified water needs. A summary of those projected needs over time for water user groups located within the HTGCD is presented in **Figure 36**.

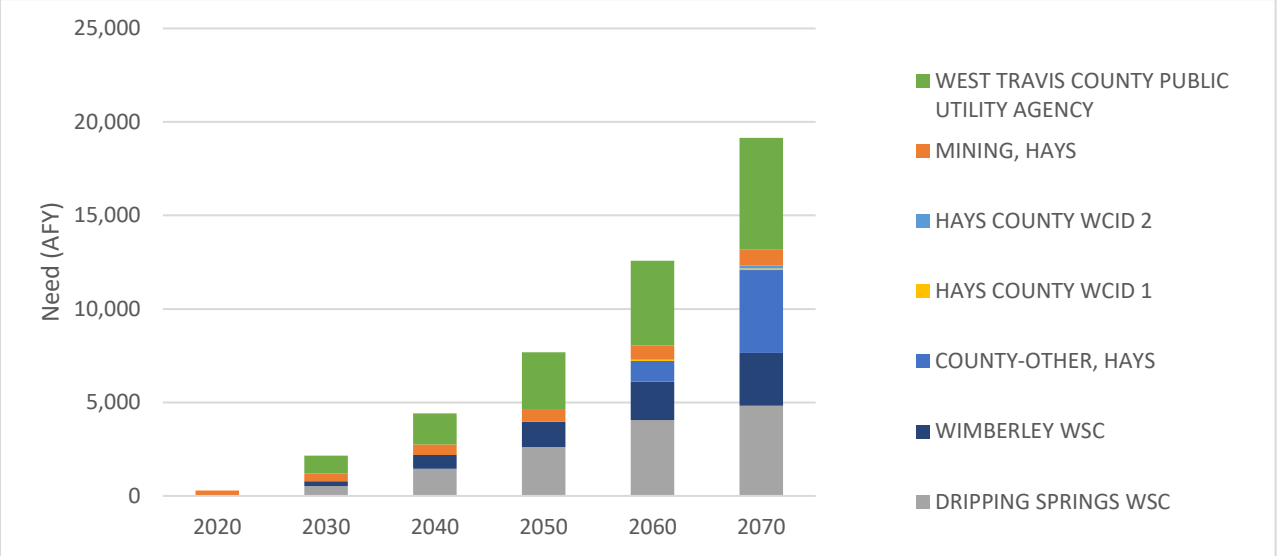


Figure 36 – Projected needs identified from regional water planning for entities located in the Hays Trinity Groundwater Conservation District (2020 – 2070; AFY)

As evidenced from **Figure 36,** while immediate needs in 2020 are relatively minor, more significant needs are projected to increase in the next ten years, when by 2030 needs are approximately 2,200 AFY. These needs more than double by 2040 and are projected to increase substantially over the remaining decades, with a need of a little more than 19,000 AFY of need by 2070.

The needs developed via the regional water planning process are projected to increase significantly for water user groups located within the HTGCD. The regional planning efforts (Regions K and L) engage in a high-level planning effort utilizing a formalized process to identify potentially feasible strategies, assessing potential impacts from such strategies, developing cost estimates, coordinating with individual water providers and developing recommended water management systems (WMSs) to meet the identified needs for each water user group.

Table 13 presents those water management strategies recommended from the 2021 Region K and Region L Water Plans, including their recommended amounts by decade, for water user groups located within the district. These water management strategies fall broadly into eight categories, with amounts distributed as shown in **Figure 37** below. Note that the strategies identified and discussed herein may not necessarily be physically located within the District but are planned to provide water to entities with needs within the District.

Table 13 – Recommended Water Management Strategies from 2021 Regional Water Planning (Regions K and L) for Water User Groups located within the Hays Trinity Groundwater Conservation District (AFY)

Water User Group	Category	2020	2030	2040	2050	2060	2070
COUNTY-OTHER, HAYS							
BRUSH MANAGEMENT - HAYS COUNTY	BRUSH CONTROL	0	83	83	83	83	83
BS/EACD EDWARDS / MIDDLE TRINITY ASR - HAYS COUNTY-OTHER	AQUIFER STORAGE & RECOVERY	0	289	289	289	289	289
BS/EACD SALINE EDWARDS DESALINATION AND ASR	AQUIFER STORAGE & RECOVERY	0	0	500	500	500	500
EXPANSION OF TRINITY AQUIFER SUPPLIES - HAYS COUNTY-OTHER	GROUNDWATER WELL DEVELOPMENT	0	0	0	0	0	200
GBRA MBWSP	AQUIFER STORAGE & RECOVERY	0	1,000	1,000	1,000	3,029	8,220
HAYS COUNTY PIPELINE - REGION K PORTION	AQUIFER STORAGE & RECOVERY	0	1,000	1,000	1,000	3,029	8,220
RAINWATER HARVESTING - COUNTY-OTHER HAYS	RAINWATER HARVESTING	0	16	24	31	36	50
DRIPPING SPRINGS WSC							
DIRECT POTABLE REUSE - DRIPPING SPRINGS WSC	POTABLE REUSE	0	560	560	560	560	560
DIRECT REUSE - DRIPPING SPRINGS WSC	NON-POTABLE REUSE	0	390	460	531	601	672
EXPANSION OF TRINITY AQUIFER SUPPLIES - DRIPPING SPRINGS WSC	GROUNDWATER WELL DEVELOPMENT	0	0	300	300	300	300
LCRA - MID-BASIN OFF-CHANNEL RESERVOIR	NEW MAJOR RESERVOIR	0	0	0	1,000	2,000	2,000
MUNICIPAL CONSERVATION - DRIPPING SPRINGS WSC	CONSERVATION	174	289	339	417	522	576
RAINWATER HARVESTING - DRIPPING SPRINGS WSC	RAINWATER HARVESTING	0	34	44	57	73	81
HAYS COUNTY WCID 1							
MUNICIPAL CONSERVATION - HAYS COUNTY WCID 1	CONSERVATION	74	136	196	226	225	225
HAYS COUNTY WCID 2							
MUNICIPAL CONSERVATION - HAYS COUNTY WCID 2	CONSERVATION	26	62	114	169	211	259
MINING, HAYS							
EXPANSION OF TRINITY AQUIFER SUPPLIES - HAYS COUNTY MINING	GROUNDWATER WELL DEVELOPMENT	600	600	600	600	600	600
WEST TRAVIS COUNTY PUBLIC UTILITY AGENCY							
DIRECT REUSE - WEST TRAVIS COUNTY PUA	NON-POTABLE REUSE	0	97	99	104	111	116
GBRA MBWSP	AQUIFER STORAGE & RECOVERY	0	3,000	3,000	3,000	3,000	3,000
HAYS COUNTY PIPELINE - REGION K PORTION	AQUIFER STORAGE & RECOVERY	0	3,000	3,000	3,000	3,000	3,000
LCRA - EXCESS FLOWS PERMIT OFF-CHANNEL RESERVOIR	NEW MAJOR RESERVOIR	0	1,400	1,400	2,500	2,500	3,300
MUNICIPAL CONSERVATION - WEST TRAVIS COUNTY PUA	CONSERVATION	405	984	1,610	2,546	3,631	4,840
SURFACE WATER INFRASTRUCTURE EXPANSION - WTCPUA	NEW MAJOR RESERVOIR	0	1,400	1,400	2,500	2,500	3,300
WIMBERLEY WSC							
GBRA MBWSP	AQUIFER STORAGE & RECOVERY	0	262	752	1,366	2,060	2,851

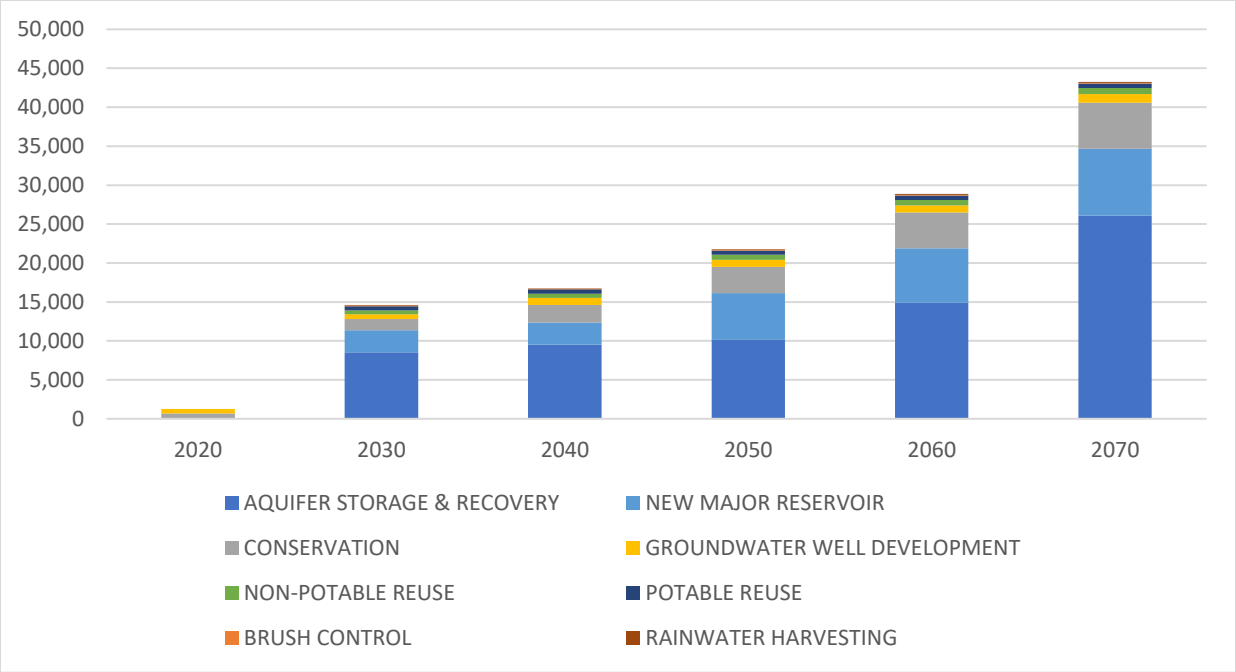


Figure 37 – Distribution of recommended Water Management Strategy amounts from 2021 Regional Water Plans by category for water user groups located within the Hays Trinity Groundwater Conservation District (2020 – 2070; AFY)

As evidenced above, the needs identified within the District are projected to significantly exceed the estimated groundwater availability. Indeed, while groundwater well development is recommended to meet the relatively minor near-term needs identified in the regional water planning process, groundwater well development is currently expected to play a relatively minor role in meeting the significant needs identified for longer-term needs of the area.

Increasingly, water users within the District are planned to utilize alternative water sources. Surface water from the Guadalupe River basin, stored utilizing Aquifer Storage and Recovery (where available and/or feasible), represents the greatest magnitude of recommended water management strategy, followed by stored surface water supplied from a recommended off-channel reservoir located in the Colorado River Basin. While somewhat smaller in magnitude, conservation is also recommended to offer a critical, cost-effective role in meeting near- and long-term needs for entities within the district. Water user groups located in the district are aggregated below for each category of recommended water management strategy in **Table 14**.

Table 14 – Water user groups located within the Hays Trinity Groundwater Conservation District aggregated by category of recommended water management strategy

WATER MANAGEMENT STRATEGY CATEGORY
AQUIFER STORAGE & RECOVERY
COUNTY-OTHER, HAYS
WEST TRAVIS COUNTY PUBLIC UTILITY AGENCY
WIMBERLEY WSC
BRUSH CONTROL
COUNTY-OTHER, HAYS
CONSERVATION
DRIPPING SPRINGS WSC
HAYS COUNTY WCID 1
HAYS COUNTY WCID 2
WEST TRAVIS COUNTY PUBLIC UTILITY AGENCY
GROUNDWATER WELL DEVELOPMENT
COUNTY-OTHER, HAYS
DRIPPING SPRINGS WSC
MINING, HAYS
NEW MAJOR RESERVOIR
DRIPPING SPRINGS WSC
WEST TRAVIS COUNTY PUBLIC UTILITY AGENCY
NON-POTABLE REUSE
DRIPPING SPRINGS WSC
WEST TRAVIS COUNTY PUBLIC UTILITY AGENCY
POTABLE REUSE
DRIPPING SPRINGS WSC
RAINWATER HARVESTING
COUNTY-OTHER, HAYS
DRIPPING SPRINGS WSC

FINANCIAL ANALYSIS

The technical summary reported herein identifies several issues of concern regarding present and projected future demands on the limited groundwater resources within the District. Such issues necessitate sophisticated efforts to effectively and efficiently regulate and manage water resources given the rapidly increasing demands occurring in Hays County. It is critical to understand the funding structure presently employed to support such regulation and management.

Presented in this section is a summary of the high-level financial review of funding mechanisms established for local GCDs (including the District) within the region. A discussion of legislative drivers forming the statutory basis for funding GCDs is offered, along with a general discussion on potential revenue sources available to various GCDs. A comparative discussion on the District's funding structure relative to other local GCDs is also presented.

LEGISLATIVE DRIVERS

The means for generating revenue for groundwater conservation districts in Texas is established by law in TWC Chapter 36, Subchapter G. These statutes allow for the levying of taxes to pay for bond issuances, as well as for operations and maintenance, limited to a maximum of $0.50 per $100 of assessed value. Generally, this maximum limit is considered high, as no GCDs are currently known to tax at this high of a rate and are typically a fraction of this maximum amount.

Districts are also generally provided the authority (with certain areas subject to special statutes) to establish fees with maximums for specific uses:

- $1 per acre-foot for agriculture
- $10 per acre-foot for "all other" uses

Generally, the majority of other fees are generated from non-agriculture customers. Importantly, the law has numerous exceptions, some detailed for specific districts within TWC Chapter 36, and others reflected in the enabling legislation for a given district.

For the District, the financing mechanisms are established via the enabling legislation as enacted in the Special District Local Laws Code, Chapter 8843, Subchapter D. This code allows for the District to set fees for well construction, applications for permit renewals and service connection fees. However, it is important to note that this code specifically prohibits the District from imposing taxes or assessing or collecting any other fees not expressly listed therein (Section 8843.153).

REVENUE SOURCES

Generally, GCDs recover expenses primarily through one of, or a combination of, two general revenue categories: ad-valorem taxes or fees. Fee categories include production fees from non-exempt groundwater users, application or drilling fees, permit renewals, groundwater export fees or fees for penalties seen in **Figure 38**.

Figure 38 – Typical revenue sources for groundwater conservation districts (HTGCD revenue streams highlighted in red)

The two financing mechanisms largely utilized by districts throughout the state are ad-valorem taxes and/or production fees from non-exempt groundwater users. The District, on the other hand, is currently limited (by law) to recovering expenses through three fees: application/drilling fees (sometimes referred to as connection fees), fees for operating permits/renewals and fees for penalties. Of these three revenue sources, connection fees are the primary source of revenue for the District. A breakdown of the District's 2019 fiscal revenue and expenses are presented below in **Figure 39**.

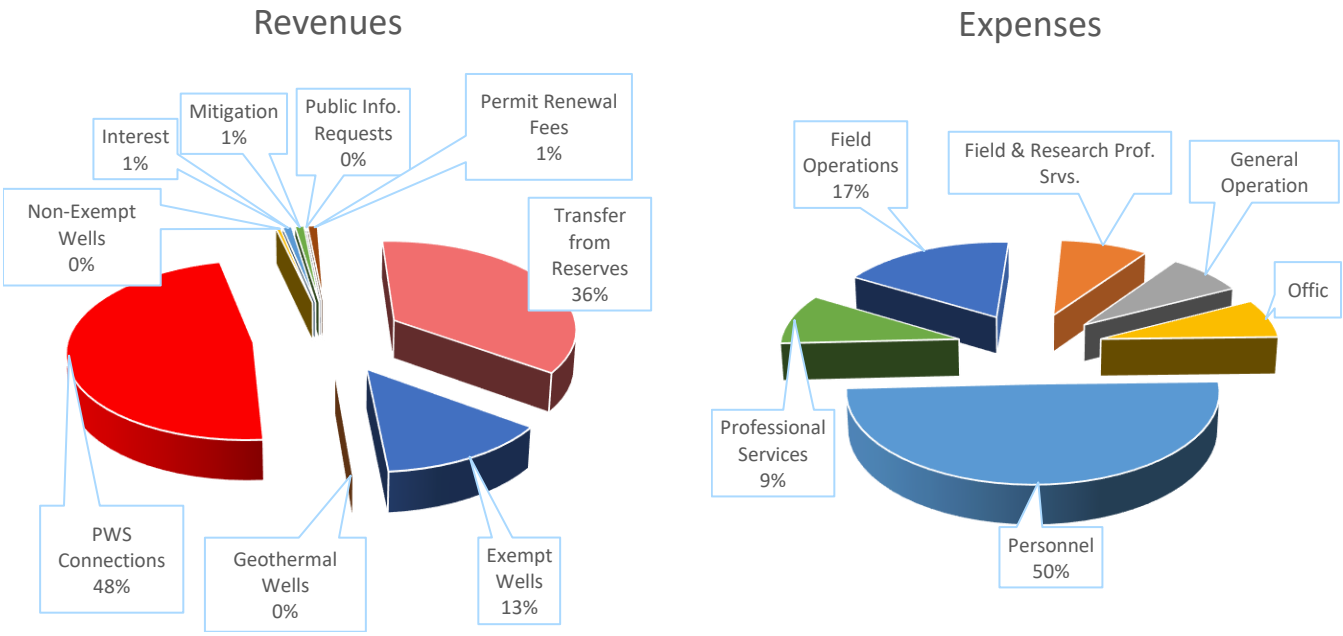


Figure 39 – Breakdown of revenue and expenses from the Hays Trinity Groundwater Conservation District 2019 Budget

Of particular note when analyzing the District's distribution of revenue source, one must pay particularly close attention to the relative magnitude of revenue generated from PWS connection fees (48 percent; bright red) and revenue transferred from the District's reserves (36 percent; pink). As stated previously, connection fees comprise nearly half of the District's entire revenue. Alarmingly, it is noted that such connection fees will end as available groundwater supplies become fully permitted. Additionally, more than one-third of the District's revenue is derived from the District's reliance upon monetary reserves, which may not be a sustainable revenue source in future years. When viewed collectively, approximately 84 percent of the District's 2019 revenue may be unsustainable.

COMPARISON WITH OTHER GROUNDWATER CONSERVATION DISTRICTS

A comparative survey of surrounding GCDs offers a broad perspective on the disparity of the District's revenue sources relative to the practices of neighboring districts. Presented in **Table 15** is this comparative summary, identifying the capability of districts to impose taxes, various types of fees or a combination of both. A tax-based district may levy property taxes if approved by voters for budgeted items through a local election. Districts may also charge export fees and administrative fees; solicit grants, gifts, and loans; and charge fees for services such as water testing. Well production fees are based on the amount of water a well uses or the documented capacity of the well based on its approved permit.

As noted previously and evidenced in **Table 15**, the District is more limited in its ability to generate revenue than any neighboring GCD. In fact, all other Central Texas GCDs have the ability to either levy taxes, assess fees, or both, whereas the District is currently unable to recover costs through either of these options (as shown in **Figure 40**). For those GCDs unable to assess ad-valorem taxes, production fees (from non-exempt users) are the primary means of generating revenue to maintain a balanced budget and those districts' operations. Our limited research and analysis indicate that the District is the only groundwater conservation district in Central Texas that cannot utilize ad-valorem taxes or production fees for funding operations.

Table 15 – Comparative survey of neighboring groundwater conservation district revenue mechanisms relative to the Hays Trinity Groundwater Conservation District

Entity	Taxes	Fees	Prod	Exp	Aq Mgt	Comments
Hays Trinity	No	**Yes**				No taxes or production fees; PWS Connections (48 percent)
Comal-Trinity	No	**Yes**	X			Production fees ($1 per AF Agri. vs. $20 per AF others)
Medina County	**Yes**	**Yes**		X		Groundwater export fees and excess usage fees
Blanco-Pedernales	**Yes**	**Yes**				Taxes - $0.0224 per $100 of AV; capped at $0.05
Cow Creek	**Yes**	**Yes**	X			~70 percent funded through Taxes; 9.5 percent production fees
Kinney County	**Yes**	**Yes**				Taxes - $0.0607 per $100 of AV; capped at $0.10
Edwards Aquifer Authority	No	**Yes**			X	Aquifer Management Fee of $50/AF (98.9 percent of Revenues)
Trinity-Glen Rose	No	**Yes**	X			95 percent of rev. is well production fee income ($22 per AF)
Central Texas	**Yes**	**Yes**	X			Taxes - $0.0072 per $100 of AV; ~64 percent of total revenues
BSEACD	No	**Yes**	X			Production fees ($0.17/$0.44 per 1000 gal, $1/AF Agri.)

*All entities subject to Texas Water Code Chapter 36 legislation
** All entities subject to their own rules and regulations as well as their individual groundwater management plans
***Some entities are additionally governed by Special District Local Laws Code
Fee Types: Prod – Production Fee; Exp – Export Fee; Aq Mgt – Aquifer Management Fee
AV – Assessed Value

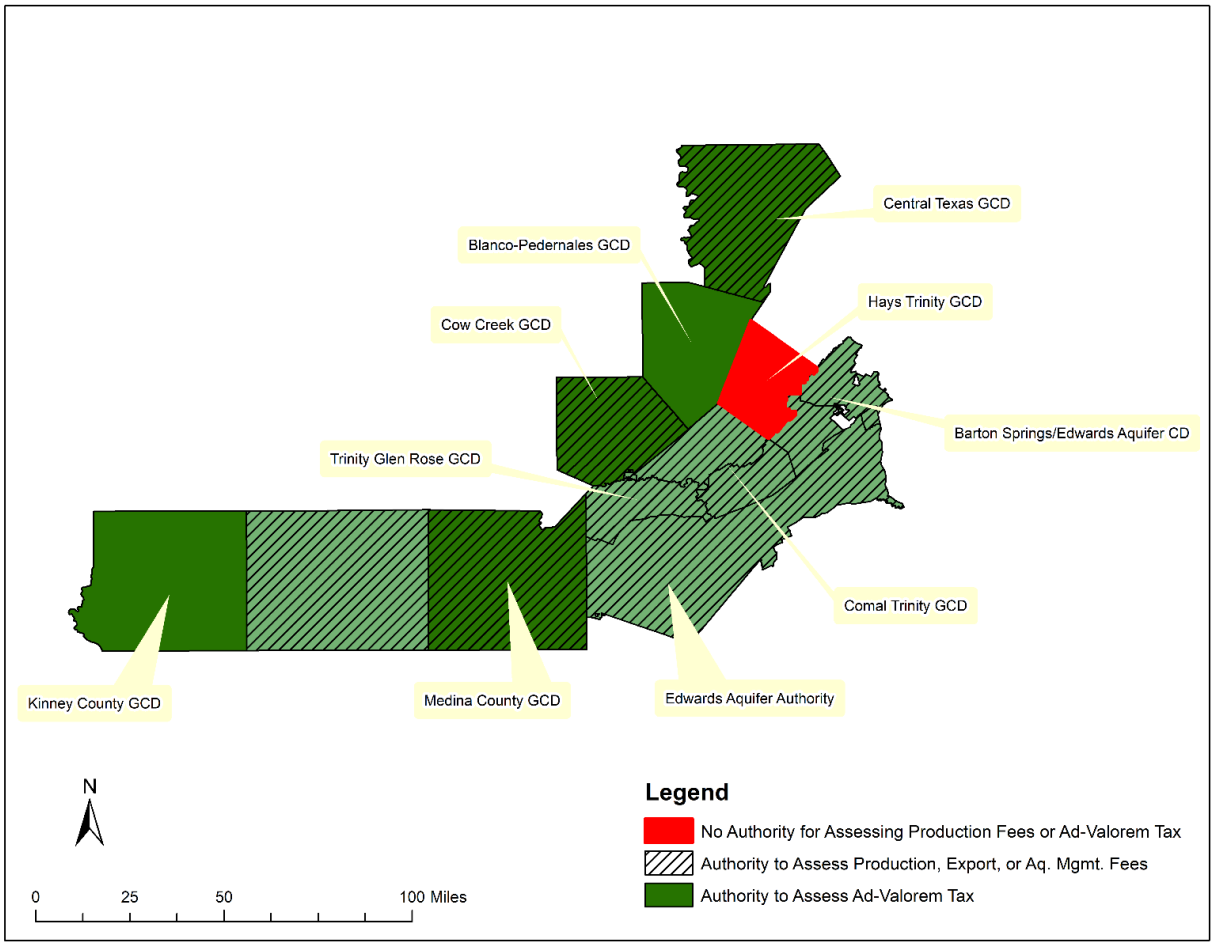


Figure 40 – Map of selected Central Texas groundwater conservation districts identifying present authority for assessment of ad-valorem taxes, assessment of production, export, or aquifer management fees, or both.

CONCLUSIONS AND RECOMMENDATIONS

The District's primary function is sustainably protecting the groundwater resources under its jurisdiction. The District's *Strategic Water Vision 2021* effort has not, to date, produced new technical information; rather, its importance has been in compiling the known studies, facts and issues relating to water resources management within the District along with issues related to ongoing District financing, disseminating this information and engaging with willing stakeholders to foster a dialogue over the appropriate path forward to address such issues.

The unprecedented growth in Hays County, along with increasing reports of dry wells, have produced an urgent need to effectively manage and regulate the limited groundwater resources in the District. Significant uncertainties exist regarding the extent of sustainable groundwater availability to meet Hays County's rapidly growing demand. Further uncertainty exists regarding the sustainability of the District's ability to recover its operational expenses through its present means of generating revenue. Thus, the District may contemplate actions to seek to either modify its enabling legislation and/or adopt rules as appropriate to sustain the District's operations towards meeting its legislative mandate.

As the District moves forward to continue to uphold its charge and mission to make sound regulatory decisions to ensure that groundwater is used efficiently and at sustainable rates, it is anticipated that the stakeholder engagement efforts initiated as part of the *Strategic Water Vision 2021* process will continue. The valuable information gained from ongoing collaboration amongst all groundwater users can serve as a basis for the District to move forward and continue to better serve the area through their mission.

The *Strategic Water Vision 2021* outreach efforts and initial technical information review have informed the development of the below series of recommendations, categorized as policy, communication, technical, and financial for the District's consideration.

POLICY RECOMMENDATIONS

Policy-level recommendations were identified and discussed in the Round 2 stakeholder working group meetings. These recommendations are presented here for the District's consideration moving forward:

Policy Recommendation 1: Seek changes to enable legislation to allow for other forms of usage fees.

The District should seek changes in its enabling legislation to allow the district to transition to a funding structure allowing production fees. This will help protect this aquifer for the next 50 years, fees are here to make sure the aquifer is sustainable for large and small users. Other usage fees are not fully removed from future pursuit, but this recommendation is for the immediate future.

Throughout this process, most surveyed stakeholders expressed the desire for water to continue to be free, but a significant majority indicated that if water were not free, people would be more likely to conserve it. In addition, the majority of survey respondents

indicated that volume usage fees (production fees) are the fairest fee structure. As the District continues to rapidly grow and non-exempt users outpace exempt water users, production fees would do a better job of recovering operational expenses while promoting water efficiency.

Production fees are reliable usage fees that work. Groundwater conservation districts throughout Central Texas have production fees as a part of their management portfolio, and the District is the only one that does not have the capability to levy a tax or assess a production fee. Other fees that could be considered include well title transfer fees or adjustments to the connection fee structure. Ad-valorem taxes are based on assessed property value, and it is important to note that the District's current enabling language explicitly restricts the use of such taxes. The District does not have an interest in seeking such a significant change and given the status of the current upcoming legislative session such an approach would be much less feasible.

Policy Recommendation 2: Work with county and city officials to craft waterwise development ordinances, rules, incentives and supporting studies.

The District should work with county and city officials to craft water-wise development ordinances, rules, and incentives, and support studies that help promote groundwater conservation and long-term sustainability in the region. Looking at the feedback received, in the face of limited groundwater supply, stakeholders ranked county/city growth and development ordinances as being the most important management strategy. Stakeholders voiced an interest in developing a more refined characterization of projected population growth in Hays County, which can be influenced by ordinances and regulation. Stakeholders also voiced support for potential water marketing solutions to incentivize more effective use. A clearer understanding of growth and more effective utilization of the resource leads to a clearer understanding on water demands, promoting better decision-making on water management.

Policy Recommendation 3: Continue to promote and support state-of-the-art groundwater modeling and technical analyses to better inform water resource management.

The District should continue to promote and support the state-of-the-art groundwater modeling and technical analyses to better inform water resource management. Most of the surveyed stakeholders believe that there will be insufficient groundwater by 2025 and further believe the District should stop issuing permits when groundwater allocation is reached. Stakeholders have also expressed uncertainty regarding the sustainability of current management goals and indicated a need for more detailed modeling capability to accurately assess availability. District estimates and anecdotal evidence suggest permitted and exempt use is approaching availability limits of the source under present management goals. Participants support more rigorous and detailed studies to be performed to inform the District and community on the benefits that the aquifer provides to the ecological environment and resultant impacts on the local economy.

Policy Recommendation 4: Explore and support studies investigating alternative groundwater management strategy projects beyond the construction of additional wells.

The District should explore and support studies investigating alternative groundwater management strategy projects beyond the construction of additional wells. A large majority of participating stakeholders believe that alternative water supplies need to be considered. Regional planning identifies an increasing need for a suite of future strategies contemplating sources other than groundwater wells. Such strategies could include:

- ASR (Aquifer Storage & Recovery)
- Conjunctive use
- Conservation
- Reuse
    - Direct
    - Indirect
    - Alternative onsite reclamation (e.g., rainwater harvesting)
- Supporting more rigorous studies at the local level

Policy Recommendation 5: Seek opportunities to promote conservation through educational efforts in support of the Districts groundwater management plan.

The District should seek opportunities to promote conservation through educational efforts in support of its groundwater management plan. Conservation offers opportunities to identify and realize cost effective near-term effects from demand management. There appears to be general support for this strategy from stakeholders, and its importance is further reflected in the State's 2021 Regional Water Plans. Identifying opportunities for increased water efficiency, such as through demand management and management of water loss, can offer cost-effective near-term benefits for all water users, providers, and their customers.

Policy Recommendation 6: Increase educational efforts and outreach in the community.

Maintaining stakeholder communication and serving the water community to ensure the continued benefits of groundwater resources is of utmost importance to the District's staff and board. The District should continue to seek out opportunities to assist in education and outreach in areas such as exempt well use, modeling, drought contingency planning, and conservation (discussed previously). Also, it will be important to engage with Independent School Districts in the area to facilitate the sharing of successful conservation methods between school districts.

A more detailed discussion on recommended approaches to enhance the District's outreach is presented in the Communication Recommendations below.

COMMUNICATION RECOMMENDATIONS

In actively working to improve communication with stakeholders, the District should continue to facilitate opportunities for connection and provide enhanced communication resources. This may include an upgraded website for the District, designed to assist in information transference and more frequent communication that benefits all stakeholders of the District. Other tools include utilizing social media to distribute educational and informative content more effectively, and/or assigning groundwater ambassadors to advise, engage and educate within the community, with businesses, and with other water providers in the region.

To expand on the recommendations provided in the previous section, it is recommended the District plan to continue its outreach and engagement with stakeholders and the public as they move forward. As the *Strategic Water Vision 2021* engagement process concludes, presented herein are more detailed recommendations regarding communication for the District's consideration to enhance public outreach efforts in the future.

Communication Recommendation 1: Enhance the District Website:

The District would benefit from amplifying their current website to include all the information gathered from the *Strategic Water Vision 2021* engagement process and making sure it is easily accessible and downloadable to everyone. In addition, the District should continue to add educational materials, visualizations, white papers, videos, etc. as available to help with education to the community and those who visit the website.

Currently, the website has a "Conservation" section with general tips for conserving, instructions and documents for rainwater harvesting, landscape irrigation and conservation for appliances. These links will be added value to website visitors and could also be used as tools and content that can be placed on other media outlets such as social media, emails, or newsletters. It is important to continue to add to the resources on the website to keep the content fresh and relevant. Ensuring that the content is visually engaging, easy to read and provides educational content but also informs visitors of the limited resources and increasing demand in the area would be beneficial to the cause of sustaining the groundwater in the Trinity Aquifer.

Directing visitors to the website through other outreach methods such as newsletters, social media, emails, etc. will be helpful in attracting more visitors to the content posted on the webpage.

Communication Recommendation 2: Quarterly Newsletter:

Implementing a quarterly e-newsletter for stakeholders would be advisable for the District to keep those contacts continuously educated, informed and up-to-date on any important news. E-newsletters are a great resource for getting information out quickly and maintaining consistent engagement.

Communication Recommendation 3: Social Media:

Social media is an important tool to get quick updates out to many users. It is one of the most used media and news access outlets. Maintaining a strong and consistent presence on social media allows for ample opportunities to share content related water management activities, conservation, updates to processes, etc. Social media also allows for more visual, engaging and informal content that can be easily shared amongst the public.

Social media should be used to maintain an ongoing engagement relationship with the public moving forward. Using social media in conjunction with e-newsletters or updates to the website is advisable. Including ways to access the social media pages on the Hays Trinity website would be a great way to add to the current following on those pages. One way to do this is embed the social media posts directly onto the website.

The District social media pages could benefit from adding more engaging content for users including conservation resources, educational content, images or graphics, news release and/or updates, along with other engaging content such as polls or contests. Other local groundwater districts in the area have utilized some of these measures and have grown to a much larger following. While drought updates are informative, other content should be utilized as appropriate.

Communication Recommendation 4: Local Collaboration:

As evidenced by the *Strategic Water Vision 2021* process, collaboration with stakeholders can both strengthen and inform the District's problem-solving efforts. Recognizing this potential, the following opportunities for local collaboration are identified for the District's consideration:

- Work with school districts that have successfully implemented innovated conservation measures and ask that they share or allow the District to present those ideas to other school districts within the Hays Trinity Groundwater District.
- Utilize school affiliations to distribute educational material to students/families on conservation, its benefits, and efforts of the District to the community.
- Work with water municipalities to add educational materials from the District with public water bills. Dripping Springs Water Supply Corporation has verbally agreed that they would be willing to collaborate with Hays Trinity on sharing content to their water users.
- Identify local project champions as District ambassadors to assist in grassroots efforts to get information out regarding the Districts efforts and conservation updates. Have these local ambassadors work with and consult businesses, communities on improved water management practices, etc.
- Work with other environmental advocacy groups, elected officials and other stakeholders to help publish information about the aquifer, conservation resources, drought information and other news from the District. Having a working, collaborative relationship with other entities and stakeholders will help to push information more efficiently and reach larger audiences.

TECHNICAL RECOMMENDATIONS

Hays County has experienced unprecedented growth in its population over the last decade and has been recently identified by the U.S. Census Bureau as having the second-highest growth rate of any county in the nation. Water providers and users in the District have historically relied upon groundwater supplies but have increasingly needed to utilize additional alternative sources to meet their rapidly growing water demands. With this growth, the study and regulation of the groundwater resources available within the District have necessarily had to grow more sophisticated as greater scrutiny has been given to this limited, cost-effective water supply alternative.

With greater attention to groundwater supplies has come increased awareness of arising issues warranting increased study and regulation. Numerous studies suggest the recent growth is expected to continue to increase, with demands increasing accordingly. However, modeling of the aquifer performed by the State suggests that under present management conditions the current demands on the aquifer are approaching the extent of the availability of water from the source. While more refined modeling efforts supported by the District are underway, anecdotal evidence of increasing reports of dry wells to the District suggest an immediately rising concern of availability, irrespective of modeling and associated management assumptions.

Needs developed from the regional water planning process are projected to increase significantly for water user groups located within the District, from 2,200 AFY to 19,000 AFY over the 2020 – 2070 period. Such needs may exceed the present availability of groundwater resources as presently managed and regulated. Regional Plans contemplate and recommend a broad suite of alternative water management strategies to meet these needs, with cost effective groundwater well construction and conservation strategies comprising near-term solutions.

From a management perspective, increasing the attention of stakeholders and policymakers to these immediate issues regarding the groundwater resources available to water users within the District is necessary to ensure groundwater supplies are efficiently and effectively utilized as demands increase. The present Strategic Water Vision 2021 effort being undertaken here represents the District's continued effort to meet their statutory objective to manage and regulate the available groundwater supply. This will require a suite of activities relating to education, monitoring, coordination and technical study to manage the resource collaboratively and smartly.

From a technical perspective, the review and summary of the available technical information performed herein has identified several areas warranting future scrutiny, noted below:

Technical Recommendation 1: Develop an improved estimation of the number of exempt wells and related groundwater use within the District.

Groundwater wells constructed for some domestic and agricultural uses are exempt from reporting use to the District. Given the significance in the magnitude of exempt well use within the District, improving the estimation of this usage will better inform awareness of the extent of present demands on the aquifer.

Technical Recommendation 2: Identify and/or develop estimates of 2015 – 2020 population growth and water use.

Municipal demands comprise the largest portion of water demand in the District. The projections of population growth that form the basis of projected municipal demands derived for regional water planning rely upon data from the 2010 – 2015 period. More recent TDC projections suggest a potentially higher growth rate for Hays County. Given the rapidity of recent growth, a compilation of more recent 2016 – 2020 data relating to connections, use and population would provide a more refined basis for projection of future demand.

Technical Recommendation 3: Develop a more refined delineation of population and connections in both the District's jurisdictional area and throughout Hays County.

Many projections of water demand and population growth are available at the county level. At present, the primary technical means readily available to the District to disaggregate county-level data to the district-level is the use of an areal proportion of 55.15 percent. However, use of the areal proportion may introduce inaccuracy in estimates relating to population and/or water demand. An improved approach would be through identifying the numbers of connections for all water providers in the District and the county. A proportion based on connections would likely allow for more accurate estimations of population and water demand within the District.

Technical Recommendation 4: Perform a detailed demographic analysis of Hays County reflecting regional policy scenarios and objectives.

A technically rigorous demographic study of Hays County with sufficient geographic specificity to identify elements of relevance to the District would facilitate the development of information and data for use by the District in estimating the extent of population and demand growth. Scenarios reflecting factors such as build-out conditions, local and/or county ordinances, would allow for the estimation and description of the amount and location of future development that may be allowed to occur under certain regulations. Such a study would be useful to both the District as well as providing regional benefits.

Technical Recommendation 5: Continue to support the development of an enhanced depiction of modeled groundwater availability specific to the District area.

At present, modeling developed by the TWDB in support of the joint-planning process for GMA #9 represent the most readily available depiction of groundwater availability to the District area. This model estimates groundwater flow in the Trinity Aquifer in the Hill Country, but (1) does not explicitly simulate or account for surface water considerations; and (2) is regional in scope with the main purpose of estimating available groundwater volumes for the entire Trinity Aquifer, which extends beyond the Blanco River basin to the north, west, and south (Martin, et. al., 2019). The District has supported the development of a more sophisticated model specific to the Trinity Aquifer in the Hill Country, the Brazos River Aquifer Assessment Tool. The development of this tool, which more explicitly addresses the aquifer of direct relevance to the District, should continue to be supported to better inform upon the availability of groundwater to users in the District.

FINANCIAL RECOMMENDATIONS

The District provides a suite of activities relating to education, monitoring, coordination, and technical study to regulate groundwater collaboratively and smartly in a manner that provides economic and environmental benefits to the region. Historically, the District has accomplished this through reliance upon connection fees, supplemented with other revenue mechanisms; however, the District has had to increasingly rely upon its financial reserves. Given the limitations of these reserves, and the fact that revenue from connection fees will diminish as less permits are granted in the future due to the allocation of available groundwater supply from the Hill Country portion of the Trinity Aquifer, the District's current funding mechanisms appear unsustainable.

If the effective regulation of the region's groundwater resource is to continue in a cost-efficient manner, changes to the District's enabling legislation are necessary to allow for an alternative revenue source. All other Central Texas GCDs have the ability to either levy taxes, assess fees or some combination of both. For those GCDs unable to assess ad-valorem taxes, production fees (from non-exempt users) are the primary means of generating revenue to maintain a balanced budget and those districts' operations. Thus, the following recommendations are offered for consideration.

Financial Recommendation 1: The District should seek changes in its enabling legislation to allow the District to transition to a funding structure allowing production fees.

This recommendation is supportive of Policy Recommendation 1. Districts throughout Central Texas have production fees as a part of their management portfolios. As the district continues to rapidly grow and non-exempt users outpace exempt water users, production fees offer an opportunity for continued revenue generation while promoting water efficiency. The continuance of effective regulation will help protect the Hill Country portion of the Trinity Aquifer, ensuring sustainable use of the aquifer for large and small users.

Financial Recommendation 2: Other revisions that could be considered include:

- Adjustments to well title transfer fees
- Adjustments to the connection fee structure

REFERENCES

HDR Engineering, Inc., February 2011. *Water and Wastewater Facilities Plan for the Portion of Hays County West of the IH-35 Corridor*, prepared for County of Hays, Texas, City of Dripping Springs, Dripping Springs Water Supply Corporation, Barton Springs/Edwards Aquifer Conservation District, Guadalupe-Blanco River Authority, City of Hays, Hays Trinity Groundwater Conservation District, Lower Colorado River Authority, City of Wimberley, Wimberley Water Supply Corporation, City of Woodcreek, and Aqua Texas, Inc.. TWDB Regional Planning Grant No. 0804830842. Austin, Texas.

Hays Trinity Groundwater Conservation District (HTGCD), 2021. *Management Plan*, Adopted December 3, 2020. Dripping Springs, Texas.

Lower Colorado Regional Water Planning Group (Region K), 2021. Lower Colorado Regional Water Plan (Region K), submitted November 5, 2020. Austin, Texas.

Martin, N.M., Green, R.T., Nicholaides, K.D., Fratesi, S.B., Nunu, R.R., and Flores, M.E. 2019. Blanco River Aquifer Assessment Tool: A Tool to Assess How the Blanco River Interacts with Its Aquifer: Creating the Conceptual Model. Technical Report prepared for the Meadows Center for Water and the Environment. Texas State University at San Marcos, Texas. 136 p. + attachments.

Population and Survey Analysts (PASA), March 2019. Demographic Update for Dripping Springs Independent School District, Spring 2019. Dripping Springs, Texas.

South Central Regional Water Planning Group (Region L), 2021. South Central Regional Water Plan (Region L) submitted November 5, 2020. Austin, Texas.

Texas Water Development Board, 2021. Projections Methodology and Documentation. 2021 Regional Water Plans. https://www.twdb.texas.gov/waterplanning/data/projections/methodology/index.asp