

NOVEMBER/DECEMBER 2022

# FISCAL NOTES

THE GOOD FOR TEXAS TOUR: WATER EDITION 7

STATE REVENUE WATCH 11

## Drought in Texas

By Jess Donald and Spencer Grubbs



HOW RAIN SCARCITY  
AFFECTS TEXANS  
AND THE ECONOMY

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TPWD

Texans expect hot summers, and many cope with high temperatures by counting down the days until autumn brings some degree of relief. But excessively long periods of little to no rain are another story. Drought is an unpredictable and unforgiving weather phenomenon that can extend well beyond the summer months. The most severe droughts are destructive to an abundance of Texas industries and residents' quality of life.

Drought presents enormous challenges for Texas' economy, particularly for its agricultural sectors. The current drought of record is estimated to have cost the Texas economy nearly \$7.62 billion in direct agricultural losses and nearly \$17 billion in total losses in 2011 alone, according to a recent report by the Texas Water Development Board (TWDB). With very little rainfall during the planting season, this year's drought could have a similar impact on West Texas farmers and ranchers, many of whom are sounding alarm bells about 2023.

Agriculture tends to be the hardest hit, but severe drought reverberates across an array of economic sectors in Texas, including municipal government. State water policy and

planning, as well as local drought management programs, continue to evolve to mitigate, if not prevent, the most harmful effects of severe drought in Texas.

### WHAT IS DROUGHT?

Drought is a long period of little to no precipitation that leads to a water shortage. But there are many cases when drought isn't that cut and dried. Defining drought raises a slew of questions. How much precipitation is too little? How many days, weeks or months of sparse precipitation is abnormal? Who or what is impacted the most by lower levels of precipitation? How are the natural effects of limited precipitation made worse by people's demand on existing water supplies?

The amount of annual rainfall considered drought-conducive in Memphis, Tennessee, may be considered an exceptionally wet period in Santa Fe, New Mexico. A drought in Montana may manifest as a period of abnormally low levels of winter snowfall or snow accumulation in the mountains. Long story short: Drought can mean different things to different people and places.

# A Message from the Comptroller



Clean and reliable water is necessary for survival. When we're thirsty, we can turn on the faucet, press the button on a drinking fountain or buy a bottle of water at the store. But it's easy to forget how much work goes into delivering clean water to Texas homes and businesses now and in the future.

With the population ballooning and businesses booming, it comes as no surprise that Texas will need a lot of water to stay afloat. But planning for Texas' future water needs requires the dedication and resourcefulness of organizations and passionate individuals at the local, regional and state levels.

This fall, as part of my *Good for Texas Tour: Water Edition*, I visited several organizations that are bellwethers of innovative water planning and management, and I spoke with their employees about the challenges and successes of turning planning into action. My first tour stop was at San Antonio Water System's H2Oaks Center, which houses a state-of-the-art brackish water desalination and aquifer storage and recovery facility. From there, I visited the Panhandle Groundwater Conservation District near Amarillo and the North Texas Municipal Water District in Wylie. And I spoke with leaders at the Lower Neches Valley Authority in Beaumont and the Edwards Aquifer Authority in San Antonio.

You can read details about their work in this issue. You also can read about droughts and their toll on Texas' economy — notably, our state's agricultural industries and municipalities.

Texas currently is experiencing the worst drought since 2011, and it has spelled disaster for the state's cotton industry. The International Center for Agricultural Competitiveness at Texas Tech University estimates that due to this year's drought, cotton producers, which are concentrated in the Panhandle, will lose about \$2.1 billion in total economic activity, not accounting for crop insurance. Although crop insurance helps producers recoup revenue losses, it doesn't help businesses and consumers further down the supply chain.

Texas' livestock industry, too, has been feeling the heat. In response to water and food shortages this summer, some farmers and ranchers reduced the size of their cattle herds. And city governments are having to keep a close eye on water supplies and implement conservation practices not only to maintain the quality of life for current residents and businesses but for future ones, too.

As always, I hope you find this issue informative!

  
**Glenn Hegar**

Texas Comptroller of Public Accounts

## TEXAS SUPPLY CHAIN

### [FOOD]

Food is an essential commodity, and getting it to our tables involves a sophisticated supply chain with many vulnerable components. Severe weather and natural disasters have long posed risks to the food supply. More recently, the COVID-19 pandemic and cyberattacks have increased this essential sector's vulnerability.

#### FOOD SUPPLY CHAIN INDUSTRY, 2020

SHARE OF TOTAL TEXAS GROSS DOMESTIC PRODUCT (GDP):

TOTAL TEXAS GDP:

**4.9%**  
**\$85.6 BILLION**

ONE IN A SERIES OF REPORTS THE COMPTROLLER HAS PREPARED ON TEXAS SUPPLY CHAINS

Source: JobsEQ

#### TEXAS FOOD SUPPLY CHAIN EMPLOYMENT AND WAGES, 2020

FOOD SUPPLY CHAIN INDUSTRIAL SECTOR	TEXAS EMPLOYMENT	AVERAGE ANNUAL WAGES	TOTAL WAGES
AGRICULTURE	34,994	\$40,899	\$1.4 BILLION
MANUFACTURING	116,788	\$51,586	\$6.0 BILLION
WAREHOUSING	1,400	\$46,768	\$65.5 MILLION
WHOLESALE TRADE	89,894	\$62,652	\$5.6 BILLION
RETAIL TRADE	256,136	\$30,046	\$7.7 BILLION
FOOD SERVICES	966,782	\$20,312	\$19.6 BILLION
<b>TOTAL</b>	<b>1,465,994</b>	<b>\$27,617</b>	<b>\$40.5 BILLION</b>

The food-related sectors of these industries employ nearly 1.5 million Texans and provide \$40.5 billion in annual wages.

Source: JobsEQ

#### TEXAS FOOD SUPPLY CHAIN CONTRIBUTION TO GDP, 2020

IN BILLIONS OF DOLLARS



Source: JobsEQ

### Texas Agriculture

TEXAS RANKS FOURTH NATIONALLY IN AGRICULTURAL CASH RECEIPTS, WHICH TOTALED \$20 BILLION IN 2020.

Texas' top five agricultural commodities in 2020 were:

- 1. CATTLE AND CALVES** (\$8.5 BILLION, RANKED NO. 2 AMONG ALL STATES)
- 2. DAIRY PRODUCTS, MILK** (\$2.8 BILLION, NO. 4)
- 3. BROILERS** (\$1.7 BILLION, NO. 5)
- 4. COTTON LINT, UPLAND** (\$1.6 BILLION, NO. 1)
- 5. CORN** (\$948.7 MILLION, NO. 12)

Source: U.S. Department of Agriculture

Note: USDA cash receipts data are periodically updated. These figures reflect USDA data at time of writing.

#### LEARN ABOUT

the reasons supply chains have become a hot button issue in recent months. Watch Episode 3 in the Fiscal Notes Economy Explainer video series at:

[HTTPS://COMPTROLLER.TEXAS.GOV/ECONOMY/FISCAL-NOTES/2022/MAY/EPISODE3.PHP](https://comptroller.texas.gov/economy/fiscal-notes/2022/may/episode3.php)

If you would like to receive a paper copy of *Fiscal Notes*, contact us at [fiscal.notes@cpa.texas.gov](mailto:fiscal.notes@cpa.texas.gov).

## DROUGHT HISTORY IN TEXAS

Texas is no stranger to drought. For many Texans, especially those who live west of the Interstate 35 corridor, drought is expected — it's just a matter of when it will happen.

But just because Texans have come to expect drought doesn't mean they are complacent about the destruction it can bring. One of the most devastating droughts in Texas' modern history occurred from 1950 to 1957. According to a February 2022 study by TWDB, the state's agriculture industry alone suffered an estimated \$36 billion in direct losses from this drought. Total costs to the entire state economy are unknown.

The drought from 2010 to 2014 was shorter but more severe by some measures than the 1950s drought — 100 percent of the state was affected by drought for many weeks, and nearly 88 percent was under exceptional drought conditions at the most intense period in early October 2011. The U.S. Department of Agriculture (USDA) estimated the agriculture industry suffered losses between \$11.1 billion and \$15.5 billion (also in 2021 dollars) during this drought. Total costs to Texas and other impacted states approached a staggering \$73 billion, and an estimated 271 Texans lost their lives, according to the National Oceanic and Atmospheric Administration (NOAA).

Additionally, NOAA estimates that there have been 18 drought events with an economic impact of \$1 billion or more in Texas since 1980. Included in its forecast is the current drought Texas has been experiencing since 2021 (although the total cost is not yet known).

Year to date, 2022 is the 11th driest year in the past 128 years and is the worst drought since 2011. Between Aug. 9 and Aug. 15 of this year, about 68 percent of Texas was in extreme drought conditions and nearly 30 percent was in exceptional drought conditions, according to the U.S. Drought Monitor. Since then, due to increased rainfall and cooler temperatures in much of the state, drought conditions in Texas have eased. At time of writing, about 15 percent of the state is experiencing extreme or exceptional drought conditions, and nearly 90 percent still is abnormally dry.

## AGRICULTURAL IMPACTS

Agriculture is big business in Texas, and cotton is king. Texas A&M AgriLife estimates that cotton production contributes \$2.4 billion to the state's gross domestic product, supports 40,000 jobs statewide and generates \$1.55 billion in annual labor income. Cotton farming is of particular importance in the High Plains region of Texas.

"Within 100 miles of Lubbock is the largest concentration of cotton production in the world," explains Darren Hudson, director of the International Center for Agricultural Competitiveness at Texas Tech University. His organization estimates that cotton producers provide a total of 26,353 jobs to the High Plains region, contributing a net average in excess of \$4 billion to the region's economy during a

## Crop Insurance

Crop insurance is designed to help cushion agricultural producers, notably farmers and ranchers, against the costs incurred from the destruction of crops due to natural events or against revenue losses incurred by drops in prices for agricultural commodities sold. The most common type of crop insurance is multiple peril crop insurance (MPCI), which is federally subsidized and regulated by the USDA and sold by private insurance companies. MPCI provides coverage for damages caused by a variety of natural events including drought.

With crop insurance, losses by agricultural producers are capped at about 35 percent. "A 35 percent loss (or deductible) is not chump change — it's a significant



Darren Hudson,  
Texas Tech University

loss in revenue," says Darren Hudson, director of the International Center for Agricultural Competitiveness at Texas Tech University. "But [crop insurance] does buffer farmers a good bit.

"Crop insurance as a federal program has worked reasonably well at protecting assets on the

farm and farm income, but it doesn't really protect the infrastructure that supports agriculture, particularly the 'past-the-farm' infrastructure," Hudson says. "If you look back at [what comes] before the farm — the input, such as seed and chemical suppliers — crop insurance benefits them only to the extent of when the crop fails."

He illustrates his point with a simplified example: A cotton farmer whose crops fail immediately after being planted will receive an insurance check for about 65 percent of expected revenue, which protects the farmer but not the suppliers on the front end who haven't yet been paid. "All that money is not flowing into the rest of the economy," Hudson says. Conversely, if the farmer's crops fail much later in the season, those suppliers have been paid already and are less affected.

"On the other side [of the agricultural supply chain] are the cotton gins, the warehouses, the shippers and all those [industries]," he says. If the cotton crop fails, "there's no cotton moving through the cotton gin or going into a warehouse or being trucked." Crop insurance, therefore, doesn't help these industries in the year the loss occurs but helps farmers producing in future years.

Sources: Insurance Information Institute; Center for Insurance Policy and Research

# Drought in Texas

typical production year. This year, the center further projected a 65 percent loss of dryland cotton in the region due to widespread drought, costing cotton producers an estimated \$2.1 billion and eliminating 17,130 jobs (excluding losses covered by crop insurance). While the losses still would be significant with crop insurance, it would save regional producers almost \$1 billion in economic activity and maintain 7,906 jobs.

The regional impact of drought on cotton producers showcases the importance of water to Texas' economic health. The repercussions of the reduction in Texas' cotton production can be felt around the world, contributing to the third year in a row of a global deficit in cotton fiber affecting industries across all sectors, including retail and clothing manufacturing.

## LIVESTOCK

The expansive open land of rural Texas is well suited for the state's largest agricultural commodity, livestock. Cattle and calves generated more than \$10 billion in cash receipts in 2021, making up nearly 14 percent of the U.S. total. Dairy products saw \$2.8 billion in cash receipts the same year, totaling almost 7 percent of the U.S. total.

Drought is hitting the livestock and dairy industries hard this year; at one point, 39 percent of the state's rangeland was in poor condition. By the first part of October, range and pasture conditions were 57 percent fair to poor. Texas A&M AgriLife reported this summer that both U.S. and Texas cattle herds were shrinking. Cattle producers have had to cull their herds with grazing land, grain feed and water in low supply. While

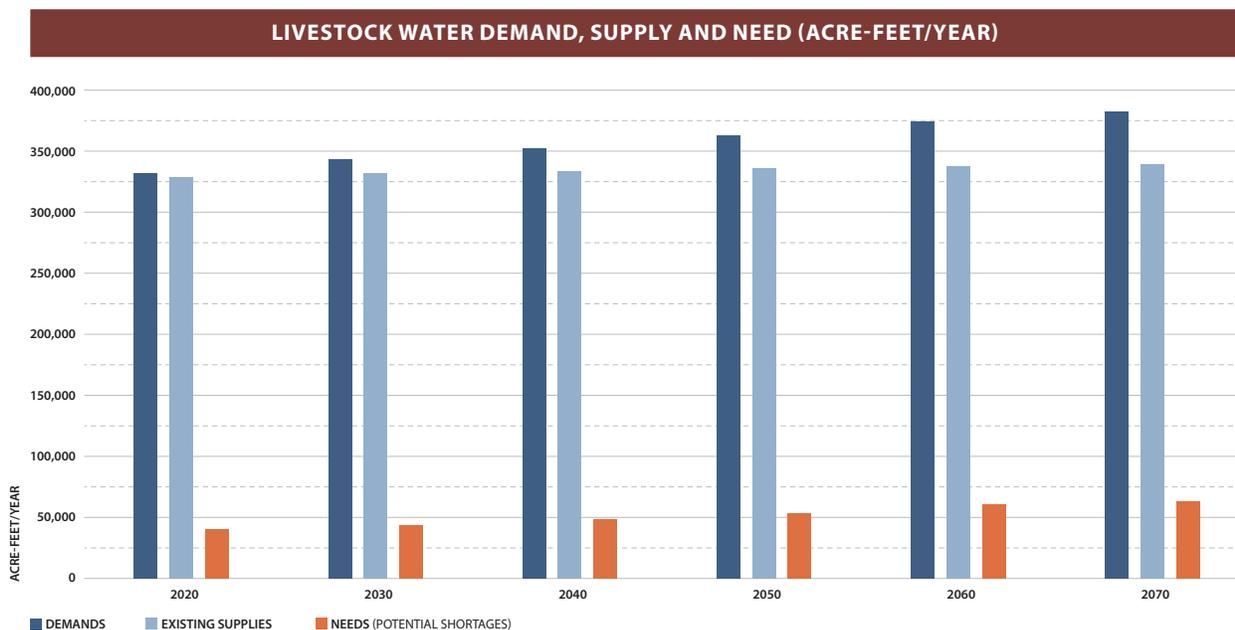
there is not an estimate of projected losses from the current drought, AgriLife reports that the drought of 2011 is estimated to have cost Texas livestock producers \$3.23 billion, to give a frame of reference.

Market factors greatly impact water demand for agricultural irrigation and livestock purposes. The prices of agricultural goods as well as the costs of fuel, fertilizer and feed play a role in Texas' water demand and need, illustrating the interconnectedness of water and the economy. Irrigation water demand is the largest category of water demand in the state and is estimated to continue to be until 2050, when it is projected to begin declining and to drop by almost 15 percent by 2070. In contrast, livestock water demand is projected to increase nearly 15 percent by 2070. Although livestock water demand only accounts for around 2 percent of the state's total water demand, livestock water needs are steadily outpacing supply. Additionally, potential water shortages will increase by more than 57 percent (**Exhibit 1**).

## MUNICIPAL IMPACTS

In addition to industry, the impact of drought and unmet water needs can be felt at home, particularly in Texas' growing urban population. According to the Texas Demographic Center, the state's population grew at 10 times the national average from 2020 to 2021, 1.3 percent compared with 0.13 percent, respectively. Much of that growth is concentrated in Texas' urban cores centered in the suburban areas near Houston, Dallas, Fort Worth, Austin and San Antonio, increasing municipal water demand for residential, business and industrial users.

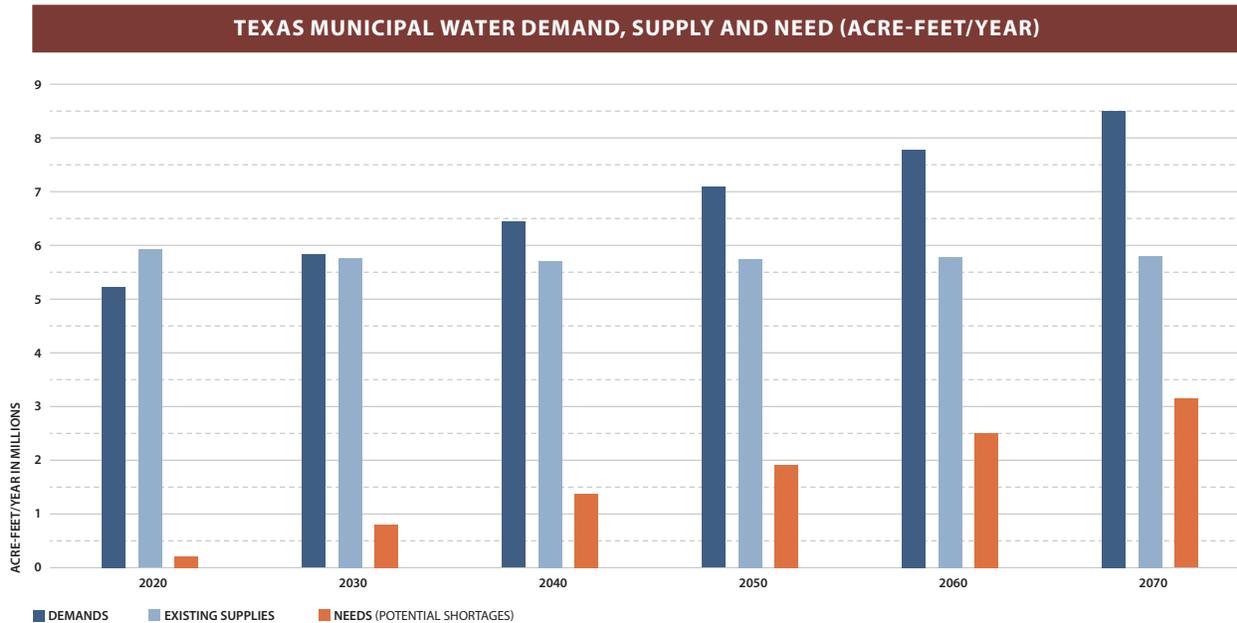
EXHIBIT 1



Source: TWDB

Note: Projected water needs calculations include the anticipated effects of water management strategies and conservation efforts.

## EXHIBIT 2



Source: TWDB

Note: Projected water needs calculations include the anticipated effects of water management strategies and conservation efforts.

Municipal water needs, or potential shortages, will increase over the coming decades according to the State Water Plan (SWP) — from 7 percent of the state’s overall water needs in 2020 to a 46 percent share by 2070. Continued population growth and phenomena such as drought strain the balance between municipal water supply and demand, creating an increasing municipal water need in Texas unless water strategies and conservation methods are implemented (**Exhibit 2**).

Failing to meet water needs harms individual Texans as well as the economy. According to the 2022 SWP, industrial water use (including manufacturing, mining and steam-electric power sectors) accounts for roughly 15 percent of total water demand statewide across the planning period, at 8 percent, 2 percent and 5 percent, respectively. Collectively, industrial conservation only makes up 1.4 percent of current water management strategies and will account for just 0.6 percent by 2070. Water shortages hurt business, industry, public safety and public health. The TWDB estimates that the socioeconomic impact of not meeting the population’s water needs would result in \$153 billion in income loss and nearly 1.4 million lost jobs by 2070 (**Exhibit 3**). The economic impact of municipal water needs differs from that of agricultural irrigation. Robert Puente, president and chief executive officer of San Antonio Water System, explains, “If you don’t have a good water supply able to sustain the effects of drought, industry and businesses will start to notice and be more reluctant to relocate here.”

Conservation is a key component to reducing the state’s municipal water demand and need. Municipal water conservation strategies make up nearly 13 percent of

the state’s current recommended water management strategies that include:

- Metering of all new connections and the retrofitting of existing connections.
- Water system audits and water loss controls.
- Incentives such as rebates to install water-efficient plumbing fixtures.
- Water pricing structures that discourage waste.
- Year-round landscaping watering restrictions.
- Public outreach and education.

While nearly half of Texas water utilities recommended municipal water conservation as a strategy, not all municipal water users have effective conservation programs, especially when it comes to residential water use (**Exhibit 4**). The utilities that serve the cities of Dallas, Houston and San Antonio each focus on community engagement and reduction of residential water use, with municipal conservation strategies making up 100 percent, 100 percent and 65 percent of their current water management strategies respectively.

Access to water is a common need bringing communities together throughout the state. Conservation, including residential and industrial, is a vital tool.

## DROUGHT PLANNING AND MANAGEMENT

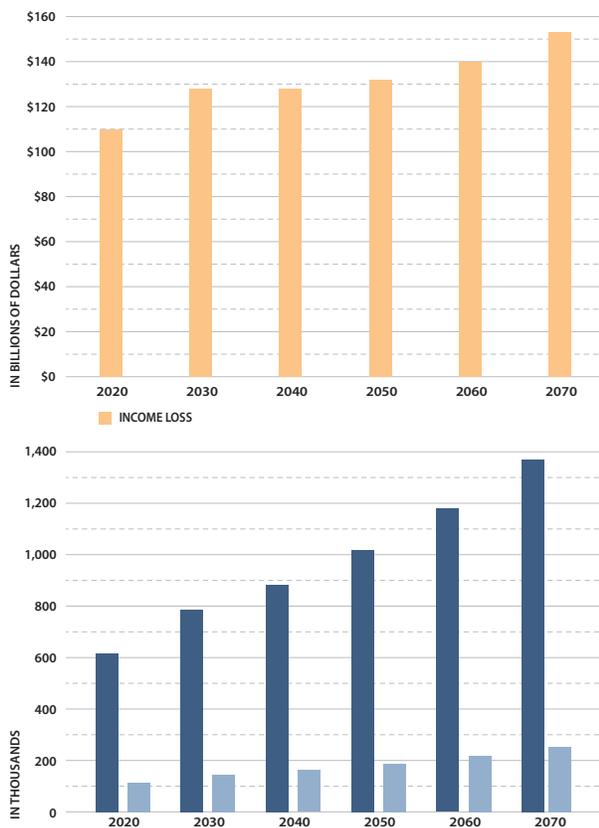
The causes of drought stem from unpredictable acts of nature, but the severity of drought, or how its impacts are felt by people and businesses, is partly dependent on how cities, regions and states plan for drought.

At the local level in Texas, certain municipal water utilities plan and prepare for drought by developing and updating a drought contingency plan every five years. At the regional level, 16 water planning groups develop water plans based on the “drought of record” — for some groups it’s the 1950-57 drought, and for others it’s the 2010-14 drought — which helps them respond to future droughts by making preparations using the worst drought in the past as a reference point. The planning groups recommend region-specific water management strategies, such as water conservation measures, to employ when water demand is at its highest and water supply is at its lowest.

Finally, at the state level, the TWDB compiles information from the regional water plans into a comprehensive SWP, also published every five years.

**EXHIBIT 3**

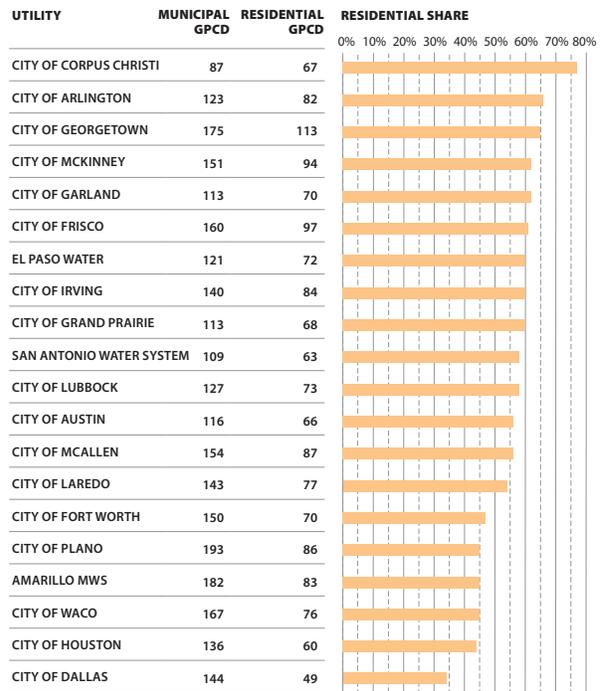
**PROJECTED ANNUAL SOCIOECONOMIC IMPACT OF NOT MEETING TEXAS WATER NEEDS**



Source: TWDB  
 Notes: Year 2018 dollars, rounded. Economic measurements include contributions made by individual producers, industries, sectors or group of sectors within a year, in addition to part-time and full-time jobs lost due to the shortage. Values have been adjusted to include the direct, indirect and induced employment impacts on the region.

**EXHIBIT 4**

**TEXAS TOP 20 RESIDENTIAL WATER USERS IN GALLONS PER CAPITA PER DAY (GPCD), 2021**



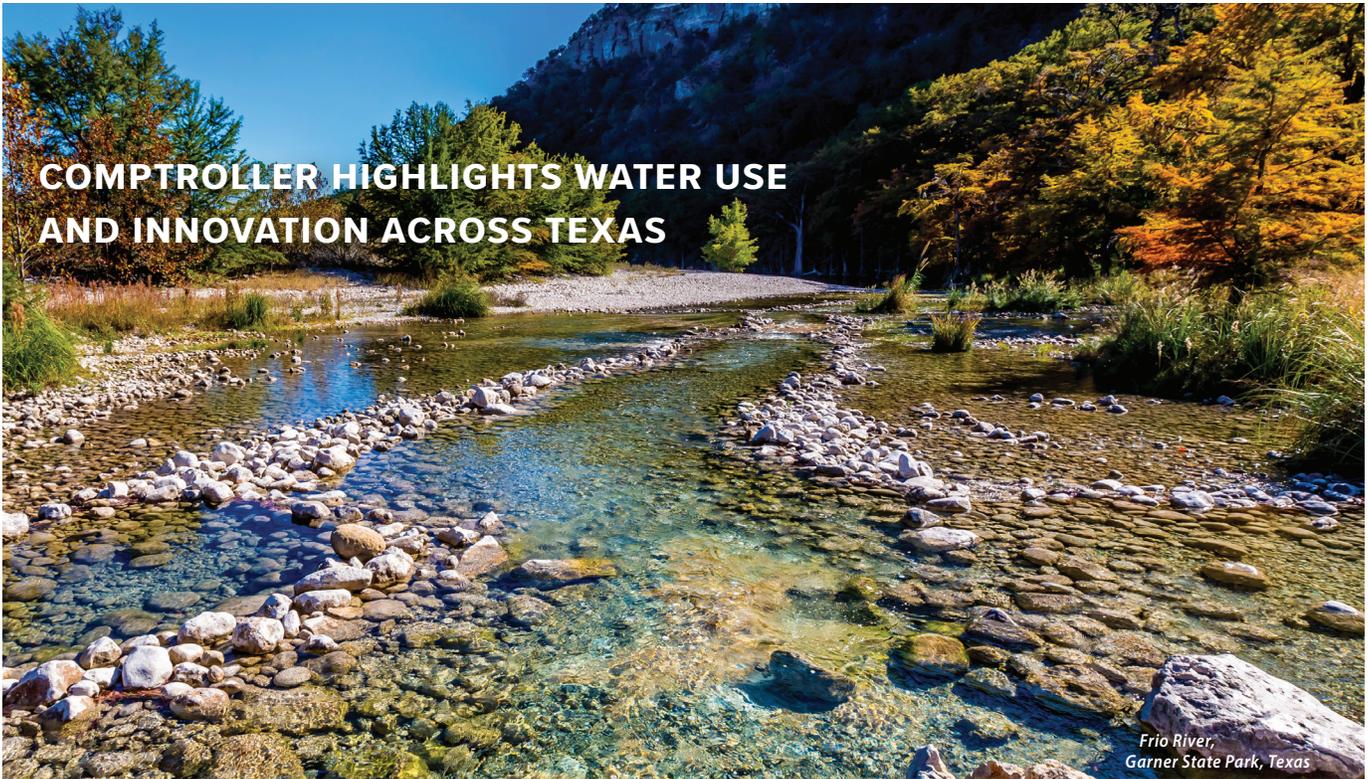
Sources: TWDB and Texas Comptroller of Public Accounts  
 Notes: Residential GPCDs are calculated based upon data provided by utilities. Some utilities do not report categorical water use volume or residential GPCD data. GPCD numbers are estimated and not official numbers and may be subject to change.

The Texas Legislature established other organizations responsible for monitoring and managing drought across the state, including the Drought Preparedness Council and the Emergency Drinking Water Task Force, as well as financial assistance programs such as the Texas Department of Agriculture’s drought-related disaster relief grants or the TWDB’s Drinking Water State Revolving Fund.

**CONCLUSION**

Water is the lifeblood necessary for the smooth operation of Texas and its economy, affecting people and industry alike. The impact of drought can be devastating, creating the need for Texans to preserve the state’s greatest asset: its water supply. “Planning is absolutely the key. You’ve got to plan, but just as important or more important is implementation. And that’s not always easy. It requires money, investment and a lot of commitment,” says Puente. Texans are innovative and resourceful and are looking toward the future to minimize the impact of drought through a variety of water management strategies and planning. **FN**

Read more on the innovations cities are implementing to secure the state’s water supply at [comptroller.texas.gov/economy/fiscal-notes/2022/jul/water-systems.php](https://comptroller.texas.gov/economy/fiscal-notes/2022/jul/water-systems.php).



Water use, availability and planning are vital in Texas, given the state's size and expansive needs. As part of his ongoing *Good for Texas Tour* series of statewide travels, Comptroller Glenn Hegar visited water projects across the state that are working hard to meet Texans' water needs, now and in the future.

"People moved to this state to provide for themselves and for future generations," says Hegar. "But the fact is, we can only provide economic opportunities if we meet basic, core, essential needs — and one of those is water."

Texas' population reached more than 29.1 million in 2020. Between 2010 and 2020, Texas' population grew by 4 million people, or 16 percent, more than any other state and nearly 1.3 million more than second-place Florida. State demographers estimate that by 2050, Texas' population will grow to more than 47 million people, all of whom will require reliable and clean water sources.

The Texas Water Development Board (TWDB) is the state's lead water planning and infrastructure financing agency. Every five years, the TWDB releases an updated State Water Plan (SWP), which serves as a guide to Texas water policy and regional water supplies and needs for 50 years into the future.

According to board member George Peyton, "It's imperative upon us, the state and our agency, to plan for all these people and businesses moving here, ensuring water availability so that economic success can be available for everyone." TWDB Chair Brooke Paup puts it even more bluntly: "If a community doesn't have a sustainable water source, they cannot grow."



TWDB Chair Brooke Paup, Comptroller Glenn Hegar and San Antonio Water System President/CEO Robert Puente tour the H2Oaks Center.

## GROUNDWATER

Groundwater is water located underneath the earth’s surface and is sourced from 31 aquifers throughout Texas, with about 92 percent of all available groundwater in Texas coming from aquifers. Groundwater provides about 60 percent of the state’s total water use. In 2019, nearly 74 percent of groundwater in Texas was used for irrigation purposes — water for plants and crops that feed millions of Texans (**Exhibit 1**).

Texas is home to nearly 100 groundwater conservation districts (GCDs), which work to maintain safe and adequate supplies of groundwater throughout the state. The Edwards Aquifer Authority (EAA) is a GCD that seeks to conserve and preserve the Edwards Aquifer and its groundwater.

Roland Ruiz, general manager of the EAA, says, “More than 2 million people are dependent on this aquifer as their primary water resource. So our job is really to take care of that resource ... It’s there for not only the current residents of this part of Texas, but future generations.”

The EAA estimates that from 1997 to 2014, its regulatory oversight preserved 2.6 million acre-feet of water. (An acre-foot is the volume of water needed to cover one acre to a depth of one foot and is equal to 325,851 gallons of water.)

## AQUIFERS AND DESALINATION

### Aquifers

Texas is home to nine major aquifers and 22 minor aquifers, all of which provide groundwater (**Exhibit 2**). Aquifers are underground geologic formations made up of porous rock or sediment that hold groundwater and are replenished through rainfall, surrounding streams and lakes, or inflow from surrounding aquifers.

An innovative way to preserve water in Texas aquifers is through aquifer storage and recovery (ASR). ASR is the process of capturing excess water and injecting it deep into aquifers to be stored for use during emergencies for months, or even years, at a time.

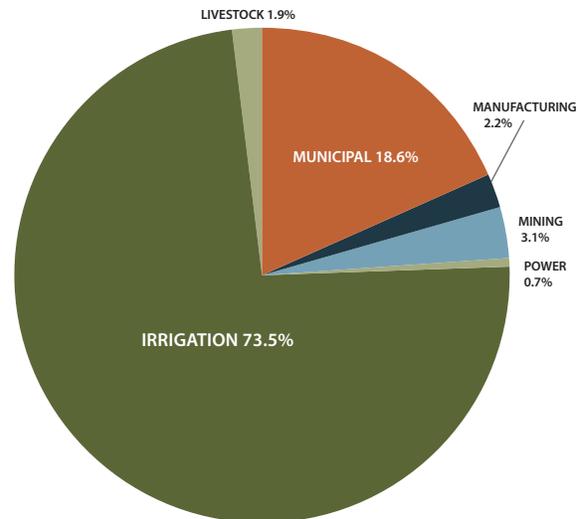
During the *Good for Texas Tour*, Hegar visited the San Antonio Water System’s H2Oaks Center, which has an estimated 200,000 acre-feet of water stored in the largest ASR system in the state. The center produces water from three different sources out of one location to deliver drinking water to its 2 million customers. Hegar calls it “one of the crucial facilities that will help the state implement successful water management strategies to meet the growing demand for this precious natural resource.”

### Desalination

Desalination is the process of removing excess salt and other minerals from various types of water such as groundwater, surface water, reclaimed water and seawater. The purpose of desalination is to create fresh water from water that otherwise may be unusable. Desalination is used in parts of Texas where water is too salty or highly mineralized. Thirteen percent of all desalination plants in the country are in Texas.

EXHIBIT 1

### USES OF GROUNDWATER BY CATEGORY, TEXAS, 2019



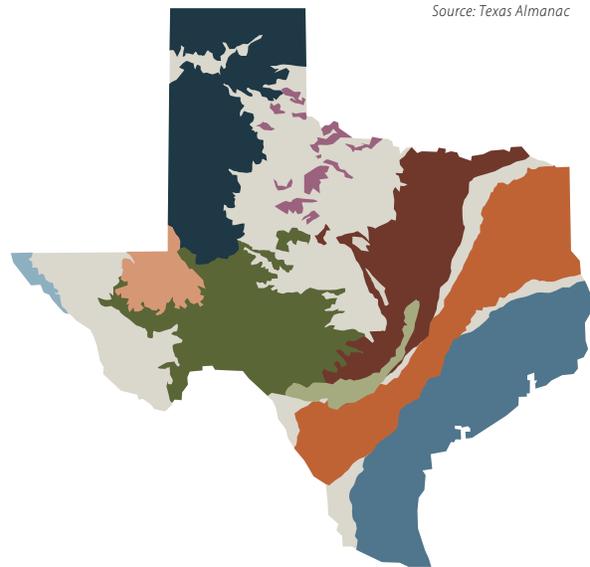
Source: Texas Water Development Board

EXHIBIT 2

### MAJOR AQUIFER MAP



Source: Texas Almanac



During Hegar’s visit to H2Oaks, he also toured the state’s second-largest groundwater desalination center. Texas currently has 53 municipal desalination facilities with a combined production capacity of 157 million gallons per day — more than 176,000 acre-feet per year. More than two-thirds

# The Good for Texas Tour: Water Edition

(36 facilities) of all desalination plants in Texas treat brackish groundwater, which is groundwater that contains dissolved solids such as salt between 1,000 and 10,000 parts per million. Of the remaining plants, 16 treat brackish surface water, and one treats reuse water.

In 2022, TWDB reported that Texas has more than 3.8 billion acre-feet of brackish groundwater available based on completed studies in 13 of the major and minor aquifers, a huge amount of source water suitable for desalination.

## CLOUD SEEDING

Cloud seeding — also called precipitation enhancement — is a weather enhancement process that stimulates clouds to produce more rain. In this process, aircrafts spray clouds with small ice-like particles, such as silver iodide. These particles allow moisture in clouds to condense into water droplets that fall as rain when heavy enough.

Hegar visited the Panhandle Groundwater Conservation District (PGCD), home to one of five cloud seeding programs in Texas. To help supplement the Texas water supply, some areas of the state are using periodic cloud seeding attempts to increase rainfall. The PGCD conducts cloud seeding operations to augment groundwater recharge over the Ogallala Aquifer.



George Bomar, Texas Weather Modification Association

This is a target area of nearly 4.1 million acres in the eastern sector of the Texas Panhandle, which allows access to cloud systems moving out of Oklahoma.

Cloud seeding is included in the TWDB's 2022 SWP and is projected to provide about 5,000 acre-feet of water per year by 2070. According to George Bomar, volunteer chairman with the Texas Weather Modification Association, "Water is the greatest challenge that Texas

is going to face in coming decades. [It] is our most precious resource, and we're going to be challenged to have enough of it in the coming decades in order to meet the needs of a growing population."

## SURFACE WATER

Surface water is water that is located above ground. Surface water accounted for about 42 percent of Texas' total water use in 2019, with about half of this being used for municipal purposes. Nearly 30 percent of surface water is used for irrigation and 15 percent for manufacturing (**Exhibit 3**).

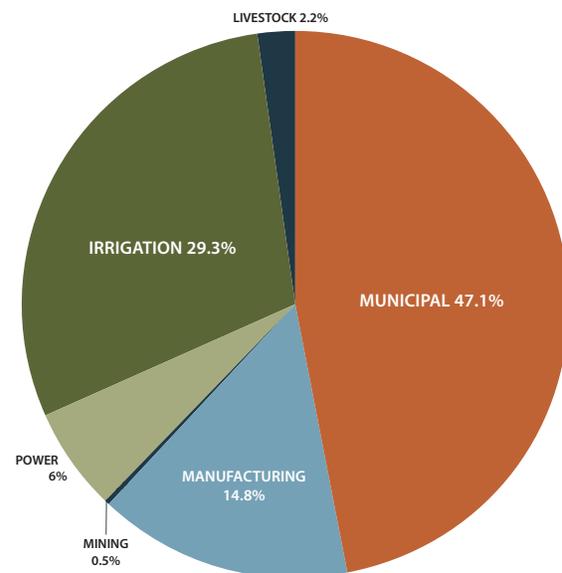
To meet future water demands, the regional water planning groups recommend surface water projects that will provide the state with an additional 2.8 million acre-feet of water per year by 2070. One of these projects is Bois d'Arc Lake in Northeast Texas, the first major Texas reservoir to be built in 30 years. The North Texas Municipal Water District is spearheading the project with financial assistance from the TWDB.



Flares fixed on an aircraft's wing house silver iodide used for cloud seeding.

### EXHIBIT 3

#### USES OF SURFACE WATER BY CATEGORY, TEXAS, 2019



Source: Texas Water Development Board

Once completed, Bois d'Arc Lake could provide up to 82 million gallons of water per day to the North Texas region, highlighting the coordination between state, local and city governments.

## CANAL SYSTEMS

Canals enhance the distribution of water throughout Texas, supplying water for crop irrigation, industry and municipal uses as well as providing a means of transportation for ships and cargo. The largest transportation canal in Texas is in the

# The Good for Texas Tour: Water Edition

Gulf Intracoastal Waterway (GIWW). The Texas portion of GIWW handled more than 70 percent of the canal's total traffic in 2018 — about 77.7 million tons. Overall, when taking into account indirect and induced economic impact, the canal backs nearly 65,000 jobs and \$8.7 billion in labor income and contributes \$31.7 billion to the state's economic output, according to the Texas Department of Transportation.

Hegar visited the Lower Neches Valley Authority, which manages fresh water in the Neches River Basin and the Neches-Trinity Coastal Basin in East Texas. Watersheds of the Neches River and its tributaries cover 10,300 square miles and produce 5.6 million acre-feet of water annually. The canal system also enhances the area's biodiversity, boasting some of the greatest mussel diversity in Texas.

## Flood Mitigation

Water is a delicate resource — too little can lead to drought and too much can lead to flooding. According to the Federal Emergency Management Agency, Texas ranked sixth in the nation for flood insurance payouts in 2022. In Central and West Texas, as well as along the Gulf Coast, floods can be a common danger. On the flip side, flooding sometimes can be beneficial to the environment. It can contribute to groundwater recharge, maintain floodplains as a habitat for plants and animals and preserve floodplains, thus reducing the severity of larger flooding events. This is possible through flood management and flood mitigation.

In 2018, the Texas Legislature required the TWDB to establish a statewide flood mitigation planning process and develop Texas' first state flood plan by September 2024, updating it every five years thereafter. Additionally, the Legislature approved the establishment of the Flood Infrastructure Fund, which provides financial assistance for flood control, flood mitigation and drainage infrastructure projects.

## WATER REUSE

Water reuse is the use of wastewater that has been treated to remove contaminants, solids and impurities so that the water can be used for such things as irrigation, groundwater replenishment, industrial processes and more. In 2020, reuse sources contributed 620,000 acre-feet to Texas' water supply. Although water reuse makes up a small portion of Texas' water supply, its share is expected to grow by 15.2 percent between 2020 and 2070.

The following are four examples of water reuse facilities in Texas:

- The Dallas/Fort Worth Metro Wetlands is an 1,840-acre engineered wetland made to filter and clean the heavy effluent flows of the Trinity River's East Fork.

- The Bob Derrington Water Reclamation Plant in Odessa was created in 1949 and delivers 6 million gallons of effluent daily to local industry, lawns, farms and parks.
- Blue Hole Primary School in Wimberley includes in its design the mechanisms to harvest rainwater, air conditioning condensation and grey water (wastewater from showers, baths, sinks and washing machines) to provide water for toilets, landscaping and fire suppression.
- Brazos Research Wetlands in Waco is a 7-acre wetland that studies and evaluates treated wastewater effluent.

## LOOKING AHEAD

Through enhanced conservation, sound management strategies and the use of innovative technology, Texans are confronting water challenges head-on.

"The future of water in Texas is the future of the Texas economy," Hegar says. "Whether in times of drought or flood, responsible water management ensures Texans see water as a resource — not a crisis. Texans around the state are employing innovative strategies to turn our water challenges into opportunities. And that's good for Texas." **FN**



San Antonio Water System's H2Oaks Center includes a research laboratory.

*The Comptroller's Good for Texas Tours highlight significant areas of the state's economy. Explore the full reports at [comptroller.texas.gov/economy/economic-data](https://comptroller.texas.gov/economy/economic-data).*

*The chart labels in Exhibit 3 have been corrected from the printed issue.*

## NET STATE REVENUE – ALL FUNDS, EXCLUDING TRUST

### Monthly and Year-to-Date Collections: Percent Change from Previous Year (IN THOUSANDS)

This table presents data on net state revenue collections by source. It includes most recent monthly collections, year-to-date (YTD) totals for the current fiscal year and a comparison of current YTD totals with those in the equivalent period of the previous fiscal year. These numbers were current at press time. For the most current data as well as downloadable files, visit [comptroller.texas.gov/transparency](http://comptroller.texas.gov/transparency).

Note: Texas' fiscal year begins on Sept. 1 and ends on Aug. 31.

1. Includes public utility gross receipts assessment, gas, electric and water utility tax and gas utility pipeline tax.

2. Includes taxes not separately listed, such as taxes on oil well services, coin-operated amusement machines, cement and combative sports admissions as well as refunds to employers of certain welfare recipients.

3. Includes various health-related service fees and rebates that were previously in "license, fees, fines and penalties" or in other non-tax revenue categories.

4. Gross sales less retailer commission and the smaller prizes paid by retailers.

Notes: Totals may not add due to rounding. Excludes local funds and deposits by certain semi-independent agencies. Includes certain state revenues that are deposited in the State Treasury but not appropriated.

TAX COLLECTIONS BY MAJOR TAX	OCTOBER 2022	YEAR TO DATE: Total	YEAR TO DATE: Change from Previous Year
<b>SALES TAX</b>	\$3,815,782	\$7,502,404	14.45%
<i>Percent Change from October 2021</i>	11.91%		
<b>MOTOR VEHICLE SALES AND RENTAL TAXES</b>	\$588,481	\$1,204,383	10.47%
<i>Percent Change from October 2021</i>	8.41%		
<b>MOTOR FUEL TAXES</b>	\$311,564	\$640,046	-0.42%
<i>Percent Change from October 2021</i>	-3.10%		
<b>FRANCHISE TAX</b>	\$35,280	\$106,606	176.15%
<i>Percent Change from October 2021</i>	567.65%		
<b>OIL PRODUCTION TAX</b>	\$543,922	\$1,096,009	36.72%
<i>Percent Change from October 2021</i>	32.72%		
<b>INSURANCE TAXES</b>	\$40,180	\$86,122	116.46%
<i>Percent Change from October 2021</i>	360.74%		
<b>CIGARETTE AND TOBACCO TAXES</b>	\$89,032	\$190,688	10.30%
<i>Percent Change from October 2021</i>	-20.32%		
<b>NATURAL GAS PRODUCTION TAX</b>	\$409,554	\$889,336	74.40%
<i>Percent Change from October 2021</i>	58.68%		
<b>ALCOHOLIC BEVERAGES TAXES</b>	\$150,117	\$288,460	14.70%
<i>Percent Change from October 2021</i>	15.91%		
<b>HOTEL OCCUPANCY TAX</b>	\$65,538	\$122,420	16.38%
<i>Percent Change from October 2021</i>	21.97%		
<b>UTILITY TAXES<sup>1</sup></b>	\$148,142	\$147,907	96.16%
<i>Percent Change from October 2021</i>	103.55%		
<b>OTHER TAXES<sup>2</sup></b>	\$20,953	\$37,767	-146.57%
<i>Percent Change from October 2021</i>	70.17%		
<b>TOTAL TAX COLLECTIONS</b>	<b>\$6,218,546</b>	<b>\$12,312,149</b>	<b>20.69%</b>
<i>Percent Change from October 2021</i>	<b>16.54%</b>		
REVENUE BY SOURCE	OCTOBER 2022	YEAR TO DATE: Total	YEAR TO DATE: Change from Previous Year
<b>TOTAL TAX COLLECTIONS</b>	\$6,218,546	\$12,312,149	20.69%
<i>Percent Change from October 2021</i>	16.54%		
<b>FEDERAL INCOME</b>	\$5,650,693	\$12,181,738	11.66%
<i>Percent Change from October 2021</i>	-10.93%		
<b>LICENSES, FEES, FINES AND PENALTIES</b>	\$464,874	\$1,125,001	-2.41%
<i>Percent Change from October 2021</i>	1.70%		
<b>STATE HEALTH SERVICE FEES AND REBATES<sup>3</sup></b>	\$914,946	\$3,158,777	99.12%
<i>Percent Change from October 2021</i>	-41.53%		
<b>NET LOTTERY PROCEEDS<sup>4</sup></b>	\$225,523	\$433,705	-15.10%
<i>Percent Change from October 2021</i>	-0.38%		
<b>LAND INCOME</b>	\$459,205	\$872,943	36.51%
<i>Percent Change from October 2021</i>	26.62%		
<b>INTEREST AND INVESTMENT INCOME</b>	\$153,186	\$347,494	39.70%
<i>Percent Change from October 2021</i>	-29.47%		
<b>SETTLEMENTS OF CLAIMS</b>	\$3,760	\$6,708	-16.79%
<i>Percent Change from October 2021</i>	6.80%		
<b>ESCHEATED ESTATES</b>	\$7,278	\$30,913	-21.74%
<i>Percent Change from October 2021</i>	-38.06%		
<b>SALES OF GOODS AND SERVICES</b>	\$21,178	\$38,314	5.76%
<i>Percent Change from October 2021</i>	28.49%		
<b>OTHER REVENUE</b>	\$356,201	\$484,844	-34.73%
<i>Percent Change from October 2021</i>	-44.27%		
<b>TOTAL NET REVENUE</b>	<b>\$14,475,391</b>	<b>\$30,992,587</b>	<b>18.85%</b>
<i>Percent Change from October 2021</i>	<b>-4.64%</b>		



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