

Second Draft of 2020 WCAC Report

# **Progress Made in Water Conservation in Texas**

*Report and Recommendations to the 87th Texas Legislature*

**Submitted by the**  
**Water Conservation Advisory Council**  
**[www.savetexaswater.org](http://www.savetexaswater.org)**  
**Karen Guz, Presiding Officer**  
**[Date]**



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[Date] [\[From 2018 WCAC Report\]](#)

The Honorable Greg Abbott  
Governor of Texas

The Honorable Dan Patrick  
Lieutenant Governor of Texas

The Honorable Joe Straus, III  
Speaker of the Texas House of Representatives

Dear Sirs:

It is our honor as members of the Water Conservation Advisory Council (WCAC) to provide you with the sixth biennial report on progress made in water conservation in Texas.

The Council serves as a professional forum for the continuing development of water conservation resources, expertise, and progress evaluation of the highest quality for the benefit of Texas. In addition to their professional endeavors, the 23 members of the council, their designated alternates, and interested stakeholders have voluntarily dedicated countless time and effort to protecting water resources, reducing the consumption of water, eliminating the loss or waste of water, improving water use efficiency, and increasing the recycling and reuse of water.

Respectfully submitted on behalf of the 23 members of the Council,

[Signature]

Karen Guz  
Presiding Officer, Water Conservation Advisory Council

c: The Honorable Charles Perry  
Chairman, Senate Committee on Agriculture, Water, & Rural Affairs

The Honorable Lyle Larson  
Chairman, House Natural Resources Committee

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# Executive Summary

[\[From 2018 WCAC Report\]](#)

In 2007, the 80th Texas Legislature created the Water Conservation Advisory Council (WCAC) to provide the resource of a select group of professionals with expertise in water conservation. The Water Conservation Advisory Council operates under the following mission:

*to establish a professional forum for the continuing development of water conservation resources, expertise, and progress evaluation of the highest quality for the benefit of Texas— its state leadership, regional and local governments, and the general public.*

The Water Conservation Advisory Council (the Council) is comprised of a unique set of perspectives, which provides a broad view of water conservation in Texas, examining where we have been and where we are to ensure a bright water future for Texas.

Since the last report to the legislature, three of the Council's recommendations have been incorporated into new legislation and policies. The Texas Legislature enacted the need for trained water loss auditors with the passing of House Bill 1573. Additionally, the legislature approved designation of a water conservation coordinator with House Bill 1648, and the addition of a non-voting member to regional water planning groups with Senate Bill 1511.

The Council, made up of its 23 members, their designated alternates, and numerous interested parties have contributed extensive time and effort by both participating at meetings and through the Council's workgroups, which include:

- Agricultural
- Commercial & Institutional
- Industrial
- Municipal
- Public Awareness
- Water Loss
- Wholesale Water Suppliers & Regional Water Authorities

The workgroups allow for focused efforts on specific water conservation initiatives and then report back to the Council with findings, initiatives, and outcomes. The Council utilizes these efforts to expand awareness on the importance of water stewardship by:

- hosting frequent guest presenters at their meetings
- posting white papers and guidance documents as online resources
- refining voluntary measures outlined in the Best Management Practices Guides
- monitoring implementation of water conservation strategies by water users included in regional water plans

- presenting seven Blue Legacy Awards showcasing champions of water conservation in Texas.

This sixth report to state leadership summarizes the Council's recent activities in relation to their seven statutory charges.

In addition, five legislative recommendations, summarized below, are included herein. These recommendations represent the majority opinion of the council members but do not necessarily reflect the views of each entity or interest group.

[Summary of Legislative Recommendations]

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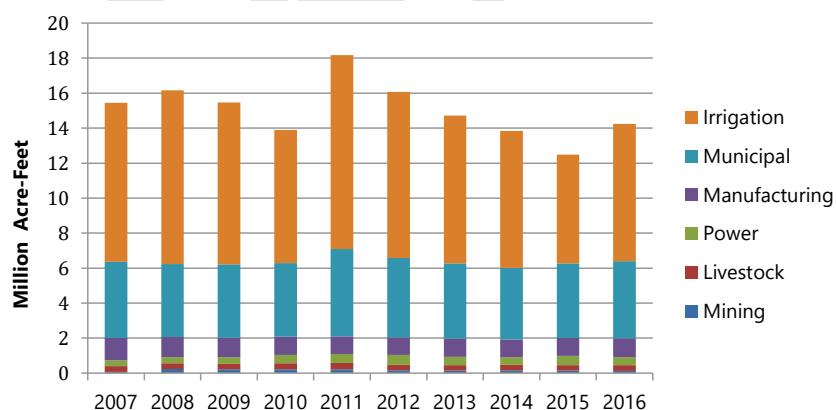
# Legislative charges

## *Introduction*

[From 2018 WCAC Report]

The WCAC was established in 2007 via passage of Senate Bill 3 and House Bill 4 and given seven charges relating to the development and the evaluation of progress regarding water conservation efforts in Texas. This is the sixth report to state leadership briefly addressing each charge and identifying key findings and recommendations.

As Texas continues to grow in population and thrive in terms of agricultural and industrial productivity, successful conservation of our water resources will be critical. Despite such growth over the last 10 years and because of dedicated conservation efforts, water use in Texas has remained relatively stable in many water use categories, fluctuating most notably with the statewide drought in 2011 (Figure 1). However, looking forward, water conservation efforts are even more important, as the population is projected to increase by 70 percent in that time, growing to over 51 million people. The current state water plan includes a variety of water management strategies to meet the difference between our existing supplies and future water demands, with water demand management (conservation) activities expected to provide 30 percent of new water needs by 2070<sup>1</sup>.



<sup>1</sup> 2017 State Water Plan, available online at [www.twdtexas.gov/waterplanning/swp/2017](http://www.twdtexas.gov/waterplanning/swp/2017).

**Figure 1. 2016 Categorical Water Use in Texas for 2016<sup>2</sup>**

## *Charge 1. Monitor trends in water conservation implementation*

The WCAC has 23 members, appointed by TWDB, who represent major water use sectors and stakeholders in our state. The members representing the areas listed below have summarized findings and progress in their respective areas.

### **Agricultural Water Conservation**

Irrigation of crops accounts for an estimated 54 percent of all water use in Texas, making it by far the largest water use category. Approximately 74 percent of all groundwater and 33 percent of surface water are used for agricultural irrigation. (TWDB 2017 estimates) As the largest water user, agricultural irrigation presents the state's best opportunity to achieve significant water use savings.

**Commented [JS1]:** Update Provided by:  
John Bender – Alternate: Agricultural Groups

Over the past several decades, the major trends in agricultural water use efficiency have been: Advances in plant genetics to produce higher yields with less water; improvements in the efficiency of irrigation systems; and, widespread adoption of conservation tillage practices. While these trends are expected to continue, an emerging movement is irrigation scheduling which employs a variety of techniques to apply water more precisely when and where it is needed.

Widespread adoption of best management practices like irrigation scheduling is key to agricultural water conservation. This requires education and demonstration projects to inform farmers about the new technology and practices and also convince them these practices will have a positive impact on their net income.

### **Groundwater Conservation Trends**

- Highly efficient low-pressure center pivot irrigation is now used on 78.9 percent of irrigated acres in Texas. (USDA 2018 Irrigation and Water Management Survey)
- Improved irrigation management and scheduling tools are being developed using location targeted weather-based evapotranspiration estimates and in-field monitoring of soil and plant water stress.

<sup>2</sup> Chart taken from Texas Water Use Estimates Report, available at:  
<http://www.twdb.texas.gov/waterplanning/waterusesurvey/estimates/data/2016TexasWaterUseEstimatesSummary.pdf?d=146433.800000028>.

- Drought tolerant crops such as cotton, sorghum and wheat are being included in rotation and "split pivot" strategies to balance with higher water demand crops.
- Variable rate irrigation systems are being developed which allow for in-field adjustment of water application according to localized soil water capacity and crop yield ability.
- Field trials of deficit irrigation for cotton have shown significant promise.

#### **Surface Water Conservation Trends**

- In the Lower Rio Grande Valley, there is a slow conversion of flood/furrow irrigation to drip irrigation when the value of crops can justify the investment and where irrigation districts can provide smaller volumes of water over a longer time period.
- There is slow adoption of integrated data dashboards, raised beds, drip systems and plastic mulch in new citrus groves.
- In the Upper Rio Grande Valley, irrigation scheduling using soil moisture sensors in some pecan fields around El Paso has resulted in reduced number of irrigations.

#### **Rangelands Water Conservation**

The Texas Legislature, in 2011, replaced the state's brush control program with the Water Supply Enhancement Program, administered by the Texas State Soil and Water Conservation Board (TSSWCB). However, the state has not provided funding for the program since Fiscal Year 2018 appropriations of \$2.47 million, even though TSSWCB is statutorily required to operate the program.

Invasive brush increases evapotranspiration and rainfall runoff resulting in water being lost from aquifer recharge and the growth of grasses for grazing. Brush control is a proven best management practice for conserving rainfall for beneficial uses with the additional benefits of improving water quality in streams and reducing sedimentation in reservoirs that provide water for residential, commercial and industrial uses. Continued funding of the Water Supply Enhancement Program would assist private landowners with the cost of maintaining their land in ways that provide public benefits to all Texans.

**Commented [JS2]:** Comment from Tim Loftus:

This statement begs for the addition of appropriate references to the scientific literature.

## **Institutional and Commercial Water Conservation**

The complexity of the Commercial and Institutional sector creates some challenges in measuring and tracking water efficiency progress. One way Texas is ahead of most of the United States is in having clear definitions for commercial and institutional use. Texas Administrative Code §288.1 provides the following definitions:

**Institutional** use is the use of water by an establishment dedicated to public service, such as a school, university, church, hospital, or government facility, regardless of ownership.

**Commercial** use is the use of water by a place of business, such as a hotel, restaurant, or office building but does not include multi-family residences or agricultural, industrial, or institutional users.

Although these definitions are in place, the billing systems used by utilities are often unable to separate these uses from other user categories. An important priority is encouraging the adoption of these definitions and maintaining the ability to track customers by them as utilities upgrade billing systems or adopt data management platforms.

Beyond the ability to identify non-residential customers by broad categories, it is also important to have a way to organize them in categories such as food service, office buildings, churches, hotels and more. Two coding systems for businesses are already in use for this purpose. Several Texas utilities have used the North American Industrial Classification System (NAICS) system to code their non-residential customers. Other utilities have their customer base entered into the ENERGY STAR Portfolio Manager Tool which is part of the Better Buildings Challenge from the U.S. Department of Energy. The two systems can be cross-referenced so that data sets can be combined for analysis.

Research on this sector is also beginning to focus on developing water efficiency metrics. This has not yet been accomplished because of the diversity inherent in how water is used at commercial and institutional locations. In some cases water use per person served will be logical. In other cases it may be that usage per patient or usage per meal produced will make sense. It will be important to work with stakeholders within the business communities represented to ensure that the metrics selected fairly and accurately provide a water efficiency metric.

The WCAC Commercial and Institutional workgroup seeks to develop three projects during the next year:

- 1) **Improve Utility Coding of Customers:** Increase awareness of water sector definitions adopted in Texas so that these can be incorporated accurately into future utility databases.
- 2) **Enhance Understanding of Water Use Categories Patterns:** by recruiting utilities to share anonymized usage data that has already been coded by one of the accepted user categories.
- 3) **Develop Efficiency Metrics by Sector:** Work with the interested parties to come to agreement on efficiency metrics (use per pupil, use per meal served etc.) for some of the largest water use sectors

A major challenge to accurately measure water use for Institutional and Commercial customers lies in the inconsistent definition of these user categories. Texas Administrative Code §288.1 provides the following definitions:

Institutional use is the use of water by an establishment dedicated to public service, such as a school, university, church, hospital, or government facility, regardless of ownership.

Commercial use is the use of water by a place of business, such as a hotel, restaurant, or office building but does not include multi family residences or agricultural, industrial, or institutional users.

Although these definitions are in place, the billing systems used by utilities are often unable to separate these uses from other user categories. Developing a metric similar to per capita use associated with municipal use is also difficult because it requires site specific 'population' information which depends on the type of facility and may be proprietary in nature.

To rectify this issue, the consistent use of definitions and billing codes of facilities are needed.

Many cities across the nation, including several Texas cities, are using the ENERGY STAR Portfolio Manager Tool, part of the Better Buildings Challenge from the U.S. Department of Energy. The ENERGY STAR system is designed to define building type for energy conservation and the U.S. Environmental Protection Agency has developed a coding system to support this effort. Additionally, the North American Industrial Classification System (NAICS) is another coding system that works to monitor business and economic activities. Because the Portfolio Manager system was designed to monitor facility type with respect to energy use, it is also recommended for use by water utilities.

As part of monitoring trends, development of benchmark data for commercial and institutional water users. Examples of a benchmark would be gallons used per square foot or gallons per student for schools or gallons per room for hotels. Energy Star Portfolio Manager collects some of this information. This benchmarking data collection would provide data to evaluate the

**Commented [JS3]:** Comment from Tim Loftus:

These definitions are good and mutually exclusive. Where does the problem of inconsistency lie? Is this something we can rectify through a recommendation to tighten up specific code language? The paragraph opens by suggesting we have a problem – inconsistent definitions – but then those definitions that are offered are not problematic leading to a lack of logic in the presentation thus far.

**Commented [JS4]:** Comment from Tim Loftus:

This seems to be the real problem rather than one of definition.

**Commented [JS5]:** Comment from Tim Loftus:

This sounds like something the WCAC should be able to do if we made it our aim to resolve. The language mentions these other classification systems, but stops short of indicating why they can or can't be used to help solve the problem.

**Commented [JS6]:** Paula Paciorek included a link to the Better Buildings Challenge:

<https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/communicate-your-success/energy-star-communications-toolkit/motivate-competition-0>

Perhaps the link could be included as a footnote?

**Commented [JS7]:** Comment from Tim Loftus:

This is an incomplete sentence.

**relative efficiency of commercial and institutional facilities to others in the same category and to monitor water conservation efforts.**

**Commented [JS8]:** Comment from Paula Paciorek:

It is my understanding that Energy Star Portfolio Manager only allows to benchmark energy (electricity) but not water - although it does work as a tracking tool.

## Manufacturing and Electric Power Generation Water Conservation

Texas ranks first in the nation in electric power production<sup>3</sup> and second for manufacturing output<sup>4</sup>. **In 2018 almost 17% of the electric power producing was from renewable sources, which use little to no water in the generation process. Most of the renewable energy is from wind generation, where Texas ranks first nationally as well.** Because the sustainability of the Texas manufacturing sector is so highly dependent on water, manufacturers closely track and manage their water usage, file the required water conservation plans, complete the TWDB's annual water use survey, and seek out opportunities to conserve water on a consistent basis. An analysis<sup>5</sup> conducted in 2016 showed a reduction in water use per unit of output in manufacturing. As an example, over the last two decades, Texas refineries have reduced water usage by as much as 30 percent while output revenue has increased steadily. The combination of economic gains and water use efficiency is the result of innovation by many Texas industries.

Though each of the state's 27 complex and multi-operational refineries is unique, with distinct water needs and operations, water conservation has resulted from:

- evolving water management practices;
- water treatment and technology development;
- utilization of alternative sources;
- collaboration within the industrial sector; and
- cooperation at the local, regional, and state level.

Water consumption by industries is highly variable making it difficult to compare one water user to another. Future efforts should continue to explore opportunities for improved efficiency and development of water conservation best management practices appropriate for each

<sup>3</sup> Information can be found at the U.S. Energy Information Administration online at: <https://www.eia.gov/state/>

<sup>4</sup> State Manufacturing Data can be found at: <http://www.nam.org/Data-And-Reports/State-Manufacturing-Data/>

<sup>5</sup> Find Hoffman's examination of water use trends on [savetexaswater.org](http://savetexaswater.org). In addition, TWDB funded a review of past methodologies used to create water demand projections used in regional water planning, and the report will be posted at [http://www.twdb.texas.gov/publications/reports/contracted\\_reports/doc/0704830756ThermoelectricWaterProjection.pdf](http://www.twdb.texas.gov/publications/reports/contracted_reports/doc/0704830756ThermoelectricWaterProjection.pdf).

facility. The sector should consider sharing non-proprietary information within their respective trade groups as a way of encouraging water conservation. The Council welcomes water users to share their successes and water metrics through case studies posted to the Council's online resource library to potentially accelerate efficiency gains.

## Municipal Water Conservation

Municipal water demands are expected to grow by as much 62% by 2070 eventually accounting for 39% of water used in Texas. This increase is primarily driven by strong population growth in several key regions in our state. Meeting municipal conservation targets will be critical as savings will account for 9.6% of water supply strategies by 2070.

Municipal usage is highly diverse stemming from single family, multi-family, commercial institutional and light industrial water consumption in cities and aggregated county areas. Fortunately, a great deal of data is collected by TWDB on potential savings and progress in this water sector. Saving plans are quantified in TWDB Conservation Plans and documented in Conservation Annual Reports. Water Loss Audits provide regular data regarding savings progress from infrastructure and management improvements.

Updated Conservation Plans: (#) water utilities submitted updated Five Year Conservation Plans in 2019 on how conservation efforts will be deployed for approximately (#) municipal customers across Texas. For the first time these plans included designating a person as the Water Conservation Coordinator for the reporting entity. This was also the first time a new, free Conservation Planning Tool was available to both assist in selecting Best Management Practice (BMP) strategies and in making accurate savings estimates over time. [Insert any summary information we have on per capita target updates and BMP usage. Also do we have any idea how many reports included use of the new tool?]

### Trends in Conservation Reports:

[Need data for this paragraph. Annual report summary update: hopefully continue to see declining per capita in total gpcd and residential gpcd]

Conservation Best Management Practices Guide: WCAC volunteers have been hard at work updating the Conservation Best Management Practices Guide so that the latest in conservation programming options could be included in municipal plans and reports.

**Commented [JS10]:** Comment from Tim Loftis:

Some, but not all BMPs that are indicated in the water conservation plan annual report, are associated with quantified savings. It would be more accurate to say that "saving plans are partially quantified ..."

- **Outdoor Watering Schedule BMP** was added to encourage communities to consider reasonable year-round limits on operation of irrigation systems which yield significant water savings.
- **Custom Rebate BMP** was added to guide incentives for commercial, institutional and industrial customers.
- **Enforcement of Irrigation Standards** was added to remind communities that enforcement of TCEQ irrigation efficiency standards provides consumer protections and water savings.
- **Utility Water Audit & Water Loss BMP** was added to update with the latest international best practices including seeking outside expertise for validity of audit data.
- **Plumbing Assistance for Economically Disadvantaged BMP** was added to provide guidance on how to simultaneously save water and provide assistance for those most in need

**Table 1. Water conservation annual report data Update available?**

	5-Year goal average <sup>†</sup>	2013 average	2014 average	2015 average	2016 average	2017 average
Total GPCD*	145	148	148	143	142	142
Residential GPCD	92	82	79	78	77	76
Water loss GPCD	17	20	20	18	17	18
Commercial, Institutional, & Other GPCD	NA <sup>‡</sup>	46	49	47	48	48
Percent water loss	10	13	13	13	12	12
Percent water reused	NA <sup>‡</sup>	6	7	10	6	5
Percent water saved	NA <sup>‡</sup>	6	9	14	15	12

\*GPCD = gallons per capita per day; <sup>†</sup>based on 2014 conservation plans; <sup>‡</sup>NA = not applicable

**Table 2. Water conservation annual report activities**

	2013	2014	2015	2016	2017

Meters replaced	326,305	364,875	359,957	312,914	344,340
Leaks repaired	96,991	140,976	110,387	108,684	101,543
Education programs	308	266	297	403	422
Drought plans activated	164	179	118	57	42

**Commented [JS11]:** Comment from Paula Paciorek:

*Education Programs Implemented?*

**Commented [JS12]:** Comment from Paula Paciorek:

What does this exactly mean? that a DCP stage was triggered?

**Water Loss Workgroup Efforts:** Municipal water loss improvement represents a significant opportunity for both water savings and improved financial outcomes for utilities. In addition to updating the Water Loss Audit & Water Loss BMP, the group pursued two projects:

**Water Audit Training Requirement Progress:** It is a new requirement that water loss audits be completed by someone who has attended an approved TWDB Water Loss Audit Training. TWDB staff offered \_\_\_ workshops through-out Texas that were attended by approximately \_\_\_ individuals. An on-line training module was also launched to support this requirement. Training sessions were popular in every region and resulted in strong participation and engagement.

**Audit Data Validity Pilot Recommendation:** A legislative recommendation from the WCAC is that Texas pursue a Data Validity Pilot Program engaging volunteer utilities in efforts to improve their water loss audits by working with outside experts who review data inputs and conclusions. The goal of this effort is to ensure that our water loss audit reports are accurate and that audit conclusions guide investments that yield the best return on investment for citizens.

## Wholesale Water Conservation

Wholesale water suppliers are entities that sell water to another for resale to the public for human consumption. Wholesale water suppliers face the challenge of making progress in conservation without having direct retail customers. As a result, providers frequently focus conservation efforts on general public outreach with the use of dedicated advertising campaigns, websites, social media, and newsletters. Suppliers are also developing programs and materials that directly support and assist their wholesale customers' conservation program efforts. Support for wholesale customers from the supplier can vary based on the dedicated resources and needs of the customer. Table 3 provides a summary of XX wholesale suppliers' conservation activity in 2019 as reported to TWDB.

**Commented [JS13]:** Update Provided By:  
Dustan Compton – Member: WCID

**Table 3. Wholesale water supplier water conservation annual report data for 2019.**

Population Served	Gallons of Water Produced	Gallons of Water Conserved	Gallons of Water Recycled	Water Savings Dollars	Education and Public Awareness Programs	Leak Detection and Water Loss Programs

#### Progress in Conservation from Wholesale Water Suppliers<sup>6</sup>

- Wholesale water providers continue to encourage their contracting entities to adopt and implement water conservation plans and programs to reduce per capita and peak use demands.
- Wholesale water providers are complying with Texas Administrative Code 30 Section 288.5 to require their customers, and their subsequent wholesale customers, to have a water conservation plan and many require them to submit that plan to the provider for review and documentation.
- Many wholesale water providers proactively meet with their customers to communicate, coordinate and focus conservation efforts. Providers frequently provide resources for their customers to share in their communities to reduce water waste and increase conservation program participation.
- Many smaller wholesale water providers and wholesale customer cities have limited resources, do not have dedicated conservation staff and may not share the view that water conservation is an important water supply strategy.
- Wholesale water providers support school education programs in various ways. Many support the TWDB's Major Rivers program, some collaborate with local partner agencies on school programs and a few have dedicated education teams with specific curriculum and resources for teachers and students in their service area.
- Wholesale water providers face challenges to effectively document conservation program water savings. Many recognize the limitations of being a wholesale provider

<sup>6</sup> Contributing wholesale water providers include: Brazos River Authority, Central Texas Water Supply Corporation, City of Dallas Water Utilities, El Paso Water, Guadalupe-Blanco River Authority, Greater Texoma Utility Authority, Gulf Coast Water Authority, Houston County Water Control Improvement District #1, North Texas Municipal Water District, Red River Authority of Texas, Sabine River Authority, San Jacinto River Authority, Tarrant Regional Water District, Upper Trinity Regional Water District, West Central Texas Municipal Water District

and relying on their customers to have a direct connection with retail water users for significant conservation progress.

- Wholesale water providers conduct and coordinate regional conservation outreach campaigns through digital advertising, videos, billboards, social media, newsletters, email subscriptions, etc. Some providers continue to promote the "Water IQ: Know Your Water" program. The "Water My Yard" program, from Texas A&M AgriLife Extension, continues to grow across the state. The water conservation public awareness campaign, "Water is Awesome," encouraged water users in the North Central Texas region to help "Keep Texas Water on Tap" in 2019. New campaigns such as, "Make Every Drop Count," raises awareness on outdoor water use during high-demand months.
- Wholesale water providers support their customers with education and learning opportunities. Some providers allow wholesale customer employees to participate in facility trainings. Many providers support regional conservation symposiums that are held annually or biennially for customer city employees.
- Wholesale water providers also work on their supply side conservation efforts. Having third-party verification calibrations on water plant meters, meter replacements and water recycling efforts are being implemented and considered.
- Wholesale water providers are also promoting efficient water use for their agricultural customers. Many promote conservation recommendations and some provide incentives.

## *Charge 2. Monitor new technologies for possible inclusion in the Best Management Practices Guide*

### **State-Wide ET Network Potential**

Agriculture irrigation is the state's largest water use sector. Landscape watering can account for over 30% of total municipal water use. Efficient irrigation practices are an important long-term conservation strategy to help meet growing water needs. Best management practices and technology improvements have proven to be effective tools with proven water saving results. One technology the Council is interested in monitoring the progress of is the potential advancement of evapotranspiration (ET) networks across the state.

**Commented [JS14]:** Update provided by: Dustan Compton

ET networks are made up of local or regional weather stations to provide information to support irrigation and water management activities. ET is a measurement of the total amount of water needed to grow plants and crops. This term comes from the words evaporation (evaporation of water from the soil) and transpiration (transpiration of water by plants). Different plants have different water requirements, so they have different ET rates. Calculating ET requires the measurement of solar radiation, wind, relative humidity and temperature with specific sensors and it is widely used for irrigation water management and crop production. ET network weather stations are equipped to measure the needed data, a system to calculate plant water requirements and a method to share this information to end users. Currently, access to ET data across the state is uneven and increasing the availability would have significant water conservation benefits.

There have been a few regional ET networks created across the state including in the Lower Rio Grande Valley and West Texas high plains areas. Some of the networks were initially funded from Agriculture Water Conservation Grants from TWDB but have since shut down due to lack of long-term funding. The TexasET Network, a project by Dr. Guy Fipps with the Texas A&M AgriLife Extension Service, began in 1994 and currently has over 50 weather stations located statewide with the sole purpose to calculate local ET-related data. It is self-funded through revenue from short courses, contracts and grants, and depends upon local sponsors to cover the costs of the weather stations. Local sponsors not only purchase the station itself, but also provide the location site for the station, perform all maintenance of the station and the site, and cover communication costs.

The TexasET Network displays daily weather and determines ET values, offers interactive, easy-to-use calculators that allow users to determine the irrigation water requirements of crops and landscapes, and provides several other tools for downloading data and setting up automatic email notifications of customized weather data and irrigation recommendations. TexasET data is also being used as a basis to provide weekly irrigation recommendations to residential properties. The first such program in Texas was the "Seasonal Irrigation Program" by the San Antonio Water System. The TexasET Network provides the "backbone" for the "Water My Yard" program (<http://WaterMyYard.org>) that is used by many cities and water districts. Extensive urban ET weather station networks have been established in the Dallas/Ft. Worth, Austin, and greater Houston areas.

Recently, there has been an essential advancement into a different network called TexMesoNet (developed and managed by TWDB) and it is important to note the difference of an ET network. A mesonet is a network of weather stations spaced close enough to each other to observe and track meso-scale weather events, such as individual super-cell thunderstorms. Mesonet systems typically collect data on atmospheric conditions, solar energy, soil moisture, and soil temperature. This data is used for weather forecasting, alternative energy development, agriculture, and for fire, flood, and freeze warnings. The primary goal of the TexMesoNet is to

provide high quality data to support flood monitoring and flood forecasting efforts. Both networks are useful but have different goals and associated equipment.

The Council recognizes that the Texas Groundwater Protection Committee recommended funding for a regional High Plains ET Network in support of the statewide ET network in their report to the 86<sup>th</sup> Legislature in January 2019. It is our understanding the Committee will once again recommend sustainable funding in support of progress towards a statewide ET network in their next legislature report. A statewide ET network approach is currently underway in other states. Several, such as Oklahoma and Florida, have seen the benefits of having a statewide ET network including:

- Regional and municipal water planning
- Regional and municipal wastewater planning
- Direct application for agricultural and municipal water users
- Forestry management
- Efficient management and use of water resources

The historical piecemeal approach of grant funded regional ET networks have proven to be unsustainable. Previous studies have recognized the value of ET networks, the potential of having a statewide network and recommendations to have the TWDB become a consistent manager and provider of ET information.<sup>7</sup> The TexasET Network may provide a model to build upon across the state and the Council is interested in monitoring this potential for a sustainable future. ET information is critical to agricultural, municipal and wholesale water managers and serious concern would rise if the data were not available. The council is charged with advancing water conservation throughout the state and a full expansion of an ET network available to all water users has great potential to help meet the future water needs of Texas.

### *Charge 3. Monitor the effectiveness of the statewide water conservation public awareness program and associated local involvement in implementation of the program*

Water conservation is the most cost-effective water management strategy to meet the state's water needs. Water conservation success, however, is achieved by end users who are equipped

<sup>7</sup> Assessment of Texas Evapotranspiration (ET) Networks Final Report:  
[http://www.twdb.texas.gov/publications/reports/contracted\\_reports/doc/0903580904\\_evapotranspiration.pdf](http://www.twdb.texas.gov/publications/reports/contracted_reports/doc/0903580904_evapotranspiration.pdf)  
Feasibility Study for Development of Statewide Evapotranspiration Network Final Report:  
[https://www.twdb.texas.gov/publications/reports/contracted\\_reports/doc/1613581995.pdf](https://www.twdb.texas.gov/publications/reports/contracted_reports/doc/1613581995.pdf)

and willing to conserve. With a significant portion of Texas' future water supplies identified as coming from conservation, it is imperative that the public, or end users, become more aware of their source water supply, the need to conserve, and motivated to practice water conservation in their daily routines.

While several successful water conservation campaigns exist in Texas at a local or utility level, and TWDB's Water IQ program provides important educational resources, a statewide water conservation public awareness campaign that was envisioned by the passage of SB 3 and HB 4 in 2007 (80<sup>th</sup> Texas Legislature) has neither been funded nor developed and implemented. awareness campaign has not yet been developed, implemented and funded.

**Commented [JS15]:** Updates to this section provided by Sarah Schlessinger and Tim Loftus.

In a recent initiative by Texas Water Foundation, the need for a statewide water awareness campaign has been further discussed. Through philanthropic funding, statewide polling was conducted to determine the efficacy of a statewide campaign that engages and complies local efforts. Statewide surveys conducted in January 2020 confirm that a statewide campaign is successful when it combines a sense of pride with action, and that respondents are more likely to react to messages that impact them on an individual, or local basis. Texas Water Foundation's initiative has developed into a prototype statewide water awareness campaign that will be piloting in local test markets in 2020.

**Commented [JS16]:** Comment from Tim Loftus:

This is a "funny" word as complement and compliment have different meanings. Fun fact of the day!!

Recognizing the importance that water conservation will play in Texas' future, and need to engage the public to achieve successful water conservation, the council supports the development and implementation of a statewide water awareness campaign. Funding The development of a statewide campaign would mark a significant contribution and complement to local efforts that were inspired by the potential for a statewide water conservation public awareness program called for be a continuation of the efforts initiated by the statewide water conservation public awareness program that was created by the Texas Legislature in 2007 with the passage of Senate Bill 3 and House Bill 4.

**Commented [JS17]:** Comment from Tim Loftus:

From Section 16.401(b) of SB 3 – "The executive administrator is required to develop and implement the program required by Subsection (a) in a state fiscal biennium only if the legislature appropriates sufficient money in that biennium specifically for that purpose." Should this paragraph end with mention that the program is not being implemented due to lack of state-funding appropriation? Let's be clear that SB 3 intended for the state to develop and implement a program. Why no funding? Can't hurt to make clear that the state could play a role here as intended by SB 3. Otherwise, it sounds like it's entirely up to an ngo to make this happen and that was not the intent of SB 3.

#### *Charge 4. Develop and implement a state water management resource library*

The Council continues to develop and update best management practices for municipal and wholesale providers and for agricultural, commercial, and industrial users. These best management practices, available at [www.savetexaswater.org](http://www.savetexaswater.org), are voluntary efficiency measures that save a quantifiable amount of water, either directly or indirectly, and can be implemented

within a specified timeframe. Recognition by the Texas Legislature of these best management practices on the Save Texas Water website would help water providers and users know where to learn more about efficient practices for long-term water supply. The second is the development of a resource library through [www.savetexaswater.org](http://www.savetexaswater.org), including resource documents and case studies.

In addition to developing and maintaining our online resources, several members of the Council are involved in a statewide dialogue on the creation of a centralized repository for water information and data. Rather than duplicate efforts, the Council may consider collaborating in this effort in the future. One opportunity for collaboration exists with Texas Water Foundation's development of an online, publicly available water resources library. This effort seeks to collect water related research, BMPs, educational tools and guides and could provide the Council with an online repository of resources.

### *Charge 5. Develop and implement a public recognition program for water conservation*

Water conservation is critical to ensuring all Texans have an adequate water supply today and into the future. The efficient use of current water supplies is the most cost-effective water management strategy to meet this demand. The development and implementation of successful programs are critical to ensure, by 2070, the state meets the estimated 30 percent of the future water supplies are achieved in the form of conservation and demand management.

#### ***Conserving water is an investment that benefits all Texans.***

To showcase examples of effective water stewardship occurring throughout Texas, the Water Conservation Advisory Council established the Blue Legacy Awards to recognize responsible management of our water resources. Members of the municipal, agricultural, and manufacturing water use sectors who have demonstrated a commitment to water conservation celebrated for their efforts as a recipient of this distinguished award. The Blue Legacy Awards are presented at premier events to elevate the importance and awareness of water conservation related practices. Their success stories and photographs, as well as nomination packets, can be found on [www.savetexaswater.org](http://www.savetexaswater.org). The council presented the 2019 awards as part of Texas Water Day at the Capitol on March 13, 2019.



**Figure 3. Karen Guz, Presiding Officer of the Council, presents three of the seven Given out at Texas Water Day at the Capitol on March 13, 2019. Left to right: Hodges Farm (Agriculture – Producer); Mr. Jesus Reyes with El Paso Water Improvement District #1 (Agriculture – Non-Producer); BVWaterSmart (Municipal – Population 100,000 - <50,000).**

### *Charge 6. Monitor the implementation of water conservation strategies by water users included in regional water plans*

The Texas Water Development Board requires regional water planning groups to consider water conservation to meet any identified water supply need by a water user group<sup>8</sup>, and conservation has become a recommended water management strategy in all regional plans. However, recommendations do not automatically translate into actions by water users.

**Commented [JS18]:** Update provided by: Ken Kramer

Evaluating whether the recommended water conservation strategies in regional water plans actually are being implemented is critical since the regional and state water plans project that approximately 28% of future water supply needs in Texas by 2070 are to be met through conservation<sup>9</sup>. Three sources of information for this evaluation in recent years have been the regional water plans themselves, a Statewide Water Conservation Quantification Project report done under contract to the Texas Water Development Board and released in 2017<sup>10</sup>,

<sup>8</sup> Title 31, Part 10 of the Texas Administrative Code, Rule §357.34: Identification and Evaluation of Potentially Feasible Water Management Strategies and Water Management Strategy Projects.

<sup>9</sup> 2017 State Water Plan, available online at [www.twdtexas.gov/waterplanning/swp/2017](http://www.twdtexas.gov/waterplanning/swp/2017).

<sup>10</sup> Averitt and Associates, Inc.: Statewide Water Conservation Quantification Project, prepared for the Texas Water Development Board, available online at: [https://www.twdtexas.gov/publications/reports/contracted\\_reports/doc/1600012030\\_Water%20Conservation.pdf](https://www.twdtexas.gov/publications/reports/contracted_reports/doc/1600012030_Water%20Conservation.pdf)

and reports such as the Texas Water Conservation Scorecard prepared and recently updated by the organizations participating in the Texas Living Waters Project<sup>11</sup>.

However, the latter two sources are not comprehensive reviews of *all* water user groups with recommended water conservation strategies in *all* regions of the state, although the reports provide useful information about progress or problems with implementation of conservation. Potentially, the most complete source of such information would be the regional water plans.

Since 2012 the Texas Water Development Board, as directed by the Legislature, has required that each regional water plan, updated and revised every five years, include information on the implementation of water management strategies recommended in the previous water plan adopted for the region. This rule<sup>12</sup> first applied to the 16 regional water plans submitted to the Board in 2015 (known as the 2016 plans), which were to report on the implementation of conservation and other water management strategies proposed in the 2011 water plans.

A previous review of a selected sample of the 2016 plans found that they varied “widely in the level of detail, comprehensiveness, and usefulness of their...discussions of the implementation of water conservation strategies recommended in the 2011 plan.<sup>13</sup>” In its biennial report, *Progress in Water Conservation in Texas: Report and Recommendations to the 85<sup>th</sup> Texas Legislature*, the Water Conservation Advisory Council concluded that “the overview of conservation implementation found in most [2016] plans is minimal.<sup>14</sup>”

The 2021 regional water plans being finalized this year (2020) provide an opportunity to assess implementation of water conservation strategies that were recommended in the 2016 plans. Unfortunately, the timing of the preparation of this *Progress in Water Conservation: Report and Recommendations to the 87<sup>th</sup> Texas Legislature*, precluded a definitive assessment of the manner in which the 2021 plans discuss and evaluate implementation of water conservation strategies in previous plans.

As of this writing, the 2021 plans have been released only in draft form (known as “initially prepared plans” or IPPs) for public review and comment. In many of the plans, completion of the sections discussing implementation of previously recommended strategies is currently underway by the planning groups and their consultants. These sections do not have to be completed until the final plans are due to be submitted to the Texas Water Development

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<sup>11</sup> [Citation to be added.]

<sup>12</sup> Title 31, Part 10 of the Texas Administrative Code, Rule 357.45: Implementation and Comparison to Previous Regional Water Plan

<sup>13</sup> Available online at:

[https://savetexaswater.org/resources/doc/Kramer\\_rwpg\\_implementation\\_2016.pdf](https://savetexaswater.org/resources/doc/Kramer_rwpg_implementation_2016.pdf)

<sup>14</sup> Report available online at: [https://savetexaswater.org/resources/doc/2016\\_WCAC\\_Leg\\_Report.pdf](https://savetexaswater.org/resources/doc/2016_WCAC_Leg_Report.pdf).

Board in October 2020 (by which time this Council report to the Legislature will have been finalized).

However, a review of some of the 2021 plans for which the discussion of the implementation of water management strategies is complete or near completion, combined with communications with consultants to some of the planning groups and Texas Water Development Board planning staff, yields a few observations:

- Since conservation is often a recommended strategy only for user groups with a projected water need in a particular decade, the fact that many water user groups did not have projected water needs for 2020 means that some of them would not have begun implementation of certain water conservation strategies in time to be evaluated in the 2021 regional plans.
- Most of the regional water plans appear to be relying primarily on a spreadsheet template provided by the Texas Water Development Board to report brief information on implementation of especially conservation but also other strategies in the form of tables, rather than providing detailed evaluations of implementation.
- In many cases, the information in these tables is being populated by responses to surveys of water user groups distributed by the planning groups and their consultants, but the response rate to these surveys has been low – leading to incomplete information that undermines a comprehensive assessment of implementation, even if planning group consultants attempt a labor- and time-intensive effort to obtain that data by other means.
- One exception to these general observations is that Region C (North Texas) has done a more detailed look at the implementation of at least some of the conservation strategies in its previous plan, which indicates progress on conservation in the region<sup>15</sup>.

This preliminary look at regional water plans and their discussion of implementation of previously recommended water conservation strategies suggests that thus far most of the regional water plans are not providing a comprehensive evaluation of whether water conservation is advancing at a rate that will meet the expectations for that strategy to achieve its projected role in addressing water supply needs. The Council will dialogue with the new Interregional Planning Council (representing regional water planning groups) and the Texas Water Development Board staff during the next two years to discuss how to enhance the

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<sup>15</sup> Chapter 5-B, Volume 1, 2020 Initially Prepared Region C Water Plan, available online at: [http://www.twdb.texas.gov/waterplanning/rwp/plans/2021/Region%20C/RegionC\\_2021DraftRWPV1.pdf?d=11457.140000071377](http://www.twdb.texas.gov/waterplanning/rwp/plans/2021/Region%20C/RegionC_2021DraftRWPV1.pdf?d=11457.140000071377).

current evaluation of the implementation of water conservation strategies to improve the prospects for meeting the conservation goals in the regional and state water plans.

*Charge 7. Monitor target and goal guidelines for water conservation to be considered by the Texas Commission on Environmental Quality and Texas Water Development Board*

## **Recommendations for legislation to advance water conservation in Texas**

In 2015, the 84th Texas Legislature passed Senate Bill 551 directing the Council to include in their report "recommendations for legislation to advance water conservation in this state, which may include conservation through the reduction of the amount of water lost because of evaporation." Included herein are five legislative recommendations for consideration that represent the majority opinion of the council members but do not necessarily reflect the views of each entity or interest group<sup>16</sup>.

### *1. Groundwater Conservation: Continue funding for the Texas Alliance for Water Conservation*

The Texas Alliance for Water Conservation, located at Texas Tech University, is a state-supported, agricultural producer demonstration and education project promoting groundwater conservation through best management practices and technologies to improve sustainability and profitability in the Texas Southern High Plains. This project began in 2004 and received initial grant funding of \$6.2 million through 2013. In 2014, the Texas Legislature appropriated an additional \$3.6 million from the Agricultural Water Conservation Fund for a 5-year period (2014-

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<sup>16</sup> At the October 16, 2018 Council Meeting, twenty members voted to accept the report with some revisions while three members (Ms. Jennifer Allis, Texas Commission on Environmental Quality, Mr. Kevin Kluge, Texas Water Development Board, and Ms. Maria Martinez, federal agencies) abstained from voting.

2019). Current funding has been extended to December 31, 2020 with a contract expiration date of August 31, 2021.

The Texas High Plains is one of the most important agricultural regions of the United States but is highly dependent on water for irrigation from the Ogallala Aquifer at non-sustainable rates of use. Approximately 90 percent of the water withdrawn from the aquifer is used for agricultural irrigation. TAWC education and demonstration projects are located in the heart of this region. Research efforts are constantly producing advances in technology and agricultural practices to conserve water. In order for those advances to result in more efficient or reduced water usage, users must be made aware of and implement new technologies and practices. TAWC is a vital link between researchers and agricultural water users. TAWC recruits agricultural producers to implement specific practices and technology, keep detailed multi-year records of costs and yields and then demonstrate the results to other producers. This peer-to-peer sharing of experience, data and results is highly effective in increasing the rate of adoption of water conserving best management practices. TAWC demonstration projects provide convincing proof of new methods that not only reduce water usage but also increase profitability for producers, which is a key factor in promoting adoption.

Much of TAWC's education and demonstration efforts have focused on conservation of the Ogallala Aquifer and the technologies that supply only what the crop needs at specific stages of development, thus creating significant water savings to real farm scenarios.

Renewed funding will allow TAWC to continue promoting water conservation and launch new thrusts to include 1) field-scale demonstrations of minimum tillage and multi-species cover crops to enhance soil water retention, and 2) options and guidelines for conversion from irrigated to rainfed cropping systems. TAWC will also communicate options in contract cattle grazing of cover crops and rainfed forages to enhance the value of land retired from irrigation. New investment in TAWC will expand the impact of technology transfer for water savings through tighter linkage with soil health and value-added land management. TAWC estimates \$475,000 per year would support the core operations and personnel to carry on administration, producer relations, education, event programming, and demonstrations. Supplementary grants can then be obtained to support specific outreach objectives.

***The Council recommends that, subject to available state revenue for the 2022–2023 biennium, the Texas Legislature fund the Texas Alliance for Water Conservation agricultural demonstration and education project promoting water conservation through best management practices and new technologies at \$475,000 per year, through general revenue appropriations deposited to the Agricultural Water Conservation Fund and distributed through the TWDB's Agricultural Water Conservation Grants Program, and establish this level of annual funding through baseline general revenue appropriations to***

**Commented [JS19]:** Comment from CJ Tredway:

Suggest deleting this descriptive phrase; a full description of the TAWC is provided in the background.

***the TWDB in future years***

**2. Surface Water Conservation: Restore funding for the Texas Ag Water Efficiency Education and Demonstration Project facility.**

From 2004 to 2015 the Texas Water Development Board funded the Texas Project for Ag Water Efficiency to demonstrate and assist farmers in implementing surface-water irrigation practices on farms in the Lower Rio Grande Valley that would conserve water and maintain the economic viability of their farming practices. Out of these demonstrations, a number of operations were converted to more efficient irrigation practices both by farmers and irrigation districts.

A component of the project was the construction of a meter calibration and educational center named the Texas Center for Ag Water Efficiency for the demonstration, education and research of agricultural water conservation measures, tools and technologies. This facility is the only one of its kind in Texas and one of only a handful nationwide. Water managers and employees from across the state used these facilities to educate personnel on the refinement of agricultural water measurement and delivery.

The Center produced multiple developments that have been adopted by irrigation districts including:

- Efficient, low-cost canal gates for controlling water delivery.
- A Supervisory Control and Data Acquisition (SCADA) system for the automation of multiple gates throughout a district's delivery system to maximize the efficient delivery of water to farmers and cities served by the district.
- New telemetry hardware and software to meet the unique needs of monitoring and operation of delivery systems that are common for the surface water irrigation systems of Texas.
- Meter calibration for various types of metering devices and demonstration of new devices to determine whether they will withstand the harsh raw water conditions typical to water diverters across the state.
- Education and demonstration programs to encourage the use of improved irrigation practices in partnership with Texas A&M AgriLife Extension Service, Texas ~~State Soil soil~~ and ~~Water water Conservation conservation Districts districts~~ and the USDA Natural Resource Conservation Service.

**Commented [JS20]:** Comment from CJ Tredway:

Should not be capitalized.

Restored funding will enable the maintenance, improvement and expansion of the mechanical and technological components of the facility and expansion of educational and research opportunities. As innovative water conservation technologies continue to evolve, the Rio Grande Center for Ag Water Efficiency can serve as a hub to demonstrate effective on-farm and district delivery systems and educate agricultural producers, water providers and project developers on proven water conservation technologies that are available to modernize their operations, with the Harlingen Irrigation District continuing to provide "in-kind" support in the form of labor, materials, and administrative oversite.

***The Council recommends that, subject to available state revenue for the 2022-2023 biennium, the Texas Legislature fund the Texas Project for Ag Water Efficiency (AWE) for the education, research and development of agricultural water conservation initiatives at \$200,000 per year, through general revenue appropriations deposited and distributed through the TWDB's Agricultural Water Conservation Grants Program, and establish this level of annual funding through baseline general revenue appropriations to the TWDB in future years.***

### *3. Maintain level of funding for TWDB's Agricultural Water Conservation Grant program.*

The TWDB's Agricultural Water Conservation Program supports the implementation of the conservation water management strategies identified in the state and regional water plans by funding projects and programs throughout the state. During the 86th Legislative Session, the appropriations act increased authorized dispersals through the Agricultural Water Conservation Grant Program from \$600,000 to \$1,200,000 per fiscal year.

The grant program offers funding through a competitive process at least once a year to state agencies and political subdivisions for agricultural water conservation programs and projects. Grant topics vary from year to year to address current issues in agricultural water conservation. Projects awarded funding must further water conservation in the state and support the implementation of water conservation management strategies in the state water plan. Specific evaluation criteria are listed in the request for applications.

Previously funded activities include demonstrations of conservation practices, educational outreach, purchase and installation of water use monitoring equipment, and irrigation-efficiency

improvements. Funding recipients must report improvements in water use efficiency or water savings. The success of the program is quantified through annual water savings estimates reported by grant and loan recipients for five years after equipment installation and/or construction completion.

The program has collectively saved:

- 496,000-acre feet of water reported through 74 grant projects over the past 10 years.
- 79,000-acre feet of water reported through 10 loan projects over the past 10 years.

Examples of successful projects that implement irrigation conservation strategies include:

- Irrigation scheduling via the use of real-time soil moisture monitoring, remote system shutoff devices and other conservation tools in Regions A and O.
- Irrigation conservation demonstrations and outreach through the Texas Alliance for Water Conservation project, identified as a strategy in the Region O plan.
- Irrigation system improvements such as canal lining, canal-to-pipeline projects, SCADA systems, and automated canal gates in Region E, Region K, and Region M.
- Irrigation water use measurement throughout the state.

***The Council recommends that, subject to available state revenue for the 2022–2023 biennium, the Texas Legislature maintain the current level of \$1,200,000 per year for Texas Water Development Board's Agricultural Water Conservation Grant Program, in addition to any funds appropriated specifically for the Texas Alliance for Water Conservation and the Texas Project for Ag Water Efficiency.***

#### Agricultural Water Conservation Fund Projected Balance<sup>17</sup>

Fiscal Year	Fund Balance	Investment Projections	Loan Origination	Total Loan Repayments	Grants Payable	Annual Grants	Fund Balance
2020	\$7,826,581	\$117,399	\$2,000,000	\$1,284,262	\$3,670,885	\$1,200,000	\$2,357,357
2021	\$2,357,357	\$35,360	\$-	\$1,181,117	\$-	\$1,200,000	\$2,373,834

<sup>17</sup> Data as of 8/31/2019; Assumptions: offer up to \$1,200,000 in annual grants; annual administrative costs associated with the program continue to be covered by general revenue; outstanding balance of \$3,670,885 committed through existing grant project encumbrances; assumed demand for the agricultural loan program is \$1,000,000 every other year after fiscal year 2020; and, 1.50 percent investment earnings rate.

2022	\$2,373,834	\$35,608	\$1,000,000	\$1,319,863	\$-	\$1,200,000	\$1,529,305
2023	\$1,529,305	\$22,940	\$-	\$1,067,348	\$-	\$1,200,000	\$1,419,592
2024	\$1,419,592	\$21,294	\$1,000,000	\$1,211,904	\$-	\$1,200,000	\$452,791
2025	\$452,791	\$6,792	\$-	\$973,034	\$-	\$1,200,000	\$232,616
2026	\$232,616	\$3,489	\$-	\$833,375	\$-	\$1,069,481	\$-
2027	\$-	\$-	\$-	\$305,576	\$-	\$305,576	\$-
2028	\$-	\$-	\$-	\$305,472	\$-	\$305,472	\$-
2029	\$-	\$-	\$-	\$155,280	\$-	\$155,280	\$-
2030	\$-	\$-	\$-	\$152,640	\$-	\$152,640	\$-
2031	\$-	\$-	\$-	\$-	\$-	\$-	\$-

#### 4. Advancing Use of Data to Understand Trends in Water Use

**The request is for** **The Council recommends, subject to available state revenue for the 2022 – 2023 biennium, \$200,000 in funding to be made available through TWDB to advance the understanding of municipal water and industrial-use trends using available annual reporting data. This would fund a research project to explore how available TWDB water use data and economic and industrial output data available from public data bases can be used to develop the need analysis discussed below and how to set up this analysis on a continuing basis within the TWDB.**

##### Objective:

The objective is to have a consulting firm or university **(i.e. a qualified contractor)** use data reported by municipal providers and **other industrial**-users to:

- Better understand municipal seasonal as well as indoor and outdoor water use trends over time;
- Quantify municipal monthly per capita water use over time; and
- **Examine Industrial monthly use patterns by NAICS code and geography and develop trend metrics based on gallons of water used by an appropriate denominator depicting output by that industrial sector.**

The project would set up analytics that could be easily updated each year as new reports make new information available. An annual report on seasonal and indoor/outdoor water use patterns across regions and by water providers could be made available to help assess progress and update strategies.

Finally, the consultant or university would provide the TWDB with the tools to continue these trend analyses over time.

##### Background:

**Commented [JS21]:** Comment from CJ Tredway:

In discussing this recommendation, the Council decided not to limit it to municipal and industrial trends but to look at all trends.

**Commented [JS22R21]:** At the March WCAC meeting, “understanding of municipal, industrial, commercial, and institutional water use trends” was recommended as well as the inclusion of ‘retail public water providers’ to include additional providers that do not fall in the municipal category.

**Commented [JS23]:** Revisions to this section submitted by CJ Tredway, unless otherwise noted.

**Commented [JS24]:** Feedback from: Tim Loftus

Currently, the Texas Water Development Board collects large amount of monthly and annual water use data from ~~urban and industrial (mining, power, and manufacturing)~~ water users. Only annual data has historically been used for TWDB projections of water use and by regional planning groups. What is missing is the examination of ~~past historical~~ data to develop for trends, if any, and tracking change, in water efficiency including seasonal variations. Another trend analysis that is not being done in the amount of water used per unit of output for industrial operations and the impact of seasonal industrial use on water use patterns.

**Commented [JS25]:** Feedback from: Tim Loftus

This type of information has been identified as needed by the TWDB planning staff, regional water planning groups, and the Texas Water Conservation Advisory Council. All ~~information data~~ needed is available from public sources such as TWDB, Energy Information Administration, US Department of Commerce, the Texas Comptroller and related sources.

**Commented [JS26]:** Comment from CJ Tredway:

Will the TWDB be requesting this item in their LAR? If not, I suggest no referencing TWDB staff needs.

**Commented [JS27]:** Comment from Tim Loftus:

Data + analysis = information

This type of data analysis will:

- Provide the TWDB with a statistical analysis of the effectiveness of seasonal and other conservation measures;
- Show how trends in water use per unit of output for industrial operation have changed over time, so better long range projections can be made;
- Better quantify how water is used in the urban and industrial environment (Seasonal vs Other uses)
- Provide needed input to the Texas Water Conservation Advisory Council for its charge to: **Monitor trends in water conservation implementation; and**
- Provide better input data to the regional planning groups to make long term projections of water use.

#### Need:

One example of the need for ~~trend analysis~~ and the statistical analysis of monthly and seasonal water use can be illustrated by the fact that per capita water use has decreased from around 190 gallons per person per day in 1980 to 140 gallons per person per day by 2015. The TWDB analyzes the impact of plumbing codes on future water use but does not analyze historical seasonal water use trends.

Likewise, manufacturing water use has decreased but production is up. For Example, according to US Energy Information Administration, oil refining output has increased steadily over the last two decades, but total refining water use has decreased over that period. These trends need to be analyzed for all manufacturing sectors. Again, seasonal use by manufacturing is not analyzed.

**Commented [JS28]:** Comment from Tim Loftus:

Be careful with this statement as it implies much more than looking at water use data for change and any trends during the past several years. This statement suggests that we'll have conservation-related data or pre- and post-conservation data that in a multilinear regression analysis, for example, will explain x% of the variability we see in water-use data over time that can be attributed to conservation. I think this is overpromising especially since we're relying on TWDB and other publicly available data.

**Commented [JS29]:** Comment from Tim Loftus:

There's no guarantee that any trend will be found and, therefore, the matter shouldn't be framed as though a trend is a foregone conclusion.

**Commented [JS30]:** Feedback from Tim Loftus

#### Conclusion:

Trend and seasonal water use analysis is critical to advancing our understanding of changing water use patterns in Texas. The information is needed by the TWDB planning staff, the regional planning groups, and the Water Conservation Advisory Council. The project would develop a methodology to accomplish the above analysis and provide a set of data that would follow

**Commented [JS31]:** Comment from CJ Tredway:

Will the TWDB be requesting this item in their LAR? If not I suggest not referencing TWDB staff needs.

trends for the period of record starting in 1985. The consultant or university would then help the TWDB install the necessary tools and software to continue this analysis in the future.

**Commented [JS32]:** Comment from Tim Loftus:

TWDB staff are in agreement about taking on new analysis obligations?

## 5. Establish Level 1 Validation program for Water Loss Audits.

**The Council recommends that, subject to available state revenue for the 2022-2023 biennium, the Texas Legislature appropriate \$605,000 for the biennium to the TWDB to establish a program building on a water audit validation study being conducted by the TWDB. Under the guidance of the TWDB, level 1 validations would be conducted of water loss audits submitted by a group of 50 utilities volunteering to participate, establish a methodology for conducting level 1 validations, and establish a training program to certify validators. Preference for participation would be given to those utilities with a financial obligation to the State requiring that they complete a water loss audit. If more than 50 utilities apply to this program TWDB will work to ensure that a representative group of utilities is selected (ex. geographical, population, urban/rural, financial obligation)**

**Commented [JS33]:** Comment from CJ Tredway:

"Level 1" is used throughout this section but sometimes it is capitalized and sometimes it is not.

### Background:

Level 1 validation of water loss audits is a process by which the data used in a water loss audit is reviewed by a third party working with the submitting utility. Assessment scores are given to 20 different data inputs in the water loss audit that provide an indication of how much confidence a utility or governing agency should have in the accuracy of that input. Level 1 validation works to ensure those scores are accurate, bringing in fresh eyes to review the audit.

This is crucial since water loss audits are used to make funding decisions, both by the State and by utilities. The validation ensures that best practices are being followed per industry guidance, increasing the efficacy of spending on reducing water loss and helping ensure that cost effective water loss measures are targeted.

The funding for this initiative includes all costs required to have a third party, hired by the TWDB, perform the validations, building on completed water loss audits from the participating utilities.

This program is intended to build upon a study currently underway by the TWDB to perform level 1 validations on at least six utilities of varying sizes. That study is exploring the framework required to establish a level 1 validation process in Texas. For the proposed initiative, the TWDB would be encouraged to include a variety of utilities, with consideration given to utility size, type, and whether the utility is rural or urban.

When California implemented Level 1 validation of water loss audits, the percentage of submitted audits that contained unrealistic results, such as negative water losses, fell by over ten percent. Reported data validity scores also dropped by a median number of 13 points. Thus, the data accuracy improved, while overconfidence in the results of those audits decreased.

**Commented [JS34]:** Feedback from Tim Loftus

Level 1 validation would require training ~~on~~ on proper validation methodology according to the TWDB validation scoring matrix and would be separate from the training that the TWDB currently requires for submission of water loss audits. The validator cannot be the same person who completes the audit ~~in order~~ to prevent bias and to minimize unintentional omissions. For this recommendation, validation would be conducted by third party contractors. This funding would establish a framework for an ongoing validation effort.

**Commented [JS35]:** Feedback from Tim Loftus

**Commented [JS36]:** Feedback from Tim Loftus

#### Budget Outline:

Task	Cost
Program Announcement/Recruitment	\$20,000
<i>Provide on-going management of the program, including the development of a program management plan and associated schedule, marketing and outreach plan, regular team coordination calls for program management and documentation, internal progress tracking, internal task assignments and accountability, program management plan amendments, and course corrections as warranted.</i>	
<i>Development of a recruitment and retention plan, development of all communication materials in support of the recruitment plan.</i>	
<i>Manage water system recruitment and retention for the program.</i>	
Level 1 Validation Process	\$175,000
<i>Receipt and review of supporting documentation</i>	
<i>Level 1 Validation session</i>	
<i>Utility-specific documentation</i>	
Compilation and reporting of validation results	\$40,000
Validation Certification	\$250,000
<i>Texas specific Level 1 Validation certification criteria</i>	
<i>Scheduling and administration of certification workshops</i>	

<i>Certification workshops</i>	
<i>Proctor/examinations/compilation of results</i>	
<i>Participation notification and reporting</i>	
Training of TWDB staff for follow-on certification training	\$20,000
<i>Conduct "train the trainer" classes with TWDB staff</i>	
TWDB staffing during validation and certification process	\$100,000
<i>On-going administration of the Program including ongoing management for training and technical assistance, subject matter experts, and regular progress reporting.</i>	
<i>Kickoff call to begin the process of Validation Training Program design.</i>	
<i>Host a webinar to prepare attendees for Level 1 Validation Process.</i>	
<i>Provide direct outreach to training participants to ensure they will bring appropriate representation of utility staff to events.</i>	
<b>Total</b>	<b>\$605,000</b>

## References

[From 2018 WCAC Report]

Averitt & Associates, Inc., 2017, *Statewide Water Conservation Quantification Project Report*, [www.twdb.texas.gov/conservation/doc/StatewideWaterConservationQuantificationProject.pdf](http://www.twdb.texas.gov/conservation/doc/StatewideWaterConservationQuantificationProject.pdf), 3267 p.

Legislative Budget Board, 2013, *Texas State Government Effectiveness and Efficiency Report, Selected Issues and Recommendations*, [http://www.lbb.state.tx.us/Documents/Publications/GEER/Government Effectiveness and Efficiency Report 2015.pdf](http://www.lbb.state.tx.us/Documents/Publications/GEER/Government%20Effectiveness%20and%20Efficiency%20Report%202015.pdf), 489 p.

Sierra Club-Lone Star Chapter, the National Wildlife Federation, and Galveston Bay Foundation, 2016, *Texas Water Conservation Scorecard*, <http://www.texaswaterconservationscorecard.org/>, 84 p.

TWDB, 2001, *Report 347: Surveys of Irrigation in Texas*, [http://www.twdb.texas.gov/publications/reports/numbered\\_reports/doc/R347/Report347.asp](http://www.twdb.texas.gov/publications/reports/numbered_reports/doc/R347/Report347.asp), 102 p.

TWDB, 2016, *Water for Texas—2017 State Water Plan*, <http://www.twdb.texas.gov/waterplanning/swp/2017/>, 164 p.

United States Department of Agriculture, National Agricultural Statistics Service, 2014b, 2013 *Farm and Ranch Irrigation Survey*, <https://www.agcensus.usda.gov/Publications/2012/>, 266 p.

Wagner, K., 2012, *Status and Trends of Irrigated Agriculture in Texas: Texas Water Resources Institute of Texas A&M University, EM-115*, <http://twri.tamu.edu/publications/educational-materials/2012/em-115/>, 6 p.

Water Conservation Implementation Task Force, 2004, *Report to the 79th Legislature*, [http://www.savetexaswater.org/resources/doc/WCITF\\_Report\\_2004.pdf](http://www.savetexaswater.org/resources/doc/WCITF_Report_2004.pdf), 88 p.

Water Research Foundation, 2016, *Residential End Uses of Water, Version 2: Executive Report*, <http://www.waterrf.org/PublicReportLibrary/4309A.pdf>, 15 p.

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