

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

*Report and Recommendations to the 86th Texas Legislature*

**Submitted by the**

**Water Conservation Advisory Council**

**[www.savetexaswater.org](http://www.savetexaswater.org)**

**Karen Guz, Presiding Officer**

**December 1, 2018**



**Water Conservation Advisory Council**



## Council Members

Jennifer Allis  
Texas Commission on Environmental  
Quality

Dan Hunter  
Texas Department of Agriculture

Cindy Loeffler  
Texas Parks and Wildlife Department

John Foster  
TX State Soil and Water Conservation Board

Kevin Kluge  
Texas Water Development Board

Aubrey Spear  
Regional Water Planning Groups

Maria Martinez  
Federal Agencies

Karen Guz  
Municipalities

Sarah Schlessinger  
Groundwater Conservation Districts

Valerie Miller  
River Authorities

Ken Kramer  
Environmental Groups

Wayne Halbert  
Irrigation Districts

H.W. Bill Hoffman  
Institutional Water Users

Carole Baker  
Water Conservation Organizations

Tim Loftus  
Higher Education

Jay Bragg  
Agricultural Groups

Craig Elam  
Refining and Chemical Manufacturing

Gary Spicer  
Electric Generation

C.J. Tredway  
Mining and Recovery of Minerals

Anai Padilla  
Landscape Irrigation and Horticulture

Linda Christie  
Water Control and Improvement Districts

Celia Eaves  
Rural Water Users

Donna Howe  
Municipal Utility Districts

December 1, 2018

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,



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

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, in order to chart a path forward 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, strategies, 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.

### **1. Enhanced data collection, management, and accessibility**

The Council recommends that, subject to available state revenue for the 2020-2021 biennium, the Texas Legislature increase appropriations to the Texas Water Development Board (TWDB) to enhance existing data collection, management, and accessibility efforts and to ascertain what cities and water utilities need to do to begin collecting the necessary information.

### **2. Funding a statewide water conservation public awareness program**

The Council recommends that, subject to available state revenue for the 2020-2021 biennium, the Texas Legislature appropriate up to \$3 million per year to the TWDB to implement a statewide water conservation public awareness program as directed by the Texas Legislature in 2007 with the passage of Senate Bill 3 and House Bill 4.

### **3. Maintain funding for agricultural water conservation and research programs**

The Council recommends that, subject to available state revenue for the 2020–2021 biennium, the Texas Legislature should maintain funding levels for agricultural water conservation research, education, training, conservation programs with best management practices that reduce evapotranspiration, and financial assistance programs focused on improving water use efficiency in agricultural irrigation.

### **4. Funding to enhance the accuracy and value of water loss audits**

The Council recommends that, subject to available state revenue for the 2020-2021 biennium, the Texas Legislature appropriate \$500,000 for the biennium to the TWDB for an expanded water loss program (including three additional FTEs) to assist water utilities in the design and conduct of water loss audits and another \$500,000 for the biennium to the TWDB for competitive grants for up to six utilities of varying sizes to conduct pilot projects for validation of their water loss audits.

**5. Continue funding for the Texas Ag Water Efficiency Education & Demonstration Project.**

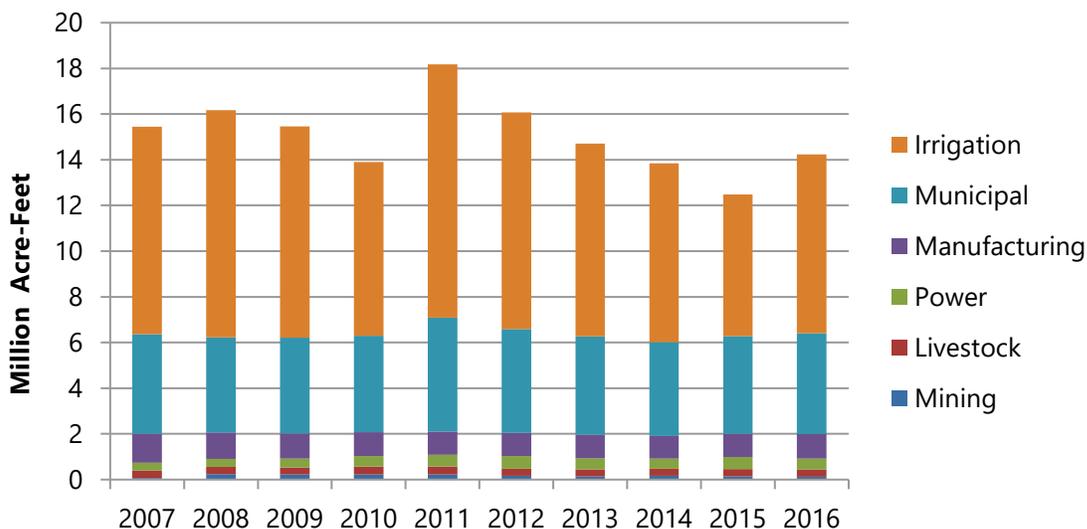
The Council recommends that, subject to available state revenue for the 2020-2021 biennium, the Texas Legislature fund this project for the education, research, and development of agricultural water conservation initiatives at \$150,000 to \$200,000 per year, through general revenue appropriations deposited 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.

# Legislative charges

## *Introduction*

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, growing to over 51 million people by the year 2070. 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>.



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

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

<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>.

## *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**

Water is critical for agriculture and the rural communities that agriculture supports. Since the 1930s, farmers and ranchers have been actively pursuing and implementing conservation practices to maximize their use of available water on cropland and pastures (USDA, 2013). Statewide, irrigation water use hovers around 9 million acre-feet per year. While agricultural producers have continued to voluntarily adopt best management practices to improve irrigation efficiency, the data needed to fully assess and quantify the extent of this trend is not easily accessible or readily available.

In the 1950s, well-drilling and pumping technologies became economically viable for agriculture. This transformed farming in many areas of the state. Today, roughly 25 percent of all harvested acres (or approximately 6.17 million acres) utilize irrigation to supplement rainfall. Of those acres, approximately 82 percent employ high-efficiency center-pivot irrigation systems and 6 percent have adopted advanced efficiency systems (such as drip tape or trickle systems) (Wagner, 2012). The remaining 12 percent furrow and/or flood irrigate; however, in most instances, the farmers that still use these practices have laser-leveled fields and utilize irrigation scheduling to maximize water use efficiencies.

In addition, some irrigation districts and wholesale providers of surface water have made substantial upgrades to water delivery infrastructure in an effort to reduce transportation loss. However, financing these projects is difficult given their relative cost(s) and the inability of districts to feasibly pass these costs along to farmers. It is equally difficult to assess the true amount of water saved by such projects, even though it could be significant.

These improvements in irrigation efficiencies, as well as enhancements in crop genetics, and pest management have enabled farmers to double crop yields on fewer acres with no more water than was utilized in the 1970s. *The Status and Trends of Irrigated Agriculture in Texas* notes that the statewide economic value directly derived from irrigated agriculture was \$4.7 billion in 2007 (Wagner, 2012). This highlights the need to continue the pursuit of conservation technologies to sustain economic viability and food security.

The last detailed statewide assessment of agricultural irrigation practices was conducted in 2001 and reported in TWDB *Report 347: Surveys of Irrigation in Texas*. The Census of Agriculture's *Farm and Ranch Irrigation Survey (USDA, 2013)*, currently the best source of information regarding trends in adoption of conservation practices, indicates significant progress by agricultural producers.

In 2016, a team of 80 university and federal researchers and extension specialists in 9 institutions and 6 states overlying the Ogallala Aquifer began the Ogallala Water Coordinated Agriculture Project (OWCAP). This multidisciplinary research and outreach project focuses on challenges related to groundwater declines and long-term agricultural sustainability in the High Plains region<sup>3</sup>. Project participants include personnel at Texas A&M, West Texas A&M, and Texas Tech Universities.

The Texas collaborators will concentrate on:

- integrating hydrologic, crop, economic, and climate models to produce candidate scenarios for effective conservation of groundwater;
- developing improved methods of crop, soil, and water management, including irrigation scheduling and delivery technology, that maximize efficiency of water use;
- identifying economic and policy factors that sustain profitable agricultural use of water;
- extending information on novel technologies and user-friendly tools to producers and decision-makers.

While the OWCAP will focus primarily on the Ogallala Aquifer, the information gained through the project will assist in furthering the implementation of agricultural conservation technologies throughout the state.

## **Institutional and Commercial Water Conservation**

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.

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<sup>3</sup> For more information, visit <http://www.ogallalawater.org>.

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.

## **Manufacturing and Electric Power Generation Water Conservation**

Texas ranks first in the nation in electric power production<sup>4</sup> and second for manufacturing output<sup>5</sup>. 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>6</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 refiners 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.

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<sup>4</sup> Information can be found at the U.S. Energy Information Administration online at: <https://www.eia.gov/state/>

<sup>5</sup> State Manufacturing Data can be found at: <http://www.nam.org/Data-And-Reports/State-Manufacturing-Data/>

<sup>6</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).

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 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 significantly as more Texans move to urban centers in coming decades. The challenge of meeting the needs of these future urban citizens will be easier as per capita consumption drops. Using conservation as a cost-effective strategy for meeting future supply needs will also help keep water rates lower in the long-term than they are likely to be if higher water demand leads utilities to expand infrastructure capacity. Monitoring municipal conservation investments and outcomes is critical to ensuring that a large portion of the Texas population has secure and affordable water in generations to come.

Trends in Conservation Reports: A review of high-level results from the Conservation Annual Reports provides some encouraging results. Total gallons per capita per day (GPCD) and Residential GPCD have been declining over the past five years. A statewide focus on water loss also appears to be yielding benefits with water loss per capita measurements showing a decline as well. Water utilities estimate that the amount of water they have saved has more than doubled since 2013 (Table 1). While this is encouraging, questions remain regarding accuracy of water savings estimates. In addition, weather patterns, water use restrictions, and economics impact water use trends. Conservation efforts vary greatly across the state complicating trend assessment.

The Need for Quality Conservation Plans: Water utilities with over 3,300 connections are required to prepare and submit Conservation Plans to the TWDB every five years, with many utilities needing to update their plans by May 1, 2019. These reports include information on per

capita goals which are then referenced in required annual Conservation Reports to TWDB. Conservation plans must also provide five- and ten-year per capita savings goals. While some utilities include specific strategies such as conservation best management practices, as listed in the TWDB's Best Management Practices Guides<sup>7</sup> to achieve these goals, this is not yet required by statute.

Improving Annual Report Data: The on-line reporting tools used by utilities to complete annual conservation reports to the TWDB have been enhanced to improve reporting ease and accuracy. The annual Water Use Survey, Water Loss Audit and Conservation Plan Annual Reports are rich with data that provide insights into how each utility functions and plans to become more water efficient over time. While the contents of these reports are public information and the TWDB has recently posted water loss and use data reports online, some of the information is not readily accessible to Texans who might want to review how their utility is planning for and managing conservation.<sup>8</sup>

Useful data are also provided to the state through water conservation plans and reports on implementation progress required of certain entities in Texas. An entity's water conservation plan identifies strategies for reducing the consumption of water, reducing water loss, and increasing water reuse and contains best management practices which, if implemented, can help an entity reach their goals. In 2017, the most common activities from submitted annual reports include school education, reuse for industry, and water conservation pricing. The data compiled from the past five years of annual water conservation reports are shown in Tables 1 and 2.

Conservation Best Management Practices Guide: Knowing that new Conservation Plans are due soon, the Council's Municipal Workgroup has been working diligently to update the Municipal Best Management Practices Guide to include innovative conservation practices and options appropriate for utilities of all sizes. An important effort leading up to the deadline for these reports will be WCAC and TWDB activities encouraging utilities to engage in quality analysis, stakeholder input and thoughtful consideration of conservation goals prior to local approval and submission to the TWDB and the Texas Commission on Environmental Quality (TCEQ).

Are We Meeting Future Conservation Needs?: The TWDB has taken several important steps during the past year to improve understanding of conservation progress and reporting. A 2017 *Statewide Water Conservation Quantification Project* report estimated the volume of water conservation saving for a select group of water utilities to determine whether activities will save enough water to meet the municipal conservation water management strategies in the 2017

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<sup>7</sup> <https://www.twdb.texas.gov/conservation/BMPs/index.asp>

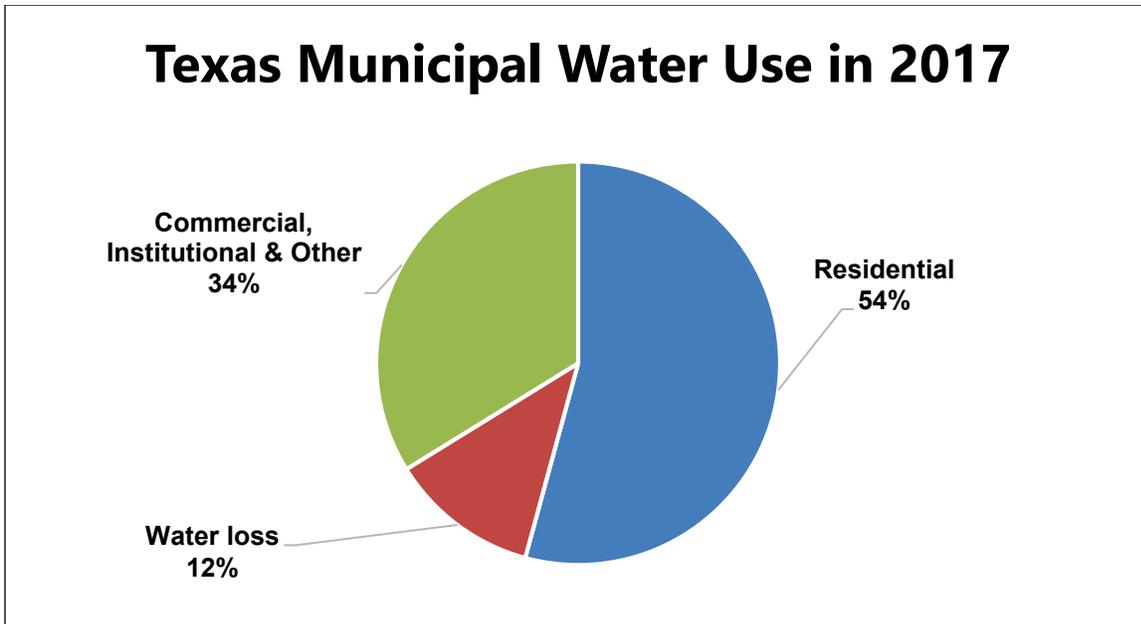
<sup>8</sup> Historical water loss audit and conservation annual report data can be found at: <https://www.twdb.texas.gov/conservation/municipal/waterloss/historical-annual-report.asp>.

State Water Plan (Averitt & Associates, Inc., 2017). The good news in the report is that the majority of respondents, 119 utilities, reported conservation activities that appear to meet the 2020 conservation strategy volumes, while 51 utilities did not. An estimation of water savings from conservation activities for the 170 utilities is very informative; however, other utilities may not have the resources to accurately estimate these savings. The range of savings estimates provided for similar activities is a cause for concern. To assist utilities in estimating water savings, the TWDB has contracted the development of a Municipal Water Conservation Planning Tool that will estimate the water savings and the costs associated with a variety of water conservation activities.

**Table 1. Water conservation annual report data**

	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; †based on 2014 conservation plans; ‡NA = not applicable



**Figure 2. Texas Municipal Water Use in 2017**

**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

Trends in Water Use Categories: An annual Water Use Survey is submitted to the TWDB by all community public water systems. From the Water Use Survey 2017 reporting year, 381 water utilities served more than 3,300 customer connections. A biennial report, *Water Use of Texas Water Utilities*<sup>9</sup>, provides some insights regarding total urban water use trends and use by the sectors of single family, commercial, industrial, multifamily, institutional, and agricultural. Significant findings show that about 80 percent of these water utilities reported water use by

<sup>9</sup> The 2016 report can be found online at: [https://www.twdb.texas.gov/publications/reports/special\\_legislative\\_reports/doc/2016\\_WaterUseOfTexasWaterUtilities.pdf](https://www.twdb.texas.gov/publications/reports/special_legislative_reports/doc/2016_WaterUseOfTexasWaterUtilities.pdf)

the various customer sectors. Some water utilities did not report by sectors mostly because they specifically did not report single-family and multifamily sectors separately for residential water use, primarily due to their billing systems that do not account for refined categories. In general, as utilities become larger, the relative percentage of their metered water delivered to residential sectors decreases. Because single-family accounts often have their own billing category, the reported 48 percent of total use by this sector is fairly accurate. Some areas of Texas showed significant decreases in volume of water sold in this category despite experiencing growth in single-family homes. While this recent trend is encouraging, it will be important to note if it continues as weather and drought conditions fluctuate in future years.

The sector-based water use metric developed by the TCEQ and the TWDB, in consultation with the WCAC, allows for comparisons of water use among municipalities and water utilities. The forthcoming Water Use of Texas Water Utilities report provides a detailed analysis.

Outdoor Watering Restraint A Key Conversation: The updated *Water Conservation by the Yard*<sup>10</sup> report by the Texas Living Waters Project and the *Water Use Quantification Report* both highlight the need to focus on outdoor water usage (Averitt & Associates, Inc., 2017). The amount of total municipal water used on outdoor landscapes varies greatly with analyses suggesting 30-50 percent of municipal water used for landscape irrigation across Texas. *Water Conservation by the Yard* suggests that by limiting outdoor watering to no more than twice per week, Texas could reduce 11 percent of total municipal water demands. The Water Use Quantification Report similarly highlights mandatory limits on outdoor irrigation as a key municipal water strategy for the future. A new municipal best management practice document suggests local limits on outdoor irrigation combined with landscape education and incentives are effective strategies for utilities to better manage outdoor water use.

Water Loss Workgroup Formed: Municipal water loss is a growing area of focus for water conservation. While Texas has made great strides by requiring water loss audits, there are still many opportunities to improve water security through water loss improvements. The Water Loss workgroup has looked to the American Water Works Association Water Loss Committee to assess national research projects. In addition, the workgroup has reviewed initiatives in other states with similar concerns. These discussions led to the desire to promote data validity projects that will help utilities ensure they are drawing accurate conclusions from water loss audit reports.

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<sup>10</sup> Full report can be found at: [https://texaslivingwaters.org/wp-content/uploads/2018/03/WCBTY-II\\_Final\\_031918.pdf?pdf=WCBTY-2018](https://texaslivingwaters.org/wp-content/uploads/2018/03/WCBTY-II_Final_031918.pdf?pdf=WCBTY-2018).

## Wholesale Water Conservation

Similar to municipal entities, wholesale and regional water suppliers must submit water conservation plan updates every five years and implementation reports every year if:

- the supplier is applying for or receiving financial assistance of more than \$500,000 from TWDB, or
- they are a retail public utility that provides potable water service to 3,300 or more connections, or
- the utility is applying for a new water right or amending an existing water right greater than 1,000 acre-feet for municipal, industrial and other non-irrigation uses.

Table 3 provides a summary of 55 wholesale suppliers' conservation activity in 2017 as reported to TWDB.

**Table 3. Wholesale water supplier water conservation annual report data for 2017.**

<b>Population Served</b>	<b>Gallons of Water Produced</b>	<b>Gallons of Water Conserved</b>	<b>Gallons of Water Recycled</b>	<b>Water Savings Dollars</b>	<b>Education and Public Awareness Programs</b>	<b>Leak Detection and Water Loss Programs</b>
7,902,453	670,859,970,591	51,042,553,406	40,516,858,879	\$58,272,217	38	30

Many 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. The following are examples of wholesale and regional water supplier conservation progress since 2016:

- Wholesale suppliers are taking initiatives to protect the quality of their water supplies. For example, the Upper Colorado River Authority has had success working with local communities and the TCEQ to implement watershed protection plans to address areas of concern.

- Wholesale suppliers have embraced communicating the “value of water” message with the public. This strategy has recently been included as North Texas Municipal Water District continues to use the recognized *Water IQ: Know Your Water* brand in its public awareness program.
- Wholesale suppliers are working to deliver conservation assistance to their city customers. City of Dallas met with their wholesale customers to survey ways they could provide assistance. Items being considered include: providing resources and developing water loss and leak detection workshops. The Lower Colorado River Authority, Tarrant Regional Water District and Upper Trinity Regional Water District are some of the wholesale suppliers assisting with residential irrigation system evaluation programs in their service areas.
- Wholesale suppliers are spreading the “importance of conservation” message to the public. In 2017, Sabine River Authority of Texas presented their conservation plan at the Texas Clean Rivers Program Sabine Basin Steering Committee meetings and provided education at the Shangri La Eco-Fest in Orange, Texas. Also, the Dallas County Park Cities Municipal Utility District provided water conservation education materials to Highland Park Independent School District elementary and middle school teachers.
- Wholesale conservation efforts are also supporting the agriculture industry. Gulf Coast Water Authority has recently completed a program to install meters on every irrigated field within their service area. As a result, this allows them to provide financial incentives for farmers to keep water use below a certain amount.
- Wholesale and retail suppliers are also supporting weekly watering advice services throughout the state and examples are provided in Table 4.

**Table 4. Examples of wholesale & retail suppliers participating in weekly watering advice services.**

<b>Water My Yard</b>	<b>Brazos Valley WaterSmart</b>	<b>Water is Awesome</b>
Lower Colorado River Authority North Texas Municipal Water District Dallas County Park Cities Municipal Utilities District Upper Trinity Regional Water District	City of Bryan City of College Station Wickson Creek Special Utility District	City of Dallas Tarrant Regional Water District

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

Members of the Council, their designated alternates, and interested stakeholders continue to monitor new water conservation technologies across all sectors to ensure the online guide contains the most up-to-date best management practices. Several new best management practice documents have been proposed and are nearing final adoption. These include: Custom Conservation Rebates, Customer Characterization, Outdoor Watering Schedule, and Plumbing Assistance Programs for Economically Disadvantaged Customers. Other best management practices have been updated to ensure that they include the most recent information. The Public Outreach and Education best management practice document has been updated to include information on how to use social media, web education and other forms of electronic outreach. The Water Loss Audit best management practice is being updated to reflect the newest thinking on Level One Data Validation that ensures the most accurate conclusions are being drawn from audits.

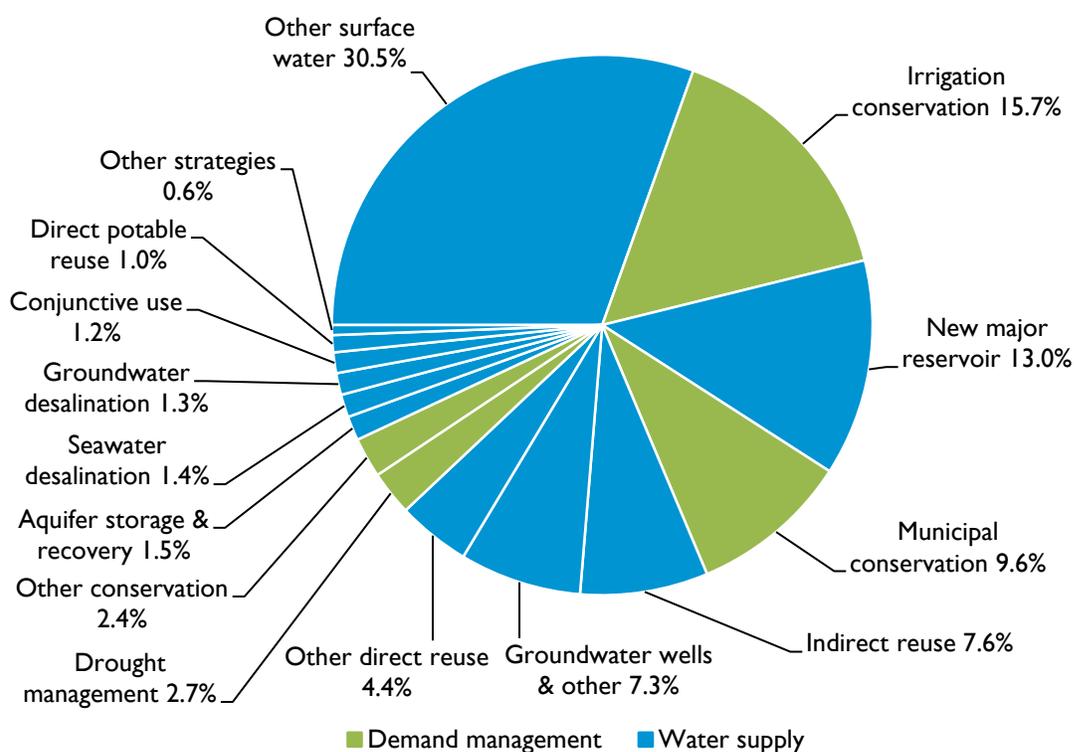
Technology is developing quickly to help customers better understand how they use water. Utilities with Advanced Metering Infrastructure (AMI) are able to develop customer dashboards to show customers when and how they use water. Other utilities are using customized customer water reports that summarize water use and compare households to similar ones providing motivation to improve efficiency. Flow sensors that can be added to irrigation systems and domestic lines are evolving fast. As new technology, web application tools and analytics become available, the WCAC will explore how these can be shared with utilities and, when there is enough firm information, develop them into best management practices guidance documents.

## *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, and regional water planners often identify public awareness and education as a key component of that strategy. Municipal water conservation as recommended in the 2017 State Water Plan accounts for approximately 10 percent of the state's recommended water management strategy supply volumes in 2070 (Figure 3) (TWDB, 2016).

In monitoring water conservation programs and public awareness efforts, the Council found that consistent messaging supported by research and data enhances the effectiveness of these activities. Research in Texas in 2004 and 2014<sup>11</sup> indicated that people are more likely to conserve water when they know the source of their water supply. That theme is an essential component of the current statewide water conservation public awareness brand, “Water IQ: Know Your Water”.

Nearly 100 entities have become Water IQ partners with the TWDB, but without legislative appropriations the program has not become a statewide effort. Due to the divergent geography and water sources in Texas, some water providers have dedicated resources to develop awareness campaigns specific to their needs. The TWDB and the Meadows Center for Water and the Environment are currently researching other statewide “umbrella” messages that can be tailored to meet the needs of local and regional water providers. The Council continues to believe that a statewide conservation message should be supported with state-level funding.



**Figure 3. Share of recommended water management strategies by strategy type in 2070 (TWDB, 2016)**

<sup>11</sup> Find the 2014 “Texas Statewide Water Conservation Survey” by Basalice & Associates and enviromedia at: <http://www.texaswater.org/wp-content/uploads/2014/09/Texas-Statewide-Water-Conservation-Survey.pdf>.

### *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.

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

The Council created the Blue Legacy Awards in 2010 to recognize members of the municipal, agricultural, and manufacturing water use sectors who have demonstrated a commitment to water conservation. Awards are presented at premier events to elevate the importance and awareness of water conservation related issues. More than thirty champions of water conservation have been celebrated for their efforts to date. Their success stories and photographs, as well as nomination packets, can be found on [www.savetexaswater.org](http://www.savetexaswater.org). The council plans to present the 2019 awards as part of Texas Water Day at the Capitol on March 13, 2019.

**Table 5. Blue Legacy Award nomination categories**

Agricultural ~ Non-Producer	Municipal ~ population <10,000
Agricultural ~ Producer	Municipal ~ population 10,000 to 50,000
Manufacturing	Municipal ~ population 50,000 to 100,000
Municipal ~ River Authority or Regional Water District	Municipal ~ population 100,000 to 500,000
Municipal ~ Innovative Projects	Municipal ~ population >500,000



**Figure 3. Karen Guz, presiding officer of the council, presents three of the seven Blue Legacy Awards given out at Texas Water Day at the Capitol on March 26, 2017. Left to right: Texas Living Waters Project (municipal-innovative projects); Mr. Leon New of Texas A&M AgriLife (agricultural-non-producer); and New Braunfels Utilities (municipal-Retail or Wholesale Water Supplier).**

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

Evaluating the implementation of water conservation strategies in the regional and state water plans has been a challenge since the WCAC was created in 2007. An October 2012 rule change by the TWDB required the 2016 regional plans to provide information on conservation implementation. As noted by the Council in its 2016 report, however, with some exceptions (especially the plans for Regions C, H, and K), “the overview of conservation implementation found in most plans is minimal” and focused primarily on municipal conservation and not on other types of water use.

Fortunately, some progress has been made in meeting this challenge since the Council’s 2016 report. Legislative funding in 2015 allowed TWDB to fund a research project to quantify reductions in water demands from municipal water conservation strategies in the 2017 State Water Plan (which incorporates all 16 regional plans).

The Statewide Water Conservation Quantification Project, completed by Averitt & Associates in 2017, intensively engaged 170 water utilities representing more than 58 percent of the state’s total projected 2020 population. The surveyed utilities accounted for over three-fourths of the recommended 2020 municipal water conservation strategies for the regional and state plans. Based on interviews and data collection from those 170 utilities, the researchers found, among other key findings, that:

- nine out of 15 regional water planning areas surveyed are projected to exceed their 2020 supply volumes recommended to be achieved through municipal conservation

(note: this does not necessarily mean that each region will meet its municipal water demands overall nor does it mean that any region's municipal water supply demands will be met solely through conservation);

- Texas as a whole is projected to exceed the 2020 recommended supply volume from municipal conservation by over 95,000 acre-feet per year;
- however, whether the recommended supply volumes achieved through municipal conservation will be met in future decades varies, with the state falling slightly short of the goal beginning in 2050; and
- "one activity—an ordinance that permanently limits outdoor water to twice per week or less—is projected to save 112,223 acre-feet per year in 2020 by the 46 utilities that have adopted it."

Although the findings of the Statewide Water Conservation Quantification Project are encouraging – showing progress in municipal water conservation in many parts of Texas – they also indicate that conservation progress is not universal in the state. Indeed, not all municipal water use groups in each region are projected to meet their individual conservation goals even if their region as a whole may achieve its regional municipal conservation goal. Moreover, additional work is needed to assure the accuracy of estimates of the progress that is being made on municipal conservation. Finally, regional and state water planners and decision-makers could use more detailed estimates of projected progress on water conservation in other sectors of water use – such as agricultural, which remains the largest sector of water use in Texas.

*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*

While there are no statewide water conservation targets or goals set by state agencies, conservation goals are set by individual water utilities in their water conservation plans, which are required to include 5- and 10-year goals for total water use, residential water use and water loss, expressed in GCPD. The goals should be based upon historical volumes but the actual 5- and 10-year goals are determined by the utility and their individual circumstances. The TWDB recently posted online data from the conservation plan annual reports, including the goals in

their current conservation plan, as well as utility-reported water use and loss values.<sup>12</sup> Such information will allow the public to view recent usage and the goals of water utilities.

While not technically a goal or target, in cases where a municipal water user group (city or utility) faces a future water need, the regional water planning groups will generally develop water conservation strategies to meet a specific volume of the need. These strategy volumes, which are subsequently included in the state water plan, are sometimes viewed as targets for what the water user group will need to save in the future, although there has historically been little feedback from the strategy volumes to the utility's conservation plan goals and activities.

According to the 2017 State Water Plan, if all the recommended municipal conservation and reuse strategies were implemented in 2070, the projected statewide municipal average gallons per capita per day would decline from the currently projected 163 gallons per capita per day in 2020 (without recommended conservation or reuse strategies) to approximately 124 gallons per capita per day in 2070 (with recommended conservation and reuse strategies). While this reduction in daily per capita usage is important, total municipal water use between 2020 and 2070 will still increase by over 31 percent because of population growth. Thus, the interaction between the conservation water management strategies and the conservation plan targets and activities of water providers in the state is crucial and should require regular reevaluation and review.

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<sup>12</sup> TWDB Water Conservation Report data available at:  
<http://www2.twdb.texas.gov/apps/wcreps/wcreports.aspx>.

# 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>13</sup>.

## *1. Enhanced data collection, management, and accessibility*

In order to evaluate meaningful trends in water use and the effectiveness of conservation programs and strategies, targeted water use data must be collected and readily available to state, regional and local water use planners. While more data is always better, a consistent baseline is essential for monitoring long-term trends.

As discussed previously in Charge 1, the lack of quality data hampers efforts to monitor trends in implementation of water conserving activities. While the TWDB collects data to assist with water planning, resource management, and education, often the data needed to assess progress in water conservation simply does not exist.

For example, the agricultural sector is the highest water use sector in the state; however, the last detailed Statewide Survey of Irrigated Acreage, Water Use, and Irrigation System by Type was conducted in 2001 by the Texas State Soil and Water Conservation Board and the Texas Water Development Board in collaboration with the U.S. Department of Agriculture – Natural Resources Conservation Service (TWDB, 2001). The survey was extremely resource-intensive and relied heavily on the involvement of county-level USDA personnel across the state. Because of a reallocation of priorities and resources, this survey is no longer feasible.

Enhanced data collection efforts, such as surveys of irrigation efficiency, implementation of remote sensing capabilities, delineation of irrigated field polygons, and adoption of metering

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<sup>13</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.

and other water use monitoring technologies, would provide a better understanding of agricultural water use and conservation efforts in the state.

Another area of data collection in need of enhancement is the systemic quantification of the percent of water used that is returned as wastewater. This will enhance the ability to analyze how much water is available for reuse and will enhance the ability to determine consumptive vs. non-consumptive uses of water in the municipal sectors.

One new area of data analysis is the benchmarking of commercial and institutional water use throughout the United States, as shown in Table 6. These efforts are at the foundational stage in Texas. Since a third of municipal uses is for these two sectors, benchmarking commercial and institutional use by user type will greatly enhance the ability of municipal water conservation programs to effectively target these areas and develop meaningful metrics.

Also vital to TWDB’s mission is the dissemination of these datasets. Ensuring that up-to-date and accurate information is collected, managed, and made available online to the public allows for enhanced analyses and can help direct future water conservation efforts. The TWDB has made a concerted effort to make data available in a timely manner to assist water planners. It is important that the agency continue to receive support to prioritize these activities.

**Table 6. Examples of Commercial & Institutional Benchmarks**

Type of Facility	Units of Water	Measures
Schools	Gallons, CCF*	FTE <sup>†</sup> students + faculty and staff, square feet
Hotels	Gallons, CCF	Rooms, occupied rooms, number of guests, employees, square feet
Hospitals	Gallons, CCF	Beds, occupied beds, discharges, patient days, square feet, inpatient days plus outpatient visit divided by outpatient average hours of stay, square feet, doctors and staff
Restaurants	Gallons, CCF	Meals, covers (tabs), employees, seats, square feet
Office Buildings	Gallons, CCF	Employees, square feet
Golf Courses	Gallons, CCF, acre feet <sup>‡</sup>	Acres, square feet, number of holes

\* CCF = 100 ft.<sup>3</sup>; †FTE = Full-Time Employee; ‡ 1 Acre Foot = 43,560 ft<sup>3</sup> (325,851 gallons)

**The Council recommends that, subject to available state revenue for the 2020-2021 biennium, the Texas Legislature increase appropriations to the TWDB to enhance existing data collection, management, and accessibility efforts and to ascertain what cities and water utilities need to do to begin collecting information discussed above.**

## *2. Funding a statewide water conservation public awareness program*

Discussion regarding the establishment of a statewide water conservation public awareness program has been taking place since 2004. In 2007, the Texas Legislature formalized the need for a public awareness campaign by adding it to Texas Water Code, which reads “The executive administrator shall develop and implement a statewide water conservation public awareness program to educate residents of this state about water conservation. The program shall take into account the differences in water conservation needs of various geographic regions of the state and shall be designed to complement and support existing local and regional water conservation programs.” (Texas Water Code §16.401)

The Legislative Budget Board (LBB) staff in the 2013 Government Effectiveness & Efficiency Report (GEER), suggested a \$6 million appropriation for the biennium for Water IQ as part of its recommendations to “Enhance State Participation in Municipal Water Conservation,” noting that the program could help lower water use by Texans<sup>14</sup> (Legislative Budget Board, 2013). The LBB staff calculated in 2013 that a reduction in water consumption of just one gallon per capita per day by all Texans could avoid \$407.2 million of the \$53.1 billion in capital costs that had been projected by the 2012 State Water Plan.

Various regional water planning groups have recommended funding for a water conservation program in their most recent (2016) water plans. The council believes that the rationale for state funding for a water conservation campaign is sound – a relatively small expenditure for conservation now will reduce water demands over time, decreasing the amount of infrastructure needed in the future and saving Texans money in coming years. Moreover, a statewide public awareness program will complement existing local and regional conservation efforts while carrying the conservation message to communities that do not have the financial resources for a program of their own.

Although there is a need to increase the public’s knowledge of water efficiency and its relationship in meeting current and future water demands, there were no funds specifically appropriated to the TWDB for the program in 2005 or in subsequent legislative sessions.

***The Council recommends that, subject to available state revenue for the 2020–2021 biennium, the Texas Legislature appropriate up to \$3 million per year to the TWDB to implement a statewide water conservation public awareness program as directed by the Texas Legislature in 2007 with the passage of Senate Bill 3 and House Bill 4.***

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<sup>14</sup> Water IQ was the conservation campaign created by a coalition of groups in 2004 in response to the recommendation from the Water Conservation Implementation Task Force.

### *3. Maintain funding for agricultural water conservation and research programs*

According to the Texas Water Resources Institute, voluntary adoption of new practices and technologies by agricultural producers resulted in a dramatic increase in statewide irrigation application efficiency: from about 60 percent efficient in 1970 to 88-95 percent today (Wagner, 2012).

Improvements in agricultural irrigation use efficiency in Texas have been achieved through effective research and education programs and the technical and financial assistance available to aid in their adoption. Despite these efforts, opportunities remain to further advance agricultural water use efficiencies and conservation

The 2017 State Water Plan projects that agricultural irrigation use will decline over the fifty-year planning horizon – due primarily to more efficient irrigation systems, reduced groundwater supplies, the economic difficulty of pumping water from increasingly greater depths, reduced availability due to drought and the transfer of water rights from agricultural to municipal uses. However, the irrigation needs identified in the plan far exceed those of any other water use sector for each decade of the planning horizon, thus highlighting the importance of increased irrigation efficiency in maintaining the economic viability of the agricultural sector.

To meet a portion of the identified irrigation needs, the regional planning groups recommended irrigation conservation strategies consisting of both on-farm practices, such as equipment upgrades that improve upon irrigation efficiency, and in-district improvements, such as lining canals to reduce conveyance losses. Other best management practices (e.g. brush control, residue management, cover crops) applied on agricultural land also help reduce evapotranspiration losses, and may increase the potential for beneficial water yields to downstream water supply reservoirs. Further research in improving crop genetics, drought tolerance, irrigation scheduling, soil management, and other such technologies may offer additional water savings.

Continued investments in research, educational outreach, technical assistance, and financial incentives are needed to ensure that the agricultural sector continues to thrive as producers and irrigation districts continue to adopt practices that result in significant water savings for the benefit of all Texans.

***The Council recommends that, subject to available state revenue for the 2020–2021 biennium, the Texas Legislature should maintain funding levels for agricultural water conservation research, education, training, conservation programs with best management practices that reduce evapotranspiration, and financial assistance programs focused on improving water use efficiency in agricultural irrigation.***

#### *4. Funding to enhance the accuracy and value of water loss audits*

Section 16.0121 of the Texas Water Code requires a retail public utility providing potable water to perform and file with the TWDB an audit computing the utility's system water loss during the preceding year. The audit must be completed and submitted annually by the utility if the utility receives financial assistance from TWDB or if the utility has more than 3,300 connections. All other utilities must conduct and file a water loss audit every five years.

Conducting a water loss audit requires a detailed understanding of the utility's system and knowledge of the terminology and tools available for analyzing results of the audit itself. An improperly conducted audit wastes time and resources and, most importantly, does not provide the utility with the information needed to adequately track water loss or identify issues that require immediate action.

In 2017, the Texas Legislature adopted a requirement, based on a previous recommendation by the Council, that water loss audits be conducted by persons trained to conduct those audits and the TWDB provide that training without charge. The TWDB has adopted rules to implement this requirement and is currently providing this training.

The Council believes, however, that additional efforts are needed to help assure the accuracy of water loss audits and to enhance their value to water utilities in informing decisions about meeting water demands in a cost-effective manner. These utilities, especially smaller utilities with limited resources, would benefit from technical assistance from TWDB staff in the design and conduct of water loss audits. Additional staff would be able to provide utilities with a consistent approach to auditing their systems and controlling their water loss, guide the TWDB and utilities toward industry recommendations for water loss auditing and control, and improve water loss volume data as utilities improve their data collection and reporting capabilities.

Also, professional organizations such as the American Water Works Association and the Water Research Foundation believe that the reliability of and accountability for water loss audits would be aided by third party validation of those audits. Indeed, three states (Georgia, California, and Hawaii) have adopted requirements for validation of water audits. The council believes that a

prudent approach in Texas would be to make funding available for competitive grants to allow a small number of Texas utilities to conduct pilot projects to validate their water loss audits. These pilot projects would provide an opportunity to assess the value of validation in enhancing the accuracy of water loss audits.

***The Council recommends that, subject to available state revenue for the 2020-2021 biennium, the Texas Legislature appropriate \$500,000 for the biennium to the TWDB for an expanded water loss program (including three additional FTEs) to assist water utilities in the design and conduct of water loss audits and another \$500,000 for the biennium to the TWDB for competitive grants for up to six utilities of varying sizes to conduct pilot projects for validation of their water loss audits.***

## *5. Restore funding for the Texas Ag Water Efficiency Education and Demonstration Project facility.*

From 2004 to 2015 the Texas Water Development Board's Agricultural Water Conservation Grants Program funded a project known as the Texas Project for Ag Water Efficiency<sup>15</sup>. This project demonstrated the various types of irrigation on farms in the Lower Rio Grande Valley to assist farmers in implementing conservation measures that would conserve water and maintain the economic viability of their farming practices. Out of these demonstrations, operations were converted to better irrigation practices both by the farmers and the districts.

A component of the project was the construction of a meter calibration and educational center for the demonstration, education, and research of agricultural water conservation measures, tools, and technologies. This million-dollar 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 utilized these facilities to educate personnel on the refinement of agricultural water measurement and delivery.

Efficient low-cost automated canal gates operated on solar or wind generator power were developed using this facility as were Supervisory Control and Data Acquisition (SCADA) systems for automated water delivery. Developments from this center have been adopted by several districts in the Lower Rio Grande Valley as well as the El Paso County Water Improvement District #1 and the Lower Colorado River Authority. Four of the Blue Legacy Awards for agriculture have been awarded to recipients related to this project.

During the active project period, the Harlingen Irrigation District hosted more than 20 workshops, seminars, and other such training events at the Rio Grande Center for Ag Water

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<sup>15</sup> More information available at: <https://texasawe.org/>

Efficiency. These educational opportunities allowed for water providers and agricultural producers to not only gain knowledge on developing technology and conservation strategies but also established a dialogue between the producers and water providers to further innovations.

As surface water irrigation is still the largest user of water in several areas of the state, this facility has the potential to play a significant role in the education, research and development of water conservation initiatives for irrigated agriculture. Despite initial investment, this facility is no longer being used to its full potential.

Restored funding will enable the maintenance, improvement, and expansion of the mechanical and technological components of the facility; which in turn, will allow for the growth of educational and research opportunities. As innovative water conservation technologies continue to evolve, the vision for the Rio Grande Center for Ag Water Efficiency is to use the facility as a hub to demonstrate the relationship between effective on-farm and district delivery systems and educate both agricultural producers and water providers on proven water conservation technologies that are available to modernize their operations.

***The Council recommends that, subject to available state revenue for the 2020-2021 biennium, the Texas Legislature fund this project for the education, research, and development of agricultural water conservation initiatives at \$150,000 to \$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.***

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