# 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

Karen Guz, Presiding Officer

December 1, 2018

# water conservation advisory council plus a star with a water drop as the point on top

December 1, 2018

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Rural Water Users

Donna Howe

Municipal Utility Districts

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 Water Conservation Advisory Council 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

# Executive Summary

In 2007, the 80th Texas Legislature created the Water Conservation Advisory Council to provide the resource of a select group of professionals with expertise in water conservation. The 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 general public*.

The Water Conservation Advisory Council combines a unique set of perspectives to provide a broad-reaching guide on water conservation in Texas, both where we have been, where we are, as well as where we still have to go to make improvements for the future.

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 water loss auditors to be trained in water loss auditing 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 members, their designated alternates, and numerous interested parties have contributed extensive time and effort to expand awareness of 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 guide, monitoring implementation of water conservation strategies by water users included in regional water plans, and presenting nine Blue Legacy Awards showcasing champions of water conservation in Texas. This sixth report to state leadership summarizes the council’s recent activities related to their seven statutory charges.

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

**1. Adoption of enforceable time-of-day limitations on outdoor watering**

The council recommends that the Texas Legislature require a political subdivision that provides retail public water service and applies to the TWDB for state financial assistance of more than $500,000 for a municipal water supply project to adopt enforceable time-of-day limitations on outdoor watering by its customers as part of an ongoing conservation program before the TWDB makes a financial commitment. This requirement does not apply to entities that are primarily wholesale water providers or nonprofit water supply corporations, and the requirement may be waived for financial assistance to meet an emergency need. The TWDB should adopt guidance to assist political subdivisions in developing and implementing this requirement.

**2. Enhanced data collection, management, and accessibility**

The council recommends that, subject to available state revenue for the 2018–2019 biennium, the Texas Legislature increase appropriations to the Texas Water Development Board to enhance existing data collection, management, and accessibility efforts.

**3. Funding the statewide water conservation public awareness program**

The council recommends that, subject to available state revenue for the 2018–2019 biennium, the Texas Legislature appropriate up to $3 million per year to the TWDB to implement 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.

**4. Maintain funding for agricultural water conservation programs**

The council recommends that, subject to available state revenue for the 2018–2019 biennium, the Texas Legislature maintain funding levels for agricultural water conservation education, training, and financial assistance programs focused on improving water use efficiency in agricultural irrigation.

**5. Prioritizing municipal conservation research in higher education**

The council recommends that the Texas Legislature explore ways to address the lack of research and coursework in all aspects of municipal water conservation.

# Legislative charges

## Introduction

The Water Conservation Advisory Council (WCAC) was established in 2007 via passage of Senate Bill 3 and House Bill 4 and given seven charges relating to progress on water conservation in Texas. Water conservation activities are expected to provide for 30 percent of new water needs by 2070.[[1]](#footnote-2) Successful demand management will be critical to meeting the needs of new Texans, with the population projected to increase by 70 percent in that time, growing to over 51 million people.

In 2007 the 80th Texas Legislature, via passage of Senate Bill 3 and House Bill 4, established the Water Conservation Advisory Council[[2]](#footnote-3). The legislature directed the council to report on progress made on water conservation in relation to seven specific charges. This is the sixth report to state leadership briefly addressing each charge and identifying key findings and recommendations to advance water conservation efforts in Texas.

## Charge 1. Monitor trends in water conservation implementation

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

### 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 pastures1.

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% of all harvested acres (or approximately 6.17 million acres) utilize irrigation to supplement rainfall. Of those acres, approximately 82% employee high-efficiency center-pivot irrigation systems and 6% have adopted advanced efficiency systems (such as drip tape or trickle systems). The remaining 12% 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.

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.

The last detailed statewide assessment of agricultural irrigation practices was conducted in 2001 and reported in TWDB *Report 347: Surveys of Irrigation in Texas*[[3]](#footnote-4). The Census of Agriculture’s *Farm and Ranch Irrigation Survey (2013)*[[4]](#footnote-5), currently the best source of information regarding trends in adoption of conservation practices, indicates significant progress by agricultural producers.

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” (2012, TWRI) notes that the statewide economic value directly derived from irrigated agriculture was $4.7 billion in 2007. This highlights the need to continue to pursue conservation technologies to sustain economic viability and food security.

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 ([Ogallalawater.org](http://www.ogallalawater.org/)). Project participants include personnel at Texas A&M, West Texas A&M, and Texas Tech Universities. The Texas collaborators will be concentrating on 1) integrating hydrologic, crop, economic, and climate models to produce candidate scenarios for effective conservation of groundwater; 2) developing improved methods of crop, soil, and water management, including irrigation scheduling and delivery technology, that maximize efficiency of water use; 3) identifying economic and policy factors that sustain profitable agricultural use of water; and 4) 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.

In additional, 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 feasible pass these costs along to farmers. It is equally difficult to assess true amount of water saved by such projects, even though it could be significant.

### Institutional and Commercial Water Conservation

Institutional users include schools, hospitals, and nursing homes, whereas commercial users include offices, restaurants, and retail stores. Monitoring trends in water use and conservation for these unique water use sectors is complicated. A recent analysis by Hoffman[[5]](#footnote-6) to isolate the commercial and institutional components of reported municipal water use found that 21 percent of the metered water was used by commercial entities and 4 percent went to institutional users. The study also noted that indoor per capita residential use was roughly equal to per capita use in the commercial and institutional sectors.

Determining a metric similar to the per capita water use associated with municipal use is difficult because it requires site-specific ‘population’ information that depends on the type of facility and may be proprietary in nature. For commercial facilities, ‘population’ could be based on square feet of heated space for an office building, the number of occupied guest rooms for a hotel, meals served for a restaurant, or beds in a hospital. Future efforts should focus on developing an appropriate metric that incorporates available site specific information with non-proprietary data that can be gathered from tax records or economic output reports.

### Manufacturing and Electric Power Generation Water Conservation

Texas ranks first in the nation in electric power production and second for manufacturing output. 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 Texas Water Development Board’s annual water use survey, and seek out opportunities to conserve water on a consistent basis. A recent analysis[[6]](#footnote-7) showed a dramatic reduction in water use per unit of output in manufacturing and an increase in water used per kilowatt of power generated. In fact, 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.

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.

Are We Meeting Future Conservation Needs? The Texas Water Development Board (TWDB) has taken several important steps during the past year to improve understanding of conservation progress and reporting. The Statewide Quantification Report was commissioned to determine whether water utilities are doing enough now to meet conservation targets in statewide plans and how much they will need to do in the future. The good news in the report is that the majority of respondents, 119 utilities, reported conservation activities that appear to meet current targets while 51 did not. While self-reported water savings from conservation activities are good news, there remains a concern that 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. TWDB has put out a competitive bid project to address this concern through a conservation savings estimation tool for utilities.

The Need for Quality Conservation Plans: Water utilities with over 3,300 connections are required to prepare and submit Conservation Plans to TWDB every five years with the next due date being May, 2019. These reports include information on per capita targets 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 to achieve these goals, this is not yet required by statute.

Conservation Best Practices Guide: Knowing that new Conservation Plans are due soon, the Municipal Workgroup of the WCAC has been working diligently to update the Municipal Best Management 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 efforts by the WCAC and TWDB staff encouraging utilities to engage in quality analysis, stakeholder input and thoughtful consideration of conservation goals as their plans must be approved at the local level before submission.

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 Water Use Survey, Water Loss Audit and Annual Conservation Reports are rich with data that provide insights on how each utility functions and plans to become more water efficient over time. While all of these are public documents, they are not readily accessible to Texans who might want to review how their utility is planning for and managing conservation.

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. The percent of water utilities estimate they have saved has more than doubled since 2013. While this is encouraging, the challenge of accuracy of savings estimates remains a question. Reports submitted by municipal water providers document water conservation progress. The average total water use per capita and residential use per capita have dropped in the past five years. While these numbers are encouraging, they do not tell the entire story. Weather patterns, water use restrictions, and economics impact water use. Conservation efforts vary greatly across the state complicating trend assessment.

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. The data compiled from the past five years of annual water conservation reports are shown in tables 1 and 2.

Table 1. Water conservation annual report data

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

\*gpcd = gallons per capita daily; †based on 2014 conservation plans; ‡NA = not applicable

Table 2. Water conservation annual report activities

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 2013 | 2014 | 2015 | 2016 | 2017 |
| Meters replaced | 326,305 | 364,875 | 359,957 |  | \* |
| Leaks repaired | 96,991 | 140,976 | 110,387 |  |  |
| Education programs | 308 | 266 | 297 |  |  |
| Drought plans activated | 164 | 179 | 118 |  |  |

Trends in Water Use Categories: An annual Water Use Survey is submitted to the TWDB by utilities with over 3,300 connections. A biennial report, Water Use of Texas, provides some insights regarding total urban water use trends and use by the sectors of single family, commercial, industrial, multi-family, institutional, agricultural and other. While 311 of the 350 utilities reporting were able to report by at least one category, it is unlikely that most have billing or data systems that allow them to refine their results exactly as TWDB defines the categories. For example, multi-family accounts are often categorized as “commercial” for billing purposes and therefore consumption by this category is likely under-represented in the analysis. Because single-family accounts often have their own billing category, the reported 47% of total use by this sector is likely 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 Texas Commission on Environmental Quality and the Texas Water Development Board, in consultation with the Water Conservation Advisory Council, allows for comparisons of water use among municipalities and water utilities. The forthcoming biennial report to the legislature titled *Water Use of Texas Water Utilities*[[7]](#footnote-8) provides a detailed analysis.

### Outdoor Watering Restraint A Key Conversation: The updated Water by the Yard report by Texas Living Waters and the Water Use Quantification Report both highlight the need for focus on outdoor water usage. The amount of total municipal water used on outdoor landscapes varies greatly with analyses suggesting 30-50% of municipal water used for landscape irrigation across Texas. Water By the Yard suggests that by limiting outdoor watering to no more than twice per week, Texas could reduce 11% of total municipal water demands. The Water Use Quantification similarly highlights mandatory limits on outdoor irrigation as a key municipal water strategy for the future. A new Municipal Best Practice document suggests local limits on outdoor irrigation combined with landscape education and incentives.

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 AWWA Water Loss Committee to assess national research projects and to initiatives in other states with similar concerns. These discussions led to the desire to promote Data Validity projects that will help utilities ensure that they are drawing accurate conclusions from water loss audit reports.

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. Wholesale water providers face the challenge of making progress in conservation without having direct retail customers. As a result, many wholesale water providers have recently initiated or expanded conservation efforts focused on general public outreach with the use of dedicated advertising campaigns, websites, social media, and newsletters. Wholesale water providers are also increasingly developing programs and materials that directly support and assist their wholesale customers’ conservation program efforts. Support for wholesale customers from the provider can vary based on the dedicated resources and needs of the customer. Wholesale water providers and customers across the state are working together to provide a variety of resources and programs including model conservation plans, regional conservation conferences, workshops, rebate programs, outreach materials, bulk purchasing opportunities, and technical assistance.

## 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 Practice documents have been proposed and are nearing final adoption. These include: \_\_\_\_(list). Other Best Practice documents have been updated to ensure that they include the most recent information. The Public Outreach & Education BMP has been updated to include information on how to use social media, web education and other forms of electronic outreach. The Water Loss Audit is being updated to reflect the newest thinking on Level One Data Validation that ensures the right conclusions are being made from audits.

Technology is developing quickly to help customers better understand how they use water. Utilities with Automatic Meter Integration 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, app 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 practice 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% of the state’s recommended water management strategy supply volumes in 2070. (Figure 1).

Figure 1. Share of recommended water management strategies by strategy type in 2070 (TWDB 2017)

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[[8]](#footnote-9) 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 statewide water conservation public awareness program, “Water IQ: Know Your Water”, which was established by the Texas Legislature in 2007 with the enactment of Senate Bill 3 and House Bill 4.

Since passage of that legislation, however, in the absence of direct legislative appropriations to the Texas Water Development Board for implementation of Water IQ, this public awareness program has not been a statewide effort. Some local and regional water utilities, political subdivisions, and nonprofit groups – for example, North Texas Municipal Water District – have adopted Water IQ as their water conservation outreach program. Currently almost 100 entities are Water IQ partners, and others may join this effort by signing up at www.WaterIQ.org. Some private funds have been raised and spent in cooperation with the Texas Association of Broadcasters to spread Water IQ messages, but the reach of these efforts is limited by geography and available funding. The council’s review indicates that Water IQ will reach its potential for advancing water conservation only if it becomes truly statewide in scope and is supported by state-level funding, and the council has prepared a recommendation in that regard.

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

There are two on-line resources the Council has continued to develop. One is the Conservation Best Practices Guide (available at…\_). The Council has also been steadily developing content available through savetexaswater.org. This site has become a location not just to list Council meeting agendas and notes, but also a place to access resource documents have been created by Council workgroups as well as case studies and resource documents referenced in Best Practice Guides.

## 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 an incomparable 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 savetexaswater.org. The council plans to present the 2017 awards as part of Texas Water Day at the Capitol on March 22, 2017.



Figure 2. C.E. Williams, former presiding officer of the council, presents three of the nine Blue Legacy Awards given out at Texas Water Day at the Capitol on March 26, 2017.20172017. Left to right: Mrs. Janet Adams of Fort Davis Water Supply Corporation (municipal); Dr. Shad Nelson of Texas A&M-Kingsville (agricultural); and Mr. Nick McFarland of Cargill Meat Solutions (manufacturing).

Table 3. 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 |
| **\****first awarded in 2015* | Municipal ~ population >500,000 |

*Charge 6. Monitor the implementation of water conservation strategies by water users included in regional water plans DRAFT (6/19/18)*

Evaluating the implementation of water conservation strategies in the regional and state water plans has been a challenge over the years since the Water Conservation Advisory Council was created in 2007. An October 2012 rule change by the Texas Water Development Board 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. As a result of a state legislative appropriation and directive in 2015 the Texas Water Development Board was able 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). That study, conducted under contract by Averitt & Associates, was completed in 2017. The findings of the study are found in the Statewide Water Conservation Quantification Project State Report – 2017, available on the Texas Water Development Board website. An appendix of the State Report includes a report for each of 15 (out of the 16) water planning regions that provides specifics on the respective region’s progress in meeting the water conservation goals in its water plan.

The Executive Summary of the State Report provides a helpful overview of the project design, key findings, and observations by the researchers, as well as recommendations for developing “a process to standardize and improve bottom-up…conservation savings estimates,” including “a common data collection and reporting system…” This initiative is a possible future task for the Water Conservation Advisory Council, working in cooperation with the Texas Water Development Board and regional water planning groups.

The Project completed in 2017 intensively engaged 170 water utilities representing more than 58 percent of the state’s total projected 2020 population and accounting for over three-fourths of the recommended 2020 municipal water conservation goals 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 moving forward 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 appears to be 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

As proposed by the Water Conservation Implementation Task Force in its 2004 report to the legislature[[9]](#footnote-10), targets and goals established by an entity should consider a minimum annual reduction of one percent in total gallons per capita per day (gpcd), based upon a five-year rolling average, until such time as the entity achieves a total gpcd of 140 or less. The task force also proposed a statewide goal of 140 gallons per capita per day. Total gpcd equals the total amount of water diverted or pumped by a water service provider (i.e., utility) for potable use divided by total population served.

It is important to note that the selection of the goal of 140 gallons per capita per day was a compromise and that a more aggressive but achievable goal (if adopted) would save Texas even more water. In fact, 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)[[10]](#footnote-11). 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, GCPD goals require vigilance and reevaluation.

The report by the task force includes the directive to revisit these targets and goals “as data become available to set more meaningful stretch goals and targets.” The council continues to monitor target and goal guidelines in consultation with the Texas Commission on Environmental Quality and the 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 eight 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.[[11]](#footnote-12)

## 1. Adoption of enforceable time-of-day limitations on outdoor watering

Outdoor water use, particularly lawn watering, accounts for almost one third of annual residential water use in Texas and can represent a much higher percentage during our hot, dry summers. Municipal water use during the summer months in Texas in many areas is as much as 50% to 100% higher than in the winter months, an increase usually driven by outdoor watering. Peak water demand, which may determine the sizing of water utility infrastructure, in most municipal utilities occurs during the summer. Shaving this peak demand through limitations on outdoor watering could help to avoid not only evaporative water loss and water waste but also the cost of building unnecessary water supply infrastructure.

Putting reasonable limitations on outdoor watering is not detrimental to most outdoor landscapes, especially those that are characterized by climate suitable or drought tolerant trees, plants, and grasses. Some studies show that homeowners have a tendency to overwater landscapes.

An increasing number of political subdivisions in Texas have limited outdoor watering on an ongoing basis (limitations may vary based on the time of the year) and have identified significant reductions in water use as a result. However, the *Texas Water Conservation Scorecard* report[[12]](#footnote-13) recently released by the Texas Living Waters Project found that only about a third of retail public water utilities in the state serving a population of 25,000 or more have any limitations on outdoor water use except during drought. One way to encourage more political subdivisions to adopt such practices would be to require them to have enforceable time-of-day and number of days per week watering limitations on outdoor watering in order to obtain state financial assistance for a water supply project.

***The council recommends that the Texas Legislature require a political subdivision that provides retail public water service and applies to the TWDB for state financial assistance of more than $500,000 for a municipal water supply project to adopt enforceable time-of-day and two days per week limitations on outdoor watering by its customers as part of an ongoing conservation program before the TWDB makes a financial commitment. This requirement should not apply to entities that are primarily wholesale water providers or nonprofit water supply corporations, and the requirement may be waived for financial assistance to meet an emergency need. The TWDB should adopt guidance to assist political subdivisions in developing and implementing this requirement.***

*Minority Report for recommendation 4 submitted by Mr. Aubrey Spear, council member representing regional water planning groups.*

The climate under which Texas water systems must operate varies widely from Houston to El Paso. Houston receives more than six times as much rainfall each year than El Paso does. In addition, the evaporation rates in Houston are much lower than El Paso. As a result of these extreme variations in the state, each political subdivision should be allowed to make water conservation decisions that are appropriate for their area without interference from the state legislature. Accordingly, a water utility that does not enact mandatory time-of-day irrigation restrictions should not be kept from applying for funding through the TWDB to assist them in addressing their unique water system needs. For example, a water utility in east Texas may have aging infrastructure that they need financial assistance for to reduce significant system water loss. Their system water loss may be much greater than water losses due to irrigation evaporation even if they do not have mandatory time-of-day watering restrictions. Conversely, a water utility in west Texas will have irrigation evaporation that is more than two times greater than a utility in east Texas. Therefore, the legislature may want to encourage but not mandate time-of-day water restrictions in order to leave funding opportunities open to all public water systems with respect to their unique water system needs.

## 2. Enhanced data collection, management, and accessibility

As discussed previously in this report under Charge 1, the lack of quality data hampers efforts to monitor trends in implementation of water conserving activities. Often the data needed to assess progress simply does not exist. For example, the last statewide survey of irrigated acreage, water use, and irrigation system by type, conducted cooperatively by the Natural Resources Conservation Service, the Texas State Soil and Water Conservation Board, and the Texas Water Development Board, was published in 2001[[13]](#footnote-14).

The Texas Water Development Board collects data to assist with water planning, resource management, and educating Texans of all ages about water. Also vital to the agency’s mission is the dissemination of these data[[14]](#footnote-15). Ensuring 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.

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

***See example of CI benchmarks at end of this document.***

Another area of data collection that needs enhancement is the systematic 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.

***The council recommends that, subject to available state revenue for the 2018–2019 biennium, the Texas Legislature increase appropriations to the TWDB to enhance existing data collection, management, and accessibility efforts.***

## 3. Funding the statewide water conservation public awareness program

Establishment and funding of a statewide water conservation public awareness program was a consensus recommendation of the Water Conservation Implementation Task Force (a diverse stakeholder group) established for the 2004-2005 biennium by passage of Senate Bill 1094. The program, known as Water IQ, was established by the Texas Legislature without opposition in 2007 Recognizing the need to increase the public’s knowledge of water efficiency and its relationship in meeting current and future water demands, there have been no funds specifically appropriated to the Texas Water Development Board for the program then or in subsequent legislative sessions.

The Legislative Budget Board (LBB) staff in the 2013 Government Effectiveness & Efficiency Report (GEER)[[15]](#footnote-16) 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. The LBB staff calculated at the time 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 the program in their most recent (2016) water plans. The council believes that the rationale for state funding for Water IQ 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.

***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 the statewide water conservation public awareness program that was created by the Legislature in 2007 with the passage of Senate Bill 3 and House Bill 4.***

## 4. Maintain funding for agricultural water conservation and research programs – Updated 6-20-18

According to the Texas Water Resources Institute[[16]](#footnote-17), 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.

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 in 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 BMPs (e.g. brush control, residue management, cover crops) applied on agricultural land also help reduce evapotranspiration losses, which increase the potential for beneficial water yields to downstream water supply reservoirs. Further research in improving crop drought tolerance, irrigation scheduling, soil management, and other such technologies may offer additional water use 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 BMPs that reduce evapo-transpiration, and financial assistance programs focused on improving water use efficiency in agricultural irrigation.***

## 5. Prioritizing municipal conservation research in higher education

The 2017 State Water Plan shows water use increasing along with population over the fifty-year planning horizon. Municipal demands, which include indoor residential, landscape irrigation, commercial, and institutional water use, plus water lost due to leaks, are projected to grow by the greatest total volume, from 5.2 million acre-feet per year in 2020 to 8.4 million in 2070[[17]](#footnote-18).

An informal survey by the council of public universities in Texas revealed the following: few courses exist exploring how water is used in this growing sector; and academic research investigating or developing technologies focused on the technical, economic, and sociological aspects of municipal water use efficiency is sparse.

This could lead to a shortage of professionals trained in commercial and institutional water use and associated equipment; the analysis of air conditioning and industrial cooling systems that use less water and less energy; the use of alternate on-site sources of water; and the design and development of innovative, water efficient equipment. Public universities in Texas have a tremendous opportunity to address these concerns through research, classroom instruction, and service learning projects.

**The council recommends that the Texas Legislature explore ways to address the lack of research and coursework in all aspects of municipal water conservation, especially in historically under studied areas including indoor use by residential users, and all aspects of commercial and institutional use.**

***Examples of Benchmarks***

|  |  |  |
| --- | --- | --- |
| **Type of Facility** | **Units of Water** | **Denominator** |
| **Schools** | Gallons, CCF | Full time equivalent students, FTE 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 | Acres, square feet, number of holes |

# References

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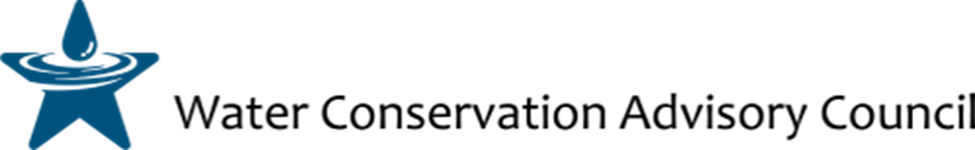
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2. [www.statutes.legis.state.tx.us/Docs/WA/htm/WA.10.htm](http://www.statutes.legis.state.tx.us/Docs/WA/htm/WA.10.htm) [↑](#footnote-ref-3)
3. Report 347 can be found at [www.twdb.texas.gov](http://www.twdb.texas.gov). [↑](#footnote-ref-4)
4. USDA - National Agricultural Statistics Service *Farm and Ranch Irrigation Survey (2013)* online at [www.agcensus.usda.gov/Publications/2012](https://www.agcensus.usda.gov/Publications/2012/). [↑](#footnote-ref-5)
5. The full analysis by Hoffman can be found on [savetexaswater.org](http://www.savetexaswater.org/) under ‘Resources’. [↑](#footnote-ref-6)
6. Find Hoffman’s examination of water use trends on [savetexaswater.org](http://www.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 [www.twdb.texas.gov](http://www.twdb.texas.gov/). [↑](#footnote-ref-7)
7. In 2011, the 82nd Texas Legislature passed Senate Bill 181 to address the calculation and reporting of water usage by municipalities and water utilities for state water planning and other purposes. Through amendments to Chapter 16 of the Texas Water Code, this legislation established a consistent method for reporting water use data and to improve conservation reporting procedures. The next biennial report is due to the legislature on January 1, 20192017. [↑](#footnote-ref-8)
8. Find the 2014 “Texas Statewide Water Conservation Survey” by Baselice & Associates and enviromedia at [texaswater.org](http://www.texaswater.org/) or on the council’s resources webpage. [↑](#footnote-ref-9)
9. Online at [www.savetexaswater.org/about/doc/WCITF\_Report\_2004.pdf](http://www.savetexaswater.org/about/doc/WCITF_Report_2004.pdf). [↑](#footnote-ref-10)
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11. At the October 25, 2016, council meeting, two decisions were not reached by consensus requiring a formal vote. On recommendation 4, two members voted against including the recommendation in the report (Mr. Aubrey Spear, regional water planning groups, and Ms. C.J. Tredway, mining and recovery of minerals); two people were present but abstained from voting (Mr. Dustan Compton, water control and improvement districts, and Dr. Robert Mace, Texas Water Development Board); and three members were absent (Ms. Celia Eaves, rural water users, Mr. Charlie Moehlenbrock, Texas Commission on Environmental Quality, and Mr. Gary Spicer, electric generation). On the motion to publish this report in its substantially final form, three people were present but abstained from voting (Mr. Dustan Compton, Ms. C.J. Tredway, and Dr. Robert Mace) and three members were absent (listed above). [↑](#footnote-ref-12)
12. [www.texaswaterconservationscorecard.org](http://www.texaswaterconservationscorecard.org/) [↑](#footnote-ref-13)
13. TWDB Report 347, [www.twdb.texas.gov/publications/reports/numbered\_reports](http://www.twdb.texas.gov/publications/reports/numbered_reports/index.asp) [↑](#footnote-ref-14)
14. See for example Water Data Interactive at [www.twdb.texas.gov/mapping](http://www.twdb.texas.gov/mapping/index.asp). [↑](#footnote-ref-15)
15. *Texas State Government Effectiveness and Efficiency Report, Selected Issues and Recommendations*, January 2013, p.321, online at [www.lbb.state.tx.us/publications.aspx](http://www.lbb.state.tx.us/publications.aspx). [↑](#footnote-ref-16)
16. *Status and Trends of Irrigated Agriculture in Texas* can be found online at [twri.tamu.edu/publications/educational-materials/2012/em-115/](http://twri.tamu.edu/publications/educational-materials/2012/em-115/). [↑](#footnote-ref-17)
17. Water for Texas—2017 State Water Plan: pre-publication version, available online at [www.twdb.texas.gov/waterplanning/swp/2017/.](http://www.twdb.texas.gov/waterplanning/swp/2017/index.asp) [↑](#footnote-ref-18)