

Progress Made in Water Conservation in Texas

Report and Recommendations to the 85th Texas Legislature

Submitted by the

Water Conservation Advisory Council

www.savetexaswater.org

Karen Guz, Presiding Officer

December 1, 2016



Water Conservation Advisory Council

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Rural Water Users

Donna Howe
Municipal Utility Districts

December 1, 2016

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 fifth 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.

The council would like to extend our sincere appreciation to Mr. C.E. Williams, who served as the presiding officer of the council for almost ten years and who exemplifies what it means to selflessly serve Texas.

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 Jim Keffer
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.

Water conservation is critical to ensuring all Texans have an adequate water supply today and into the future. The Water Conservation Advisory Council provides a unique service to all those committed to the shared responsibility of ensuring efficient use of our most precious resource.

Since the last report to the legislature, council members, their designated alternates, and numerous interested parties have contributed extensive time and effort to expand awareness of the importance of wise 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 fifth report to state leadership summarizes the council's recent activities related to their seven statutory charges.

In addition, as directed by Senate Bill 551 passed by the 84th Texas Legislature in 2015, this report contains "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, 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. Designation of a water conservation coordinator

The council recommends that the state require a retail public utility that provides potable water service to 3,300 or more connections to designate an employee as the water conservation coordinator responsible for implementing the water conservation plan.

2. Enhanced water loss audit training

The council recommends that the state require water audit reports that are already required to be prepared and submitted annually be completed by a person trained in water loss auditing. The council further recommends that the Texas Water Development Board (TWDB) adopt rules to specify training options.

3. Addition of a non-voting member to regional water planning groups

The council recommends that the Texas Legislature consider including a staff member of the Texas State Soil and Water Conservation Board, designated by its Executive Director, as a required non-voting member of each regional water planning group.

4. 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.

5. 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.

6. 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.

7. 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.

8. 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

Water conservation activities are expected to provide for 30 percent of new water needs by 2070.¹ 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 Council². The legislature directed the council to report on progress made on water conservation in relation to seven specific charges. This is the fifth 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

Agricultural Water Conservation

According to the 2012 *Census of Agriculture*³, Texas ranks fourth in the nation in number of acres irrigated and fifth in irrigation water applied. Because irrigation is so critical to Texas' food and fiber production and the state's agricultural sector, producers are deliberately working to conserve water. Planting decisions reflect both water availability and fluctuations in global commodity markets. Effective precipitation or lack thereof impacts the actual applied volume of irrigation water prior to planting and during the growing season.

Statewide, irrigation water use hovers around 9 million acre-feet per year and has been close to that number since the 1970s, but agricultural production has increased steadily due to improvements in irrigation efficiency and crop genetics. Agricultural producers continue to voluntarily adopt best management practices to improve irrigation efficiency; however, the data needed to fully assess and quantify the extent of this trend is not 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*⁴. The *Census of Agriculture's Farm*

¹ Water for Texas—2017 State Water Plan: pre-publication version, available online at www.twdb.texas.gov/waterplanning/swp/2017/.

² www.statutes.legis.state.tx.us/Docs/WA/htm/WA.10.htm

³ USDA - National Agricultural Statistics Service *2012 Census of Agriculture* online at www.agcensus.usda.gov/Publications/2012.

⁴ Report 347 can be found at www.twdb.texas.gov.

*and Ranch Irrigation Survey (2013)*⁵, currently the best source of information regarding trends in adoption of conservation practices, indicates significant progress by agricultural producers.

- Adoption of center pivot sprinklers continues to increase with over 82 percent of surveyed acres using this technology versus 78 percent in 2008.
- Adoption of drip, trickle, and other efficient irrigation systems doubled between 2008 and 2013 and now comprises 6 percent of surveyed acres.
- Use of less efficient flood and furrow irrigation continues to decline and comprised only 12 percent of the total acres surveyed, down from 19 percent in 2008.

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 Hoffman⁶ 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

⁵ USDA - National Agricultural Statistics Service *Farm and Ranch Irrigation Survey (2013)* online at www.agcensus.usda.gov/Publications/2012.

⁶ The full analysis by Hoffman can be found on savetexaswater.org under 'Resources'.

Progress Made in Water Conservation in Texas

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 analysis⁷ 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

Reports submitted by municipal water providers document water conservation progress. The average total water use per capita and residential use per capita have dropped significantly in the past five years. While these numbers are encouraging, they do not tell the entire story. Weather patterns, water use restrictions, and economics have impacted 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 2015, the most common activities from 447 submitted annual

⁷ Find Hoffman's examination of water use trends on 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.

Progress Made in Water Conservation in Texas

reports included meter replacement, leak repair, and customer education programs. 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 [†]	2010 average	2011 average	2012 average	2013 average	2014 average	2015 average
Total gpcd*	145	142	162	148	148	148	143
Residential gpcd	92	114	105	94	82	79	78
Water loss gpcd	17	18	19	21	20	20	18
Percent water loss	10	13	12	12	13	13	13
Percent water reused	NA [‡]	6	6	7	6	7	10
Percent water saved	NA [‡]	7	6	10	6	9	14

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

Table 2. Water conservation annual report activities

	2010	2011	2012	2013	2014	2015
Meters replaced	409,812	360,353	459,026	326,305	364,875	359,957
Leaks repaired	138,129	194,587	154,674	96,991	140,976	110,387
Education programs	227	354	301	308	266	297
Drought plans activated	47	230	168	164	179	118

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*⁸ provides a detailed analysis.

A recently completed study of water use within individual households provided encouragement for progress made in water conservation and insight regarding future conservation in the residential sector. The Water Research Foundation's *Residential End Uses of Water, Version 2*⁹

⁸ 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, 2017.

⁹ The electronic version of the Executive Report is available to the public at www.waterrf.org/4309.

Progress Made in Water Conservation in Texas

contains detailed survey response data, historic billing data, and other data obtained for each study site, including data from San Antonio Water System and Austin Water Utility, and reveals several trends. First, indoor household water use dropped 22 percent since 1999 with most of that resulting from a transition to more efficient water fixtures. Over time as older fixtures are replaced, indoor consumption should continue to drop. Significant water conservation gains are also expected as citizens become more aware of household leaks and more proactive about repair. Across all households, 12 percent of all water was lost due to preventable, unrepaired leaks. In fact, much of the water waste came from 32 percent of households (with leaks of up to 600 gallons per household per day). While the success of fixture standards and replacement programs is reason for celebration, the high rate of water loss from preventable leaks points to the need for continued water education for Texans.

Finally, the study looked at outdoor water usage and found high variability even among households that seemed similar. Theoretical landscape water budgets were calculated for all participating households and compared to actual use: 70 percent of households watered less than this theoretical amount. The study underscored the need to target outdoor conservation programs wisely. Large water savings can be accomplished by working with those households that water excessively.

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

Progress Made in Water Conservation in Texas

contains the most up-to-date best management practices. Recent efforts, coordinated through the council’s workgroups, include modernizing outdated practices and composing original documents to reflect recent technological advances in water conservation.

Updates in progress include irrigation scheduling using real-time soil moisture monitoring and evapotranspiration networks; technical assistance and outreach for wholesale water providers; system water audits and water loss control; waste water management; and cooling towers, boilers, and other thermodynamic operations. In addition, new best management practices are being drafted on wholesale conservation water rates; supervisory control and data acquisition systems; custom rebates for the industrial, commercial, and institutional sectors; and landscape irrigation design changes and efficiency retrofits.

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 is recommended in the 2017 State Water Plan to meet almost 10% of the state’s water demands by 2070 (Figure 1).

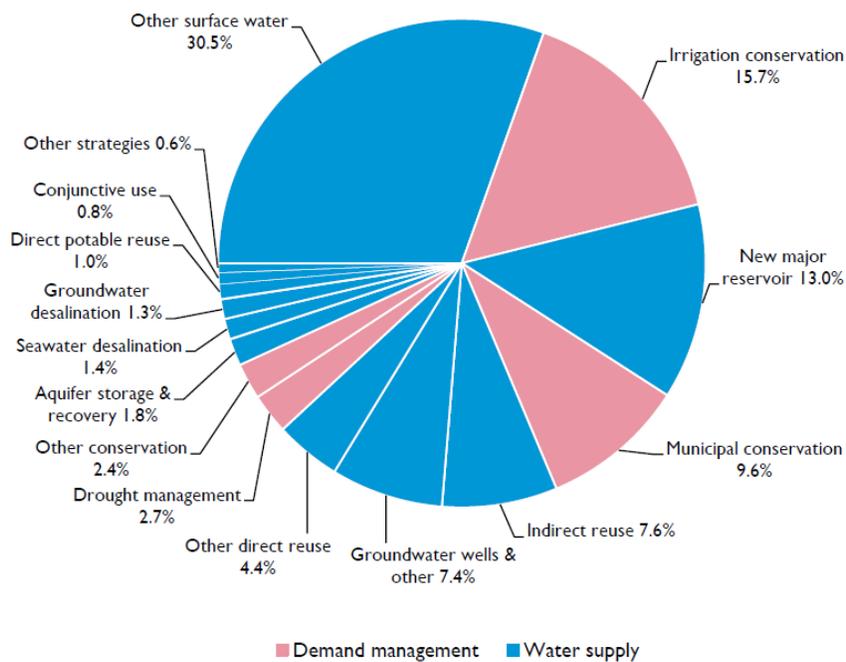


Figure 1. Share of recommended water management strategies by strategy type in 2070 (TWDB 2016)

Progress Made in Water Conservation in Texas

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 2014¹⁰ 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

The Council has partnered with the Alliance for Water Efficiency since 2008 to provide access to a national library of available water conservation resources including research, information, and tools. The Alliance for Water Efficiency is a stakeholder-based 501(c)(3) non-profit organization dedicated to the efficient and sustainable use of water.

In addition, council members representing various water use sectors and interest groups contribute additional resources that are posted on the council’s webpage (savetexaswater.org). Recently added resources include an in-depth analysis of the commercial and institutional portion of reported municipal water use; snapshots of water conservation and reuse efforts undertaken by rural systems and urban utilities; and a water conservation scorecard.

The council’s resource library will increasingly be a location where ideas on water efficiency, program evaluation papers, and reports on new technology can be shared. Pecan Street Inc.,

¹⁰ Find the 2014 “Texas Statewide Water Conservation Survey” by Baselice & Associates and enviromedia at texaswater.org or on the council’s resources webpage.

Progress Made in Water Conservation in Texas

part of the University Municipal Water Consortium, recently shared a paper on Automatic Meter Integration (AMI) and other real time consumption technologies that are rapidly advancing. Their review¹¹ of current AMI options raises important questions about how this technology can be implemented in ways that are cost effective and result in water conservation education for consumers.

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, 2015. 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

¹¹ Find the full paper on the council's [website](#) under Resources.

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

Based on the October 2012 rule change by the Texas Water Development Board¹², the council anticipated that the 2016 regional water plans would provide extensive information on the implementation of any water conservation strategies recommended for water user groups in the previous (2011) plans. However, a review by Kramer¹³ of a selected sample of the 2016 regional water plans indicates that the plans vary widely in the level of detail, comprehensiveness, and usefulness of their respective discussions of the implementation of water conservation strategies recommended in the 2011 plans, and most of the evaluation, with some exceptions, is of municipal conservation strategies rather than conservation strategies in other sectors of water use.

Indeed, the overview of conservation implementation found in most plans is minimal. The reasons most often cited for the paucity of information provided is inadequate budget to conduct a review of implementation and poor implementation survey response rates by water user groups and entities. Several regional plans, however, demonstrate a determined effort to gather and present information on conservation strategy implementation, with varying degrees of success. Among these are the 2016 plans for Regions C, H, and K. One common theme throughout most of the regional plans reviewed for this evaluation is that per capita water consumption in Texas is projected to continue to drop (although the 2011 base per capita use for the 2016 regional plans in some regions was higher than the base used for the 2011 plans), and this in part reflects implementation of passive and active conservation requirements and initiatives.

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 legislature¹⁴, 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

¹² Title 31, Part 10 of the Texas Administrative Code, Rule §357.45: Implementation and Comparison to Previous Regional Water Plan.

¹³ Find the detailed analysis by Kramer on the council's website (savetexaswater.org).

¹⁴ Online at www.savetexaswater.org/about/doc/WCITF_Report_2004.pdf.

Progress Made in Water Conservation in Texas

also proposed a statewide goal of 140 gallons per capita per day. Total gpcd equals the total amount of water diverted or pumped for potable use divided by total population.

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)¹⁵.

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.

¹⁵ Water for Texas—2017 State Water Plan: pre-publication version, available online at www.twdb.texas.gov/waterplanning/swp/2017/.

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.¹⁶

1. Designation of a water conservation coordinator

The State of Texas requires¹⁷ a retail public utility that provides potable water service to 3,300 or more connections to develop and implement a water conservation plan; however, without dedicated staff resources, a well-developed plan may never be implemented.

A designated water conservation coordinator could improve the ability of a water supplier to implement their plan and associated programs. For example, in 2009 the Lower Colorado River Authority modified its water conservation plan rules for municipal contract customers to include a requirement to designate a water conservation coordinator tasked with implementing the plan. Several water supply customers have since reported more aggressive implementation of water conservation programs thanks to their designated coordinator.

The council recommends that the state require a retail public utility that provides potable water service to 3,300 or more connections to designate an employee as the water conservation coordinator responsible for implementing the water conservation plan.

¹⁶ 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).

¹⁷ Texas Water Code §13.146, www.statutes.legis.state.tx.us/Docs/WA/htm/WA.13.htm#13.146

2. Enhanced water loss audit training

Section 16.0121 of the Texas Water Code¹⁸ requires a retail public utility providing potable water to perform and file with the Texas Water Development Board an audit computing the utility's system water loss during the preceding year. The audit must be completed annually unless the utility does not receive financial assistance from TWDB and does not provide service to more than 3,300 connections in which case an audit is due 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.

The council recommends that the state require water audit reports that are already required to be prepared and submitted annually be completed by a person trained in water loss auditing. The TWDB should adopt rules to specify training options.

3. Addition of a non-voting member to regional water planning groups

The Texas State Soil and Water Conservation Board serves as the lead state agency for the planning, management, and abatement of nonpoint source pollution resulting from agricultural and silvicultural activities; administers grant programs aimed at encouraging voluntary implementation of agricultural conservation practices; and functions to conserve the state's soil and water resources providing benefits to all Texans. Per 31 Texas Administrative Code §357.11(d-e)¹⁹, each regional water planning group includes voting members representing specific interest groups and non-voting members representing adjacent planning groups, certain entities with surface water rights, and a staff member from the Texas Water Development Board, the Texas Parks and Wildlife Department, and the Texas Department of Agriculture.

The council recommends that the Texas Legislature consider including a staff member of the Texas State Soil and Water Conservation Board, designated by its Executive Director, as a required non-voting member of each regional water planning group.

4. 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

¹⁸ www.statutes.legis.state.tx.us/Docs/WA/htm/WA.16.htm

¹⁹ Texas Administrative Code, www.sos.texas.gov/tac

Progress Made in Water Conservation in Texas

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* report²⁰ 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 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 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

²⁰ www.texaswaterconservationscorecard.org

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.

5. 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 2001²¹.

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 data²². 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.

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.

6. 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

²¹ TWDB Report 347, www.twdb.texas.gov/publications/reports/numbered_reports

²² See for example Water Data Interactive at www.twdb.texas.gov/mapping.

2007 but no funds were 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)²³ 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 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 Legislature in 2007 with the passage of Senate Bill 3 and House Bill 4.

7. Maintain funding for agricultural water conservation programs

According to the Texas Water Resources Institute²⁴, 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. Despite these efforts, opportunities for even more conservation remain.

Agricultural irrigation water conservation figures heavily in efforts by regional water planning groups to ensure Texas has adequate water supplies in the future. According to the 2017 State Water Plan, agricultural irrigation demand is expected to decrease during the fifty-year planning horizon as a result of on-farm practices such as equipment upgrades that improve irrigation efficiency and in-district projects like lining canals to reduce conveyance losses. In addition, agricultural irrigation represents the vast majority of unmet needs in each decade through 2070,

²³ *Texas State Government Effectiveness and Efficiency Report, Selected Issues and Recommendations*, January 2013, p.321, online at www.lbb.state.tx.us/publications.aspx.

²⁴ *Status and Trends of Irrigated Agriculture in Texas* can be found online at twri.tamu.edu/publications/educational-materials/2012/em-115/.

highlighting the importance of increased irrigation efficiency in maintaining the economic viability of the agricultural sector. Continued investments in 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 2018–2019 biennium, the Texas Legislature should maintain funding levels for agricultural water conservation education, training, and financial assistance programs focused on improving water use efficiency in agricultural irrigation.

8. 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 2070²⁵.

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.

²⁵ Water for Texas—2017 State Water Plan: pre-publication version, available online at www.twdb.texas.gov/waterplanning/swp/2017/.

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