

**DRAFT**



# **TWDB Statewide Municipal Water Conservation Quantification Project Report to the Plateau Regional Water Planning Group Region J • 2017**

## **1 Executive Summary**

In 2015, the Texas Legislature appropriated funds to the Texas Water Development Board (TWDB) for the purpose of funding a research project to measure and quantify the municipal water conservation efforts around the state. The project began in earnest in 2016 by recruiting utilities, collecting data, and conducting interviews in each of the 16 regional planning areas.

The project has two primary goals, the first of which is the focus of this report: 1) To assist regional planners and the TWDB to account for 358 acre-feet of water savings by the year 2070<sup>1</sup> by quantifying and measuring municipal conservation throughout the Plateau Regional Water Planning Group (PWPG), and 2) to provide individual utilities with detailed reports that will assist them to meet their own water conservation goals with the needs of the region in mind.

Pursuant to the first goal, the specific objectives of this Regional Report are as follows:

1. To assess, measure, and quantify the previous and ongoing conservation activities of participating utilities in the region;
2. Estimate the regional water savings from activities adopted by these utilities;
3. Provide regional planners with options on how to assist the region in meeting the water management strategy (WMS) supply volume for municipal water conservation set out in the regional water plan;
4. Address challenges to implementing these activities and to achieving water conservation for the individual utilities and in the region, generally; and
5. Provide state and local recommendations that will help the region achieve its goals.

### **1.1 Project Objectives**

The first objective required engagement with cities, municipal utility districts (MUDs), and other utilities to collect data, such as historical gallons per capita daily (GPCD) consumption figures, advanced metering infrastructure (AMI) specifications, and detailed feedback on each conservation activity being implemented. Personal interviews focused on determining when and to what extent these activities were being employed, as well as assessing plans to continue such conservation. Examples of frequently implemented activities include tiered water rate conservation pricing, strategic water rate increases, outdoor irrigation audits and ordinances, and rainwater harvesting.

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<sup>1</sup> This value is the recommended water management strategy supply volume for municipal water conservation. The decadal supply volumes for Region J are 357 acre-feet for 2020, 357 acre-feet for 2030, 357 acre-feet for 2040, 358 acre-feet for 2050, and 358 acre-feet for 2060.



Utilities were targeted for participation in the study using criteria supplied by the TWDB. Utilities that have a five-year water conservation plan on file with the agency and identify municipal conservation as a water management strategy (WMS) in their regional water plans within the first two decades of the planning period were invited to participate in this voluntary research project.

In Region J, no utilities met the criteria. In order to gain valuable insight about water conservation in Region J, we contacted Del Rio and Kerrville who agreed to participate and were included in our results.

These utilities represent 43.4 percent of the 2020 population of Region J and represent 74.5 percent of the 2020 WMS supply volume for municipal water conservation for the region.

Each of the participating utilities received a report on the results of its water conservation activities and water loss efforts. This report summarizes the savings from the individual utility reports within Region J.

Through staff interviews it was determined what conservation activities are currently in place or have been previously implemented. It is important to note that activities must be quantifiable to provide accurate water savings figures. Various methods were then used to quantify savings and project how future activities, if necessary, will provide cost effective conservation options for the utility to achieve its recommended WMS supply volumes.

Also, note that when comparing conservation and water loss efforts to the WMS supply volumes, only activities enacted or enhanced since 2011 were counted. Previous planning documents had already accounted for pre-2011 activities. When establishing 2011 as the base year for demands and WMS supply volumes for municipal conservation, state and regional water planners determined that the year 2011 represented the most current water use and conservation patterns.

## **1.2 Region J Plan**

The State Water Plan divides the state into 16 regions. Each region possesses its own environmental characteristics, demographics, and water supply concerns and develops its own water management strategies that can be used to meet the needs identified throughout the 50-year planning period.

Region J is a five county area that stretches from the Central Texas Hill Country westward to the Rio Grande River. It is a sparsely populated, arid, agricultural region. It is not a rapid growth area of Texas.

The Region J Plan states, "Water conservation is one of the most important components of water supply management. Recognizing its impact, setting realistic goals, and aggressively enforcing implementation may significantly extend the time when new supplies and associated infrastructure are needed." The plan calls for 358 acre-feet of savings to come from municipal water conservation annually by 2070. Water conservation activities and water loss mitigation efforts are combined in this region to arrive at this WMS supply volume for municipal water conservation.



### **1.3 Purpose of this Report**

This report provides Region J utilities and leaders with a high-level overview of where the region stands in meeting its recommended WMS supply volumes for water conservation. Equipped with this information, stakeholders can work together to shore up deficits in meeting the regional goals, form a plan for the future, and establish accountability. When individual utilities are on track, it leads to the region being on track.

## **2 Results**

The 2016 Plateau Region Water Plan recommends that Region J should achieve 358 acre-feet of savings annually to meet the 2070 WMS supply volume for municipal water conservation. The results of this study indicate that the two utilities surveyed in this region are on track to exceed their portion (266 acre-feet) by 1,610 acre-feet. The non-participating utilities in the region must achieve 92 acre-feet of supply volume by the end of the planning period.

The two utilities have implemented a variety of activities to accomplish the task. This report will highlight those activities and make recommendations to continue the effort.

Measuring water consumption in Gallons Per Capita Daily (GPCD) is a critical tool in water planning. However, it is well understood that this metric is not flawless. Relying solely on GPCD ignores variables that might distort the meaning of any particular GPCD value. This study isolates water savings that can be more confidently relied upon and thereby enhances our understanding of the savings that are contributing to decreases in GPCD. There is a section in each individual report called the “Disparity Table.” The table shows each utility how much of the change in their GPCD is due to quantifiable water conservation activities and water loss control efforts and how much results from other factors.

### **2.1 Conclusions and Next Steps**

Region J is anticipated to realize enough water savings to meet the recommended WMS supply volume for municipal water conservation through 2070 that is enumerated in the 2016 Regional Water Plan. These utilities were issued reports with suggestions on how to continue their success. These fruitful efforts should be continued as they can potentially replace other strategies that may prove difficult to accomplish or be too expensive.

### **2.2 An Evolving Reporting Process**

This report should not be considered a final report, but rather the next step for achieving the desired WMS supply volume for municipal water conservation. This report shows where Region J is towards meeting its municipal conservation WMS supply volumes. However, situations and circumstances change. It will be important for the work of measuring and quantifying water conservation activities to continue. Reviewed annually, this information could be a powerful tool for the utilities that are striving to maximize the value of their resources and water planners who must provide for the future.



### 3 Where Does Region J Stand in Meeting Its Municipal Conservation Supply Volumes?

Table 3-1 shows how the region is progressing towards meeting its 2070 future supply volume for the municipal water conservation WMS. The table is the sum of the supply volumes for the two participating utilities. These utilities make up 43.4 percent of the region's population and account for 74.5 percent of this water management strategy. The following is an explanation of the contents of Table 3-1:

Utility Population – The total current and projected population of the participating utilities. Unless otherwise provided by utility staff, these population estimates come from the regional water plan approved by the TWDB.

Conservation Activities Savings for Participating Utilities – The combined sum of the measured and quantified water savings that result from the various activities employed by the participating utilities.

Water Loss Reduction Savings (as of 2015) for Participating Utilities – The amount the participating utilities are realizing from their water loss mitigation efforts. This number is the difference between the utility's baseline<sup>2</sup> for water loss GPCD and its most recent water loss GPCD reported in the 2015 water loss audit on file with TWDB. Because this is a value derived from GPCD, it grows as the population grows. *See Section 5 "Limitations" for more detail.*

Total Savings from All Conservation Activity for Participating Utilities – The sum of the two columns: Conservation Activity Savings for Participating Utilities and Water Loss Reduction Savings (as of 2015) for Participating Utilities.

Conservation WMS Volume for Participating Utilities – The recommended municipal water conservation supply volume in acre-feet in the regional plan for decades ranging from 2020 to 2070. These values are the results from the participating utilities only.

Water Loss Reduction WMS Volume for Participating Utilities – Some regional water plans have a separate WMS supply volume in acre-feet for municipal water conservation and for water loss reduction for each decade. If any of the participating utilities have a separate WMS volume for water loss reduction, this column will have values other than zero.

Total Yearly WMS Volume for Participating Utilities – The sum of the future WMS supply volume for municipal water conservation and water loss reduction of the participating utilities.

Over (Short) – The amount that the participating utilities' total quantified savings for all current conservation activities (since 2011), including water loss reduction, is over or below the recommended total WMS supply volume for municipal water conservation in the regional water plan for those same utilities. If the amount falls below the WMS volume, it will appear in

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<sup>2</sup> In the absence of having a baseline figure provided by the TWDB or utility staff, the historic five-year average for water loss GPCD from the utility's most recently submitted five-year water conservation plan was used.



parentheses as "(Short)."

**Table 3-1. Total Savings of Utility Conservation Activities Compared to Conservation WMS Supply Volumes (in acre-feet).**

Year #	Year	Participating Utility Population	Conservation Activity Savings for Participating Utilities	Water Loss Reduction Savings (as of 2015) for Participating Utilities	Total Savings from All Conservation Activity for Participating Utilities	Conservation WMS Volume for Participating Utilities	Water Loss Reduction WMS Volume for Participating Utilities	Total Yearly WMS Volume for Participating Utilities	Over (Short)
0	2011	58,563	0	0	0	0	0	0	0
1	2012	58,701	11	0	11	13	16	30	(19)
2	2013	58,838	148	0	148	26	33	59	89
3	2014	58,976	148	0	148	40	49	89	60
4	2015	59,113	149	1,189	1,338	53	65	118	1,220
5	2016	59,571	149	1,204	1,353	66	82	148	1,205
6	2017	60,029	149	1,219	1,368	66	98	164	1,204
7	2018	60,486	149	1,234	1,384	79	114	194	1,190
8	2019	60,944	149	1,250	1,399	93	131	223	1,176
9	2020	61,402	150	1,265	1,414	119	147	266	1,148
10	2021	61,735	150	1,274	1,423	119	147	266	1,157
11	2022	62,068	150	1,283	1,433	119	147	266	1,167
12	2023	62,401	150	1,291	1,442	119	147	266	1,176
13	2024	62,734	151	1,300	1,451	119	147	266	1,185
14	2025	63,068	151	1,309	1,460	119	147	266	1,194
15	2026	63,401	151	1,318	1,469	119	147	266	1,203
16	2027	63,734	151	1,327	1,478	119	147	266	1,212
17	2028	64,067	152	1,336	1,488	119	147	266	1,222
18	2029	64,400	152	1,345	1,497	119	147	266	1,231
19	2030	64,733	152	1,354	1,506	119	147	266	1,240
20	2031	65,022	152	1,363	1,515	119	147	266	1,249
21	2032	65,311	152	1,372	1,524	119	147	266	1,258
22	2033	65,600	152	1,381	1,533	119	147	266	1,267
23	2034	65,889	152	1,390	1,543	119	147	266	1,277
24	2035	66,178	152	1,399	1,552	119	147	266	1,286
25	2036	66,467	153	1,408	1,561	119	147	266	1,295
26	2037	66,756	153	1,418	1,570	119	147	266	1,304
27	2038	67,045	153	1,427	1,579	119	147	266	1,313
28	2039	67,334	153	1,436	1,588	119	147	266	1,322
29	2040	67,623	153	1,445	1,598	119	147	266	1,332
30	2041	67,918	153	1,454	1,607	119	147	266	1,341
31	2042	68,213	153	1,463	1,617	119	147	266	1,351
32	2043	68,508	153	1,473	1,626	119	147	266	1,360
33	2044	68,803	154	1,482	1,636	119	147	266	1,370
34	2045	69,098	154	1,492	1,645	119	147	266	1,379
35	2046	69,393	154	1,501	1,655	119	147	266	1,389
36	2047	69,688	154	1,510	1,664	119	147	266	1,398
37	2048	69,983	154	1,520	1,674	119	147	266	1,408
38	2049	70,278	154	1,529	1,683	119	147	266	1,417
39	2050	70,573	155	1,538	1,693	119	147	266	1,427
40	2051	70,842	155	1,547	1,702	119	147	266	1,436
41	2052	71,110	155	1,557	1,712	119	147	266	1,446
42	2053	71,379	155	1,566	1,721	119	147	266	1,455
43	2054	71,648	155	1,575	1,730	119	147	266	1,464
44	2055	71,917	156	1,584	1,739	119	147	266	1,473
45	2056	72,185	156	1,593	1,749	119	147	266	1,483
46	2057	72,454	156	1,602	1,758	119	147	266	1,492
47	2058	72,723	156	1,611	1,767	119	147	266	1,501
48	2059	72,991	156	1,620	1,777	119	147	266	1,511
49	2060	73,260	157	1,629	1,786	119	147	266	1,520
50	2061	73,512	157	1,638	1,795	119	147	266	1,529
51	2062	73,764	157	1,647	1,804	119	147	266	1,538
52	2063	74,015	157	1,656	1,813	119	147	266	1,547
53	2064	74,267	157	1,665	1,822	119	147	266	1,556
54	2065	74,519	158	1,673	1,831	119	147	266	1,565
55	2066	74,771	158	1,682	1,840	119	147	266	1,574
56	2067	75,023	158	1,691	1,849	119	147	266	1,583
57	2068	75,274	158	1,700	1,858	119	147	266	1,592
58	2069	75,526	158	1,709	1,867	119	147	266	1,601
59	2070	75,778	158	1,718	1,876	119	147	266	1,610



Table 3-2 shows how the region is progressing towards meeting its 2070 future supply volume for the municipal water conservation WMS for the entire region. These results are compared to the recommended WMS supply volumes for municipal conservation for the entire region. The following is an explanation of the contents of Table 3-2:

Regional Population – The total current and projected population of the entire region. Unless otherwise provided by utility staff, these population estimates come from the regional water plan approved by the TWDB.

Utility Population – The total current and projected population of the participating utilities. Unless otherwise provided by utility staff, these population estimates come from the regional water plan approved by the TWDB.

Difference in Population – Total regional population minus the population of the participating utilities. This is the amount of the regional population that was not included in the study.

Regional Conservation Activities Savings for Participating Utilities – The combined sum of the measured and quantified water savings that result from the various activities employed by the participating utilities.

Water Loss Reduction Savings (as of 2015) for Participating Utilities – The amount the participating utilities are realizing from their water loss mitigation efforts. This number is the difference between the utility's baseline<sup>3</sup> for water loss GPCD and its most recent water loss GPCD reported in the 2015 water loss audit on file with TWDB. Because this is a value derived from GPCD, it grows as the population grows. *See Section 5 "Limitations" for more detail.*

Total Savings from All Conservation Activity for Participating Utilities – The sum of the two columns: Regional Conservation Activity Savings for Participating Utilities and Water Loss Reduction Savings (as of 2015) for Participating Utilities.

Total Regional Yearly WMS Volume – The sum of the future WMS supply volume for municipal water conservation and water loss reduction for the entire region.

Unaccounted for Conservation WMS Volume – The amount that the participating utilities' total quantified savings for all current conservation activities (since 2011), including water loss reduction, is over or below the recommended total WMS supply volume for municipal water conservation in the regional water plan. If the amount falls below the WMS volume, it will appear in parentheses as "(Short)."

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<sup>3</sup> In the absence of having a baseline figure provided by the TWDB or utility staff, the historic five-year average for water loss GPCD from the utility's most recently submitted five-year water conservation plan was used.



**Table 3-2. Comparison of Quantified Savings of Participating Utilities and Municipal Conservation WMS Supply Volumes for Entire Region.**

Year #	Year	Regional Population	Participating Utility Population	Difference in Population	Regional Conservation Activity Savings for Participating Utilities	Water Loss Reduction Savings (as of 2015) for Participating Utilities	Total Savings from All Conservation Activity for Participating Utilities	Total Regional Yearly WMS Volume	Unaccounted for Conservation WMS Volume
0	2011	136,298	58,563	77,735	0	0	0	0	0
1	2012	136,874	58,701	78,173	11	0	11	40	(29)
2	2013	137,449	58,838	78,611	148	0	148	79	69
3	2014	138,025	58,976	79,049	148	0	148	119	29
4	2015	138,600	59,113	79,487	149	1,189	1,338	159	1,179
5	2016	139,175	59,571	79,604	149	1,204	1,353	198	1,155
6	2017	139,750	60,029	79,722	149	1,219	1,368	198	1,170
7	2018	140,326	60,486	79,839	149	1,234	1,384	238	1,146
8	2019	140,901	60,944	79,957	149	1,250	1,399	278	1,121
9	2020	141,476	61,402	80,074	150	1,265	1,414	357	1,057
10	2021	142,703	61,735	80,968	150	1,274	1,423	357	1,066
11	2022	143,930	62,068	81,862	150	1,283	1,433	357	1,076
12	2023	145,158	62,401	82,756	150	1,291	1,442	357	1,085
13	2024	146,385	62,734	83,650	151	1,300	1,451	357	1,094
14	2025	147,612	63,068	84,545	151	1,309	1,460	357	1,103
15	2026	148,839	63,401	85,439	151	1,318	1,469	357	1,112
16	2027	150,066	63,734	86,333	151	1,327	1,478	357	1,121
17	2028	151,294	64,067	87,227	152	1,336	1,488	357	1,131
18	2029	152,521	64,400	88,121	152	1,345	1,497	357	1,140
19	2030	153,748	64,733	89,015	152	1,354	1,506	357	1,149
20	2031	154,975	65,066	89,909	152	1,363	1,515	357	1,158
21	2032	155,998	65,399	90,599	152	1,372	1,524	357	1,167
22	2033	156,521	65,732	90,789	152	1,381	1,533	357	1,176
23	2034	157,448	65,889	91,559	152	1,390	1,543	357	1,186
24	2035	158,374	66,178	92,196	152	1,399	1,552	357	1,195
25	2036	159,299	66,467	92,832	153	1,408	1,561	357	1,204
26	2037	160,224	66,756	93,468	153	1,418	1,570	357	1,213
27	2038	161,149	67,045	94,104	153	1,427	1,579	357	1,222
28	2039	162,074	67,334	94,740	153	1,436	1,588	357	1,231
29	2040	162,999	67,623	95,376	153	1,445	1,598	357	1,241
30	2041	163,814	67,918	95,896	153	1,454	1,607	357	1,250
31	2042	164,628	68,213	96,415	153	1,463	1,617	357	1,259
32	2043	165,443	68,508	96,935	153	1,473	1,626	357	1,269
33	2044	166,257	68,803	97,454	154	1,482	1,636	357	1,278
34	2045	167,072	69,098	97,974	154	1,492	1,645	358	1,288
35	2046	167,887	69,393	98,494	154	1,501	1,655	358	1,297
36	2047	168,701	69,688	99,013	154	1,510	1,664	358	1,307
37	2048	169,516	69,983	99,533	154	1,520	1,674	358	1,316
38	2049	170,330	70,278	100,052	154	1,529	1,683	358	1,326
39	2050	171,145	70,573	100,572	155	1,538	1,693	358	1,335
40	2051	171,853	70,842	101,012	155	1,547	1,702	358	1,344
41	2052	172,561	71,110	101,451	155	1,557	1,712	358	1,354
42	2053	173,270	71,379	101,891	155	1,566	1,721	358	1,363
43	2054	173,978	71,648	102,330	155	1,575	1,730	358	1,372
44	2055	174,686	71,917	102,770	156	1,584	1,739	358	1,381
45	2056	175,394	72,185	103,209	156	1,593	1,749	358	1,391
46	2057	176,102	72,454	103,649	156	1,602	1,758	358	1,400
47	2058	176,811	72,723	104,088	156	1,611	1,767	358	1,409
48	2059	177,519	72,991	104,528	156	1,620	1,777	358	1,419
49	2060	178,227	73,260	104,967	157	1,629	1,786	358	1,428
50	2061	178,864	73,512	105,352	157	1,638	1,795	358	1,437
51	2062	179,501	73,764	105,737	157	1,647	1,804	358	1,446
52	2063	180,137	74,015	106,122	157	1,656	1,813	358	1,455
53	2064	180,774	74,267	106,507	157	1,665	1,822	358	1,464
54	2065	181,411	74,519	106,892	158	1,673	1,831	358	1,473
55	2066	182,048	74,771	107,277	158	1,682	1,840	358	1,482
56	2067	182,685	75,023	107,662	158	1,691	1,849	358	1,491
57	2068	183,321	75,274	108,047	158	1,700	1,858	358	1,500
58	2069	183,958	75,526	108,432	158	1,709	1,867	358	1,509
59	2070	184,595	75,778	108,817	158	1,718	1,876	358	1,518



## 4 Quantifiable Savings

The key to this project being useful and reliable is that the results from year to year are measurable. Quantifying conservation activities that can be accurately measured provides greater certainty and better planning for all stakeholders.

While many utilities are engaged in a variety of conservation activities, not all can currently be properly measured. Some examples of these activities include education initiatives, website and social media engagement, and enforcement for water waste. That does not mean these measures are not essential; they are! Education of consumers, for example, is a fundamental activity that makes all others effective, but no hard data exists to quantify the results of education alone. Included in each individual utility report is a “Disparity Table” that shows the difference between all current quantified activities and the savings represented by the decline from the utility's 2011 total GPCD identified in its regional water plan and currently reported GPCD levels.

The utility's conservation activities have been quantified through several different means, including evidence-based studies, utility field results and savings determinations, manufacturer guarantees, water loss audits, TWDB studies, and other information that assigns a value to the activity's implementation.

Table 4-1 shows the most prevalently implemented conservation activities in the state. The values within the graph show how much these activities are saving specifically in this region.

Terms used in Table 4-1:

Water Loss Reduction – The amount of water savings (or loss)<sup>4</sup> due to efforts that reduce leaks and breaks, customer meter inaccuracy, data discrepancies, and other unaccounted-for water.

Water Rate Increases – Strategic increases to a utility's water service rates that result in reduced consumption.

2x Watering Ordinance – An ordinance that permanently restricts outdoor watering schedules to two times per week or less, year-round.

Conservation Pricing – The use of rate structures that discourage the inefficient use or waste of water.

AMR/AMI – Automatic Meter Reading/Advanced Metering Infrastructure. These are two related activities that replace manual-read meters with those that can quickly collect consumption, diagnostic, and status data and save water by curbing water loss with better response times.

Utility Outdoor Irrigation Audits – Audits performed on single-family residences by licensed irrigators that work in-house at the utility. These audits reduce water by surveying current outdoor

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<sup>4</sup> If water loss GPCD has increased from the utility's baseline or historic five-year average to its reported 2015 water loss audit level, then this value will be negative because more water is being lost than the baseline amount.



water use, making recommendations, and occasionally installing or repairing equipment to further curb use.

WaterWise Take-home Device Kits – Kits distributed to students that include water conserving devices, including showerheads, kitchen and bathroom aerators, toilet flappers, and leak detectors. Though there are other similar kits, this specific third-party vendor was by far the most prevalent throughout the state, so it was given its own quantified activity category. Savings for the showerhead in these kits were counted separately from savings in the accelerated PCS category.

Save Water Co. – Third party vendor that carries out a program targeting multi-family residential, hotel, and commercial customers. The company's work consists of identifying and repairing all leaks and drips, rebuilding existing toilets, and replacing sink aerators. This program operates outside of the utility's top-down planned efforts and is achieving notable savings, so it was deemed necessary to account for its results. Savings from the toilet-rebuilding portion of the program were counted separately from savings in the accelerated PCS category.

Rainwater Harvesting – Barrels and other rainwater collection systems that store rain for later use. Replaces using potable water.

W.I.S.E. Guys Program – Water Irrigation System Evaluation. A third-party contractor that performs audits on single-family residences similar to those conducted by in-house utility staff. There are several contractors that do this work throughout the state, but because this program was being used much more frequently, we included it as a separate savings category.

Accelerated PCS – The regional and state water plans have accounted for passive savings that will occur due to the natural replacement of inefficient water fixtures and appliances pursuant to federal and state plumbing code requirements. Some regional water plans expect all passive PCS will be achieved by 2045. By offering rebates or other incentives, directly replacing fixtures, or by giving away various items, utilities can accelerate anticipated passive PCS. These values should be helpful when planners are assessing future supply volumes that can be expected from these activities.

Other – Savings from any other conservation activity not included in the other categories. All specific savings from these activities are quantified in detail in individual utility reports.



**Table 4-1. Savings from Most Widely Used Conservation Activities (in acre-feet).**

Year	Water Loss Reduction	Water Rate Increases	2x Watering Ordinance	Conservation Pricing	AMR/AMI	Utility Outdoor Irrigation Audits (SF)	WaterWise Take-home Device Kits	Save Water Co.	Rainwater Harvesting	W.I.S.E. Guys Program	Accelerated PCS	Other	Total Savings from All Conservation Activity
2010					11								0
2011					11								0
2012					11								11
2013		137			11								148
2014		137			11								148
2015	1,189	138			11								1,338
2016	1,204	138			11								1,353
2017	1,219	138			11								1,368
2018	1,234	138			11								1,384
2019	1,250	138			11								1,399
2020	1,265	139			11								1,414
2021	1,274	139			11								1,423
2022	1,283	139			11								1,433
2023	1,291	139			11								1,442
2024	1,300	139			11								1,451
2025	1,309	140			11								1,460
2026	1,318	140			11								1,469
2027	1,327	140			11								1,478
2028	1,336	140			11								1,488
2029	1,345	140			11								1,497
2030	1,354	141			11								1,506
2031	1,363	141			11								1,515
2032	1,372	141			11								1,524
2033	1,381	141			11								1,533
2034	1,390	141			11								1,543
2035	1,399	141			12								1,552
2036	1,408	141			12								1,561
2037	1,418	141			12								1,570
2038	1,427	141			12								1,579
2039	1,436	141			12								1,588
2040	1,445	141			12								1,598
2041	1,454	141			12								1,607
2042	1,463	141			12								1,617
2043	1,473	142			12								1,626
2044	1,482	142			12								1,636
2045	1,492	142			12								1,645
2046	1,501	142			12								1,655
2047	1,510	142			12								1,664
2048	1,520	142			12								1,674
2049	1,529	143			12								1,683
2050	1,538	143			12								1,693
2051	1,547	143			12								1,702
2052	1,557	143			12								1,712
2053	1,566	143			12								1,721
2054	1,575	144			12								1,730
2055	1,584	144			12								1,739
2056	1,593	144			12								1,749
2057	1,602	144			12								1,758
2058	1,611	144			12								1,767
2059	1,620	144			12								1,777
2060	1,629	145			12								1,786
2061	1,638	145			12								1,795
2062	1,647	145			12								1,804
2063	1,656	145			12								1,813
2064	1,665	145			12								1,822
2065	1,673	145			12								1,831
2066	1,682	146			12								1,840
2067	1,691	146			12								1,849
2068	1,700	146			12								1,858
2069	1,709	146			12								1,867
2070	1,718	146			12								1,876

## 5 Limitations

The results in this report indicate the best information available as provided by utility staff. Refinement of this data should be an ongoing process and data can be fairly easily adjusted as new developments arise, such as a change in utility activity or changes in implementation and enforcement.

It is not possible to be aware of all activities that are ongoing. The timeframe to complete the project did not allow many smaller utilities to be interviewed, and some activities that are implemented on a micro scale cannot be quantified. Individual households and businesses may be implementing conservation measures that cannot be included in this report.



It should be noted that the way water loss savings into future years were calculated is based on the difference between a starting value and the water loss that is shown in the 2015 water loss audit. The beginning value is either the five-year average of water loss GPCD or a baseline value specified by the individual utility. Because we used a single year (2015) value for comparison, it is possible that the 2015 value could be anomalous due to a number of reasons, such as a water main break, a particularly wet year, or a robust effort by the utility to curtail water loss. This will distort future savings figures we have carried forward in our model because water loss will inevitably increase or decrease in later years.

Ideally, using a rolling five-year average in the calculation would smooth out such anomalies. However, there was insufficient data to do that for every utility. Our approach was to use the most complete water loss data possible, which was represented by the 2015 water loss audit. This problem will be further minimized as continued data collection will allow five-year averages to be calculated for a majority of utilities.

## **6 Region J Challenges**

Listed below are challenges the PWPG and its associated utilities are facing regarding implementing water conservation as a WMS, as identified by this study.

### **6.1 Regional Communication**

- From interview responses, it was made clear that most utilities are largely unaware of impending regional shortages or any recommendations made by the regional water planning group to specifically address municipal conservation.
- Utilities often do not know what their role is regarding regional conservation supply volumes.

### **6.2 Teamwork and Accomplishment**

Residential consumption in small towns throughout rural Texas is very low. Traditional conservation activities, therefore, are not seen as particularly necessary. It was evident through interviews in less populated towns that the amount of savings that are possible from municipal conservation efforts seems insignificant in relation to the amount of water being used by other sectors, such as agriculture and larger cities, and therefore harder to adopt. Region J has shown that small towns can make a big difference. The successes of the two participating utilities are a model for other small towns throughout Texas.

By educating communities on their portion of the regional WMS supply volume for municipal water conservation objectives, they could have a sense of doing their part by achieving reasonable results.



## **7 Recommendations**

Listed below are recommendations for the PWPG and utilities.

### **7.1 Participation and Communication**

- Utilities should fully participate in the regional water planning process to become knowledgeable about the planning process and provide stakeholder input.
- The PWPG should educate the utilities in the area about their specific WMS supply volume for municipal water conservation objectives. This gives them something very specific for which to strive. Additionally, these utilities should be informed on what options and activities are available to them and what they can expect to achieve by implementing them. Each participating utility was issued a report that gave general recommendations about how to move forward with municipal conservation activities.

The PWPG could sponsor stakeholder meetings to keep the issue relevant for these utilities. They should also establish a reliable, efficient communication structure that connects regional planners to all utilities to periodically discuss progress.

### **7.2 Continue Data Collection**

Encourage broader participation in future similar data collection projects. Increased participation will be imperative in future years to ensure accuracy, foster a more complete understanding of regional conservation, and achieving regional supply volumes. Continued data collection will make the WMS for municipal conservation an attainable ongoing strategy for the planners. Keeping up with progress will be essential to further development of the strategy. If you can measure it, you can manage it.

### **7.3 Training and Financing Opportunities**

Many utilities throughout the state are considering Advanced Metering Infrastructure (AMI). AMI is a popular and growing activity throughout the state. It represents a new way of informing consumers about their consumption patterns and is a powerful tool to change behavior. Most small utilities do not have the expertise to pursue this option. The TWDB and PWPG could help those communities take advantage of new technology. Meters must be replaced over time, and AMI could help many municipalities reduce staff overhead along with its water-savings benefits. Perhaps the PWPG and the TWDB could continue to sponsor training seminars, which should include training on how to access SWIFT and other TWDB funding programs.

Water planners, managers, and private sector businesses should be educated on the opportunities that Property Assessed Clean Energy (PACE) brings to the water conservation efforts of larger businesses. Many utilities can benefit from their large industrial and commercial customers being more efficient with their water usage. PACE offers a unique way to finance such projects so that they become attractive options. A PACE-financed water conservation project also improves cash flow for the business and saves water.



In order for a private entity to participate in PACE, either the city or county must pass a resolution to participate in the program. Once this is done, the entity has the option to "self assess" a lien on their property that will allow them to finance a water or energy-saving project over enough time to guarantee a positive cash flow.

#### **7.4 Adopting Activities**

Utilities should consider adopting the advanced municipal conservation activities detailed in their individual reports. These activities are all projected to be cost effective.

These activities were recommended based on the effectiveness and practicality of enactment. A detailed cost-benefit analysis on these activities could be performed based upon utility size. The use of specific water purchase and other cost data would allow for the calculation of savings and cost estimates for these utilities.

For Region J, the most common suggested activities were to install AMI to help reduce water loss and inform customers about their water use patterns and to use periodic, strategic water rate increases to reduce consumption.