Waukesha Water Utility 2022

Water Conservation Plan Update

Final
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Approved by the WWU Commission on January 19, 2023

GREAT WATER ALLIANCE™

Jacobs

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Acronyms and Abbreviations

2012 Plan	Waukesha Water Utility Water Conservation Plan (2012)
AWE	Alliance for Water Efficiency
AWE Tool	Alliance for Water Efficiency Water Conservation Tracking Tool
AWWA	American Water Works Association
B:C	benefit to cost
CEM	Conservation and Efficiency Measure
CII	commercial, industrial, and institutional (public)
City	City of Waukesha
Clean Water Plant	City of Waukesha Wastewater Treatment Plant
Compact	Great Lakes – St. Lawrence River Basin Water Resources Compact
gal/day	gallons per day
gpcd	gallons per capita per day
HET	high-efficiency toilet
lf	linear feet
MG	million gallon(s)
mgd	million gallons per day
NR 852	Wisconsin Administrative Code Chapter NR 852
Plan Update	Waukesha Water Utility Water Conservation Plan Update (2022)
PSC	Public Service Commission of Wisconsin
PSC 185	*Wisconsin Administrative Code* Chapter PSC 185
psi	pounds per square inch
Regional Body	Great Lakes – St. Lawrence River Basin Water Resources Regional Body
SEWRPC	Southeastern Wisconsin Regional Planning Commission
WDNR	Wisconsin Department of Natural Resources
WSSA	Water Supply Service Area
WWU	Waukesha Water Utility
USEPA	United States Environmental Protection Agency

1. Introduction

Since 2006, Waukesha Water Utility (WWU) has been a leader in water conservation among Wisconsin water utilities. In 2010, the Wisconsin Department of Natural Resources (WDNR) developed a state rule that establishes mandatory water conservation and efficiency measures (CEMs) for withdrawals in the Great Lakes basin and to promote voluntary water conservation statewide. That rule, *Wisconsin Administrative Code* Chapter Natural Resources (NR) 852 Water Conservation and Water Use Efficiency (NR 852) established a framework for the 2012 WWU Water Conservation Plan (2012 Plan). Since 2012, WWU has invested annually in its water conservation program and tracked water volumes saved through conservation. Details about conservation program implementation and water-savings achievements are documented in annual reports to the Public Service Commission of Wisconsin (PSC) and WDNR in conformance with *Wisconsin Administrative Code* Chapter PSC 185 Standards for Public Utility Service (PSC 185).

1.1 Purpose

The purpose of the WWU Water Conservation Plan Update (Plan Update) is to continue following the utility's water conservation planning process by completing the following:

- Confirm the water conservation goals.
- Review the conservation program performance over the past 10 years.
- Evaluate the effectiveness of existing CEMs.
- Analyze the benefits and costs of incorporating new CEMs into the program.
- Recommend actions to meet or exceed program water-savings goals.

The Plan Update refines WWU's path forward in customer service-oriented water-use efficiency planning and implementation. It focuses on key strategies for the next 5- and 10-year implementation periods. Because WWU anticipates transitioning to a new Great Lakes water supply within 1 year, the Plan Update will align with the water use and water conservation reporting requirements for the City of Waukesha Great Lakes Diversion, in addition to those of NR 852 and the PSC.

Figure 1-1. Water Conservation Planning Process

1.2 Background

The 2012 Plan was based on a City of Waukesha (City) water supply service area (WSSA) that was delineated by the Southeastern Wisconsin Regional Planning Commission (SEWRPC) in 2009 in conformance with Wisconsin State Statute Chapter 281 Water and Sewage and *Wisconsin Administrative Code* Chapter NR 121 Areawide Water Quality Management Plans. The 2012 Plan included targets for conservation water savings based on WSSA population projections, approved land use plans, and water-demand forecasts.

During review of the City's application for Great Lakes diversion, the City WSSA was modified by the Great Lakes – St. Lawrence River Basin Water Resources Regional Body (Regional Body) to exclude areas located

in the Town of Genesee and the Town of Delafield. The approved diversion service areas as of May 2016 were fixed to the following: [1]

1. *Incorporated land within the boundaries of the City of Waukesha and land outside the City of Waukesha's jurisdictional boundaries that is served with municipal water by the [City of Waukesha] through the WWU as of May 18, 2016. This land is referred to as the "current area served."*

2. *Land lying within the perimeter boundary of the City of Waukesha that is part of the unincorporated land in the Town of Waukesha. These areas are referred to as the "town islands." Town islands are transected or bordered by a WWU water main and are either fully surrounded by territory incorporated in the City of Waukesha or are bordered on one side by a transportation right-of-way and on the remaining sides by territory incorporated by the City of Waukesha.*

When the WSSA was reduced, the service area projected population, water-demand forecast and water-saving goals were also reduced. Table 1-1 compares key criteria that guide the WWU water conservation program. The 2012 Plan was based on the 2012 diversion criteria, and the current WWU Plan Update is based on the 2016 approved diversion criteria.

Table 1-1. Water Conservation Program Key Criteria

WSSA Buildout Condition	2012 Diversion Application	2016 Approved Diversion
Total area served, acres	32,209	28,059
Total population served	97,400[a]	89,000 – 91,290[b]
Average day water demand, mgd	10.1	8.2
Water conservation savings, mgd	1.0	0.8

[a] SEWRPC letter to City of Waukesha March 17, 2009.
[b] Interpolated from SEWRPC estimates.
mgd – million gallons per day

1.3 Water Supply Service Area

Figure 1-2 shows the WSSA. Table 1-2 summarizes the WSSA 2000 land use inventory and 2035 recommended land use plan. Residential is the single largest land use category.

Under current water service rules regulated by the PSC, all customers regardless of location in the service area are subject to the City's conservation measures, including the water rate schedule, outdoor water-use restrictions, financial incentives to install water-saving plumbing fixtures, and conservation educational resources.

[1] Final Decision on the City of Waukesha, Wisconsin's Application for Diversion of Great Lakes Water.

Figure 1-2. Water Supply Service Area

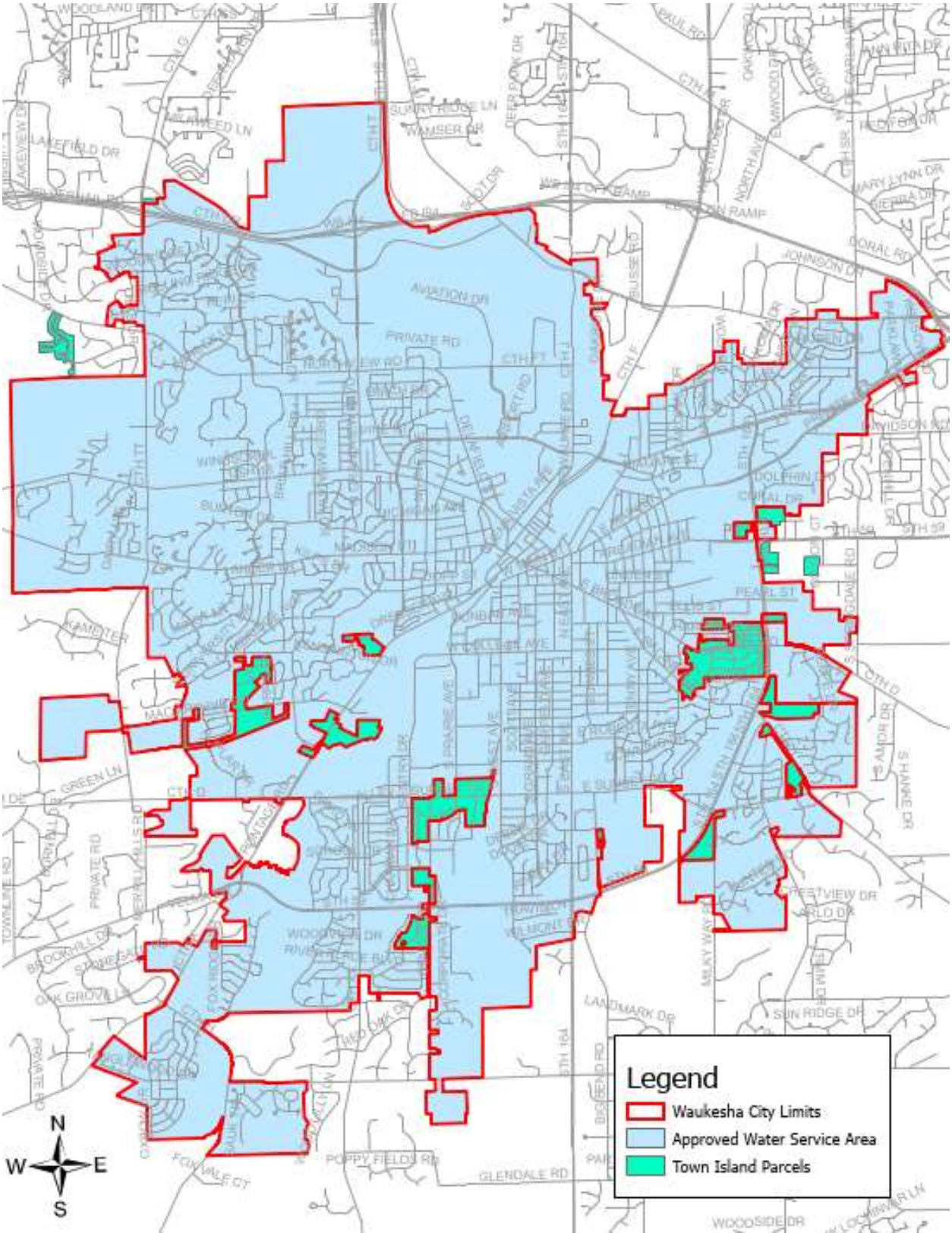


Table 1-2. WSSA Land Use By Civil Division [2]

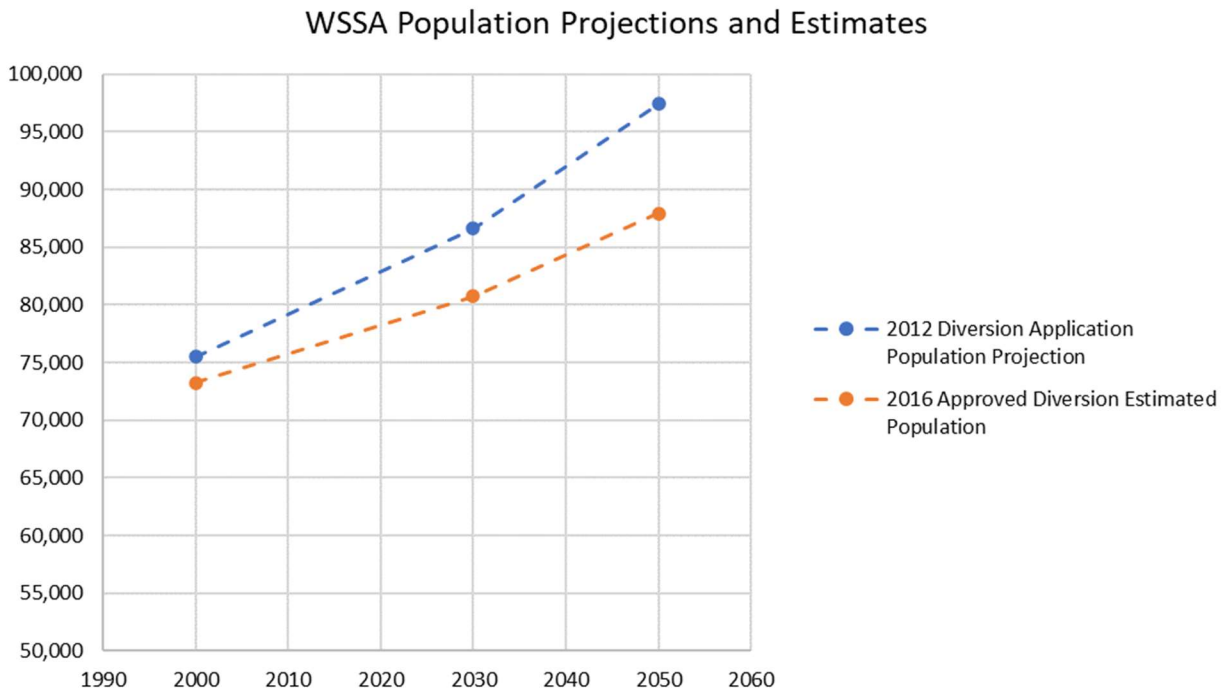
Land Use Categories	City of Pewaukee	City of Waukesha	Town of Waukesha	Grand Total
2000 Land Use Inventory, acres				
Agricultural and Other Open Lands	175	3,460	4,202	7,837
Commercial	0	816	64	880
Environmental Areas and Wetlands	53	1,670	2,711	4,434
Extractive	0	75	0	75
Governmental and Institutional		802	54	856
Industrial	0	987	38	1,025
Multi-family Residential		919	1	920
Recreational	13	500	260	773
Single-Family Residential	208	3,756	3,267	7,231
Surface Water	1	126	33	160
Transportation, Communication, and Utilities	60	2,904	904	3,868
Total	**510**	**16,015**	**11,534**	**28,059**
2035 Recommended Land Use Plan, acres				
Agricultural and Other Open Lands	3	182	808	993
Commercial	0	879	118	997
Environmental Areas and Wetlands	54	1,800	2,868	4,722
Extractive				0
Governmental and Institutional	15	964	162	1,141
Industrial	0	1,639	151	1,790
Multi-family Residential		583	0	583
Recreational	17	641	491	1,149
Single-Family Residential	366	5,999	5,956	12,321
Surface Water	1	114	33	148
Transportation, Communication, and Utilities	55	3,214	946	4,215
Total	**511**	**16,015**	**11,533**	**28,059**

1.4 Service Area Population

The most recent official population projections for the WSSA were prepared by SEWRPC in 2009. The projections were based on municipal estimates from the State of Wisconsin Department of Administration and multiple planning factors, including, but not limited to, land use, household size, demographic trends, and community development plans. Official population projections were not prepared for the smaller, approved Great Lakes diversion service area; however, projected population may be represented by the 2009 estimates less the population associated with Town of Genesee and the Town of Delafield areas included in the 2009 projections. Figure 1-2 depicts these projections and estimates. When 2020 U.S. Census-based population projections are prepared by the State of Wisconsin Department of Administration for Wisconsin municipalities, WWU will work with SEWRPC to prepared updated population projections for the WSSA.

[2] City of Waukesha Application for a Lake Michigan Diversion with Return Flow, April 2013.

Figure 1-3. Service Area Population



1.5 Water System

In 2023, it is anticipated that the WWU water supply will transition from groundwater to surface water.

Table 1-3. WWU Water System Features

Feature	2023	2024 and Beyond
Water supply type	10 groundwater wells	1 surface water pump station
Ground tanks, number	6	4
Elevated tanks, number	5	6
Watermains, miles	334	To be determined
Distribution pressure zones, number	10	10

1.6 Water Conservation Goals and Objectives

The City's water conservation goals include the following:

- Reducing average day demand by 0.4 million gallons per day (mgd) by year 2030 and by 0.8 mgd by year 2050 (the complete development/buildout condition).
- Leveraging lessons learned from implementation of existing City CEMs.
- Using the Alliance for Water Efficiency (AWE) Water Conservation Tracking Tool (AWE Tool) to the extent practical to estimate CEM savings and cost effectiveness.
- Targeting CEMs and customers with the highest potential for cost-effective water savings.
- Maintaining 5-year rolling average for 3 performance indicators: 45 gallons per capita (residential customers), ratio of maximum to average day demand of 1.6, 10 percent or less of non-revenue water.

2. Historical Water Use

To evaluate the effectiveness of the water conservation program and make informed recommendations for the Plan Update, WWU water billing, well production, and water-use audit data between 2012 and 2021 were analyzed to review historical water use since the 2012 Plan.

WWU served 20,680 accounts in 2021, a 5% increase in number of accounts compared to 2012. Most WWU customer accounts are residential with some commercial, public, and industrial customers. Over the last 10 years, the number and types of customer accounts have remained consistent with the exception of multi-family housing which were commercial accounts in 2012 and are now residential accounts. WWU also replaced several shared meters at duplexes and triplexes with individual meters, resulting in a small shift of accounts from multi-family to single-family residential. The number of irrigation meters also increased slightly because irrigation rates were implemented in 2017; however, irrigation meters still make up a very small amount of the total accounts. Figure 2-1 shows the distribution of customer accounts in 2012 and 2021, and Table 2-1 shows the number and type of customer accounts in each year.

Figure 2-1. Total Accounts by Customer Class in 2012 and 2021

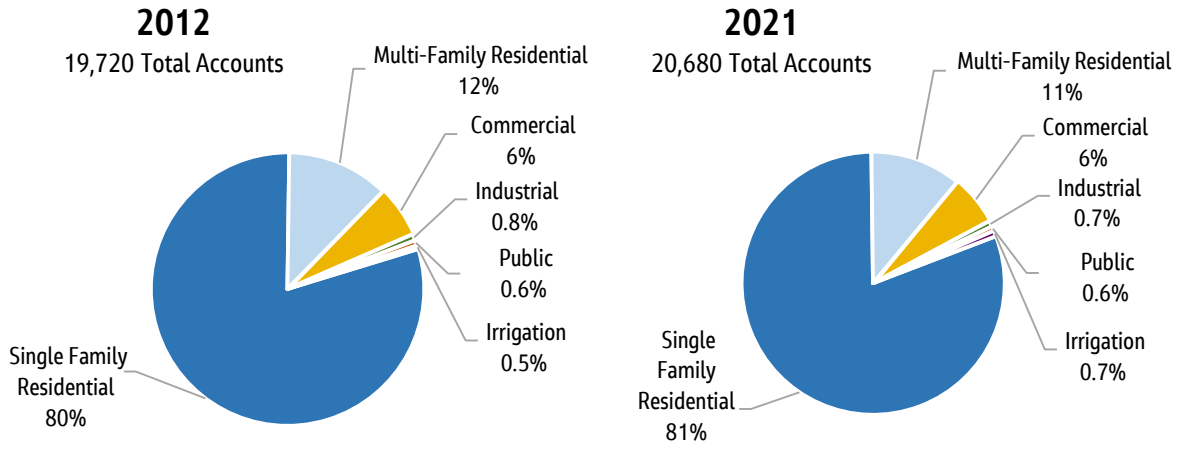


Table 2-1. Total Accounts by Customer Class in 2012–2021

Customer Class	2012	2013	2014	2015	2016	2017
Single-Family Residential	15,764	15,889	15,961	16,051	16,169	16,308
Multi-Family Residential	2,385	2,368	2,358	2,364	2,362	2,358
Commercial	1,208	1,219	1,220	1,230	1,248	1,248
Industrial	151	150	150	150	151	148
Public	122	124	121	119	118	117
Irrigation	90	92	114	118	120	122
Total	19,720	19,842	19,924	20,032	20,168	20,301

Customer Class	2018	2019	2020	2021	Percent Change 2012- 2021
Single-Family Residential	16,414	16,509	16,592	16,675	6%
Multi-Family Residential	2,346	2,336	2,328	2,319	-3%
Commercial	1,259	1,271	1,270	1,277	6%
Industrial	148	148	147	147	-3%
Public	118	118	120	120	-2%
Irrigation	132	137	138	142	58%
Total	**20,417**	**20,519**	**20,595**	**20,680**	**5%**

The total water sold has decreased from 2012 and 2021. Figure 2-2 shows a comparison of the amount of water sold by customer class between 2012 and 2021. A decrease in annual billed consumption from 2,311 million gallons (MG) to 1,805 MG in 2021 represents an overall 22% decrease over the last 10 years. Water use decreased in all customer classes, with the largest percent change in industrial water uses. Table 2-2 includes the annual billed consumption in MG by customer class from 2012 to 2021, including the overall percent change over the last 10 years.

Figure 2-2. Annual Billed Consumption by Customer Class in 2012–2021

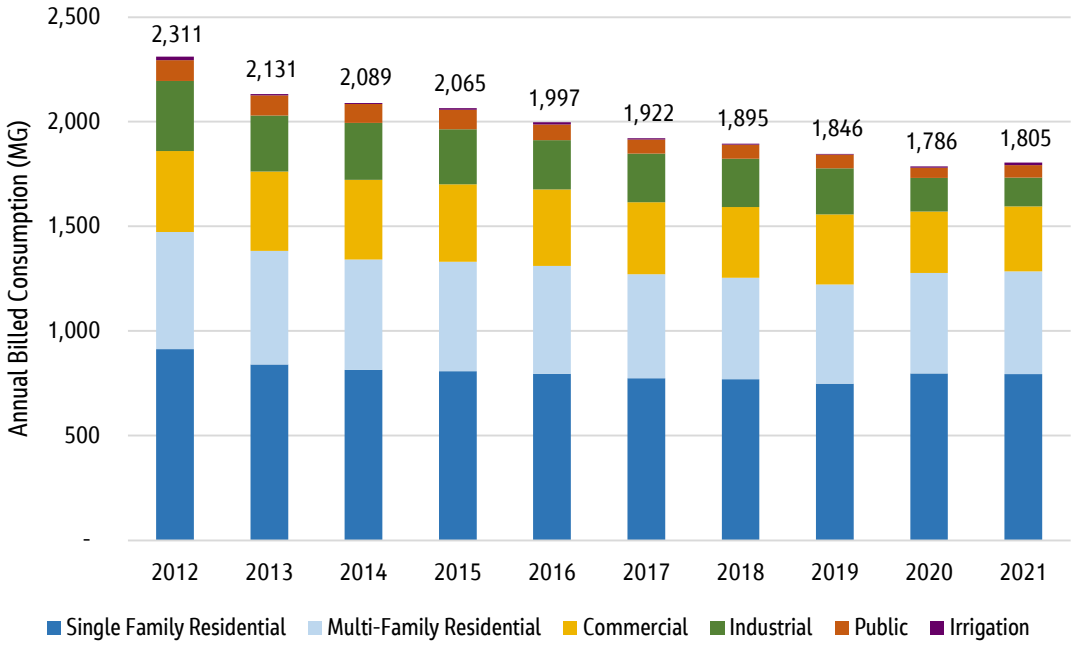


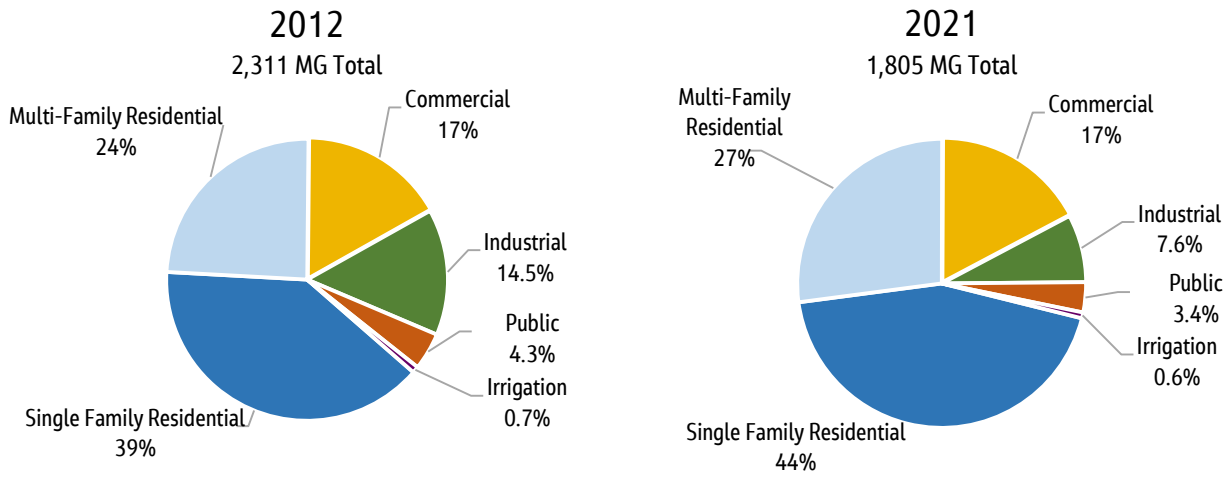
Table 2-2. Annual Billed Consumption (MG) by Customer Class in 2012–2021

Customer Class	2012	2013	2014	2015	2016	2017
Single-Family Residential	913	840	814	807	795	775
Multi-Family Residential	561	542	528	523	515	496
Commercial	387	379	380	371	366	344
Industrial	335	269	272	263	236	233
Public	99	96	91	93	76	67
Irrigation	17	6	4	8	10	7
Total	**2,311**	**2,131**	**2,089**	**2,065**	**1,997**	**1,922**

Customer Class	2018	2019	2020	2021	Percent Change 2012-2021
Single-Family Residential	770	747	797	795	-13%
Multi-Family Residential	484	474	480	490	-13%
Commercial	338	335	293	311	-20%
Industrial	231	220	161	137	-59%
Public	68	65	48	61	-38%
Irrigation	4	3	6	11	-32%
Total	**1,895**	**1,846**	**1,786**	**1,805**	**-22%**

More than 90% of the customer accounts are residential meters (single- and multi-family) and their consumption was approximately 70% of the total water sold in 2021. Commercial and industrial water are the next largest categories of water use. Figure 2-3 shows the percent water sold by customer class in 2012 and 2021. The biggest changes in the composition of water sold is the decrease in percent for industrial water and increase in percent for residential categories (note that total residential water consumption was a net decrease between 2012 and 2021; Table 2-2).

Figure 2-3. Total Billed Consumption by Customer Class in 2012 and 2021



An average demand in gallons per capita day (gpcd) was calculated for residential water by summing all single- and multi-family residential meters and dividing by the service area population. Residential water demand has decreased from approximately 53 gpcd in 2012 to 45 gpcd in 2021; Table 2-3 shows the change in average residential demand from 2012 to 2021.

Table 2-3. Residential Per Capita Water Demand

Year	Per Capita Demand Per Day (gpcd)
2012	53
2013	50
2014	48
2015	48
2016	47
2017	45
2018	44
2019	43
2020	45
2021	45

2.1 Non-Revenue Water

WWU reports revenue and non-revenue water annually to the PSC. Non-revenue water includes apparent losses, unbilled authorized consumption, and reported leakage (real losses). WWU's non-revenue water is typically less than 10%, except 2014 when sustained record low temperatures resulted in an unusually high number of water main and service lateral breaks. Figure 2-4 shows the percentage of non-revenue water from 2012 to 2021, and Figure 2-5 shows the typical breakdown of non-revenue water for 2021.

Figure 2-4. Percent Revenue and Non-Revenue Water from 2012 to 2021

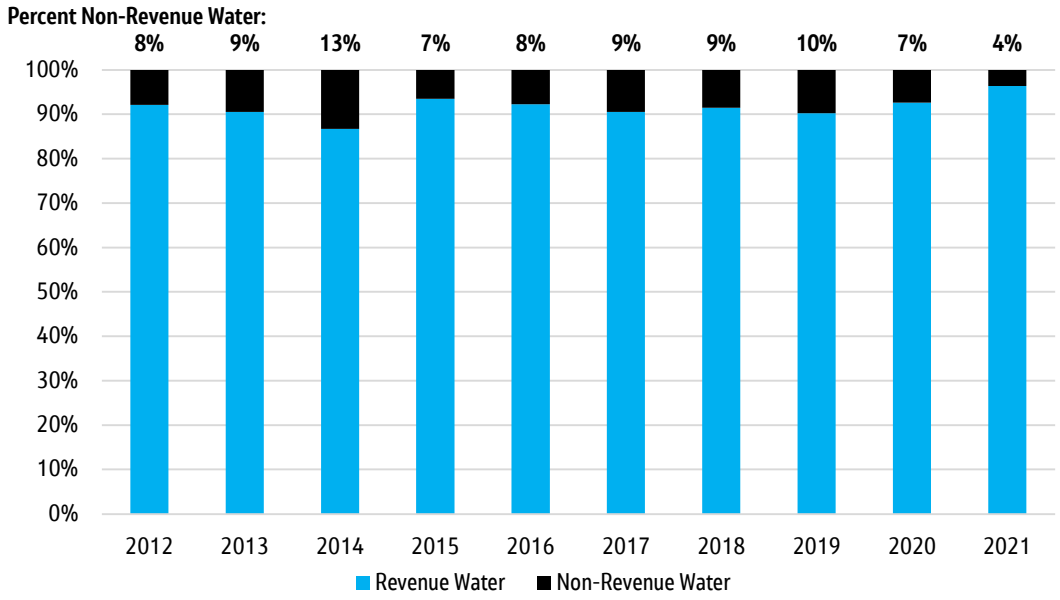
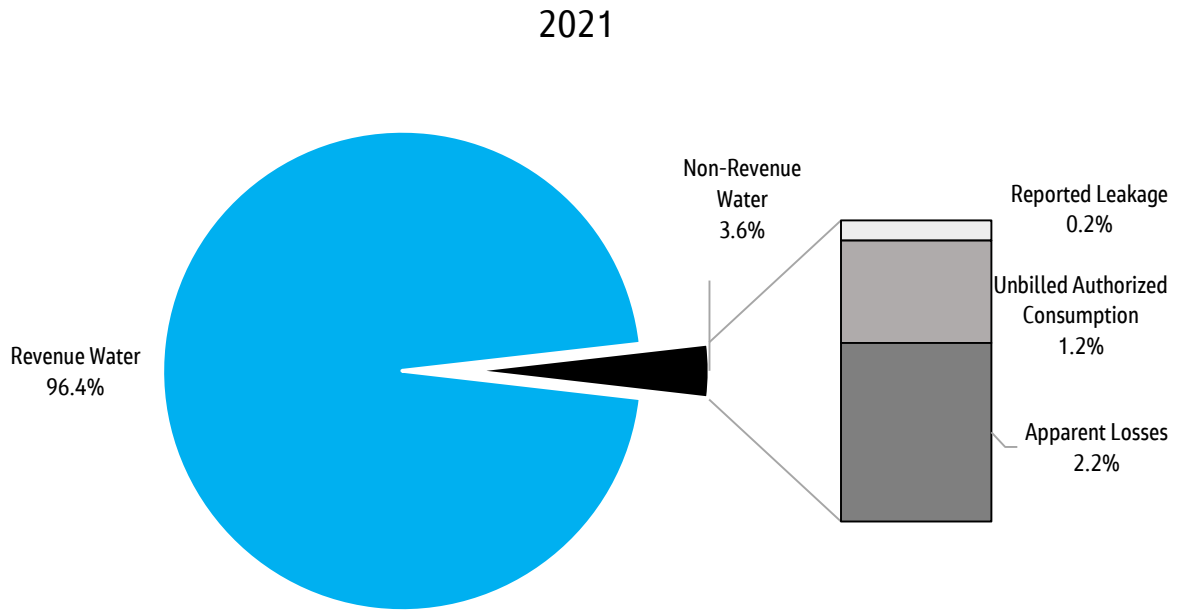


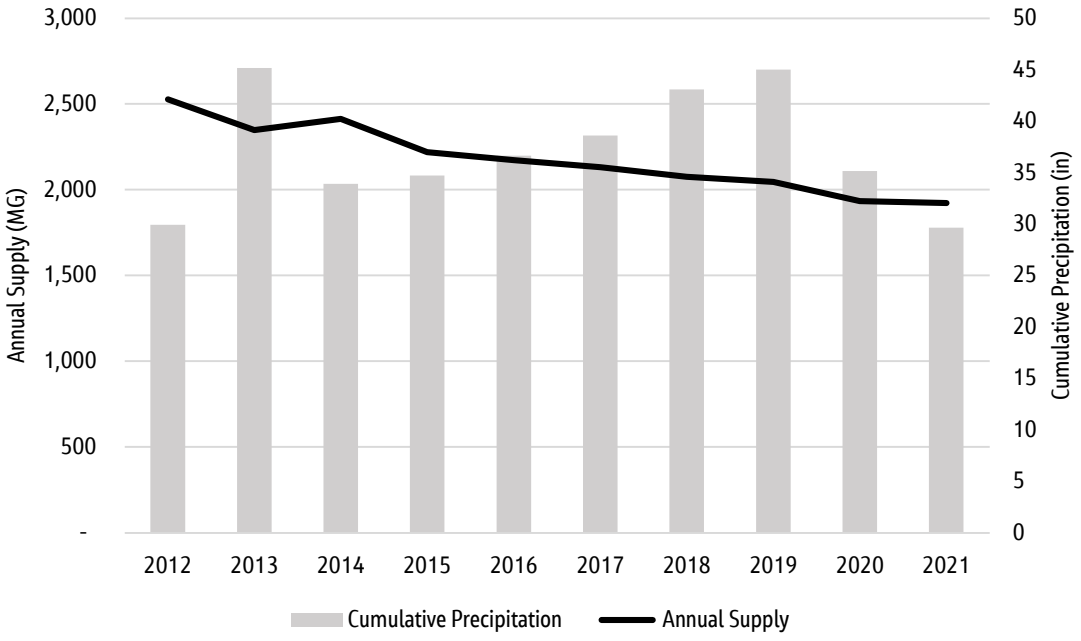
Figure 2-5. Revenue and Non-Revenue Water Losses in 2021



2.2 Seasonal Water Demand

Annual and monthly water supply from pump data at the well locations was compared against cumulative precipitation to observe general trends in different weather years. Figure 2-6 shows the annual supply and cumulative precipitation for 2012 through 2021. Cumulative precipitation increased annually between 2014 and 2019. During this time, there was also an inverse relationship with water demand that would be expected as customer outdoor water use typically declines in years with average-to-above-average precipitation. However, water demand continued to decline in lower precipitation years of 2020 and 2021, which may be attributed to reduced economic activity during COVID-19 and water conservation awareness promoted through the conservation program.

Figure 2-6. Annual Supply and Cumulative Precipitation for 2012 through 2021

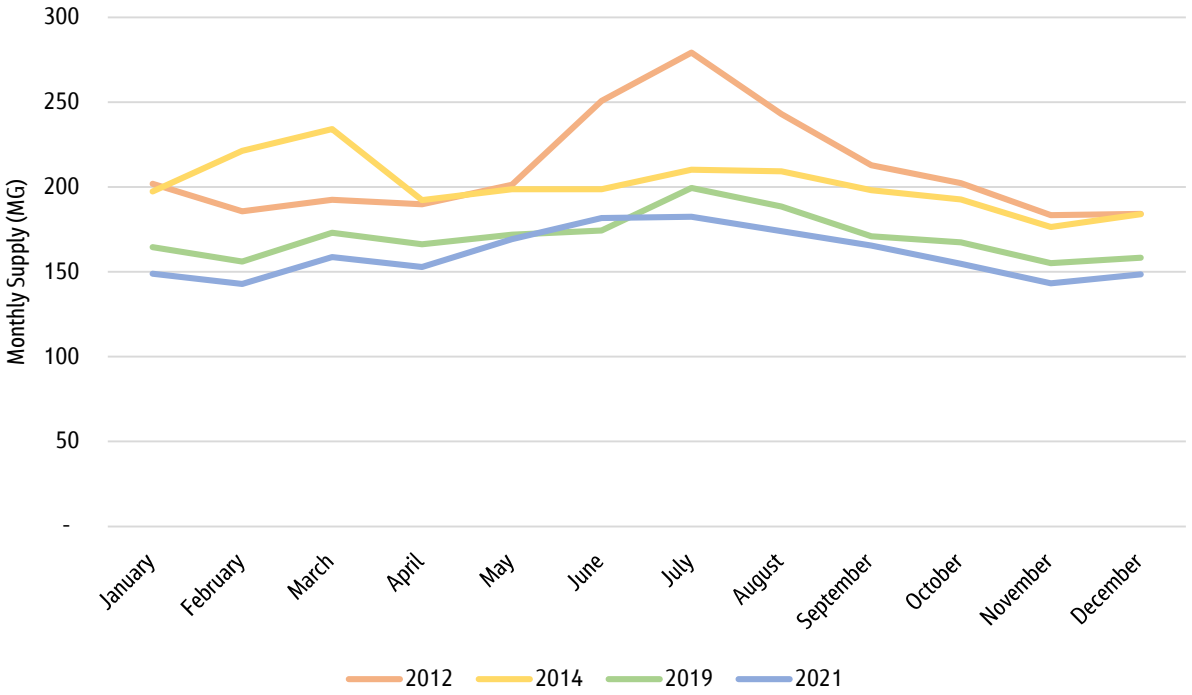


Four years were selected for further analysis of the effects of precipitation on water use: 2012 with historic below-average precipitation during summer months; 2014 with a longer, colder winter and typical precipitation year; 2019 as a year with historic above-average precipitation, and 2021 as the most recent year and with average-to-below-average precipitation. Monthly production data from each year were analyzed for differences in seasonal water demand, shown in Figure 2-7.

Overall trends align with the decrease in annual billed consumption, where monthly water supplied to customers decreased in all months when comparing 2012 to 2021. There is little variation in monthly supply in recent years, indicating that the seasonality of water use is becoming less prominent due to a reduction in outdoor water use. The reduction in outdoor water use during this period is likely due to a combination of water-use efficiency measures and increased precipitation over the last 10 years. The Wisconsin Rainfall Project combines rainfall statistics from the National Oceanic and Atmospheric Atlas 14 and the University of Wisconsin's RainyDay software that downscales global climate models to project precipitation trends at the county level in Wisconsin. Future climate models for Waukesha County indicate that rainfall frequency and quantity will likely continue to increase under all emissions scenarios. [3] This may result in continuing lower demand for outdoor water use during the growing season (May–October), similar to the conditions observed in 2017–2019.

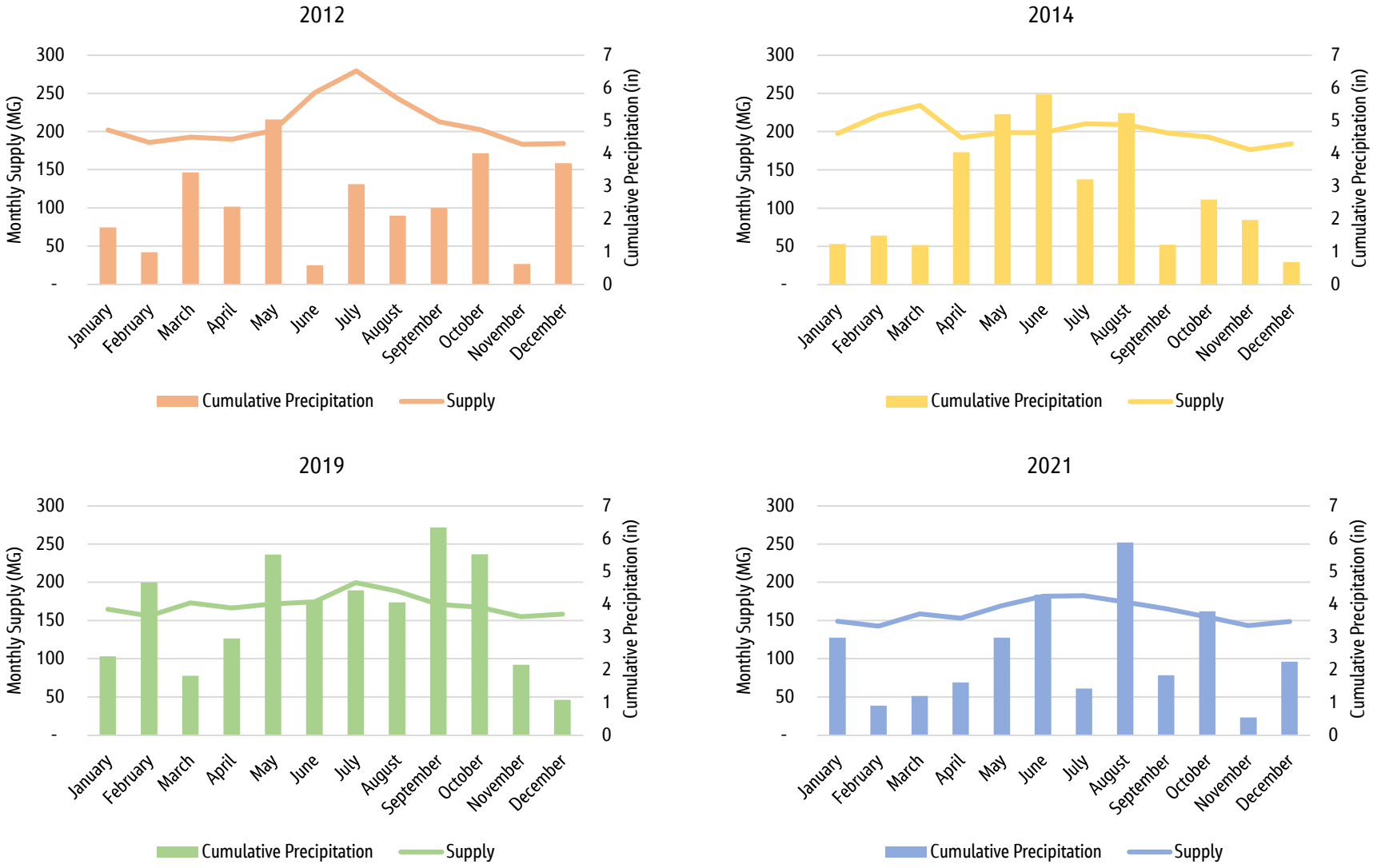
[3] https://her.cee.wisc.edu/the-wisconsin-rainfall-project/

Figure 2-7. Monthly WWU Water Production in 2012, 2014, 2019, and 2021



Cumulative monthly precipitation for each year was analyzed to further interpret possible differences in seasonal water demand. Figure 2-8 shows monthly supply and precipitation data for 2012, 2014, 2019, and 2021. The cumulative precipitation in 2019 was high in most months of the year, particularly during the Wisconsin growing season of May–October. However, decreased precipitation in 2021 resulted in very similar monthly supply trends when comparing 2019 to 2021, indicating that in recent years, the variation in precipitation does not have as much impact to water supply trends as was observed in 2012.

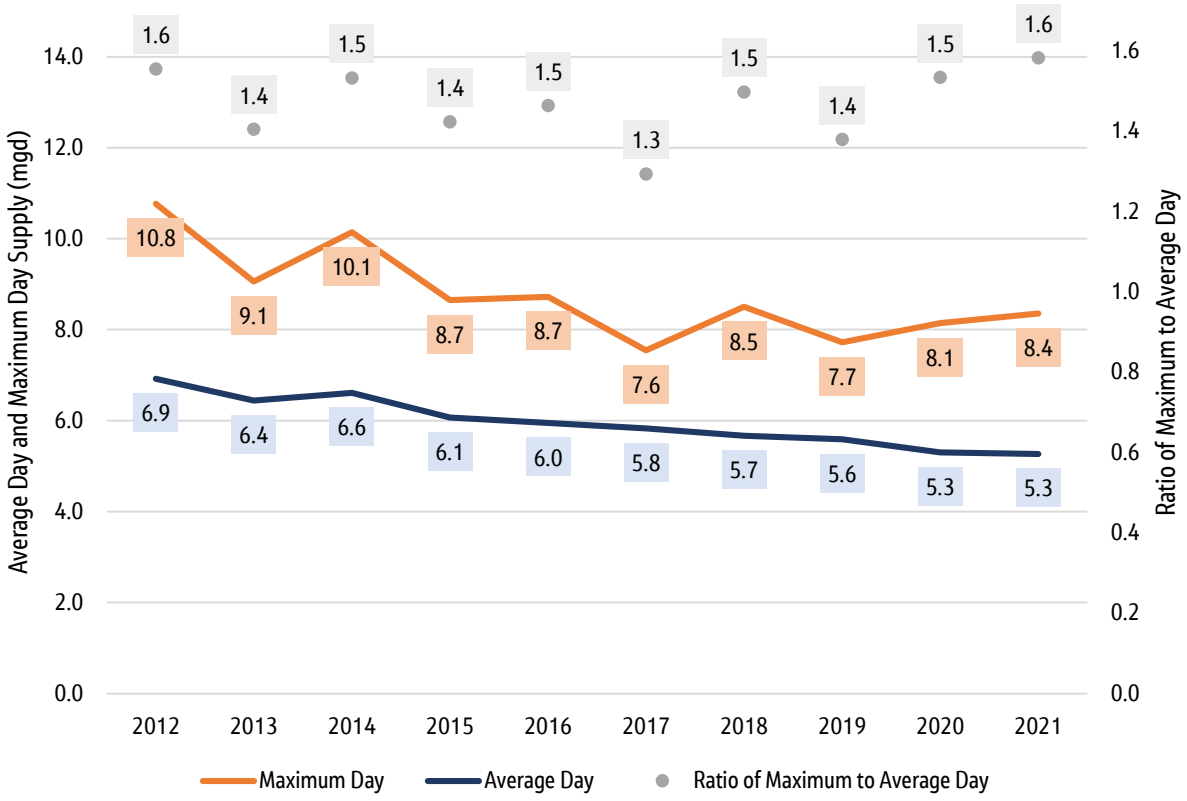
Figure 2-8. Monthly Water Supply and Cumulative Precipitation in 2012, 2014, 2019, and 2021



2.3 Variation in Customer Demand

The annual average and maximum day demand (Figure 2-9) were calculated using the WWU operating data. Both average day and maximum day demands have decreased over the last 10 years. The ratio of maximum to average day remains between 1.3 and 1.6.

Figure 2-9. Annual Average and Maximum Day Water Demand



3. Conservation Program Status: 2012–2021

WWU has long been a leader in water conservation in the state of Wisconsin. The City adopted its 2006 Water Conservation and Protection Plan, which set forth water-savings goals and recommendations for conservation program management and source water protection. Between 2006 and 2012, the City implemented a variety of conservation measures, including the following:

- First in the state to implement residential inclining block water rate structure to encourage conservation
- City ordinance to restrict outdoor irrigation
- High-efficiency toilet rebates
- School and general public information and education campaigns

Figure 3-1. Conservation Program Overview

In 2012, Waukesha adopted the 2012 Plan that established both water-savings goals as described in Section 1 and specific CEMs. These measures include both those required by NR 852 and additional measures to achieve their savings goals. This section summarizes achievements since 2012.

3.1 Summary of 2012 Water Conservation Plan

In the 2012 Plan, the recommended 5-year (2012–2016) implementation plan includes the following elements with projected water savings by CEM listed in Table 3-1 and shown in Figure 3-2:

- New and expanded fixture rebate measures to accelerate replacement of less efficient devices for residential, commercial, industrial, and public customers
- Expanded public education and information
- Additional customer water audits or inspections to design tailored customer demand management strategies
- Increase program data gathering and monitoring to measure program effectiveness

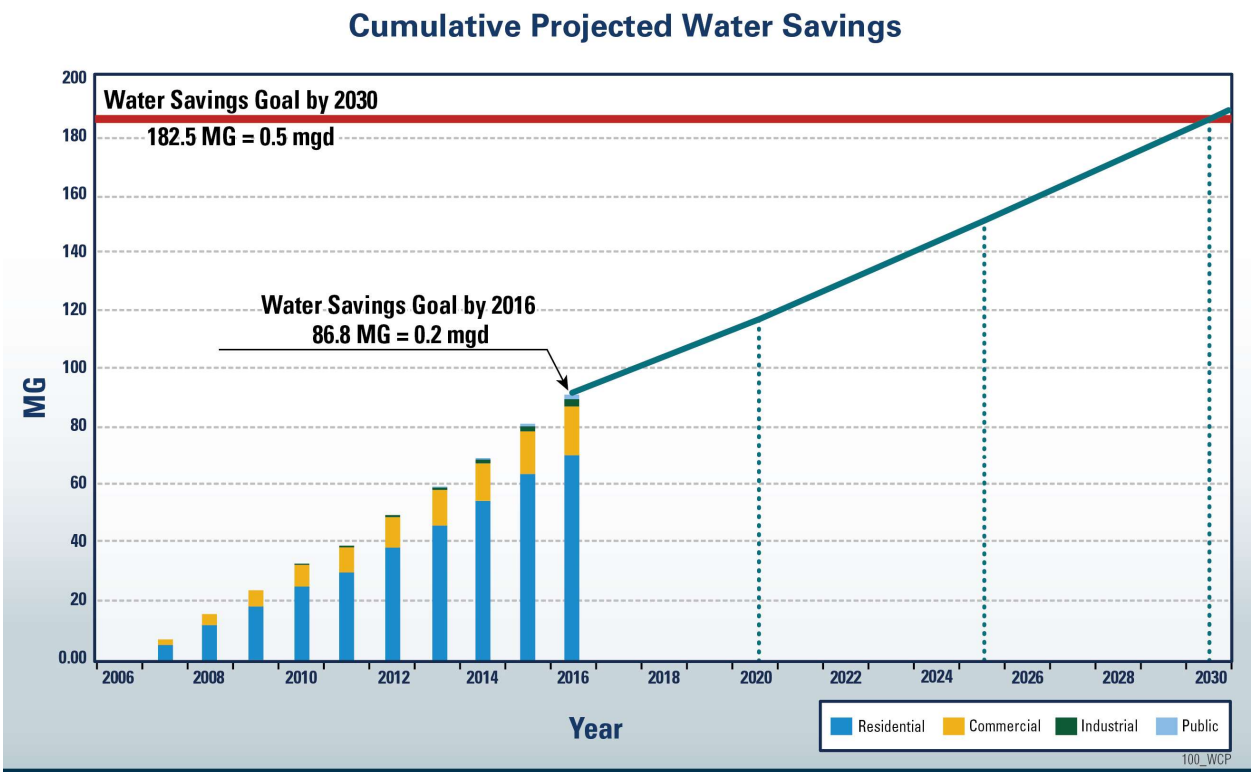
Table 3-1. Projected Water Savings for 2012–2016 in the 2012 Water Conservation Plan

Activity	Projected Water Savings (gallons)
Residential HETs, $100 rebate	7,325,700
Multi-family residential HET direct install, $100 rebate	113,000
Commercial tank-type HET, $100 rebate	34,500
Commercial valve-type HET	57,500
Industrial tank-type HET, $100 rebate	80,400
Industrial valve-type HET, $100 rebate	80,400
Public tank-type HET, $100 rebate	80,400
Public valve-type HET, $100 rebate	80,400
Residential water-efficient showerhead	866,200
Multi-family residential water-efficient showerhead	11,000

Activity	Projected Water Savings (gallons)
Commercial water-efficient showerhead	4,100
Industrial water-efficient showerhead	16,500
Public water-efficient showerhead	15,200
Residential indoor water-use surveys	73,000
Multi-family residential indoor water-use surveys	4,000
Commercial indoor water-use surveys	17,000
Industrial indoor water-use surveys	21,700
Public indoor water-use surveys	21,700
Commercial outdoor water-use surveys	N/A
Public outdoor water-use surveys	N/A
Commercial urinals, $100 rebate	93,100
Industrial urinals, $100 rebate	93,100
Public urinals, $100 rebate	93,100
Commercial spray-rinse valves rebates	1,414,300
Industrial spray-rinse valves rebates	1,414,300
Public spray-rinse valves rebates	1,414,300
Public HE clothes washer rebate	7,000

HET = high-efficiency toilet

Figure 3-2. Water Savings Goal and Projected Water Savings (2012 Plan)



The implementation strategy in 2012 began by building a strong foundation and support for the programs in the early years through public education and incentives for residential, public, and low-income customers and then expanded to include incentives for commercial, large multi-family, and industrial customers. As the program expanded, the City modified the programs to focus on activities with the highest potential for cost-effective water savings. This was done with tailored incentives for commercial and industrial customer accounts and by toilet replacements in large multi-family apartments.

3.2 Conservation Efficiency Measures

NR 852 requires all Public Water Supply (PWS) systems applying for a new or increased Great Lakes water withdrawal, diversion, or water loss to provide documentation showing implementation or completion of specified CEMs. Prior to the submission of its application for a Great Lakes diversion with return flow, the City implemented the CEMs and continued them since adoption of the 2012 Plan. The City will continue the best practices on an ongoing basis into the future. Table 3-2 provides highlights from implementation of the required CEMs from 2013-2021.

Table 3-2. Implementation Progress: Annual Highlights for Required CEMs

CEM	2013	2014	2015	2016	2017	2018	2019	2020	2021
PWS-1 Water-Use Audit	Water audits of public pools found leaks in the fall and repaired in the spring 2014 Water loss at 8.7%	Water loss at 11.2%	Water loss at 4.1%	Water loss at 5.5%	Water loss at 8.7%	Water loss at 6.3%	Water loss at 8.6%	Water loss at 6.4%	Water loss at 2.4%
PWS-2 Leak Detection and Repair Program	Fix a Leak Week Replaced 17,200 lf of mains	Additional online tools to help customers find leaks Leaks repair at public pools Replaced 11,135 lf of mains	Initiated Hydrant Leak Surveys 2 companies conducted water audits and repaired leaks or changed equipment Replaced 15,582 lf of mains	Replaced 21,830 lf of mains Inspected 2,088 hydrants and repaired leaks	Replaced and insulated laterals to eliminate need to run water during a freeze Replaced 8,156 lf of mains Inspected 1,717 hydrants and repaired 22 leaks	Replaced 10,390 lf of mains Inspected 1,288 hydrants and repaired 16 leaks	Replaced 16,224 lf of mains Inspected 1,933 hydrants and repaired leaks	Replaced 10,551 lf of mains Inspected 1,234 hydrants and repaired leaks	Replaced 8,383 lf of mains Inspected 1,174 hydrants and repaired leaks
PWS-3 Information and Education Outreach	Continued public information messages Held public meetings with giveaways and continued school-age education	Continued education programs and partnerships	Continued education programs and partnerships Launched new website	Continued education programs and partnerships	Continued education programs and partnerships Great Water Alliance held numerous open houses Received certificate from USEPA's Water Sense Program	Continued education programs and partnerships Participated in regional and national association meetings and conferences	Continued education programs and partnerships Great Water Alliance video series and newsletters	Continued education programs and partnerships Fewer public meetings due to COVID-19 pandemic	Continued education programs and partnerships Fewer public meetings due to COVID-19 pandemic
PWS-4 Source Measurement	All source water is measured	All source water is measured	All source water is measured	All source water is measured	All source water is measured	All source water is measured	All source water is measured	All source water is measured	All source water is measured

CEM	2013	2014	2015	2016	2017	2018	2019	2020	2021
PWS-R1 Distribution System Pressure Management	WWU manages system pressure in 10 pressure zones	WWU manages system pressure in 10 pressure zones	WWU manages system pressure in 10 pressure zones	WWU manages system pressure in 10 pressure zones	WWU manages system pressure in 10 pressure zones	WWU manages system pressure in 10 pressure zones	WWU manages system pressure in 10 pressure zones	WWU manages system pressure in 10 pressure zones	WWU manages system pressure in 10 pressure zones
PWS-R2 Residential Demand Management Program	Increased HET rebate to $100 Number of toilet rebates increased	Toilet rebate program continued	Added a pilot irrigation controller rebate program for a specific newly developed subdivision	Added a showerhead replacement rebate	Initiated the Rain Barrel Rebate Program 101 toilet rebates issued Conducted residential leak audits	92 toilet rebates issued	72 toilet rebates issued	Discontinued the Pilot irrigation controller rebate program for a specific newly developed subdivision due to lack of participation	Fewer rebates likely due to COVID-19 pandemic
PWS-R3 Commercial and Industrial Demand Management Program	Recognition given to large industry for their efficiency success HET toilet rebate program Worked with commercial sites to replace toilets La Casa de Esperanza toilet change outs	Innovative Site-Specific Water-Saving Grant Program Waukesha School District pool valve repair, chiller replacement and replace turf on athletic fields Carroll University and other large water user conservation measures	Added a pilot irrigation controller rebate program Pre-rinse spray valve rebate program started	Added a showerhead replacement rebate 2 multi-family customers replaced toilets 1 Site-Specific Grant awarded Waukesha School District changed on spray valves	229 multi-family toilet rebates issued One of top 15 industrial water users participated in Site-Specific Grant Program	87 multi-family toilet rebates issued	404 multi-family rebates issued	No Site-Specific Grants issued likely due to COVID-19 pandemic	No Site-Specific Grants issued likely due to COVID-19 pandemic

CEM	2013	2014	2015	2016	2017	2018	2019	2020	2021
PWS-R4 Water Reuse	WWU is required to return 100% of its effluent. Water reuse opportunities in utility supply, treatment, and distribution facilities are negligible: Administration Building plumbing fixtures have been retrofitted, landscaped areas are not irrigated, and water used in groundwater treatment process wastewater cannot be recycled because of high radium concentrations. Therefore, reuse is not cost-effective. The City provides incentives for industrial water reuse opportunities.	WWU is required to return 100% of its effluent; Analysis shows limited opportunities in the utility supply, treatment and distribution facilities (see 2013 for more detail.)	WWU is required to return 100% of its effluent; Analysis shows limited opportunities in the utility supply, treatment and distribution facilities (see 2013 for more detail.)	Onsite reuse by large industrial customer WWU is required to return 100% of its effluent Analysis shows limited opportunities in the utility supply, treatment and distribution facilities (see 2013 for more detail.)	WWU is required to return 100% of its effluent Analysis shows limited opportunities in the utility supply, treatment and distribution facilities (see 2013 for more detail.)	Onsite reuse by 1 of the top 10 industrial water customers WWU is required to return 100% of its effluent Analysis shows limited opportunities in the utility supply, treatment and distribution facilities (see 2013 for more detail.)	WWU is required to return 100% of its effluent Analysis shows limited opportunities in the utility supply, treatment and distribution facilities (see 2013 for more detail.)	WWU is required to return 100% of its effluent Analysis shows limited opportunities in the utility supply, treatment and distribution facilities (see 2013 for more detail.)	WWU is required to return 100% of its effluent Analysis shows limited opportunities in the utility supply, treatment and distribution facilities (see 2013 for more detail.)

CEM	2013	2014	2015	2016	2017	2018	2019	2020	2021
Tier 3 Additional CEMs	City Municipal Code modified to require efficient irrigation controllers and annual inspections			Sewer Credit Meter Ordinance Adopted	Increase in water rates for irrigation-only meters				Instituted monthly billing Irrigation rates increased

HET = high-efficiency toilet

lf = linear feet

USEPA = United States Environmental Protection Agency

3.3 Conservation Results through 2021

Section 2 provided information on water-use savings between 2012 and 2021 through analysis of production and billing data in a top-down approach. Changes in water use can be influenced by weather, economic conditions, and other factors. A bottom-up approach provides a method of estimating water savings directly attributable to CEMs. WWU uses the AWE Water Conservation Tracking Tool (AWE Tool) to estimate savings resulting from the conservation program. This section summarizes the savings achieved since 2012.

3.3.1 Methodology

Following the publishing of NR 852 in 2011 and prior to the development of the 2012 Plan, the City evaluated numerous CEMs using Version 2.0 of the AWE Tool. The tool is a water conservation calculator that is recommend by the WDNR for estimating water savings and costs associated with CEMs. The initial analysis using the AWE Tool resulted in a short list of candidate CEMs for further evaluation by WWU and stakeholders. Stakeholders were engaged in the water conservation planning process through an online survey, strategic customer interviews, and participation in the water conservation stakeholder committee. Engaging the City's customers and active community members provided valuable insights regarding the level of awareness of the need for conservation and ways to achieve it. The stakeholder committee input helped establish a baseline for the City's approach to future public information and education activities.

Subsequent to the 2012 Plan, and as required by Wisconsin Statutes Chapter PSC 185.97 Standards for Water Public Utility Service, WWU has annually tracked and reported CEM program progress in the AWE Tool for the purpose of reporting annual water savings along with overall cost effectiveness of each CEM.

3.3.1.1 AWE Tool Overview

The AWE Tool is a macros-enabled Microsoft Excel workbook that is navigated via separate worksheets that are grouped into three groups: User Input Sheets, Tracking Tool Output Sheets, and Background Calculation and Data Sheets. The first two categories of worksheets are where the majority of user interaction occurs. Within each User Input worksheet, there are separate modules that guide users through various inputs and calculations. The tool comes pre-loaded with a library of pre-defined conservation measures.

3.3.1.2 Transitioning Between Version 2.0 and Version 4.0

For the 2012 Plan and in subsequent annual water conservation reports, WWU used Version 2.0 of the AWE Tool to estimate conservation water savings. Since 2012, the AWE Tool has been upgraded in collaboration with AWE partners and members, while also incorporating the latest findings from relevant peer reviewed literature. As significant advancements have been made over the last 10 years, it was determined beneficial to the Plan Update to migrate WWU conservation program data to the current AWE Tool Version 4.0. Specific advancements in the tool include:

- **Additional Customer Classes.** With the addition of Multi-Family and Commercial Industrial Institutional (CII) Irrigation Meter, it is easier to track and quantify targeted CEMs.
- **Water Savings for Landscape Conservation.** A module has been added that allows the user to utilize the models' build-in landscape water-use calculator, or the users own estimates can be used.
- **Expanded Pre-Defined Conservation Measures**. There are now 50 pre-defined conservation measures.
- **Updated Standards Modules.** Modules have been updated and expanded throughout to reflect changing codes and standards.
- **New Modules.** Several new modules have been added including a price response module that estimates the effect marginal water-cost changes have on demand, as well as a water loss module.

The most significant changes between the versions of the tool occurred in the user interface, the user inputs, and the tool calculations.

For WWU, utility customer information was aligned with AWE Tool customer classes as shown in Table 3-3.

Table 3-3. AWE Tool and WWU Customer Classes

AWE Tool Customer Classes	WWU Customer Classes
Single-Family	Residential
Multi-Family	Multi-Family Residential 2 Family Residential 3 Family
CII Irrigation Meter	Irrigation
CII Common Meter	Commercial Federal Industrial Municipal Other Public State

3.3.2 Results

Table 3-4 summarizes the CEMs and number of participants entered into the AWE Tool and the model-estimated cumulative savings that have been achieved since inception of the program in 2006.

Table 3-4. Conservation Program Element Participation Rates and Estimated Savings 2006–2021

Activity	Number of Participants	Actual Water Savings (cumulative MG)
Residential HE Toilet, $25 Rebate	89	0.7
Commercial Tank-Type HE Toilet, $25 Rebate	1	0.01
Residential HE Toilet, $100 Rebate	952	8.0
Commercial HE Toilet, Large Multi-family, $100 Rebate	1,377	13.7
CII Grant, Tomorrow's Choice, $5,000	1	0.1
Commercial CII Spray-Rinse Valve Grant, $70	33	0.14
Public CII Spray-Rinse Valve $70 Grant	25	0.10
CII Grant, City Hall Toilet Replacement, $1,000	1	1.4
CII Grant, MetalTek, $1,000	1	4.0
CII Grant, Navistar, $1,000	1	15.0
CII Grant, Golden Guernsey, $1,000	1	1.9
CII Grant, GE Healthcare, $1,000	1	0.3
La Casa Village HE Toilet, $50 Rebate	40	0.4
CII Grant, Horeb Pool Leak Investigation, $1,500	1	0.4
Waukesha South Pool Valve, $0	1	0.3
CII Grant, Waukesha School District Chiller/Condenser Units, $15,000	1	0.6
CII Grant, Carrol Natatorium (Van Male) Upgrades, $2,500	1	0.8
CII Grant, Eaton/Cooper - Recirculating Pump, $10,000	1	3.1
CII Grant, Eaton Lincoln Ave Chiller Unit, $11,000	1	3.4

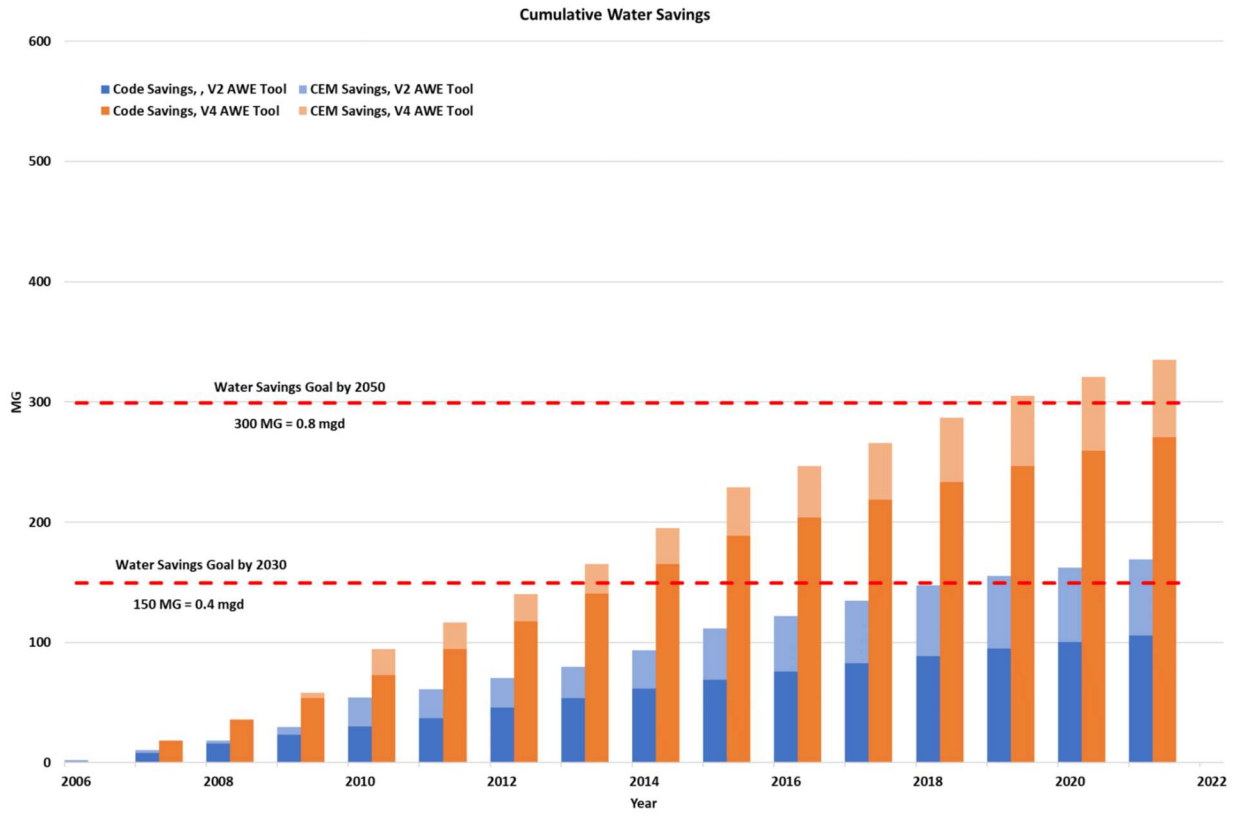
Activity	Number of Participants	Actual Water Savings (cumulative MG)
CII Grant, Waukesha Memorial Hospital Vacuum Pump Replacement, $8,400	1	2.6
CII Grant, Eaton Badger - 2nd Recirculating Pump, $10,000	1	3.1
Waukesha Housing Authority Showerhead Grant	150	0.05
Residential Low Flow Showerhead, $25 Rebate	55	0.02
CII Grant, Alloy Products - Wastewater Recycling System, $1,800	1	1.0
Industrial Tank-Type HE Toilet, $50 Rebate	12	0.2
Residential Rain Barrel, $20 Rebate	51	0.03
CII Grant, Eaton Lincoln Ave Chiller #2 & #3, $15,000	1	4.6
Total	2,801	65.8

HE = high efficiency

As discussed in Section 2, the overall and per capita water use within WWU's service area is trending downward. Using the AWE Tool, it is clear that a significant amount of the savings is the result of the City's three-pronged approach to conservation: incentives, education, and policies.

Figure 3-3 presents cumulative water savings from CEMs and Code Savings (water-use reduction resulting from changes in plumbing fixture standards and codes) through 2021 estimated with Version 2.0 and Version 4.0 the AWE Tool. Also shown are the average day demand water-savings goals for WWU by 2030 and 2050.

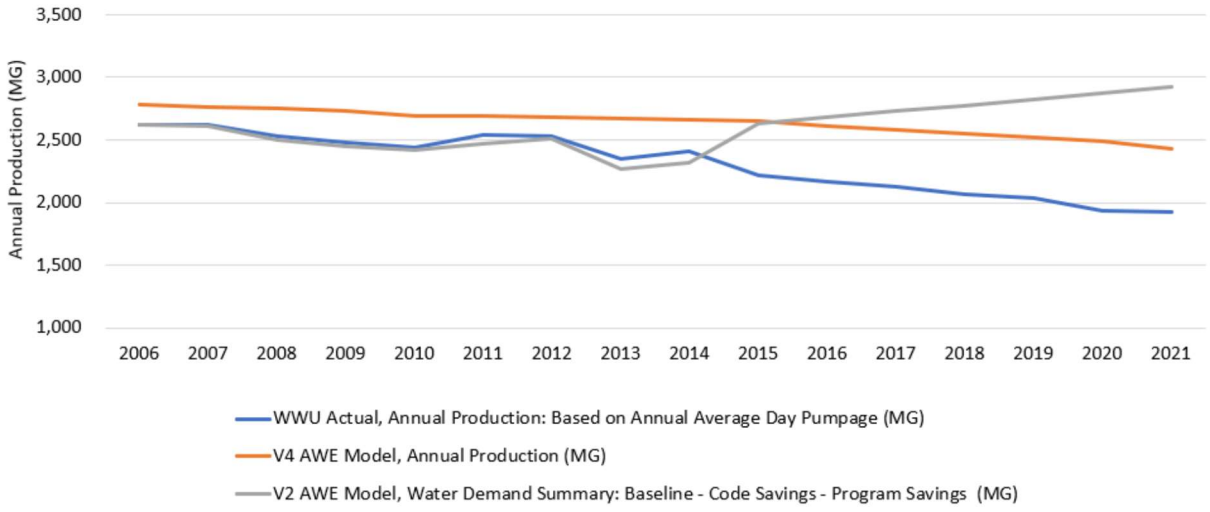
Figure 3-3. Cumulative Water Savings through 2021



The estimated cumulative water savings from CEMs is essentially the same using both versions of the tool; however, the estimated cumulative water savings attributed to Code Savings is significantly greater using Version 4.0 compared to Version 2.0. To conduct a quality control review of the Version 4.0 model-estimated Code Savings, two checks were conducted:

1. AWE Tool technical support services were enlisted to review model input and output.
2. WWU water production data was compared to AWE Tool water production estimates. Version 4.0 output aligns with actual data reasonably well and more closely than Version 2.0 output as shown in Figure 3-4.

Figure 3-4. Actual and AWE Tool Water Production Estimates Comparison



Based on AWE Tool Version 2 water-savings estimates, WWU exceeded the 2030 goal (reduce average day demand by 0.4 mgd) during 2019 and is on track to meet 0.8-mgd savings target by year 2050 (the complete development/buildout condition). Based on the Version 4 water savings estimates, the 2050 goal was achieved during 2019.

3.4 Best Practices and Case Studies

Since beginning its conservation program in 2006, WWU has adopted best practices that are key to the water savings achieved. The following subsections highlight some of the best practices along with case studies that demonstrate those practices in action.

3.4.1 Best Practices

- **Lead by example**—WWU sets an example for its customers by maintaining an efficient water distribution system, fixing leaks, and replacing aging toilets and fixtures with high-efficiency units. The City of Waukesha, Waukesha County, and Waukesha School District have installed water-efficient fixtures in public buildings. Further, the school district replaced athletic field grass with artificial turf.
- **Work with partners**—Collaboration with partners has been a key to WWU's success. The utility works with non-profit organizations locally and statewide, business and trade groups, schools, and others to provide public information, host events, and implement conservation measures.
- **Provide a flexible program with resources for all customers**—WWU's conservation program includes policies, incentives, and educational materials for all of its customers. The program is designed for and managed through continuous performance review, adaptation, and optimization. By implementing a variety of promising CEMs and evaluating measured results, WWU is able to identify ways to meet

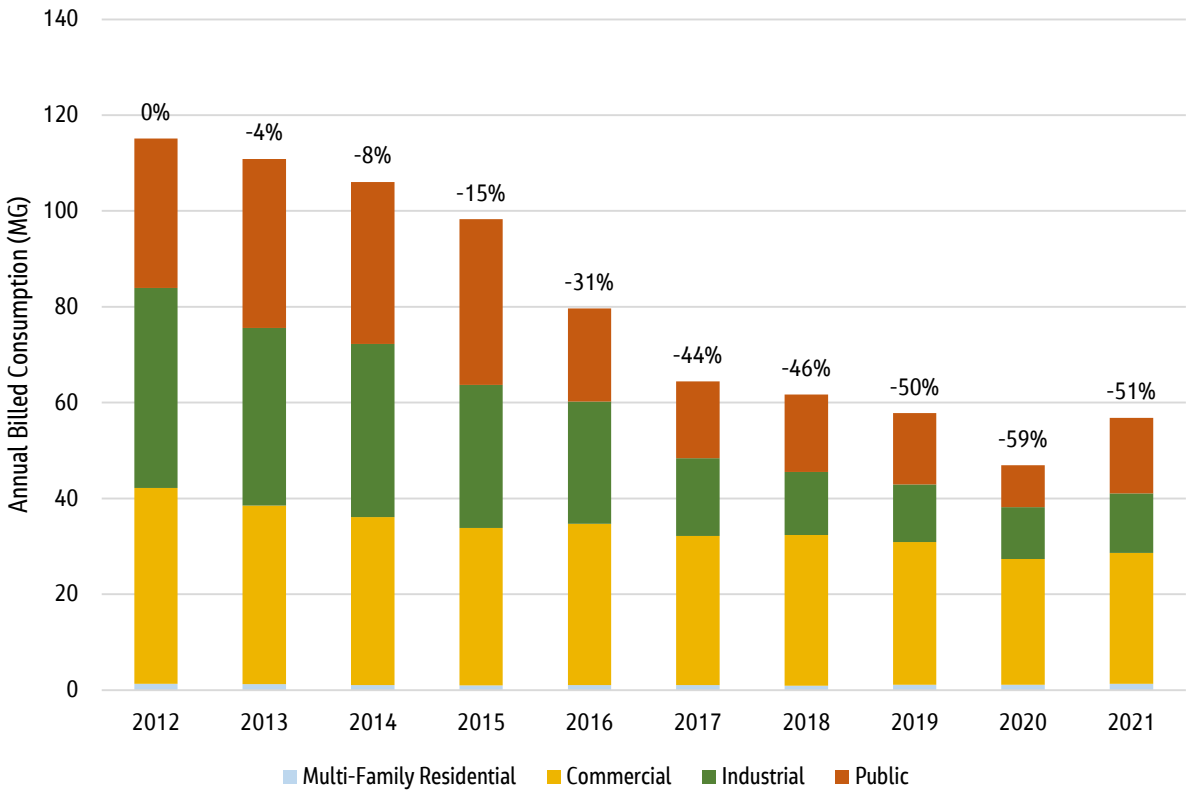
customer needs and cost-effectively save water. If offered incentives do not attract customer participation—for example, the Pilot Irrigation System Controller Rebate offer for a specific new development—the CEM is discontinued. Conversely, successful Innovative Site-Specific Grants that allow non-residential customers to identify unique opportunities to reduce water use and receive financial incentives proportional to measured water savings are strongly supported. WWU uses water billing data to target incentives for highest water users in all customer classes. These approaches accelerate water savings while minimizing program costs.

- **Maintain and increase customer water-use awareness**—In addition to programmatic water conservation education and outreach, WWU enforces its outdoor irrigation restrictions, implemented irrigation water rates in 2017, and converted from quarterly to monthly customer billing in 2021.

3.4.2 Effectiveness of Innovative Site-Specific Grant Program

Since 2012, WWU has issued 19 Innovative Site-Specific Grants. Figure 3-5 presents water-use reductions from customers that have received incentives. While many factors contribute to water savings, there has been an approximate 50% reduction since 2012.

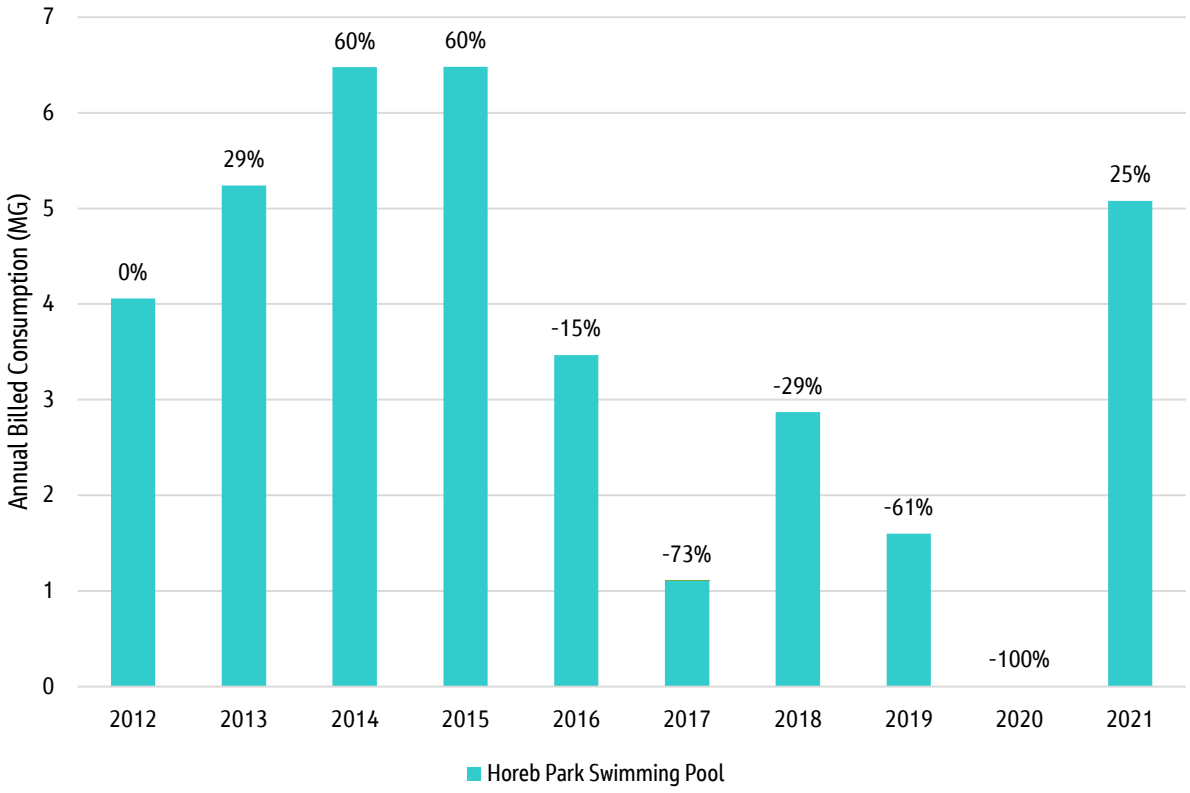
Figure 3-5. Consumption Data for All Accounts that Received Site-Specific Grants



3.4.3 Municipal and Public Case Studies—Swimming Pools

During 2013, WWU worked with the Waukesha School District and the City of Waukesha to perform audits of two public swimming pools—Waukesha South High School pool and the city pool located at Horeb Park. The following year, the District replaced a control valve actuator to prevent the pool from draining during power failures. At the Horeb Park pool, several leaks were identified in the fall of 2013 and repaired in the spring of 2014. Figure 3-6 shows reduced water consumption at the Horeb Park pool following the leak repair. In 2020, the pool was closed due to the COVID pandemic, resulting in no water use that year. The spike in 2021 was attributed to leaks found in the plaster pool liner. In 2022, the City replaced the pool liner and stopped the leaks.

Figure 3-6. Consumption Data for Horeb Park Swimming Pool Before and After Site-Specific Grant

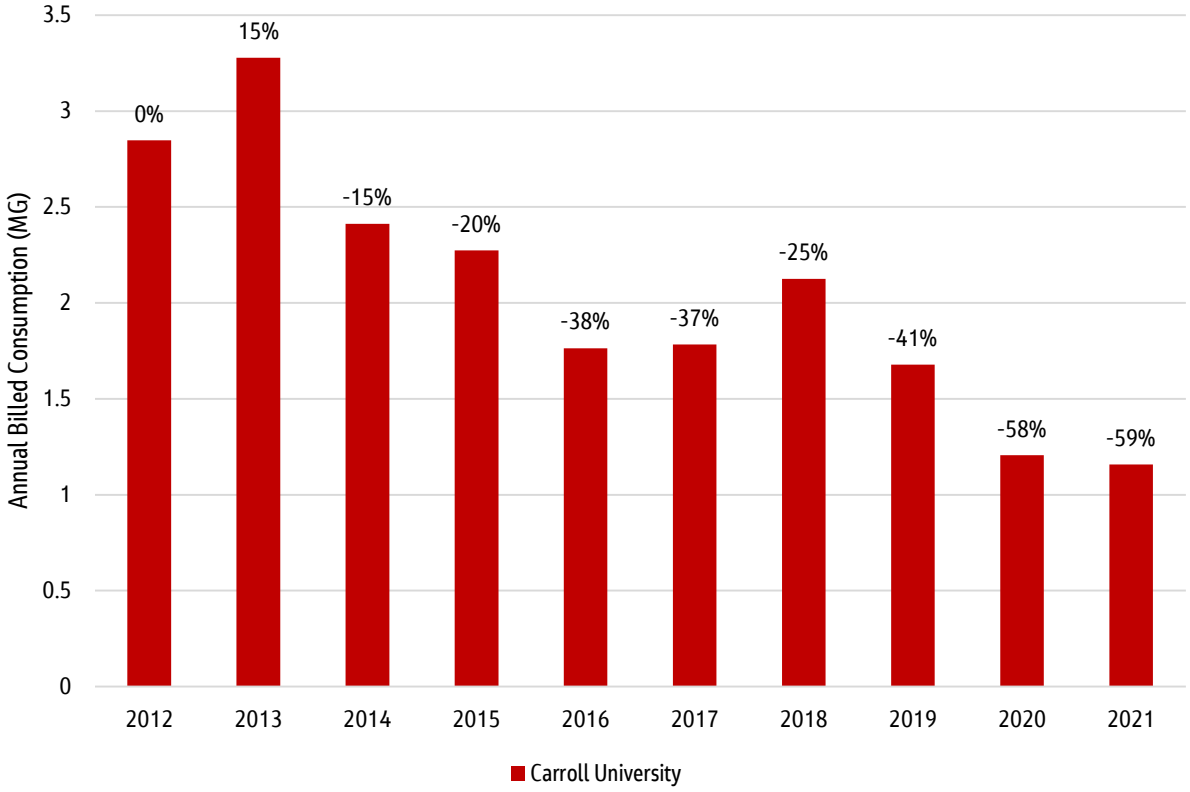


3.4.4 Commercial Case Study—Carroll University

Carroll University reduced its water use over the years through a series of conservation measures and active awareness campaigns. The university also partnered with the Waukesha School District and Waukesha County with input from the utility to develop local and regional environmental educational materials including water conservation.

In 2014, Carroll University installed domestic water heaters, thereby eliminating the need to import water through a lateral from a distant building and replaced water softeners, clothes washers, toilets, sinks, urinals, shower heads, and pre-rinse spray valves with high-efficiency models. Figure 3-7 shows a downward trend in water consumption since the university implemented conservation measures.

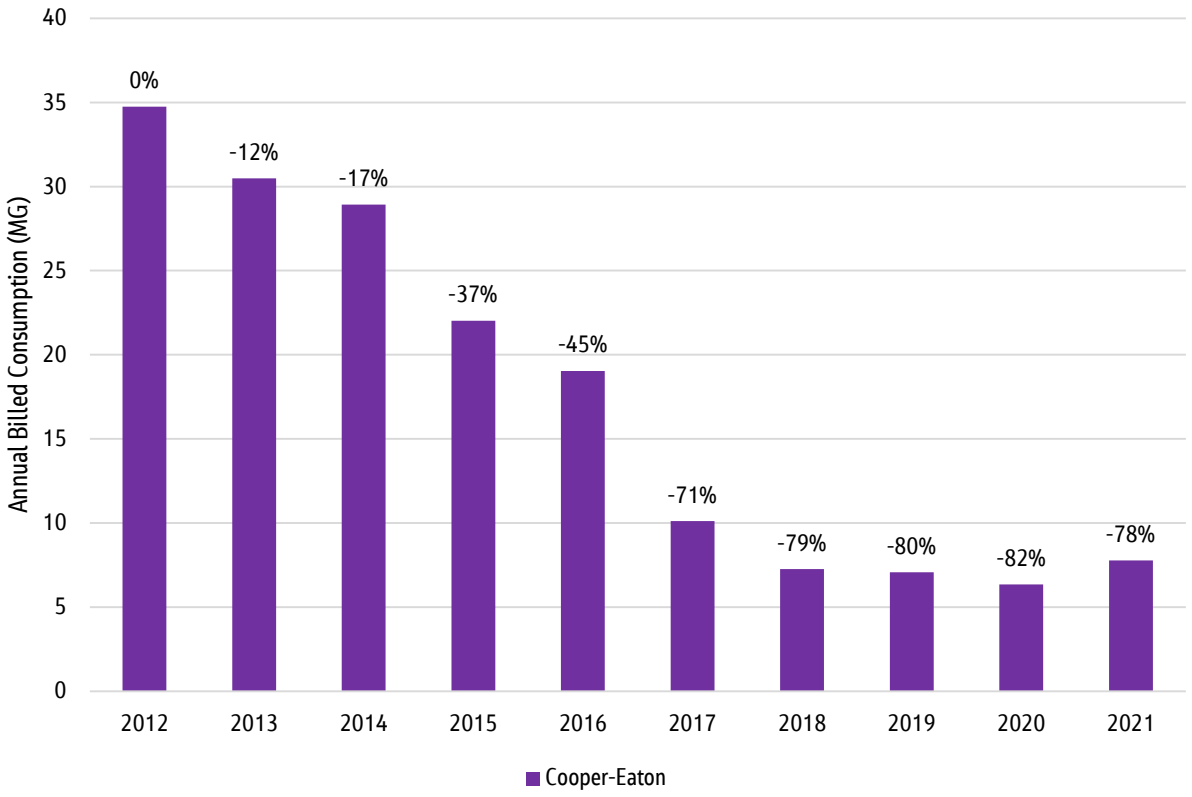
Figure 3-7. Consumption Data for Carroll University Before and After Site-Specific Grant



3.4.5 Industrial Case Study—Process Equipment and Onsite Reuse

Eaton-Cooper produces 3-phase transformers, which is a fairly water-intensive manufacturing process. In 2015, they replaced a once-through cooling system with two large water chiller recirculation systems with multiple cooling loops at one of their locations. This innovation is estimated to save 6.2 MG per year. At a second location, they installed three recirculating water chillers—one in 2015 and two in 2018. Figure 3-8 shows a significant reduction in their water use when the water-conserving equipment was installed.

Figure 3-8. Water-Use Data for Cooper-Eaton Before and After Site-Specific Grants



4. Potential Conservation Efficiency Measures Evaluation

In addition to infrastructure management measures, successful water conservation programs across the country incorporate a combination of public information, incentives, and regulations to achieve efficient water use across their service area. CEMs are focused on operating a water-tight water treatment and distribution system, public and school-age education, and a portfolio of measures to address water used by utility customers. To increase the effectiveness of water conservation programs, utilities generally select a small number of CEMs for implementation initially and modify the program as needed over time given to regulatory requirements, budget and staffing constraints, detailed water-use analysis, and customer input.

4.1.1 Infrastructure Management

Infrastructure management CEMs to be implemented during the planning horizon include the following activities:

- Continue use of the City's hydraulic distribution system model to evaluate and further optimize pressure and customer demand changes; conduct a formal system pressure management evaluation after converting to Lake Michigan water and modifying the system hydraulic grade line.
- Maintain implementation of the present leak mitigation measures including water main replacement, rapid repair of identified leaks, and the Hydrant Leak Survey program.
- Continue to measure source water.
- Continue to individually meter and bill customers on a monthly basis.
- Continue to conduct water-use inspections and audits.

4.1.2 Public Information and Education and School Education

No conservation program can be successful without the informed participation of its customers. Therefore, the City will continue to gather data and work closely with customers so that it can measure the water saved from changed water-use behaviors and their associated costs. Specific outreach activities the City is considering in the near future include the following:

- Refresh its website's online library of resources including conservation tips, online water-use calculators, leak detection guidance, information on the sprinkling ordinance and other policies, and conservation incentives. The Water Conservation Resource Library will include information for all customer classes and content on commercial dishwashers, ice makers, steamers, car washes, and food services; cooling technologies; water use audits; irrigation systems; water-efficient landscaping; and the benefits of using Waster-Sense labeled products.
- Maintain and elevate customers' water-use awareness through enforcement of the sprinkler ordinance and information about available irrigation water rates and discretionary water-use.
- Continue to provide presentations to a broad cross-section of customers, community groups, service organizations, and business groups.
- Continue school-age education and engagement.
- Continue partnerships locally, regionally, and statewide.

4.2 Conservation Program Measures to Continue

As detailed in previous sections, actual water-use savings have exceeded the goals established in the 2012 Plan. A combination of public information, incentives, and policies provide a strategic balance that WWU will continue during the 5-year planning horizon. In addition to maintaining an efficient treatment and distribution system as noted previously, Table 4-1 summarizes programs that will be extended.

Table 4-1. Conservation Program Measures to be Extended

Program	Implementation Methods
Public Information and Education	▪ WWU website ▪ Great Water Alliance website and information hub ▪ Newsletters, bill stuffers and bill messages (WWU and City of Waukesha) ▪ Newspaper articles, public service announcements ▪ Social media ▪ Brochures and advertisement content for City Parks and Recreation Department Activity Guide ▪ Videos ▪ Public outreach and community meetings ▪ School program ▪ Street signs (sprinkler ordinance requirements) ▪ Yard signs (Brown Lawn Campaign or similar campaigns) ▪ Giveaways ▪ Customer water-use audits and leak alerts
Incentives	▪ Toilet Rebate Program ▪ Shower Head Rebate Program ▪ Rain Barrel Rebate Program ▪ Innovative Site-Specific Water-Saving Measures Grant Program – This program has been highly successful in saving large volumes of water and achieving a high-benefit-cost ratio ▪ Implementation focus will be on the top water users in various customer categories
Policies	▪ Sprinkling Ordinance and Enforcement ▪ Efficient Irrigation Standards ▪ Increasing block rate for residential users ▪ Monthly billing

4.3 Potential New Program Measures Considered

In addition to the conservation programs recommended for continuation, a number of new measures were considered during the planning process as summarized in Table 4-2.

Table 4-2. Potential New Conservation Measures

Program	Implementation Considerations
Enhanced customer leak detection through data collectors	Installing data collectors (antennas) on water towers throughout the distribution system would provide WWU the ability to identify customer leaks in "real time." The program would need to be phased in given the cost of the equipment. Use of software to provide alerts when unusual spikes in water use indicating potential leaks occur would provide real-time customer awareness of leaks.
Reuse	As noted in Section 3, WWU must return all effluent resulting from Lake Michigan diversion, so municipal reuse is not a viable option. Through the Innovative Site-Specific Grant Program, however, industrial onsite reuse has proven effective and will continue to be investigated.

Program	Implementation Considerations
Water softener disconnection / elimination	The USEPA estimates that, on average, residential water softeners use 25 gallons of water or more per day, or up to 10,000 gallons per year. Due to the chemistry of Waukesha's current groundwater source, most residential customers use water softeners. An estimated 13,000 residential softeners are being used today. Once the surface water source is online, water softeners will not be needed. A program to encourage disconnection and abandonment has the potential for significant water savings. Implementation could include information on why softeners will not be needed, a rebate, or other incentive such a haul-away program.
Ice-Maker Replacement	Encouraging ice-maker replacement could be a standalone rebate program or part of the Site-Specific Grant Program.
Rain / Freeze Sensor	Rain and freeze sensors work by turning off automatic irrigation systems based on soil moisture, low temperatures, and other conditions. Materials developed for the now discontinued Pilot Irrigation Control Rebate program could be used to jump start a rebate program.
Washing Machine Rebate	Clothes washers are becoming increasingly efficient. A program to encourage their replacement could increase savings – especially in commercial facilities or a multi-family units or universities with communal laundry rooms. Encouraging their replacement could be a standalone rebate program or part of the Site-Specific Grant Program.
Low-income plumbing assistance program	Plumbing assistance programs are designed to provide plumbing contractors for low-income customers that cannot afford to repair leaks or replace inefficient fixtures. Often, a utility will contract with plumbing contractors who are assigned to repair leaks to qualifying customers. Income qualification is often determined in partnership with public assistance programs such as County Health Departments or similar governmental units.
Public / low-income housing retrofit program	This program would focus on installing high-efficiency fixtures into housing units. Often rebates are not effective since residents may not be able to invest in fixture and wait for the rebate. A program could be designed to include bulk purchases of fixtures or contracting with plumbers to install the fixtures. Other programs provide vouchers that can be redeemed at home improvement stores or plumbing houses.
Commercial sector community challenge	Some utilities have organized highly publicized challenges for restaurants, hotels, or other commercial sectors. The incentive for some of these programs are recognition, media coverage, and related publicity rather than financial incentives or rebates; however, the Site-Specific Grant Program could be used.

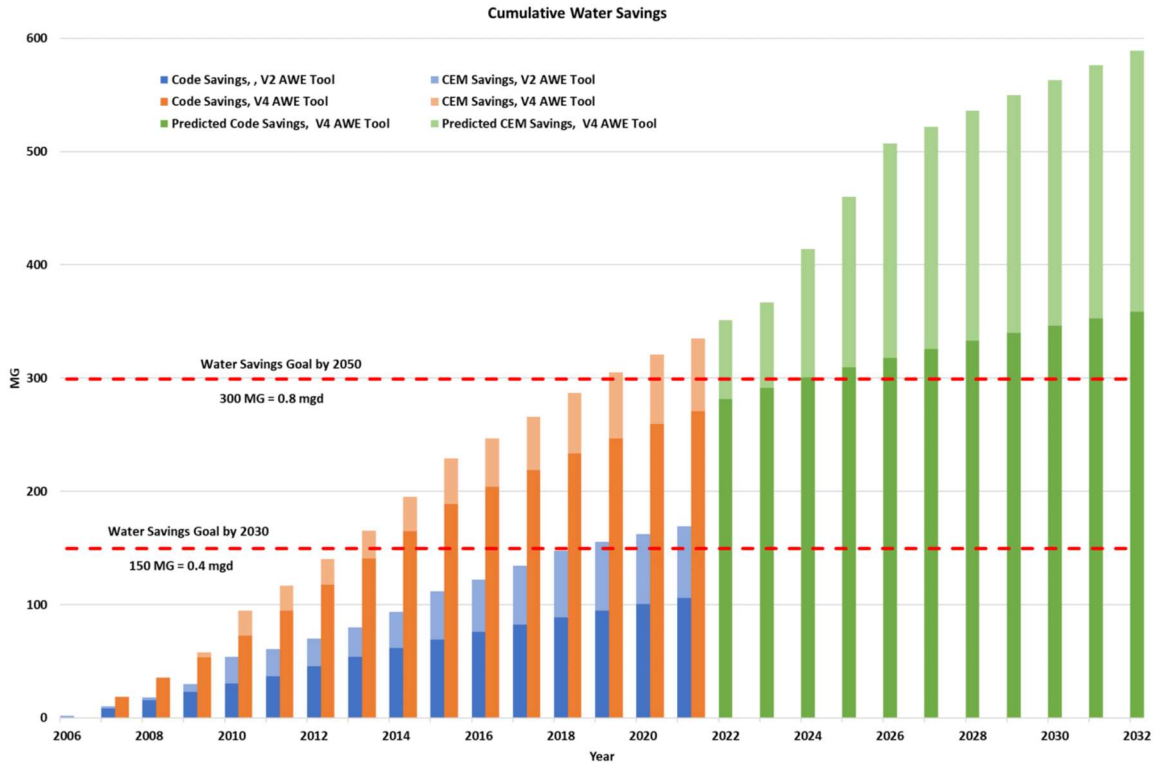
4.3.1 AWE Tool Results

Projected savings from several of the programs identified in Table 4-2 can be evaluated using the AWE Tool and assumptions such as participation levels, existing water use, and related factors. Other measures such as public information, water challenges, and similar measures are not quantifiable. Generally, programs with a benefit-cost ratio of one or greater are considered cost-effective. Table 4-3 presents results from evaluating considered conservation programs, and Figure 4-1 is a graph combining savings to date with potential total savings from potential measures presented in Table 4-3 as well as passive savings resulting from technology standards and code changes (code savings).

Table 4-3. Forecast Outcomes Attributable to Potential New Conservation Measures

Program	Water Savings, 2022 through 2035 (MG)	Utility Benefit-Cost Ratio	Society Benefit-Cost Ratio
Enhanced Customer Leak Detection; Data Collectors	0.53	0.01	0.01
SF Continuation of $100 HET Rebate	10.17	2.7	1.1
SF Continuation of $25 Showerhead Rebate	0.03	0.1	0.5
SF Continuation of $20 Rain Barrel Rebate	0.02	0.1	0.0
MF Continuation of $100 HET Rebate	22.60	3.0	1.5
MF Public/Low-Income Retrofit Program	5.25	2.0	2.0
MFR Shared Washer Rebate (WF <=4)	3.38	0.7	1.3
CII Continuation of $100 HET Rebate	1.98	3.8	1.9
CII Washing Machine Rebate	3.38	1.0	0.8
CII Continuation of $35 Spray-Rinse Valve Rebate	0.38	1.2	5.4
SF Low-Income Plumbing Assistance Program	0.21	0.1	0.3
CII Continuation of Large Landscape Water Audit	1.10	0.5	0.5
CII Continuation of Innovative Site-Specific Grant Program	43.95	4.7	4.7
SF Water Softener Disconnection	94.91	22.5	22.5
CII Ice-maker Replacement	4.38	3.9	0.2
SF Landscaping Rain/Freeze Sensor	2.86	0.2	0.0
Forecast Total	195	14.5	14.3

Figure 4-1. Combined Actual and Proposed Program Estimated Water Savings



The estimated water savings shown in Figure 4-1 do not include estimated savings in response to increased price. WWU has significant water rate increases scheduled in the next few years. When historical and future rates are input to the AWE Tool, additional cumulative water savings are estimated. These price increase response water savings are anticipated to occur but are not included in the projected cumulated water savings at this time. It is recommended that these estimated water savings be reviewed and potentially included in the cumulative water savings total in five years, after the rate increases have gone into effect.

Further, the estimated savings present in 4-1 demonstrate that not all of the conservation measures evaluated in Table 4-3 are needed to achieve the 2030 and 2050 savings goals.

5. Conservation Program Implementation Plan

With the progress made to date, and anticipated water savings in response to rate increases and discontinued use of water softeners, the water conservation program for the next 10 years will focus on maintaining – rather than significantly expanding – program activities. Projected water savings, benefits, costs, recommended program budget, and a proposed implementation schedule are provided through 2027. With the significant changes to WWU operations and regulatory compliance reporting anticipated with the transition to a Lake Michigan water supply in 2023, a review of the conservation program is recommended in 2027.

5.1 Projected Water Savings

As noted, WWU achieved its 2030 savings goal during 2019 based on savings estimated using Version 2.0 of the AWE Tool and achieved its 2050 savings goal during that same year using Version 4.0 of the AWE Tool with the revised estimates of Code Savings driving most of the difference in results. Additionally, the utility is forecasting steep increases in water rates as the costs of securing the City's water future accrue; conservation is a service to help customers by reducing their usage and monthly bills. The AWE Tool was used to estimate the projected water savings from conservation program measures and from passive savings that are the result of plumbing code changes that require water-efficient fixtures. Table 5-1 and Figure 5-1 summarize the estimated water savings since 2006 and the projected water savings from the recommended CEMs through 2027. The result is over 200 MG expected to be cumulatively saved through 2027, which indicates the City will be in a strong position to achieve its water-savings goal of 0.8 mgd by 2050.

While the conservation program gradually expanded from 2006 through 2021, the program will now focus on maintaining the conservation measures with the highest potential for cost-effective water savings within all customer classes and concentrate efforts on the City's top water users. These actions will ensure a strong return on the City's investment while maintaining customer satisfaction and utility service standards.

Table 5-1. Estimated Cumulative Conservation Program Water Savings by Customer Class, 2006–2027

Customer Class	Conservation Program Water Savings (MG)				
	2023	2024	2025	2026	2027
Single-Family	10	11	11	12	12
Multi-Family	17	19	20	22	24
CII Irrigation Meter	0	0	0	0	0
CII Common Meter	50	53	56	60	64
Total (MG)	**77**	**82**	**87**	**93**	**99**
Total (mgd)	0.21	0.22	0.24	0.26	0.27

5.2 Other Projected Benefits

Water conservation provides other benefits to the City and its customers, including the following:

- Reduced wastewater pumping and treatment costs
- Reduced water pumping and treatment costs
- Reduced volume of water needed to meet projected future water demands
- Fewer greenhouse gas emissions from water and wastewater treatment and pumping

Table 5-2 summarizes estimated projected savings resulting from the implementation of water-saving CEMs.

Table 5-2. Estimated Savings from Utility-Avoided Costs

Avoided Cost Type	2023	2024	2025	2026	2027
Water Supply	$5,309	$5,654	$5,999	$6,412	$6,826
Water Distribution	$20,573	$21,909	$23,245	$24,848	$26,451
Wastewater Collection and Treatment	$21,538	$22,937	$24,336	$26,014	$27,692
Total	$47,420	$50,500	$53,579	$57,274	$60,969

5.3 Projected Program Costs

Annually, WWU funds the water conservation program with about $62,000 from water utility revenues and $30,000 from the Clean Water Plant (City of Waukesha Wastewater Treatment Plant). Program funding is used for rebates, customer water-use audits, public education and outreach, program administration, and performance auditing, customer service, annual reporting, and plan updates. It is anticipated that program costs will remain approximately the same during this planning horizon with some adjustments for inflation and related factors.

5.4 Conservation Program Elements

The program elements forecast to be implemented during the 10-year planning period are designed to continue the momentum of WWU's conservation success and maintain the program to prevent erosion in water savings over time. Table 5-3 summarizes forecasted program elements for the first 5 years. Implementation status will be reviewed in annual reports. The implementation strategy is designed to maintain strong community support through public education and incentives for residential water users. Voluntary conservation would be expected to lead to the greatest savings, particularly for existing homes, businesses, industries, and institutions. Throughout the planning period, measures would be emphasized within various customer "markets" to affect the greatest savings and the lowest costs.

5.4.1 Conservation Program: 2023-2027

Administrative needs over the 5-year implementation phase for the plan includes additional customer service representative training and reporting activities to effectively communicate and manage the conservation incentive programs. The tasks and related budget requirements are shown in the proposed budget described earlier in this section. The administrative requirements could include contracts for purchasing or installation of conservation fixtures, an efficient rebate tracking and accounting method that would apply credits to customer accounts, and similar activities. Data management efforts are anticipated to increase over time as the conservation program is expanded.

5.4.2 Conservation Program Recommendations: 2028-2032

Given the significant changes anticipated for WWU over the next 5 years, including water conveyance of Lake Michigan water, changes in system operating pressures, water rate increases, and other factors, it is recommended that WWU conduct an informal refresh of its conservation program after 5 years (in 2028). This refresh would incorporate an update to system-wide production data, utility costs, water-use savings, and program participation. The water softener discontinuation program is expected to result in not only substantial water-use savings, but also improvements to effluent discharge water quality, which may result in additional cost avoidance not included in this update's utility-savings estimates presented in previous sections.

Table 5-3. Near-Term Program Elements (Years 1 to 5)

Program Element	Actions
Municipal Infrastructure	▪ Continue hydrant surveys, leak audits, large meter calibration and main replacement, pressure management, and other distribution system measures. ▪ Work with City, County, School District, and other governmental entities to identify potential public facility retrofit opportunities. ▪ Identify top 1 to 5 parks with high outdoor water use and estimate retrofit costs. ▪ Prepare for data collector installation program to provide real-time customer monitoring. Procurement and installation are estimated to be a 6- to 10-year program. Consideration may be given to using a software program to "read" data and send leak alerts.
Public and School Education and Information	▪ Continue school programs and tours. ▪ Continue to collaborate with the county and other groups for speaker series on water conservation. ▪ Continue partnerships to spread conservation messages and events. ▪ Update website with additional conservation resources.
Rebates and Incentives: Residential	▪ Continue $100 HET rebate and publicize program. ▪ Continue showerhead rebate program. ▪ Continue leak notifications and water audits. ▪ Consider holding a HET distribution event to distribute a target number of toilets in 1 day. ▪ Continue to work with Waukesha Housing Authority and non-profits on retrofit program as part of the HET and showerhead rebate program. ▪ Consider a pilot program with Waukesha Housing Authority for minor plumbing and leak repair (combined with a fixture replacement program). ▪ Consider a washing machine rebate for shared laundry facilities in multi-family housing or as a Site-Specific incentive. ▪ Begin planning/implement a water softener discontinuation program with the Clean Water Plant.
Rebates and Incentives: Commercial, Industrial and Institutional (Public)	▪ Continue HET rebates. ▪ Continue leak notifications and data logs. ▪ Continue spray-rinse valve program. ▪ Continue innovative site-specific incentives. ▪ Consider a washing machine rebate for commercial laundromats or as a site-specific incentive.
Policies, Regulations, and Enforcement	▪ Continue to administer and publicize sprinkling ordinance. ▪ Continue to publicize irrigation ordinance.
Reporting, Monitoring, and Plan Updates	▪ Streamline databases to facilitate auditing and reporting. ▪ CEM effectiveness audit/monitoring. ▪ Prepare and submit annual report to PSC.

6. Summary

WWU has a cost-effective water conservation program that meets the regulatory requirements of NR 852 and PSC 185 administered by WDNR and the PSC, respectively. An analysis of water savings achieved since the 2012 Plan was implemented demonstrates that by 2021, WWU has exceeded savings goals established for 2030 and 2050. Because water conservation savings can erode as water-using fixtures and equipment age and if customers' behaviors change over time, WWU plans continue to maintain its conservation program for residential, commercial, industrial, and public customers.

Additionally, in light of anticipated changes over the past several years, including introduction of Lake Michigan water and associated reduction in water softener use for most customers, as well as planned water rate increases, water-use patterns are expected to change. It is recommended that the conservation plan and program be reviewed in about 5 years (2027–2028).

The Plan Update was unanimously approved by the WWU Commission on January 19, 2023.