Pueblo Water's Municipal Water Efficiency Plan
Pueblo, Colorado
October 19, 2021

Prepared For:

Colorado Water Conservation Board
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Executive Summary

Profile

The Board of Water Works of Pueblo, Colorado (Pueblo Water) located in Pueblo County, CO along Interstate 25 on the southern front range, is an independent quasi-governmental organization officially established in 1954 to provide potable water to the City of Pueblo (Pueblo). Pueblo is located immediately upstream of the confluence of the Arkansas River and Fountain Creek at an elevation of approximately 4,700 feet. Before the five-member board was established as it operates today, components of Pueblo's water utility date back to 1874.

Pueblo Water provides treated water service to a 73.62 square mile area with a current population of approximately 115,000 residents and provides raw water to the Comanche Power Plant owned by Xcel Energy. Pueblo Water obtains its potable water supply from surface water sources in the Arkansas River Basin and a portion through transmountain diversions from the Colorado River Basin. Its supply includes senior and ample direct flow rights, storage rights and decreed exchanges.

Population

According to the State Demographer, Pueblo Water's service area is expected to grow at an annual average growth rate of 0.71% between 2020 and 2030. For this conservation plan, a growth rate of 1.1% was utilized for planning purposes[1]. Under the higher growth rate, the population served is expected to be 128,090 in 2030. Given the uncertainty of population trends, a higher growth rate is reasonable for conservation planning purposes. This figure will be reevaluated during the required update and these projections may be reduced as deemed appropriate.

Water Demand Forecasts

As part of the water efficiency[2] planning process, three distinct water demand forecasts were prepared. First, a baseline demand forecast utilizing average consumption data between 2015 and 2019, and projecting out to 2030. This baseline forecast did not include the impact of water conservation of any kind, even passive water savings, and was developed only to assess the adequacy of future supplies under reasonable worst-case conditions and to demonstrate the impact of anticipated efficiency improvements. Water demand in 2019 was 24,840 acre-feet (AF) and under the baseline forecast it is expected to increase 3,480 AF to 28,320 AF in 2030. This represents a 14.01% increase in water demand between 2019 and 2030.

A second water demand forecast through 2030 includes the impact of passive savings from Colorado legislation, and federal plumbing codes and standards. This forecast found that water demands will increase to 27,146 AF by 2030, or a 9.28% increase in potable water demand over the planning period.

A third forecast was prepared that includes the anticipated impact from Pueblo Water's planned water efficiency program measures described in this plan, as well as those savings from the passive forecast. Under this forecast, potable demand increases to 26,723 AF in 2030, representing a 7.58% increase in potable water demand over this period.

[1] Pueblo Water's Distribution Report developed by Black & Veatch utilizes a 1.1% growth rate as well.
[2] Terms water conservation and water efficiency are used interchangeably throughout this report.

These forecasts form the core of the Water Efficiency Plan and are the forecasts upon which estimated conservation savings are based. Under each forecast, Pueblo Water's supplies, treatment plant and distribution can meet future demands. Ultimately, this indicates that additional conservation measures may not be as useful or practical for Pueblo Water at this time.

Water Efficiency Planning Process and Goal Setting

Pueblo Water prepared this Water Efficiency Plan in accordance with the Colorado Water Conservation Act of 2004 to meet or exceed all statutory requirements under Colorado Revised Statute 37-60-126. The Colorado Water Conservation Board's Municipal Water Efficiency Plan Guidance Documents were utilized to guide the development of this plan.

To fulfill the statutory water conservation planning requirements under Colorado law, a series of water conservation program scenarios were developed that were cost effective and practical. For Pueblo Water, the following water efficiency measures have been identified as providing a reasonable cost savings for the utility or its customers by reducing water demand:

- Continued metering
- Continued water loss control with the addition of annual AWWA Water Loss Audits
- Continued public information and education
- Rules and regulations including the addition of a new water waste regulation
- WeatherTrak controllers for unbilled, metered city parks
- Establishing regular meetings with Planning Department and aiding in water efficiency considerations for land use codes

Pueblo Water has established a goal of 9,585 AF savings over the entire planning period compared with a continuation of current demand, of which 2,540 AF of savings will come from active savings[3]. Based on careful analysis of current demands and expected growth, Pueblo Water believes this level to be achievable and reasonable. This goal will be re-evaluated on a regular basis with the review and update to the Water Efficiency Plan occurring every year and five years, respectively.

Water Efficiency Program

Pueblo Water does not have a full-time water conservation coordinator and its water efficiency plan is implemented by the Water Resources Division. While there is not a dedicated conservation coordinator, there are many employees dedicated to the most important water conservation measures including automated metering, loss control, and long-range planning.

Pueblo Water has integrated water supply with the long-range planning process and will be an integral part of the water section in a regional comprehensive plan sponsored by the City of Pueblo, Pueblo County and Pueblo West. Pueblo Water recognizes that the initial configuration of new development will significantly influence the amount of water used over time by that development. However, the City of Pueblo does not have significant rates of new development at this time and as a result, water conservation through land use may not contribute significantly. Regardless, incorporating water efficiency is still an important aspect and integral part of the planning process. Since Pueblo Water does

[3] This goal includes both passive and active savings and is compared to 2030 projections from the baseline foreca

not have land use authority, it will work with the City of Pueblo Planning Department to explore methods for water efficiency in new and existing developments.

Water Efficiency Plan Approval

A 60-day review period was conducted and to the extent possible, comments were incorporated in thisplan. On October 19, 2021, Pueblo Water reviewed the Water Efficiency Plan and adopted it with the updates included in this final version of the plan. On Nov. 23, 2021, Pueblo Water received official notification that the plan was approved by the Colorado Water Conservation Board.

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1 Profile of Existing Water Supply System

1.1 Overview

The Board of Water Works of Pueblo, Colorado (Pueblo Water) is an independent, quasi-governmental organization authorized by the city charter of the City of Pueblo to provide Pueblo's municipal water supply. Pueblo is located east of the front range of the Rocky Mountains in central Pueblo County, CO at an elevation of 4,700 feet.

Pueblo is one of the largest steel-producing cities in the United States and referred to as the "Steel City." Though remnants of Pueblo's historical industrial base remain active, the city's general demographic has broadened in the past 40 years to encompass high technology and tourism. Agriculture in Pueblo County also continues to have a prominent role in Pueblo's economy and community life.

Pueblo Water provides treated water to approximately 115,000 people both within the city limits of Pueblo and immediately adjacent to the city limits. In addition, Pueblo Water contractually supplies raw water to the Comanche Power Plant in Pueblo. The City of Pueblo is expanding slowly and anticipates an annual growth rate much lower than other front range cities in Colorado. According to the State Demographer's Office, Pueblo County is anticipated to grow an annual average rate of 0.71% between 2020 and 2030. With these projections, the population served is predicted to be 124,785 by 2030. For planning purposes, Pueblo Water uses an annual rate of growth of 1.1% to account for any extraordinary growth. Under this high growth scenario, the population is expected to reach 128,090 by 2030. This value is used for population projections as well as throughout the remainder of this plan.

To meet state statues, a formal conservation program began with the adoption of a water efficiency plan in 1998. There have been no formal updates to this plan since; however, Pueblo Water has been actively engaged in implementing the programs presented. The purpose of this Water Efficiency Plan is to accomplish two main goals. The first is to evaluate the ongoing conservation efforts that have been implemented at Pueblo Water following the release of the 1998 Water Efficiency Plan. Retention of successful programs with the potential for additional savings should be considered, while other measures should be considered for the future. The second objective is to remain in compliance with current state requirements for water conservation planning under Colorado State Statute, 37-60-126, for "covered entities."

To meet Pueblo Water's efficiency goals and comply with State guidelines, the Water Efficiency Plan update includes:

- Overview of the existing water supply system
- Examination of past water conservation programs and measured success
- Proposed efficient water use measures
- Estimated financial and efficiency impacts of proposed measures
- Implementation and monitoring plan

Upon completion of the water efficiency plan, Pueblo Water will initiate an outreach program for public and stakeholder involvement for implementation of the proposed water efficiency measures. A monitoring program will also be established by Pueblo Water to measure the success of each implemented conservation activity.

For Pueblo Water, there is minimal cost savings associated with reducing water demand because Pueblo's water rights, treatment, and distribution system already have the capacity to serve the anticipated growth. Despite the lack of financial incentive, Pueblo Water remains committed to water efficiency and to current and proposed conservation efforts, which include many of the most important conservation measures such as system loss control and automated metering.

1.2 Existing Water Supply System

Approximately 60% of Pueblo Water's water supply originates from the Arkansas River Basin in southern Colorado, on the east side of the Continental Divide. However, through various transmountain diversion structures, Pueblo Water imports the remaining portion of its water supply from the Colorado River Basin.

1.2.1 Water Supply

Pueblo Water has a reliable portfolio of water rights capable of meeting current potable and raw water demands, even during sustained periods of drought. Pueblo Water's water rights consist of a mix of native direct flow rights, native storable rights, transmountain rights and exchange rights. Pueblo Water also utilizes storage space at Turquoise, Twin Lakes, Clear Creek and Pueblo Reservoirs.

Direct Flow Rights

Pueblo Water owns several direct flow rights including: The Old Pueblo Rights, the Booth-Orchard Grove Ditch, the Hobson Ditch, and the West Pueblo Ditch. These direct flow rights cannot be stored or reused, with the exception of the West Pueblo Ditch water right. The West Pueblo Ditch change decree allows these water rights to be used as either a direct flow right or as a native storable right.

The majority of Pueblo Water's direct flow rights are extremely senior. Of the approximately 93 cubic feet per second (CFS) of direct flow water owned, 73 CFS have a priority date of 1874 or earlier. With the exception of July and August of 2002, the rights with priorities of 1874 or earlier have always been in priority. Table 1 shows the majority of Pueblo Water's direct flow rights and their associated decreed quantities.

Direct Flow Right	Appropriation Date	Quantity (CFS)
Old Pueblo - Ditch of Trustees No. 1	04/01/1874	20.00
Old Pueblo - Ditch of Trustees No. 2	04/01/1874	25.00
Old Pueblo - Fields Ditch	06/20/1872	4.60
Old Pueblo - Richie Ditch	06/20/1870	2.50
Old Pueblo - Brooks Ditch	01/31/1871	1.20
Booth Orchard - Warrant, Barnes and Baxter Ditch	04/30/1861	7.00
Booth Orchard - Booth Ditch No. 1	04/01/1864	8.00
Booth Orchard - Booth Ditch No. 2	12/31/1871	1.00
Booth Orchard - Booth Ditch No. 3	12/31/1881	2.00
Hobson Ditch No. 1	03/31/1871	1.60
Hobson Ditch No. 2	04/30/1886	2.46
West Pueblo Ditch No. 1	04/01/1872	1.16
West Pueblo Ditch No. 2	04/01/1874	0.96
West Pueblo Ditch No. 3	10/01/1878	0.58
West Pueblo Ditch No. 4	12/31/1883	0.39
West Pueblo Ditch No. 5	12/17/1887	14.45
Total		**92.9**

Table 1: Pueblo Water's Direct Flow Rights

Currently, these direct flow rights meet the majority of Pueblo Water's potable water and Comanche raw water demands. In 2019 around 90% of Pueblo Water's potable and Comanche demands were met by direct flow rights. Even in 2002 when the availability of Pueblo Water's direct flow rights was limited, they accounted for more than 80% of the water delivered to the potable system and to the Comanche Power Plant.

Native Storable Rights

Native storable rights are water rights that can be held in storage until needed, but they can only be used once. These rights include Clear Creek Reservoir, the Arkansas River component of the Twin Lakes Reservoir water storage right, and the West Pueblo Ditch when it is not taken as direct flow.

Pueblo Water's native storable rights are relatively junior and, therefore, their yield can vary a great deal from year to year. The yield from these rights has ranged from a high of 23,088 AF in 2015 to a low of 2,396 AF in 2002.

The native storable rights are typically used to meet the small amount of potable demand not met by the direct flow rights and to serve as a reserve supply in case of emergency or severe drought.

Transmountain Rights

The transmountain rights can be held in storage until needed and can be completely consumed and reused, as long as return flows are accounted for and the water is recaptured. These water rights include the Busk-Ivanhoe Water System, the Ewing Ditch, the Fryingpan-Arkansas Project, the Homestake Project, the Independence Pass Transmountain Diversion System (Twin Lakes Reservoir and Canal Co.), the Wurtz Ditch and the Wurtz Extension Ditch.

The transmountain water rights' diversion structures are located at high elevations with relatively small drainage basins above them. Their annual yields are dependent on the amount of snowpack in the specific drainage area and those yields can vary greatly because of the spatial and temporal variability of snowfall. In recent years the yield from these water rights has ranged from a high of 21,292 AF in 2019 to a low of 9,750 AF in 2002. These values include reuse of return flows.

Currently, most of the water from the transmountain rights is held in reserve in Pueblo Water's storage accounts in various reservoirs. Water from the transmountain rights is often leased on a temporary basis to other water users but will be heavily relied upon in the future to meet Pueblo Water's increasing potable water needs and Comanche demands.

Exchanges

Pueblo Water has several decreed exchanges that allow reuse of its transmountain water and more efficient use of its water rights. Pueblo Water can exchange the transmountain component of its water returning to the Arkansas River back upstream to its intakes and reservoirs. This includes water discharged from the City of Pueblo's Wastewater Treatment Plant (WWTP), from the Comanche Plant to the St. Charles River, and from the percolation of landscape irrigation to the Arkansas River alluvium. Pueblo Water can also exchange water from its transmountain sources into reservoirs that are not on the main stem of the Arkansas River, such as Clear Creek, Twin Lakes and Turquoise Reservoirs. The successive reuse of Pueblo Water's transmountain water by exchange can nearly double the yield of that water.

Storage

Pueblo Water can store its storable water rights in several reservoirs, including Clear Creek Reservoir which it owns and operates, and in East Slope Fryingpan-Arkansas Project reservoirs pursuant to various agreements and contracts. Table 2 summarizes Pueblo Water's current storage space.

Reservoir	Storage Capacity
Pueblo Reservoir Non-Project Water	15,000
Pueblo Reservoir Fry-Ark Project Water	31,200
Clear Creek Reservoir	11,439
Twin Lakes Reservoir	12,600
Turquoise Reservoir	5,000
Total	**75,239**

Table 2: Pueblo Water Storage Accounts

Bessemer Irrigating Ditch Company

In 2009 Pueblo Water began purchasing shares in the Bessemer Irrigating Ditch Company (BIDC) as part of its future water supply planning. A decree was entered by the Division 2 Water Court in 2019 allowing for 5,488.368 shares of BIDC to be converted from irrigation to municipal and other uses. Those shares continue to be used for agricultural irrigation via leases to farmers but can be converted to provide an annual average of 7,865 AF of consumptive use water supply, dependent on Pueblo Water's needs. Pueblo Water does not anticipate that it will need to convert any shares prior to 2040, but when it does convert all of its shares it will result in the dry-up of about 4,600 acres of irrigated farmland.

1.2.2 Water Treatment and Distribution

Water treatment takes place at the Whitlock Treatment Plant, which was enlarged and enhanced in a project completed in 2004. Whitlock utilizes dual treatment trains consisting of conventional treatment and an enhanced settling facility with a total treatment capacity of 84 million gallons per day (MGD). There is a total of 56.4 million gallons of treated water storage, allocated among 17 storage tanks in a variety of locations throughout the system.

Pueblo Water's distribution system is composed of more than 579 miles of piping that also provides fire protection via nearly 4,200 fire hydrants. The latest major expansion of the distribution system in 2009 included the installation of 21,000 feet of pipe and construction of a 1.5-million-gallon storage tank to serve the newly developed St. Charles Industrial Park on the southern edge of the city.

Pueblo Water's Whitlock Treatment Plant draws water directly from Pueblo Reservoir with two Arkansas River intakes downstream of Pueblo Dam, available for redundancy. Raw water is supplied to the Comanche Power Plant from a pump station located on the Arkansas River about two miles downstream of Pueblo Dam.

Pueblo's water system has been self-supporting throughout its history. Major capital expansion and improvements have been funded with debt financing, while routine operation, maintenance and capital replacements are paid for with operating revenues.

The major components of Pueblo Water's water supply system are provided in Appendix A.

1.3 Water Supply Reliability

Pueblo Water has a reliable water supply capable of meeting current water demands even in the driest years in Colorado. Pueblo Water utilizes Riverware, a water supply modeling software developed by the University of Colorado, Center for Advanced Decision Support for Water and Environmental Systems, for planning purposes. Riverware is a dynamic modeling software that allows easy manipulation of municipal demands, lease demands and hydrology sequences. Climate change is virtually certain to continue and result in earlier peak snowmelt, increased evapotranspiration and evaporation. Additionally, climate change is expected to change the distribution of demands, resulting in even higher municipal demands in the summer. Based on the certainty of climate change and its impacts to Colorado, Pueblo Water's Riverware model was designed to include these anticipated climate changes and associated effects on hydrology and demands.

When modeling worse case scenarios, Pueblo Water utilizes a 6-year design drought consisting of a re-sequenced selection of historical hydrology years. The six-year hydrology sequence is as follows: 2001, 2012, 1992, 1991, 2012, and 2002. The sequence contains 2002 and 2012, both extremely dry years in

the Arkansas Basin and when modelled against future demands aid Pueblo Water in considering the reliability of its water supply.

Pueblo Water currently has a firm yield of 48,100 AF assuming 2002 drought conditions (not including the BIDC shares described at the end of section 1.2.1). In other words, Pueblo Water's water rights are expected to deliver 48,100 AF of water during a year with drought conditions of the same magnitude experienced during the 2002 drought. The 2002 drought was by far the most impactful drought to Pueblo Water's supply. River administration was extremely tight with senior calls much earlier in the season than normal. Pueblo Water's 1874 direct flow rights were called out of priority in July and August of 2002, when historically they had never been called out. While Pueblo Water had sufficient supplies to meet demands in 2002, water restrictions were enforced as a precautionary measure in the event the drought extended into the following year. In most years, Pueblo water has excess water. Excess water is stored in Pueblo's storage accounts in order to provide a drought reserve for the future (Table 2). If there is water in excess of the drought reserve, Pueblo Water will lease the surplus to other entities for purposes including, but not limited to agriculture, municipal and industrial.

The 48,100 AF firm yield is the minimum quantity of annual water supply realized from Pueblo Water's water flow rights during a single year. Because of extensive storage reserves Pueblo Water can deliver more than its firm yield to its customers during a drought year.

1.4 Supply Side Limitations and Future Needs

A summary of water supply limitations and future needs is shown in Table 3, adapted from Worksheet B from the Colorado Water Conservation Board (CWCB). Pueblo Water is not experiencing water shortages or high rates of population or demand growth. Even Pueblo Water's infrastructure is not aging past its useful life due to intensive water loss control measures and capital improvements. However, it is listed as a limitation because continued effort is required to keep the system in its current state. Pueblo Water remains committed to the quality of its distribution system and that is shown in its audit results presented in Section 2.3.

Limitation and/or Future Need	Yes	No	Comments on Limitation or Future Need	How is Limitation or Future Need Being Addressed
System is in a designated critical water supply shortage area		x		
System experiences frequent water supply shortages and/or emergencies		x		
System has substantial non-revenue water		x		
Experiencing high rates of population and demand growth		x		
Planning substantial improvements or additions		x		
Increases to wastewater system capacity anticipated		x		
Need additional drought reserves		x		
Drinking water quality issues		x		
Aging infrastructure in need of repair	x		Pueblo Water is facing aging infrastructure but in a different way than most utilities. Despite the age of the City, Pueblo Water has actively implemented water loss control methods and while infrastructure is aging, it is not past its useful life.	Pueblo Water performs condition assessments regularly and has capital improvement plans in place for the next 30 years to repair or replace aging infrastructure. AWWA water loss audit results would suggest that Pueblo Water is doing very well preventing loss through its distribution system.
Issues with water pressure in portions of distribution system		x		

Table 3: Water Supply Challenges and Future Needs (adapted from Worksheet B from the CWCB)

2 Profile of Water Demands and Historical Demand Management

As part of the water efficiency planning process, Pueblo Water prepared three distinct water demand forecasts. The purpose of the three forecasts was to present a range of reasonable estimates of water demands for Pueblo through the year 2030 given anticipated population growth, and to estimate the impact of the water conservation measures that occur both passively and actively. Passive savings occur as a result of national and state plumbing codes, while active savings occur as a result of a specific program implemented by Pueblo Water. These forecasts are imperative for evaluating the adequacy of Pueblo Water's supply to meet future demands and are presented in Section 2.5.

The first step in the forecasting process was to gather data and information on the history of water demands and conservation in Pueblo. After a careful review, a baseline demand was established as well as a baseline population adapted from the Colorado State Demographer's Office. This section of this Water Efficiency Plan describes the historical water demands and demand management efforts in Pueblo.

2.1 Demographics and Service Area Characteristics

Pueblo Water provided treated water to 113,567 people, as estimated by the Colorado State Demographer, in 2019. Population growth is expected to continue at a modest annual rate of 0.71%, consistent with growth from 2008 to 2019, as the City of Pueblo has not experienced the explosive growth that has occurred in northern front range metropolitan areas.

Other characteristics that set Pueblo apart from those areas are a population that is higher than average in age and has a median income level significantly lower than the front range average. These demographic facts bear on all decisions regarding rate-setting and program offerings. Pueblo's housing stock also tends to be older, which means water-using fixtures and appliances may not be as efficient, on average, as communities with newer homes. In addition, Pueblo has a relatively low percentage of its population living in multi-family housing.

To better understand water use among different categories of customers, Pueblo Water uses the following customer category assignments for its water service accounts:

- Single family residential (detached single family homes)
- Multifamily residential (attached and detached residential housing containing 2 or more units)
- Commercial (businesses and industry of all types)
- State (irrigation of State Highway right-of-way (ROW) areas; these accounts are charged at ½ rate)
- Metered Hydrant (typically contractors that use fire hydrants in town for water; contractors are provided with a meter and are billed in full)
- Check Meters (public parks and municipal buildings; these accounts are not charged)
- Dispensing (dispensing station primarily used for residences and businesses in rural areas that are not served by wells or another water provider)

In addition to potable demands, Pueblo Water contractually supplies raw water to the Comanche Power Plant. Table 4 shows the historical and forecasted delivery schedule.

Year	Quantity (AF)	Comment
2005 - 2022	13,000	Unit 1 will be decommissioned in 2022 and has a winter efficiency of 667 MWh / AF and summer efficiency of 762 MWh / AF
2023 - 2025	9,500	Unit 2 will be decommissioned in 2025 and has the same efficiencies as Unit 1
2026 – 2040 (proposed)	6,000	Xcel's recent ERP filing indicates that Unit 3 will be decommissioned by 2040. Unit 3 has a winter efficiency of 1,565 MWh / AF and summer efficiency of 991 MWh / AF

Table 4: Historical and Forecast Comanche Delivery Schedule[4]

2.2 Historical Water Demands

Table 5 provides a breakdown of water usage by customer class from 2015 – 2019, including raw water deliveries.

Customer Class	Historical Annual Water Deliveries (AFY)					Average Percent Change[5]
	2015	2016	2017	2018	2019	
Single Family Residential	11,261	12,127	11,025	12,298	11,101	0.10%
Multi-Family	2,321	2,341	2,329	2,298	2,220	-1.09%
Commercial	7,406	7,873	7,731	8,064	7,832	1.48%
State Hwy ROW	323	347	364	420	640	20.02%
Metered Hydrant	123	155	176	135	125	2.22%
Parks and municipal buildings	2,636	2,519	2,105	2,815	2,871	3.71%
Dispensing	36	46	43	44	51	9.87%
Raw Water to Comanche Power Plant	12,149	12,784	13,380	13,856	12,189	0.35%
Total Potable Deliveries	**24,106**	**25,408**	**23,773**	**26,074**	**24,840**	**0.98%**
Total Deliveries (Raw and Potable)	**36,255**	**38,192**	**37,153**	**39,930**	**37,029**	**0.71%**

Table 5: 2015 – 2019 Historical Annual Water Deliveries

While water use over the past 5 years has been slightly increasing with an average percent change of 0.98%, there is a slight declining trend since 2002. Since 2002, Pueblo Water saw an average percent change decrease of 0.5% per year, or a 12% reduction from 2002 to 2019 as shown in Figure 3. Despite the declining trend, Pueblo Water saw an abnormally high amount of water use in 2012 as a result of extreme heat and little precipitation in Southern Colorado. Additionally, drier weather in the past five

[4] Higher values for Unit efficiencies would indicate more power generation per AF of water. Unit 3 is more efficient than Units 1 and 2.

[5] Percent change was calculated by averaging the percent change by year between 2015 and 2019.

years has made consumption variable and as climate change continues, water use is expected to increase as a result of higher temperatures and less precipitation. This increase in consumption as a result of a hotter climate is something Pueblo Water takes into account during supply and demand scenarios.

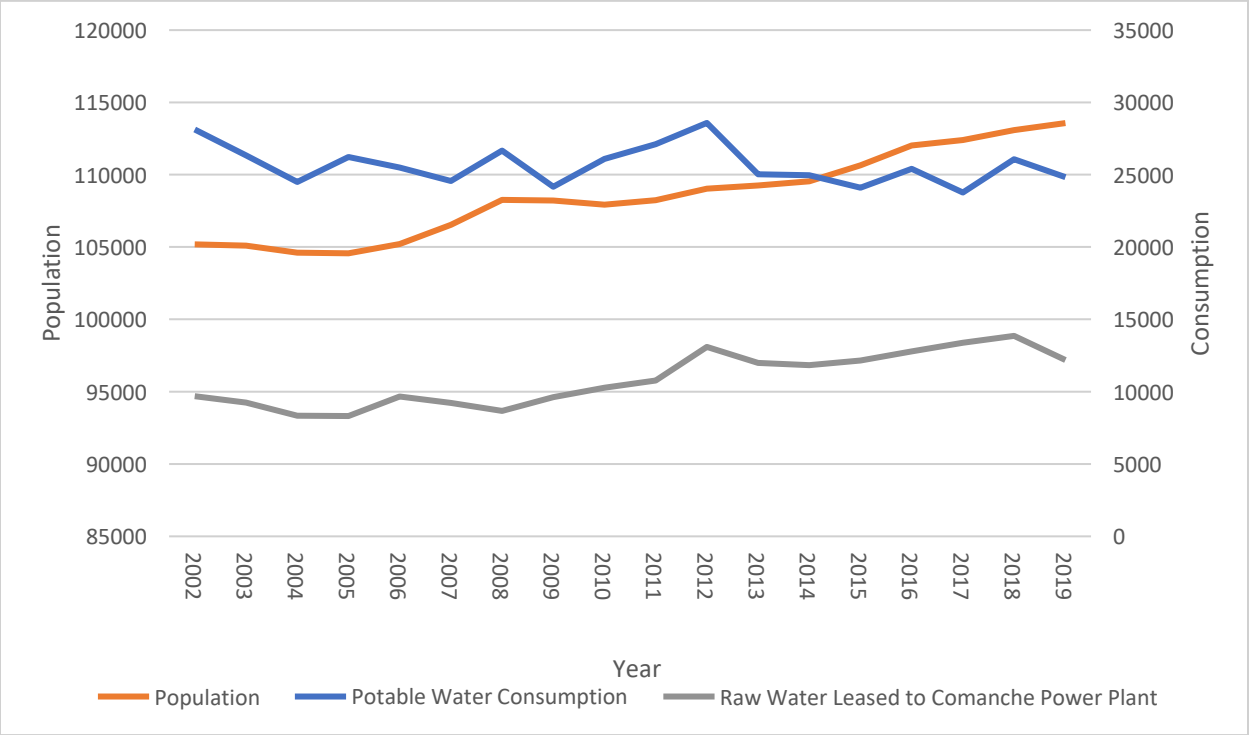


Figure 3: Historical Population and Water Consumption Data

A pie chart showing the percentage of connections by customer category is provided in Figure 4. Single-family residential customers are most prevalent in the City of Pueblo, accounting for 87% of all service connection on average between 2015 and 2019. Commercial customers accounted for 7%, while multi-family accounted for 5%. All other account types collectively accounted for 1% of all of Pueblo Water's accounts.

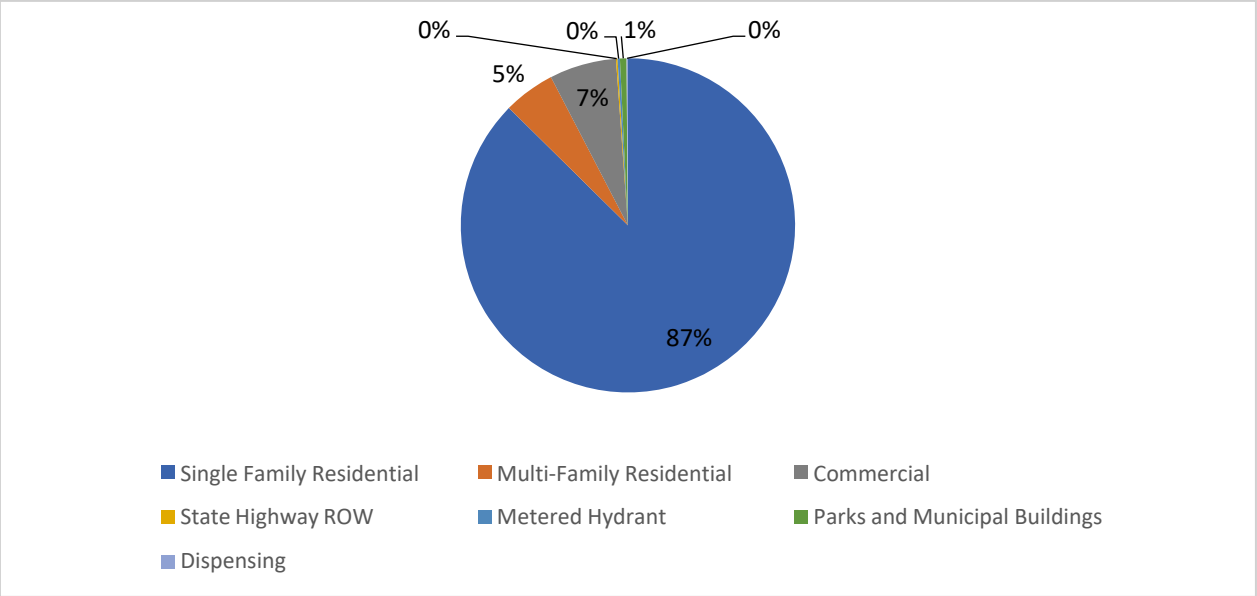


Figure 4: Average Distribution of Customer Accounts (2015 – 2019)

Figure 5 shows water use by customer category. Although single-family residential customers make up more than 87% of customer connections, they comprise only 47% of the potable annual demand on average between 2015 and 2019. Commercial customers in the City of Pueblo use a large percentage of water compared to their account size. While commercial customers only made up 7% of accounts for Pueblo Water, they accounted for 31% of potable use. Additionally, parks and municipal buildings accounted for 10% of potable water demand yet represented less than 1% of accounts.

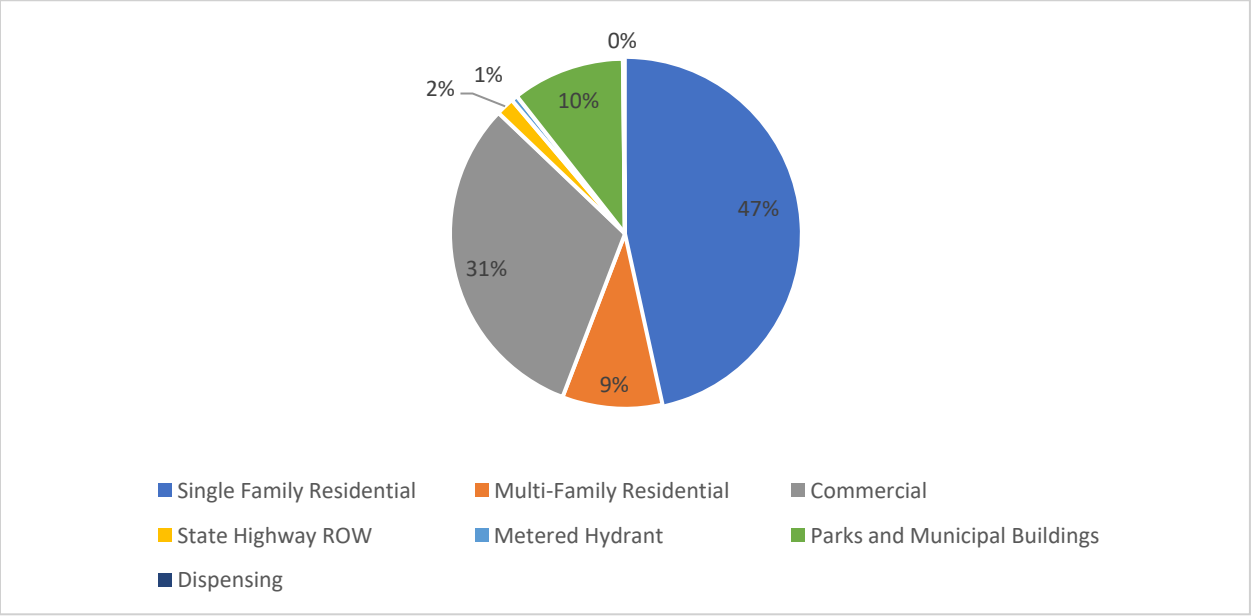


Figure 5: Average Distribution of Customer Demands (2015 – 2019)

Since the western United States receives less precipitation than other parts of the country, outdoor water use increases per capita consumption significantly. To separate indoor and outdoor use, Pueblo Water takes the average water use between December and February and assumes that represents

indoor use only. Any excess to this quantity in the remaining months of the year, is assumed outdoor use. Figure 6A shows Pueblo Water's average indoor water use compared to average outdoor water use between 2015 and 2019 for all potable water accounts. Figure 6B shows Pueblo Water's average indoor water use compared to average outdoor water use between 2015 and 2019 for residential accounts only. Outdoor use accounted for 51% of the total water use and 50% of residential use, on average, between 2015 and 2019.

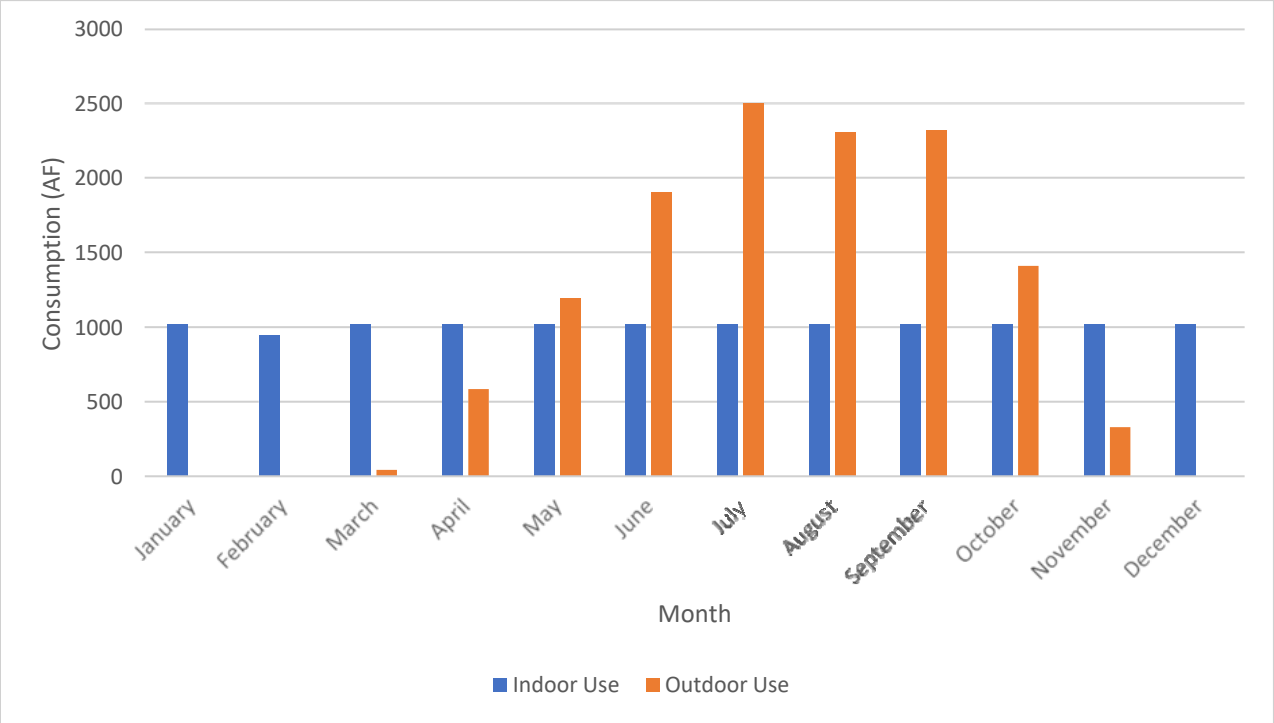


Figure 6A: Average Indoor vs. Outdoor Use - All Accounts (2015 – 2019)

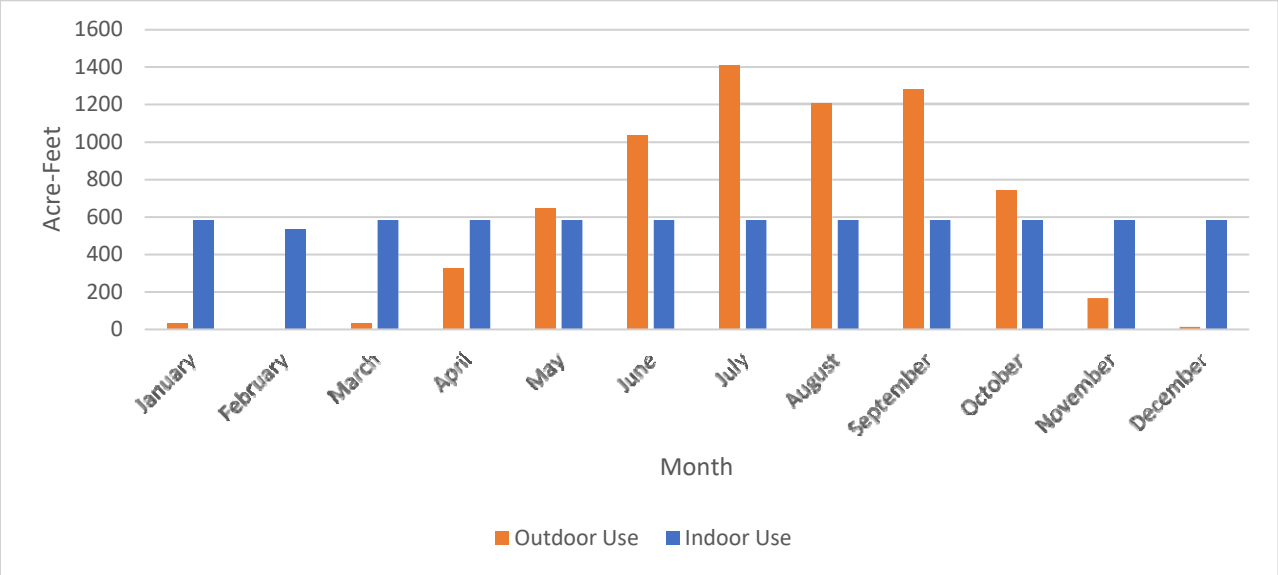


Figure 6B: Average Indoor vs. Outdoor Use – Residential Only (2015 – 2019)

Table 6 shows the average day, max day, max day occurrence and the associated peaking factor from 2015 through 2019[6]. The average day demand for this period is 24.12 MGD and the average peak demand is 50.36 MGD, occurring in July or June of each year. The average peaking factor was around 2.09. The Whitlock Treatment plant has a maximum rated capacity of 84 MGD, which is 33.64 MGD greater than the average max day demand and consequently has no problem meeting current peak water demands. Peaking capacity is not a constraining factor for Pueblo Water in any of the future demand scenarios discussed in Section 2.5.

Year	Average Day Demand (MGD)	Max Day Demand (MGD)	Max Day Occurrence	Peaking Factor
2015	23.08	49.06	28-Jul-15	2.13
2016	24.92	48.18	7-Jul-16	1.93
2017	22.99	48.17	11-Jul-17	2.10
2018	25.58	56.24	28-Jun-18	2.20
2019	24.04	50.17	19-Jul-19	2.09
Average	**24.12**	**50.36**		**2.09**

Table 6: Average Day and Max Day Demands (2015 – 2019)

The average residential per capita water demand between 2015 and 2019 was 110 gallons per capita per day (GPCD) and was calculated using Pueblo Water's single-family and multi-family residential consumption. This number was divided by the total population served by Pueblo Water, as determined by the Colorado State Demography Office, and 365 to get the daily use per capita. This number is average compared to per capita water demands in Colorado; however, due to Colorado's reliance on residential irrigation, this number is high compared to the national average. Taking into consideration all customer category demands (except for the Comanche Power Plant that uses raw water), the average per capita demand between 2015 and 2019 was 197 GPCD. This value includes potable water delivered to commercial accounts and to parks and other large irrigation customers. Figures 7 and 8 in Section 2.4.7 show historical per capita water demand for all water use and only residential use, respectively.

2.3 System Water Loss

Pueblo Water conducted an annual water loss control audit in accordance with the AWWA Water Audits and Loss Control Program: Manual of Water Supply Practices (M36), and the 2019 audit is included as Appendix B. The AWWA Free Water Audit Software was used to develop an overall water balance and relevant performance indicators for the utility.

Performance indicators are an important measurement tool to make sure that the utility is staying on track with respect to its operational practices, both internally and in relation to its peers. Pueblo Water has excellent performance as shown in Table 7 due its commitment to water loss control. Automated meters, a SCADA system, leak detection programs, and intensive capital improvement plans are some examples of the water loss control methods implemented by Pueblo Water. To better understand and interpret these performance indicators, below are definitions:

- *Validation Grading* – The AWWA Free Water Audit Software includes validation grading based on an estimation of the data validity of each of the input values. The current grade of 80/100 suggests that

[6] Max day and average day values were determined by diversions from the river for conservative peaking factors.

Pueblo Water doing about average with its data collection. In order to achieve a higher score, Pueblo Water would need to conduct several third-party audits.

- *Apparent Losses* – Apparent losses consist of unauthorized consumption and volumes of water lost through meter under-registration and data handling errors. The key impact of reducing apparent losses is an improved revenue stream, and a more equitable distribution of cost to the customer.
- *Real Losses* – Real losses consist of water leaks and breaks, background leakage that is attributed to infrastructure conditions and reservoir or storage overflows or leakage. The key impact of reducing real losses is a direct reduction in water use.
- *Unavoidable Annual Real Loss* – The theoretical lowest level of annual real losses achievable when the system is pressurized. The UARL calculation takes into account length of the water mains, number of service connections, average length of service connections, and operating pressure.
- *Infrastructure Leakage Index* – A dimensionless ration of the Current Annual Real Losses (CARL) to the Unavoidable Real Losses (UARL).

Once volumes of apparent and real losses have been identified and validated using the water balance tools, the dollar values of these components can be clearly defined. This allows for utilities to assess the value of the loss along with the cost of intervention and determine what strategies are most cost effective for reducing the volumes of loss from an economic standpoint.

Indicator	Value	Units
Validation Grading	80	Out of 100
Non-revenue water as percent by volume of water supplied:	19.1%	Percent
Apparent Losses per service connection per day:	12.50	Gallons per connection per day
Real Losses per service connection per day:	22.69	Gallons per connection per day
Infrastructure Leakage Index	1.25	Dimensionless
Annual Cost of Apparent Losses	$519,467	Dollars
Annual Cost of Real Losses (valued at customer unit cost)	$943,037	Dollars

Table 7: AWWA Water Audit Performance Indicators (2019)

Pueblo Water's real loss performance included the real loss in gallons per service connection per day of approximately 22.69. Compared to the 2017 national average of 63.8, Pueblo Water is doing extremely well with real losses.[7] An ILI close to 1 would indicate that the water utility is doing excellent with loss control and additional loss prevention measures would either be impossible or uneconomical. Pueblo Water's ILI of 1.25 suggest there is little room for improvement. The ILI is based off the UARL, which is the theoretically lowest level of losses possible based on system length and pressure. Theoretically, there will always be losses in a water system and the goal is to provide a metric that takes that inherent loss into account. Estimated apparent losses are 12.50 gallons per service connection per day, while the national average was 10.9 in 2017, putting Pueblo Water slightly higher than average. Based on the

[7] Based on data from AWWA Water Audit Data Initiative from 2017.

results of the 2019 AWWA Water Audit, Pueblo Water will continue its current water loss control measures and its annual audit; however, additional measures are not recommended at this time.

2.4 Past and Current Demand Management Activities and Impact to Demands

Pueblo Water has implemented several conservation strategies in the past and there is a clear trend in consumption that shows the benefit and potential savings of these strategies. As part of this plan, the ongoing conservation programs and measures were evaluated by looking at the historical effectiveness of these programs and the expected effectiveness moving forward. Below is an overview of the conservation measures implemented at Pueblo Water.

2.4.1 Wise Use Program

As Pueblo Water's mandatory restrictions on outdoor water use in response to the 2002 drought were lifted in the spring of 2003, an educational campaign began that has been in continuous operation up to the present day. The Wise Use program was designed to serve many different audiences by providing usable conservation information in a wide variety of delivery formats. Currently conservation information is only delivered via Pueblo Water's website.

2.4.2 System Metering/ AMR

Pueblo Water conducts a sophisticated meter testing and maintenance program whereby compound meters are tested yearly for accuracy. Colorado statute requires all water providers to meter the water use of its customers and to bill based on metered consumption. All customers at Pueblo Water are metered and all but three accounts are on automated meters (Badger Orion Advanced Meter Infrastructure "AMI" System). Pueblo Water started the endeavor to transition to automated metering in 2006 and has been diligently testing and replacing meters since. The AMI system is capable of finding leaks throughout the distribution system significantly faster by analyzing historical consumption data for each account to alert Pueblo Water staff of abnormal consumption. Additionally, hourly data retrieved from the AMI system has been used to keep track of large customer's consumption.

In order to keep the AMI system accurate and reliable, the meters are tested and replaced per protocol. There are 250 3-inch and larger meters that are tested yearly, and 4,000 2-inch and smaller meters tested each year. The 2-inch and smaller meters are replaced every 10-12 years, regardless of their function. Since the program started in 2006, Pueblo Water is currently on its second generation of meters and spends approximately $900,000 in 2019 on meter replacements.

On each month's water bill, Pueblo Water provides customers with a graphical representation of their water consumption for each of the previous 12 months. This information helps customers to manage their own water consumption and activities that could affect their bill.

2.4.3 Leak Detection

Pueblo Water monitors its water distribution system using computerized systems that control pressures, flows, and tank levels. The system alerts personnel to any sudden drop in pressure, minimizing large unchecked losses of water from the system that could be caused by main breaks or the unexpected opening of fire hydrants. A pipeline repair and maintenance crew are on call 24/7 and repairs can be completed on short notice. This immediate response time greatly reduces any significant loss of water from such events.

Pueblo Water also maintains a continual leak detection program on its water distribution system through use of a portable ultrasonic leak detection devices. A major part of the program is the inspection of newly installed water mains for leaks, which occurs one year after a new main has been in service. The program finds an average of 10 to 20 leaks per year which would have gone undetected if not for the leak detection program.

2.4.4 Main Replacement Program

Pueblo Water has conducted an aggressive water main replacement program since 1968. The purpose of this program is to replace the oldest water mains in the city to eliminate patterns of frequent breaks or poor water quality. This program has contributed to a significant reduction in the annual number of water main breaks over the life of the program. Between 2015 and 2019, Pueblo Water has had an average of 7.12 main breaks per 100 miles of main while the national average is 25 to 27 main breaks per 100 miles of main[8].

2.4.5 Regulatory Measures

Section 7.01 in Pueblo Water's Rules and Regulations states:

> *Leaks on a property owner's water service line or private main must be repaired within ten (10) days of the date the Board notifies the property owner. If the Board determines that the leak is causing substantial property damage or wasting, the Board will provide seventy-two (72) hours written notice to the property owner that the leak must be prepared.*

Pueblo Water establishes that service line leaks must be repaired within 10 days in order to prevent wasting and 72 hours if the wasting is significant. The burden of repairing the service line falls on the property owner and in low-income areas of Pueblo, leaking services lines tend to persist because the property owner cannot afford the cost. In order to aid financially and fix leaks faster, Pueblo Water started a program in 2015 to repair, at no cost to the customer, the portion of the service line between the main and the meter for residential accounts. The funds for this program come from an additional fee of $1 per month on every single-family residential customer.

Section 1.13 in Pueblo Water's Rules and Regulations provides guidance on Pueblo Water's drought response plan. In this section there are enforceable penalties for wasting water during a drought as deemed by Pueblo Water. There are financial penalties for the first four violations with the fifth violation resulting in discontinuance of service.

2.4.6 Land Use Planning Efforts

Pueblo Water has been involved with the Planning Department's development review process as governed by Colorado Revised Statue 29-20-301, which states that the water provider is sent a copy of the development process and invited to comment. During a subdivision review meeting, Pueblo Water informs the developer if there is an existing water main or if a new one is required. Subsequently, the developer has its engineer submit plans and Pueblo Water reviews and eventually accepts. Pueblo Water also provides costs for commercial tap fees and meter costs. In addition to the development review process, Pueblo Water also meets regularly with the Mayor of the City of Pueblo to inform him of water-related issues specific to Pueblo and state-wide. While these meetings are not formal, the Mayor

[8] National Average based on data from 2017 from the Water Research Foundation, Knowledge Portals

and Pueblo Water are committed to working together on water efficiency issues. Due to the lack of past efforts, it is unlikely any water savings can be attributed to land use planning. Moving forward, Pueblo Water will consider the most important, foundational activities as identified in the CWCB's Best Practices for Implementing Water Conservation and Demand Management Through Land Use Planning Efforts.

2.4.7 Results of Water Conservation Measures

Pueblo Water has seen a reduction in water demands as a result of the aforementioned conservation measures. Per capita demands across all accounts were 224 GPCD in 1998 and have dropped to 195 GPCD in 2019. That represents a 12.81% reduction in per capita water demands between 1998 and 2019. Over that same period, the population has increased 7.69%. Figure 7 shows per capita water demands including demands from all customer categories.

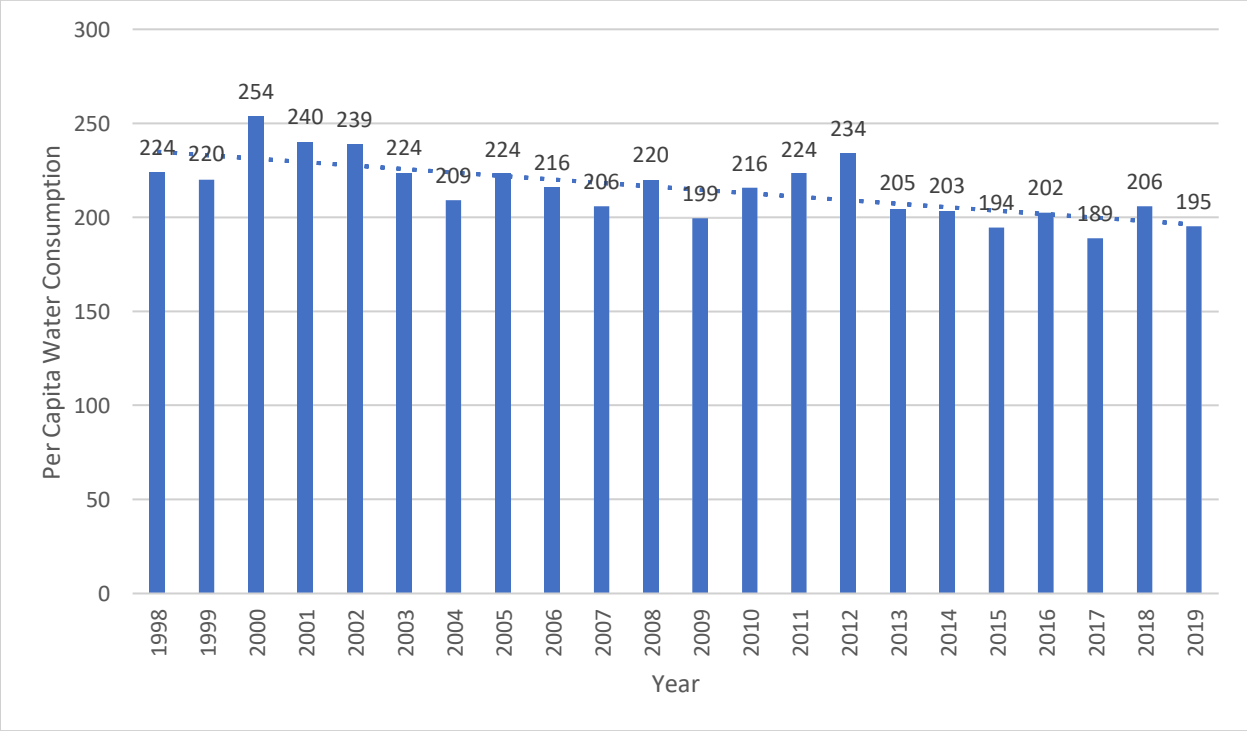


Figure 7: Historical Per Capita Water Demands (all customer categories included)

Looking specifically at how previous conservation measures have impacted residential demand, historical per capita water demands were calculated for only the single-family and multi-family residential customer categories. The per capita water demand in 1998 was 147 GPCD while in 2019 it was 105 GPCD. That represents a 28.72% decrease in per capita use since 1998. However, since the population has also increased during that time period, the total residential water use has declined somewhat less. Figure 8 shows per capita water demands for only residential and multi-family customer accounts.

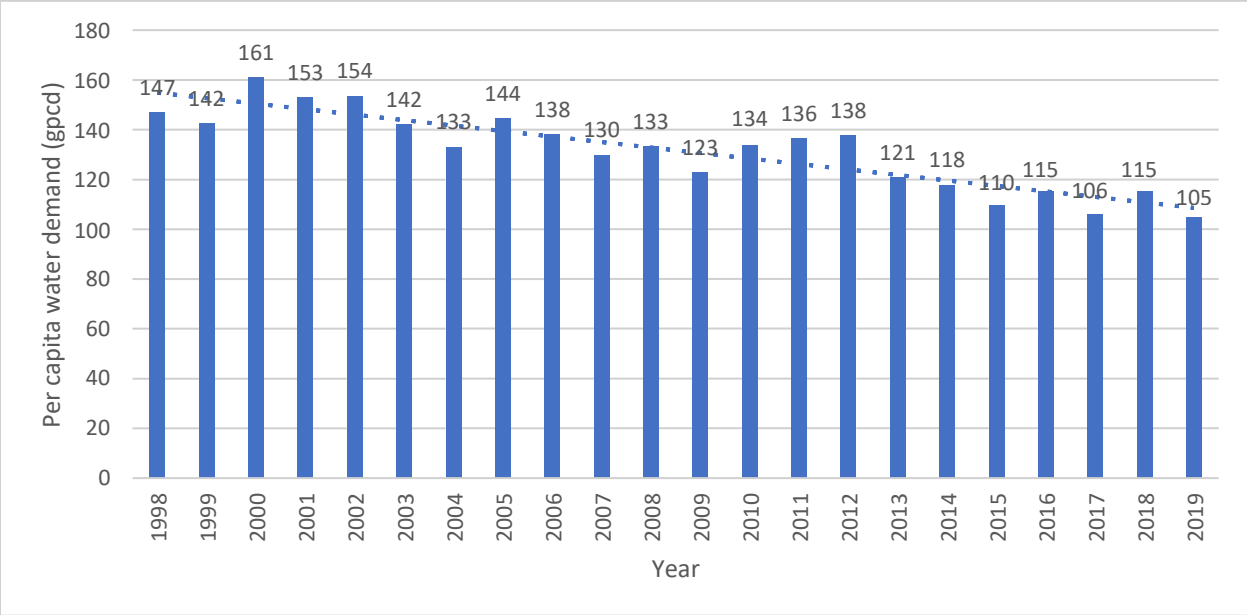


Figure 8: Historical Per Capita Water Demand (only residential and multi-family accounts)

2.5 Demand Forecasts

As part of the preparation for this Water Efficiency Plan, three separate demand forecasts were prepared:

- Baseline Forecast (without conservation)
- Passive Savings Forecast
- Passive and Active Savings Forecast

The baseline forecasting method used historical demand patterns to establish baseline per capita demand, and then increased these demands with population out to 2030, assuming average per capita water use patterns continue without change. This is a standard approach to demand forecasting, but it does not take into consideration the expected impacts of water efficiency.

The second and third forecasts were developed using a more robust method, where demands were separated out by water use sector or customer category and where seasonal and non-seasonal demands were disaggregated for each category. A separate demand forecast out to 2030 was prepared for indoor and outdoor demand in each of Pueblo Water's customer sectors, which allowed the impacts of specific water efficiency measures to be considered.

2.5.1 Population Projections

For water demand forecasting, it is important to consider a reasonably high growth forecast to ensure that sufficient water supply and infrastructure are in place when needed by Pueblo Water's customers. The population forecast used in this efficiency plan is intended to represent a reasonable "high growth" scenario for Pueblo Water in which the population grows at an annual 1.1% rate from 2019 to 2030.

Pueblo Water served a population of 113,567 in 2019, and for planning purposes, Pueblo Water anticipates a population growth rate of 1.1% per year. While the actual rate of growth between 2010 and 2019 has been less than 1% per year this high growth is considered reasonable and appropriate. Table 8 and Figure 9 show the population forecast from 2020 to 2030. Under this estimate, it is anticipated that the population served by Pueblo Water will increase to approximately 128,090 by 2030.

Year	Population
2019	113,567
2020	114,816
2021	116,079
2022	117,356
2023	118,647
2024	119,952
2025	121,272
2026	122,606
2027	123,954
2028	125,318
2029	126,696
2030	128,090

Table 8: Population Growth Projections from 2020 through 2030

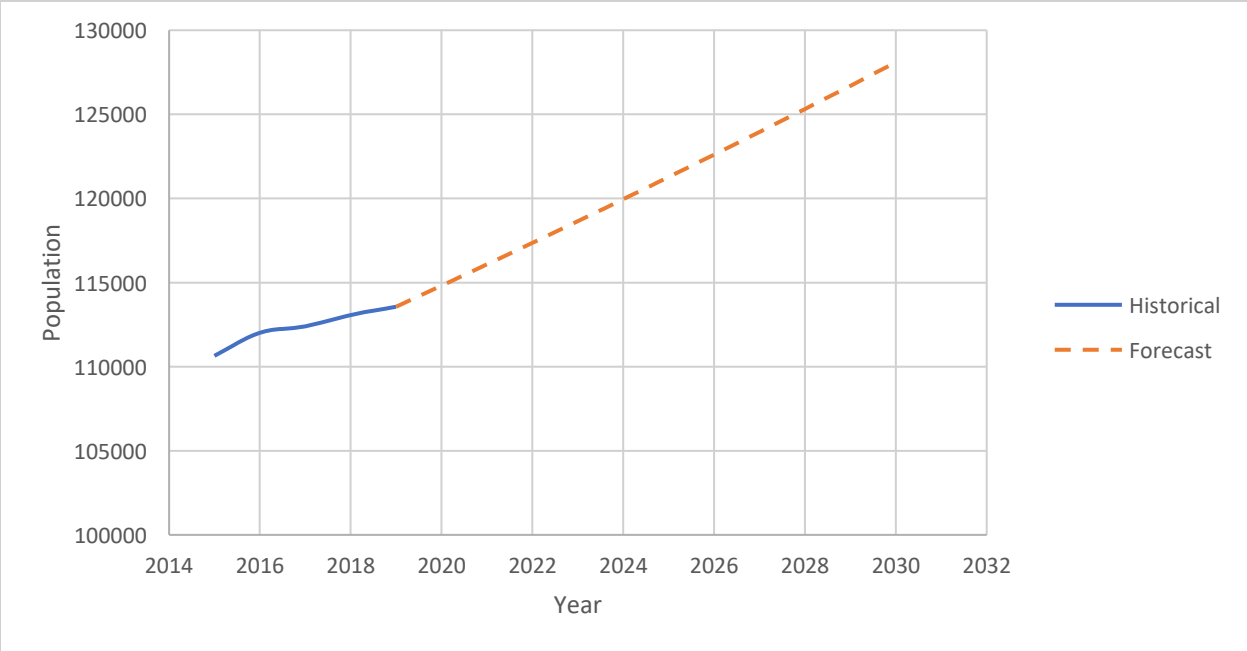


Figure 9: Historical and Forecast Population from 2015 through 2030

2.5.2 Demand Forecast Methodology

A baseline demand forecast starting from 2019 and going out to 2030 was prepared, which did not include the impact of water conservation. This baseline forecast was developed to access the adequacy of future supplies as well as to demonstrate the anticipated efficiency improvements. In the baseline forecast, all demands, including indoor and outdoor, increase proportionally with population at the current rate of use. This does not include any passive savings that can be anticipated in the future or active savings from demand management activities presented in this efficiency plan. The second and third forecasts include the impacts of water efficiency and were developed to consider the anticipated changes in each customer category due to the proposed water conservation measures.

These three forecasts form the core of the Water Efficiency Plan and are the forecasts upon which estimated conservation savings are based. Each forecast shows demand starting in 2019 and going through the planning horizon of 2030 (11 years). The results are provided in Figure 10 and further described in the sections below.

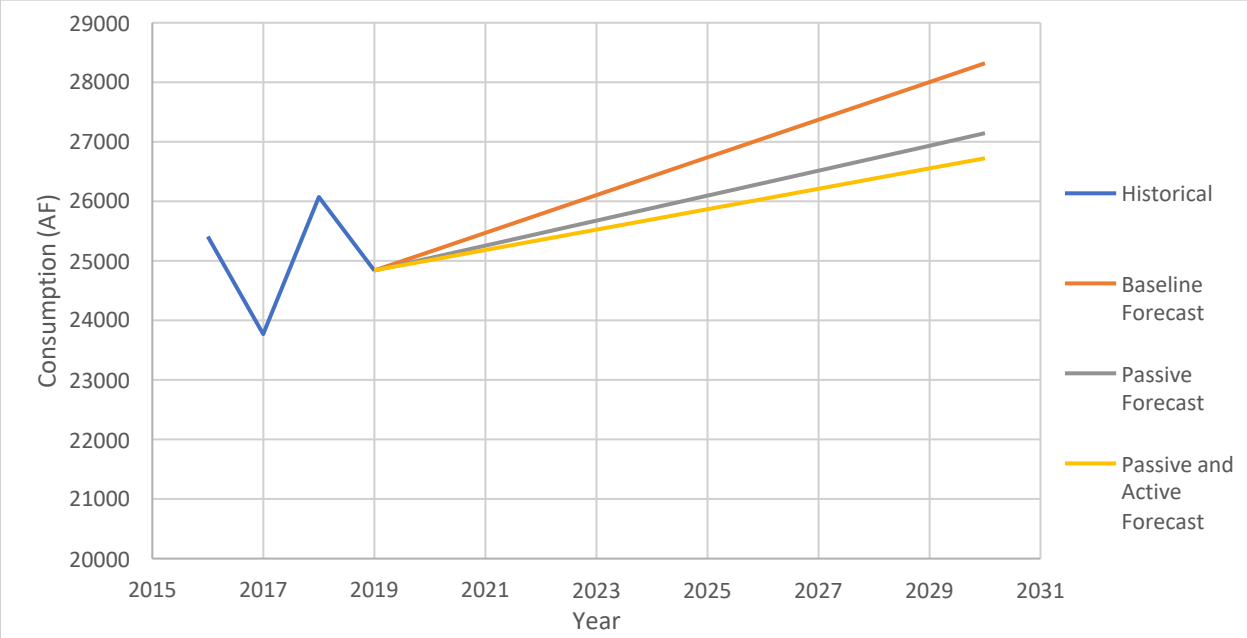


Figure 10: Baseline, Passive, and Active Demand Forecasts through 2030

Pueblo Water supplies raw water for cooling the Comanche Generating Station and this represents a significant water demand of 11,000 AF to 14,000 AF annually. Raw water demand for Comanche is forecast based on anticipated power plant operations rather than population growth in Pueblo. Comanche consists of three generating units; Unit 1 is scheduled for retirement in 2022 and Unit 2 in 2025. Projected annual demand for Comanche for 2020 through 2022 when Unit 1 is retired is 13,000 AF. For 2023 through 2025 when Unit 2 is scheduled for retirement, annual demand is forecast to be 9,500 AF. Unit 3 will be the only unit in operation after 2025 and annual demand for that period is forecast to be 6,000 AF. Table 4 in Section 2.1 shows Comanche Power Plant's anticipated demand schedule. Due to the nature of Comanche's demands, they were not forecasted using the techniques for potable use.

2.5.3 Baseline Forecast

The baseline forecast is utilized to exclude conservation and assumes that typical baseline demand patterns from 2015 - 2019 are continued into the future without change. Under this forecast, it is assumed that new customers joining the system use water identically to the current customer base. The purpose of this forecast is to assess the adequacy of current supplies and to demonstrate the anticipated impact of water conservation from both passive and active measures.

Key assumptions for the baseline forecast include:

- Baseline water use patterns for Pueblo Water (Table 5)
- Population forecast for the City of Pueblo (Table 8)
- Water use in all sectors changes proportionally with the population
- Outdoor water use impacts from temperature and precipitation in 2030 are similar to 2019
- Comanche annual demand is 13,000 AF for 2020-2022, 9,500 AF for 2023-2025, and 6,000 AF for 2026-2030

Baseline potable water demand in 2019 was 24,840 AF and under the baseline forecast is expected to increase by 3,480 AF to 28,320 AF in 2030. This represents a 14.01% increase in water demand between 2019 and 2030. Comanche demand in 2019 was 12,181 AF and is expected to decrease by 6,181 AF to 6,000 AF in 2030; a reduction of 50.74%. Combined potable and Comanche demand in 2019 was 37,021 and under the baseline forecast is expected to decrease by 2,701 AF to 34,320 AF in 2030. This represents a 4.70% decrease in total water demand through this period.

2.5.4 Passive Conservation Forecast

The second water demand forecast to 2030 includes the impact of anticipated passive efficiencies from Colorado legislation and federal plumbing codes and standards. This was provided on a sector-by-sector basis for both indoor and outdoor use. For example, Colorado Senate Bill 2014-103, which was passed in 2014 and phases out the sale of low-efficiency fixtures and appliances, is state legislation that is accounted for in the forecast of passive conservation. This forecast found that water demands will increase to 27,146 AF in 2030.

Key assumptions for the passive conservation forecast include:

- Baseline water use patterns for Pueblo Water (Table 5)
- Population forecast for the City of Pueblo (Table 8)
- Outdoor water use impacts from temperature and precipitation in 2030 are similar to 2019
- Outdoor water use in all sectors increases proportionally with the population
- 0.5% per year decrease in residential indoor per capita water use (from an average of 54.70 GPCD between 2015 – 2019 to 51.76 in 2030), continuing trends of the past 10 years
- 0.25% per year decrease in per capita commercial indoor use from ongoing replacement of fixtures and appliances (from an average of 34.20 GPCD between 2015 – 2019 to 31.49 in 2030)
- 0.25% per year decrease in per capita check meter accounts indoor use from ongoing replacement of fixtures and appliances (from an average of 5.65 GPCD between 2015 – 2019 to 5.20 in 2030)
- Comanche annual demand is 13,000 AF for 2020-2022, 9,500 AF for 2023-2025, and 6,000 AF for 2026-2030

The passive conservation forecast predicts an 9.28% increase in potable water demand between 2019 and 2030 and suggests that more efficient appliances could help reduce demands by 7,045 AF over that time period, compared to the baseline forecast. Combined with the expected reduction in Comanche demand, total demand is forecast to be 33,146 AF in 2030.

2.5.5 Passive and Active Conservation Forecast

The third water demand forecast prepared includes the anticipated impact of this water efficiency plan. Active conservation measures include any demand management activity implemented by Pueblo Water.

Key assumptions for the active conservation forecast include:

- Baseline water use patterns for Pueblo Water (Table 5)
- Population forecast for the City of Pueblo (Table 8)
- Outdoor water use impacts from temperature and precipitation in 2030 are similar to 2019
- Water loss percentage remains constant over the next 10 years. Pueblo Water will perform AWWA M36 water loss control audits on annually to monitor this. Because water loss is already very minimal there is limited potential to make further improvements in this area.
- 0.5% per year decrease in residential indoor per capita water use, continuing trends of the past 10 years
- 0.25% per year decrease in per capita commercial indoor use from ongoing replacement of fixtures and appliances
- 0.25% per year decrease in per capita check meters indoor use from ongoing replacement of fixtures and appliances
- 3% per year decrease in per capita demand of City Parks outdoor use from WeatherTrak controller cost share program. See Appendix F for further information.
- 4% reduction in water consumption, from new population added each year, compared to baseline due to land use planning best management practices
- Comanche annual demand is 13,000 AF for 2020-2022, 9,500 AF for 2023-2025, and 6,000 AF for 2026-2030

The active conservation forecast predicts a 7.58% increase in potable water demand between 2019 and 2030. This suggests more active demand management activities could help reduce potable demands in Pueblo by 2,540 AF between 2019 to 2030, compared to the passive forecast. Combined with the expected reduction in Comanche demand, total demand is forecast to be 32,723 AF in 2030, which is a decrease of 11.61% from current combined demand.

To demonstrate the reliability of Pueblo Water's water supply even under a worst-case scenario, a Riverware model was prepared utilizing baseline demand projections and Pueblo Water's six-year design drought. The six-year design drought consists of a re-sequenced selection of historical hydrology years and is shown in Section 1.3. For these purposes, the design drought was repeated 1.5 times to cover the entire 11-year planning period. Table 9 shows the hydrology year associated with each forecast year as well as the baseline demands used in the model. As with Pueblo Water's current operations, excess supply was leased through its long term and short-term programs.

Forecast Year	Run Year Index	Hydrology Year	Potable Demand	Comanche Demand
2020	1	2007	25,156	13,000
2021	2	2001	25,473	13,000
2022	3	2012	25,789	13,000
2023	4	1992	26,106	9,500
2024	5	1991	26,422	9,500
2025	6	2012	26,738	9,500
2026	7	2002	27,055	6,000
2027	8	2007	27,371	6,000
2028	9	2001	27,687	6,000
2029	10	2012	28,004	6,000
2030	11	1992	28,320	6,000

Table 9: Model Assumptions

All assumptions presented in this conservation plan were input into the model, including but not limited to decreasing Comanche water demands and increasing baseline potable demand projections. Figure 11 depicts Pueblo Water's total water system storage through the design drought and out to 2030. Total system storage was 26,025 AF in year 7, which was the lowest system storage in the 11-year period. Baseline potable water demands, and Comanche Power Plant demands were met each year, with excess water available at the end of each year for leasing or storage. Even under baseline demand projections, Pueblo Water's supply can meet demands and then some.

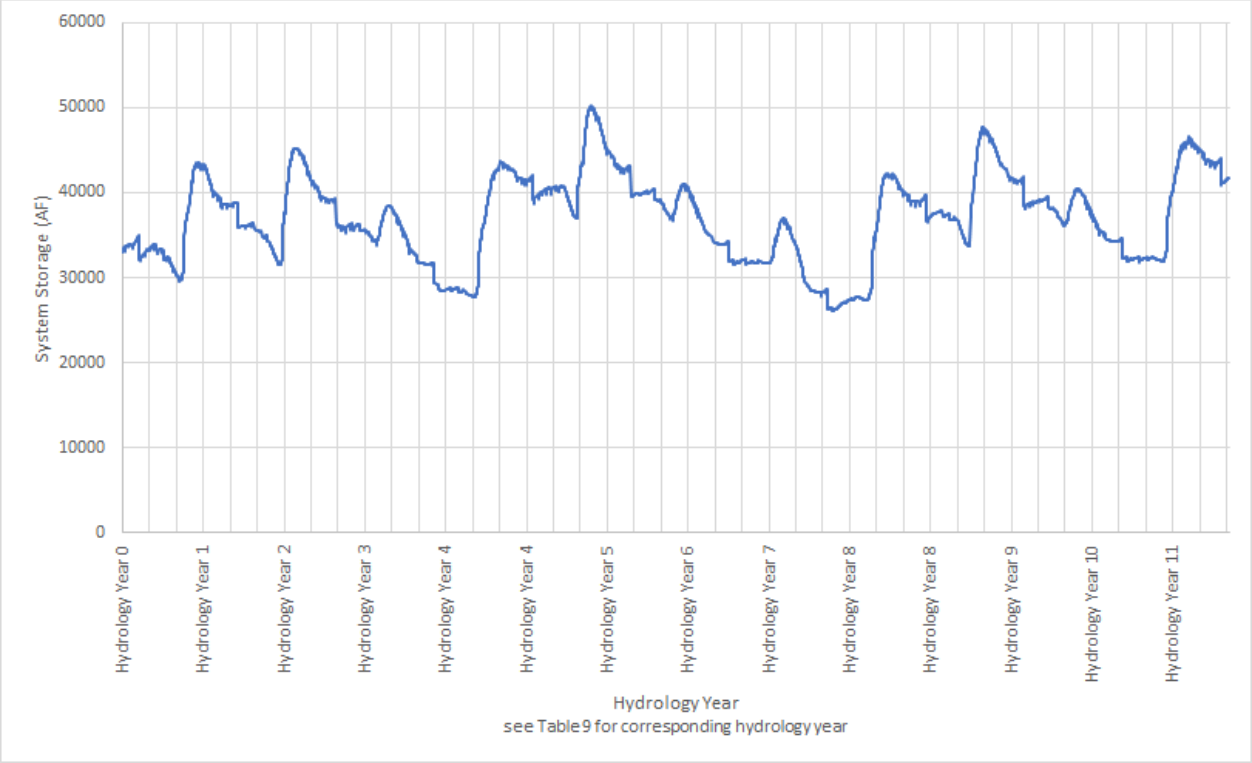


Figure 11: Total Water System Storage using Baseline Demand Projections[9]

The Riverware model results are no surprise, as all the demand forecasts are within the range of historical demands that were experienced in the 1990s and early 2000s before conservation savings were realized. Pueblo Water was able to reliably meet its demand during that period as well.

2.6 Limited Financial Benefits of Conservation

As shown from the model above utilizing a six-year design drought as well as baseline forecasts, Pueblo Water has an ample raw water supply to meet current and future demands. Additionally, the model above did not include the conversion of Bessemer shares to municipal use, meaning that Pueblo Water has additional capacity to meet increased demand beyond what the model shows. Not only can Pueblo Water's raw water supply meet future demands, but the treatment plant can meet peak demands as well. Because of Pueblo Water's fortunate position regarding its water supply, treatment and delivery system, the financial benefits of increased water efficiency in Pueblo are minimal. With such a low ILI from the AWWA water audit, even additional savings through leak prevention would be miniscule. From an economic perspective, there is not a significant benefit to increased water use efficiency at this time.

In spite of the lack of financial incentive for water efficiency, Pueblo Water remains committed to its current conservation efforts and is proposing additional measures that have been found to be cost effective.

[9] All hydrology years start on October 1st

3 Integrated Planning and Water Efficiency Benefits and Goals

This section discusses the importance of water conservation efforts in evaluating future needs and provides an overview of Pueblo Water's future capital improvements as well as water acquisitions.

3.1 Water Efficiency and Water Supply Planning

In 2019, Pueblo Water obtained a change of water rights decree for 5,488.368 shares of the Bessemer Irrigation Ditch. Currently the shares are still being used for irrigation and until Pueblo Water needs the additional water, these shares will remain in irrigation. Various modeling scenarios show that Pueblo Water is not likely to need the conversion to municipal shares for at least 20 years.

Pueblo Water currently has 10- and 30-year capital improvement plans, in which about 15 – 20% of total revenue each year is allocated to capital improvements. This includes but is not limited to main and equipment replacements, reservoir and storage tank rehab, and water treatment plant upgrades. In addition, there are a couple large-scale projects for Pueblo Water's water collection system. These two projects will help to maximize the benefits of water conservation and reuse plans.

- Clear Creek Reservoir Rehab and Expansion. Clear Creek dam is a high hazard, large dam constructed in 1902 and is owned and operated by Pueblo Water. Clear Creek dam has a history of seepage problems mainly related to foundation conditions at the site and it is anticipated that Clear Creek dam will be rehabbed to fix seepage conditions as well as enlarged for additional storage. Design and construction are not anticipated for at least another five years and enlargement will be discussed in the update to this plan.
- Downstream Reservoir Storage for Return Flow Exchange. A flow management program has been implemented on the Arkansas River through Pueblo to protect minimum flows for recreation and fish habitat. This flow program reduces exchange potential for reusable return flows. If Pueblo Water had space in a reservoir downstream of Pueblo Reservoir, it would be able to capture the return flows when there is no exchange potential and exchange them back up when there is exchange potential on the river. Pueblo Water is currently working with several other front range entities in order to capture and store return flows downstream of Pueblo Reservoir. Please see Section 1.2.1 for further description of the transmountain return flow reuse by exchange process.

While conservation will be considered during the planning process for these projects, additional monitoring will be needed prior to incorporation of water savings from this water efficiency plan.

Land use planning efforts have been incorporated into this water efficiency plan; however, they are unlikely to mitigate the need for any future projects at this time. The City of Pueblo is expected to see an increase of approximately 1,200 people per year from 2019 to 2030. Compared to other front range communities, this number is relatively small which results in less new development. The projects listed above are still beneficial to maximize the efficiency of our current water supplies even if land use planning efforts were to decrease per capita use.

3.2 Water Efficiency Goals

Pueblo Water has established the goal of reducing demand by 9,585 AF over the planning period. This figure includes both passive and active savings. To accomplish this goal, Pueblo Water will continue to implement and expand its water efficiency program. The water efficiency program described in detail below will continue focus on foundational activities such as metering and system loss control. In

addition to their established, robust metering and loss control program, they will also include an annual AWWA water audit to examine trends and adjust planning as needed based on the data from the audit. The cost share program with City Parks department to buy and install WeatherTrak Irrigation Controllers, further discussed in Section 4.2.3 and Appendix F, is the primary tool that Pueblo Water will use to reduce its water consumption. Approximately 2,540 AF can be attributed to active savings, while 7,045 AF can be attributed to passive savings, summed over the entire planning period. This is a reasonable goal for Pueblo Water considering its particular circumstances.

It should be noted that Pueblo Water spent a significant amount of time as part of this Water Efficiency Plan analyzing different conservation rate structures that could fit financially and culturally for its customer base. Pueblo Water utilized the Alliance for Water Efficiency (AWE) Rate and Revenue Model to analyze Pueblo Water's current water use as well as potential rate models that include conservation pricing. One of the goals for Pueblo Water is to keep its rates as low as possible and its current rates are among the lowest on the front range, presented in Appendix C. There is also a considerable portion of the customer base that have many people living in one household, or generations of families in one household. Ultimately their water use per month is high in comparison to other customers, but their per capita use is considerably lower. Pueblo Water did not feel like it was appropriate for its community to adopt a conservation rate structure at this time. To combat any potential water wasting, Pueblo Water is implementing a waste of water regulation that is presented in Section 4.2.2.

3.3 Summary of Land Use Activities

Past and Current Land Use Activities

Pueblo Water has been involved with the development application process by reviewing plans and determining if water service is feasible for a proposed development. Involvement has not contributed to water efficiency or proposed alternatives that could promote conservation. In addition to the development review process, Pueblo Water has a strong relationship with the Mayor of the City and meets regularly to stay informed on water issues. However, this is not a formal meeting nor is the Planning Department involved.

Planned Land Use Activities

Pueblo Water and the Planning Department have reviewed and considered all of the activities identified as "foundational" in the CWCB's Best Practices for Implementing Water Conservation and Demand Management Through Land Use Planning Efforts Addendum to 2021 Guidance Document and are planning to implement some of the recommended activities in nearly all subsections. The Planning Department and Pueblo Water have decided to implement quarterly meetings to ensure that members of both organizations are informed on goals, opportunities, and projects of each department. In addition to the regular meetings, Pueblo Water will conduct a self-assessment, and the results will be used to inform future collaboration. At the regular meeting, it will be decided if joint meetings including the Mayor of the City of Pueblo will be necessary in the future.

Pueblo Water and the Planning Department will also work together on aligning future data and information used by each organization. Potential data that should be consistent includes future population, water demand estimates, water supply projections and land use changes.

A Pueblo Water representative currently attends subdivision review meetings between development proposal applicants and the Planning Department; however, the role is limited to infrastructure requirements and does not address water efficiency. This role will be updated to include information about how adoption of water efficiency or conservation measures could impact water use and the need for new infrastructure. It is the hope that this will result in reducing water dedications and possibly infrastructure requirements for the new development.

The Planning Department is currently developing a comprehensive plan for the entire county, of which water will be an element. Pueblo Water and the Planning Department will meet several more times in 2021 to review and add necessary water supply data to the plan.

In addition to the foundational activities listed above, the Planning Department is also considering several other technical assistance and ordinance programs; however, these are still in development. As part of the comprehensive plan, the Planning Department is reviewing the best methods for economic growth and has invited Pueblo Water to be a part of the discussion. One aspect of great importance is determining the best areas for the City to expand from an economic standpoint. In terms of water, this would mean looking into incentives to encourage efficient land development patterns and looking at areas of the city to develop with the least infrastructure needs. Similarly, the City of Pueblo lacks affordable housing, and the Planning Department is seeking ways to increase affordability while advocating for water efficiency. One method to consider is the use of model landscape plans, which is currently underway and would be provided to developers for use in their construction plans. The Planning Department is working with a landscape architecture student at the University of Colorado, Boulder to develop pre-made landscape plans for multi-family residential housing.

The Planning Department and Pueblo Water will work in conjunction to examine and review existing land use regulations and barriers. The Planning Department is already reviewing its land use codes and considering reducing the vegetation cover for certain areas of redevelopment. In addition, they are reviewing their recommended vegetation list to remove high water using plants and incorporate lower water using plants.

Finally, the Planning Department and Pueblo Water will coordinate education by providing consistent online information.

4 Selection of Water Efficiency Activities

Pueblo Water considered a variety of water efficiency programs and measures before selecting the final components for inclusion in this plan. Efficiency measures were screened using a variety of criteria including:

- Feasibility and practicality
- High likelihood of success
- Water savings and estimated cost per AF
- Community benefits

In addition to the screening factors listed above, two additional factors were used to screen potential land use activities. These two factors are:

- Preference for affordable housing and water efficiency measures that lessen the cost of development rather than exaggerate it
- Likely support by new home customers in Pueblo, and therefore developers for land use measures

These factors were incorporated into the selection process described below for consideration of land use measures.

4.1 Summary of Selection Process

Pueblo Water implemented a tiered screening and selection process for evaluating potential water efficiency activities. Existing activities were included in the list of measures and unless duplicative, existing activities are expected to continue as part of this ongoing water efficiency program.

I. The first phase included an assessment of Pueblo Water's current water efficient activities and key areas where water efficiency could be improved.
II. The second phase included a list of activities that are generally compatible with Pueblo Water's system and needs as determined by the Water Resources Division, the Executive Director, and other senior staff. They used CWCB screen and evaluation worksheets as well as the Guidebook of Best Practices for Municipal Water Conservation in Colorado. These worksheets are presented in Appendix C.
III. The final phase included the evaluation and selection for the conservation measures. The final level of screening and selection of the water efficiency activities was made by the elected Board.

Cost and viability were key factors for Pueblo when considering what efficiency program measures to implement. As noted above, the financial benefits of increased water efficiency in Pueblo are minimal. Conservation program measures were selected with the knowledge and understanding that Pueblo Water does not have a designated water conservation budget or dedicated program staff. At the same time, Pueblo Water has developed an effective demand management program over time by excelling at core foundational elements like regulations, public education, and leak prevention methods.

4.2 Water Efficiency Activities

Table 10 presents the new and ongoing water efficiency activities selected for inclusion in this plan. Each measure is described in more detail in the sections below.

Water Efficiency Activity	Sectors Impacted	Ongoing Activity?	Implementation Period of New Activities	Projected Water Savings 2020 - 2030 (AF)
Foundation Activities				
Metering[10]	All	Yes	ongoing	
System Water Loss	All	Yes	ongoing	40
Integrated Resources Planning, Goal Setting, and Demand Monitoring[11]	All	No	2022	
Initiate Discussions between Pueblo Water and Planning Department	All	No	2021	
Align Data and Information Used with Planning Department	All	No	2021	
Integrate Water Considerations into the Development Approval Process	All	No	2022	10
Integrate Long Term Land Use and Water Planning	All	Yes	ongoing	10
Ordinance and Regulations				
Waste of Water Regulation	All	No	2022	20
Examine Existing Land Use Regulations for Barriers and Conflicts	All	No	2022	15
Implement Requirements that Contribute to Water Efficiency and Compact Infrastructure for Planning Department	All	No	2022 - 2025	15
Incorporate Water Efficiency into Zoning Codes and Rezoning Procedures	All	No	2022 – 2025	15
Water Efficient Landscape Codes for Planning Department	All	No	2022 – 2025	15
Targeted Technical Assistance				
Water Reuse Systems[12]	All	Yes	2025-2030	
WeatherTrak Cost Share	City Parks	No	2022	2,360
Water Efficient Land Development Patterns	All	No	2022	20
Model Landscape Plans	Residential – Multi-Family	No	2022	10

[10] Savings from the existing metering program are most likely already fully realized based on the AWWA Water Audit results.

[11] An Integrated Water Resource Plan (IWRP) will not see direct water savings; however, it can help spur water savings and aid Pueblo Water in goal setting.

[12] A downstream reservoir will allow Pueblo Water to reuse transmountain water through exchange; however, savings most likely won't be realized in this Water Efficiency Plan.

Educational Activities				
Public Information and Education	All	Yes	2021	10
Consistent Online Information with Planning Department	All	No	2022	
Passive Savings				7,045
Total Water Savings Through 2030[13] (AF)				9,585

Table 10: New and Updated Water Efficiency Activities and Water Savings Estimates

4.2.1 Foundational Activities

Metering

A good metering program is fundamental to the success of water conservation efforts. Colorado statute requires all water providers to meter the water use of their customers and to bill based on metered consumption. In Pueblo, 100% of potable connections are metered and all but three accounts are automated (Advanced Meter Infrastructure (AMI) System). The AMI system is capable of finding leaks throughout the distribution system significantly faster than the traditional meter that is manually read monthly. Historical consumption data is utilized for each account to alert Pueblo Water staff of abnormal consumption, resulting in significantly less time to find leaks. Additionally, hourly data retrieved from the AMI system has been used to keep track of large customers' consumption. The meters are upgraded every four years and go through a rigorous testing protocol, ensuring meter accuracy is within AWWA standards of 3%. Pueblo Water budgets approximately 2.25% of its annual revenue towards meter replacements and testing, equating to roughly $900,000 per year. These practices will continue through the planning period for this water efficiency plan; however, Pueblo Water is unlikely to see any additional water savings. Since the metering program is already established, water savings have most likely already been realized.

Pueblo Water plans to implement a web-based application for customers to monitor their hourly water consumption. It is anticipated that having the ability to monitor consumption in almost real time may alert customers to irregular usage thereby avoiding wasting water sooner. There is also the potential that customers could convert high water using appliances to more efficient appliances since consumption can be retrieved hourly with the new application. While these are potential ways the application can save water, it is not anticipated to have a direct effect on savings given the demographics of the City of Pueblo. The average age in the City of Pueblo is higher than most cities and its median income is significantly lower which may inhibit adoption of the technology.

System Water Loss Control

Leak detection and water loss control are also fundamental water efficiency practices for all water utilities. Pueblo Water currently has a comprehensive distribution system loss control program including leak detection, automated meter readings, and capital improvement plans for aging infrastructure. In addition to the existing system loss control measures, Pueblo Water will implement yearly audits such as the one in Section 2.3. Conducting an annual system water audit will further assist Pueblo Water in interpreting available data and managing its water by categorizing all uses and identifying real losses

[13] Total water savings is for the entire 10-year period and compared to the 2030 Baseline Forecast. This figure includes passive savings.

that directly impact revenue. Continuing this practice yearly will also track Pueblo Water's water loss efforts and possibly pinpoint better loss technologies. However, based on the audit from 2019, Pueblo Water is doing very well managing loss through its distribution system and protecting its water resources. Additional practices will be incorporated after several years of audits.

Integrated Resources Planning, Goal Setting, and Demand Monitoring

Pueblo Water currently does not have an integrated water resource plan; however, Pueblo Water will utilize staff from the Water Resources Division to develop one. The first step in the development of the integrated water resource plan will include setting demand management goals that align with the utility. The CWCB provides guidance on integrated resources plans and outlines a nine-step process which includes goal setting and monitoring:

I. Profile of Existing Water System
II. Characterize Water Use and Forecast Demand
III. Profile Proposed Facilities
IV. Identify Conservation Goals
V. Identify Conservation Measure and Programs
VI. Evaluate and Select Conservation Measures and Programs
VII. Integrate Resources and Modify Forecasts
VIII. Develop Implementation Plan
IX. Monitor, Evaluate, and Revise Conservation Activities and the Conservation Plan

As mentioned above, Pueblo Water plans to develop the integrated water resource plan with staff from the Water Resources Division; therefore, the costs associated with this measure will be staff time and research. While the majority of this conservation measure will include the development of the integrated water resource plan, the process for integrated resource planning will continue for all projects theorized at Pueblo Water.

Land Use Measures

Members from the Water Resources Division at Pueblo Water and members from the Planning Department at the City of Pueblo will meet quarterly to educate its members on the goals, opportunities and challenges related to water supply and future development. Data will be shared and aligned between the two organizations and water efficiency will be incorporated into the development approval process.

It is not anticipated that quarterly meetings or aligning data will result in direct water savings; however, more involvement in the development review process and integrating land use planning with water planning is anticipated to result in some savings over the 10-year planning period.

4.2.2 Ordinances and Regulations

Waste of Water Regulation

While Pueblo Water currently has language in its Rules and Regulations for water waste as it relates to its drought response actions, there is no language that incorporates water waste on a typical day. Pueblo Water will consider new language in its Rules and Regulations related to water waste. This will include the activities related to water waste and its definition as well as enforcement. Water savings for

this conservation measure will be determined following a year of monitoring; however, it is expected to be less than 0.5%. The proposed Waste of Water Regulation is included as Appendix D.

Land Use Measures

The Planning Department is currently working with a consultant to examine its land use regulations and codes. Its primary goal is to strategically grow the city from an economic standpoint and to incorporate more affordable housing. Pueblo Water and the Planning Department will review existing land use regulations for barriers and conflicts as it related to water efficiency as well as current landscape codes. Following a review of existing regulations, Pueblo Water will aid the Planning Department in developing requirements that contribute to water efficiency as well as its goal of expanding the city in an economical and sustainable way.

It is anticipated that land use regulations will have direct savings since roughly 50% of residential water us can be attributed to outdoor use. Therefore, regulations that prohibit excessive water use outside could see significant water savings.

4.2.3 Targeted Technical Assistance and Incentives

Water Reuse Systems

Pueblo Water currently exchanges return flows from the WWTP into storage at Pueblo Reservoir. With climate change expected to decrease flows on the Arkansas River, exchange potential is limited especially during dry years when the excess water would be most beneficial. In order to continue to utilize water rights to their maximum potential, Pueblo Water will continue to exchange its return flows into storage for reuse. Additionally, Pueblo Water will continue pursuing downstream storage options to save water downstream when there is no exchange potential on the river. This will prevent uncaptured water downstream and Pueblo Water will be able to utilize its transmountain water rights more effectively despite a changing climate.

WeatherTrak Controllers for City Parks

The City Parks Department is responsible for irrigating City Parks and some schools equating to approximately 1,430 AF per year in water use or approximately 5.5% of potable demand. This customer class is not charged; therefore, a reduction in use would benefit other paying customers as well as result in a significant reduction in potable demand. Since 2003, Pueblo Water has seen an increase of approximately 2.5% per year in inches of water applied per square foot of irrigated area from the City Parks. This increase in water use came with less than a 0.1% increase in irrigated acres over the same time period. Figure 11 shows inches of water applied to City Parks per square foot of area from 2003 – 2019. While the actual amount of water per inches of irrigated area varies by year, the trend is generally increasing.

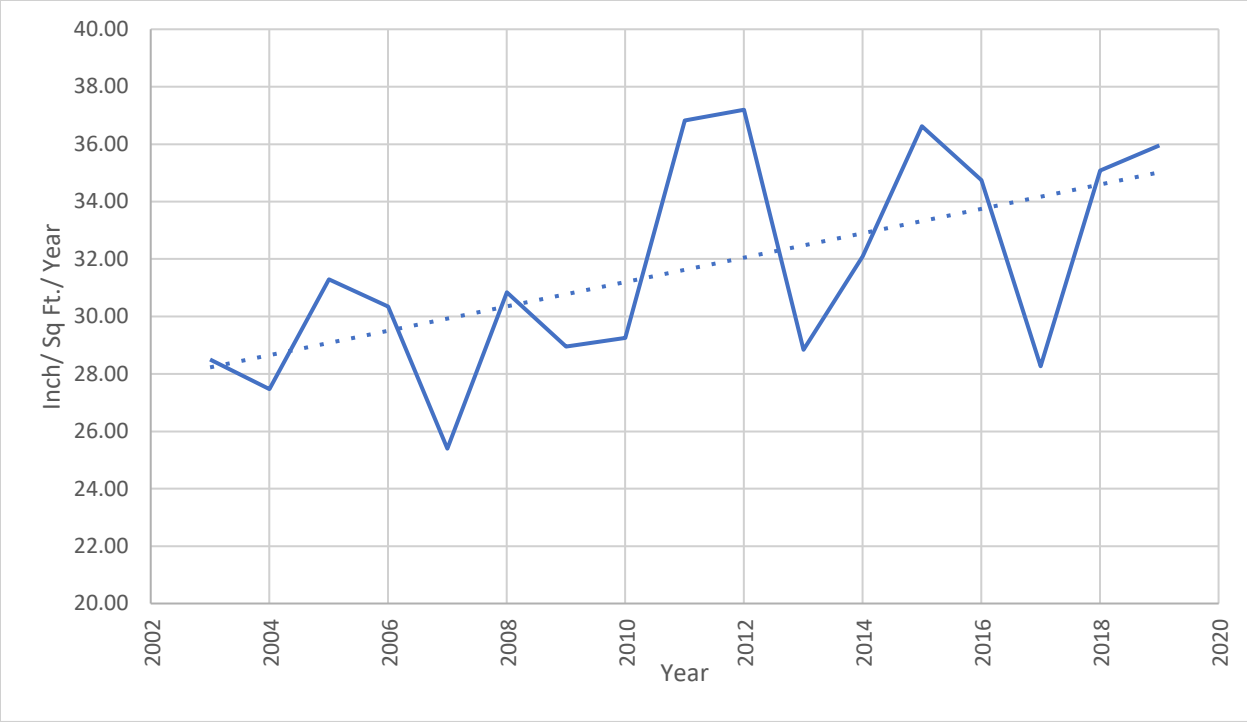


Figure 11: Historical City Parks Consumption per Square Foot of Irrigated Land

In order to promote outdoor efficiency throughout the City of Pueblo, Pueblo Water plans to implement a cost-share program with the City Parks Department to help cover the cost of WeatherTrak Irrigation Controllers and the associated installation labor. Appendix F has a more detailed proposal for the cost share program as well as specifications for the WeatherTrak Controller. Neighboring communities have seen drastic reductions in water demands with the implementation of WeatherTrak's controllers. This device uses information about the landscape, such as lawn type, slope, and location to provide a mathematically calculated quantity of water needed for that area. It considers temperature and precipitation from the previous day to adjust watering moving forward and can be monitored from a computer. Neighboring cities that have implemented this device have seen water savings up to 30%. Assuming Pueblo Water would gradually see these results as well, this cost share program could result in 2,360 AF of savings over the planning period.

Land Use Measures

The Planning Department is currently undergoing a review to improve water efficiency through land development patterns. This area is still in its infancy; however, incentives for compact developments and cluster unit developments are being considered as well as a complete review of land use codes as described in Section 4.2.2. To achieve its goal for economic efficiency through land development patterns, the Planning Department is also considering model landscape plans for multi-family residential communities. They are working with a student at the University of Colorado, Boulder to provide pre-made water efficient landscape plans, thereby reducing the cost of design for developers and implementing water efficiency, simultaneously.

It is anticipated that developer incentives to promote water efficient land development patterns will result in direct water savings; however, the planning department is still reviewing its land use codes and

regulations to see if incentives are a good fit. Water savings can be attributed to model landscape plans as well; however, they are targeted towards multi-family homes which are not significant water users in the City of Pueblo.

4.2.4 Public Information and Education

Pueblo Water continues to be proactive in providing information to its customers. In 2019, Pueblo Water re-evaluated its level of communication with residents and business owners and conducted a major effort to develop a multi-media approach to public outreach and information dissemination. In order to ensure all customers are being reached and informed about water conservation, Pueblo Water will continue to develop its educational program. Elements for implementation include:

- Bill inserts
- Dedicated Website Page
- Social Media Outlets
- Planting Xeriscape garden at modified Southside Dam[14]

Public education can be one of the most impactful measures in a water conservation program; however, Pueblo Water does not have a dedicated water conservation coordinator making large activities for the public less feasible. The most economical way to reach the public for Pueblo Water is through social media and its website. It is the hope that participation in non-Pueblo Water conservation events will increase as a result.

All public education information presented on Pueblo Water's webpage will be consistent with any water education information presented on the Planning Department's webpage.

[14] The Southside Dam is a low-head dam that will be rehabbed to allow fish and boat passage through that stretch of the river. The rehab will include a sitting area where the Xeriscape garden will be designed.

5 Implementation and Monitoring Plan

This section includes a general description of the anticipated implementation process for the water efficiency activities previously selected. The dates of anticipated implementation and adoption of new conservation measures are included with the implementation plan. In addition, a monitoring plan which includes methods of data collection and documentation requirements to evaluate the effectiveness of selected water efficiency activities is included in this section.

5.1 Implementation Plan

Many different members of staff are responsible for implementation of this conservation plan. Metering and water loss control are successful in detecting and stopping leaks as they arise for the past 20 years. Monitoring and evaluation of programs will be the responsibility of the Water Resources Division. Re-evaluation is necessary for ongoing plans to identify any changes that could be made to the current system to maximize efficiency. The schedule for implementation is shown in Table 9 in Section 4.2. It is important to note that the programs listed as well as the anticipated dates of implementation are subject to change.

5.1.1 Revenue Stability

Pueblo Water's rate structure includes a significant fixed charge component and tiered sizes designed to promote efficiency and revenue stability. Pueblo does not anticipate a high growth in water demand or population. Water efficiency as practiced by Pueblo Water helps ensure water rates remain as low as possible for its customers by maintaining the lowest water rates on the front range.

While rates are the primary revenue source, Pueblo Water also receives a significant portion of its revenue through short- and long-term raw water leases. If in-city water use declines, there could be a greater opportunity for leasing water outside the City.

5.2 Monitoring Plan

In order to maintain the success of any implemented water efficiency activities, effective monitoring is imperative to accurately measure the effectiveness of such programs and activities. At this time, all customers served by Pueblo Water are metered, which is essential in monitoring the effect of the water conservation measures implemented. Monitoring must be a continuous process and will be required to ensure that the measures implemented maintain a reduction in water usage. Pueblo Water will review and update this water conservation plan every five to seven years or as needed.

Data collection is key to the development of an effective monitoring plan. The following data will be collected and analyzed as a basis for quantifying the effectiveness for selected water conservation measures:

- River diversions to the treatment plant
- Total treated water produced
- Total treated water delivered
- Raw non-potable deliveries
- Per capita water use
- Indoor and outdoor treated water deliveries
- Non-revenue water
- Treated water delivered by customer type

- Irrigated landscape
- Precipitation
- Evapotranspiration
- Population
- New developments added to Pueblo Water's service area
- Changes to land use codes or regulations
- Other pertinent data

From data collected, conclusions can be drawn regarding the effectiveness of these programs. Data will be collected monthly and evaluated annually to determine if some programs should be altered, phased out, or remain in place.

6 Adoption of New Policy, Public Review and Formal Approval

A draft of this plan was presented at a regular meeting of Pueblo Water's elected Board on July 20, 2021. The Board directed staff to proceed with soliciting public input on the draft plan and the draft was posted to Pueblo Water's website for public review and comment on August, 2 2021. Social media was used to announce the plan and direct people to the website to review. During the 60-day comment period, one comment was received. That comment is reproduced in its entirety below and along with Pueblo Water's response. The adoption of the final plan by the Board occurred on October 19, 2021 and then the plan was submitted to the Colorado Water Conservation Board (CWCB). The CWCB approved the plan on DATE.

Please consider this input for your Water Efficiency Report:

Since I'm very familiar with Loveland Water, I have used the two cities in a side-by-side comparison. Before I report facts I need to tell you that Marcia and I do not have a water softener installed and just use tap water for our drinking and bathing.

The main difference I found in perusing both city water quality reports is the water hardness. Loveland's hardness is 1.3 grains per gallon. Here is what Pueblo Water says about their hardness:

The Total Hardness of the water produced by the Whitlock water treatment plant averages 180 mg/L (as CaCO3) or 10.5 grains per gallon. This is considered hard to very hard water. The hardness is lower in the summer when the snow runoff occurs and higher in the winter months. When water flows through soil and over rocks, it dissolves small amounts of minerals. Calcium and magnesium are the most common minerals that make water hard. Hard water is not considered a health hazard. However, it does interfere with cleaning tasks. Hard water can interfere with the effectiveness of many cleaners and causes glasses to be spotty after washing.

I have noticed white buildup on the base of our dish drying rack, this is because of Pueblo's very hard water,.

Since I'm concerned about water efficiency, unfortunately Pueblo's Water Efficiency Plan boldly states:

Because of Pueblo Water's fortunate position regarding its water supply, treatment and delivery system, the financial benefits of increased water efficiency in Pueblo are minimal.

On the other hand, Loveland has energy efficiency programs such as rebates for energy star washing machine rebate of $50.00, free refrigerator recycling, and up to a $50.00 rebate for installing a high efficiency toilet, There is also an excessive water fee in Loveland. Pueblo's Water Efficiency Plan makes no mention of financial incentives for residential customers. We just installed a 1.2 gallon highly efficient toilet. It would have been nice to apply for a $50. rebate.

Now let's look at charges for Pueblo Water:

Minimum up to 2000 gallons: $16.60

Over 2000 gallons, $2.98 per 1000 gallons.

Now let's look at charges for Loveland:

3/4 inch water tap monthly fee: $16.67

Water use per 1000 gallons is $3.45.

As you can see the rates are comparable but Pueblo is slightly less expensive.

In terms of transparency, the City of Loveland's Utilities Commission has Monthly meetings with published agendas and minutes. Pueblo Water also has monthly meetings but there are no published agendas and minutes. In addition, the Pueblo Water Board has no City representative on it. Loveland has a City Councilmember.

I hope this is valuable information for the Pueblo Board and the Water Plan.

Since the biggest water usage is the residential system with household water usage as well as lawn usage. I would like to see figures about lawn usage. If there is a chance to have voluntary lawn water usage like other communities in Colorado when our rainfall is minimal I would like to see criteria and usage plans in the Water Efficiency Plan. Please let me know if it addresses my concern.

Sincerely,

John Lewis

Pueblo Water Response:

As you noted Pueblo has hard to very hard water. Every Tuesday the current hardness is posted on the website (see link: https://pueblowater.org/your-water/). At this time there are no plans to treat the water to reduce hardness.

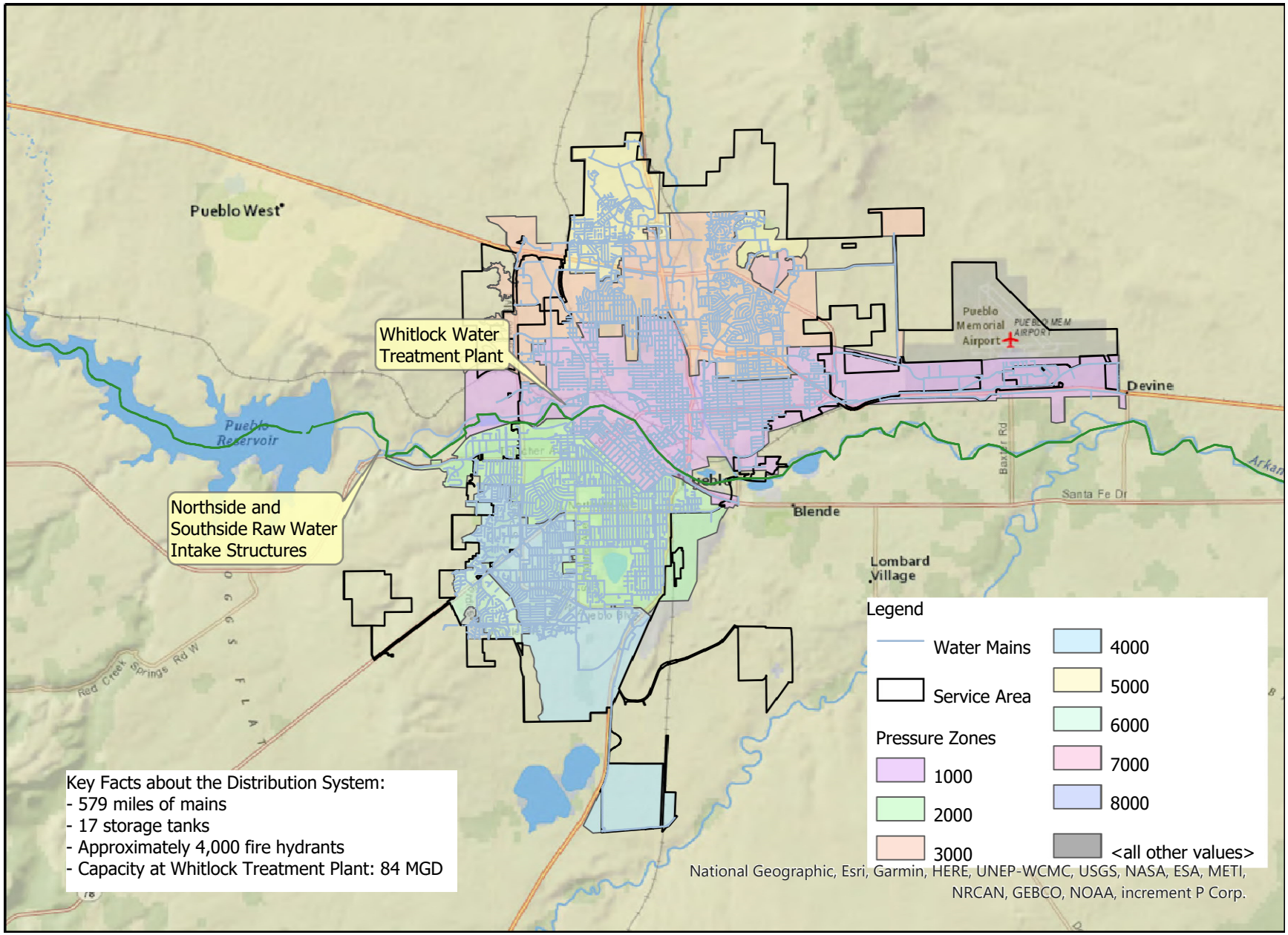
Although rebates for high efficiency fixtures and appliances are common among water utilities, research has shown they are not a very cost-effective way to reduce water use (see linked article: https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.1046.1830&rep=rep1&type=pdf). Based on an annual survey that we perform we believe that Pueblo has the lowest water rates along the Front Range. As you noted we are lower than Loveland and we are significantly lower than many other communities in the region. Since Pueblo has a relatively low median household income, maintaining low rates to keep water affordable to our customers is a top priority and that is why only the most cost-effective water efficiency actions are proposed for implementation.

We will consider posting board meeting agendas and minutes to our website. All five Pueblo Water board members are elected directly by the citizens of Pueblo, and the elected officials and staff of the City and Pueblo Water communicate regularly on topics of mutual concern.

Figure 6B showing indoor vs. outdoor use for residential accounts only was added to the plan. The vast majority of residential outdoor use is presumed to be for lawn irrigation or other landscaping maintenance uses. After a phone call follow up it was understood that the comment about voluntary lawn water usage was directed toward the concern that some neighborhood covenants and HOAs may mandate a certain amount of irrigated lawn area. Pueblo Water will do further research on this topic and address it in the next update of the plan.

Appendix A: *Distribution System Map*

Pueblo Water Distribution System Overview



0 1 2 4 Miles

Appendix B: *2019 Water Loss Audit Results*

AWWA Free Water Audit Software:
Reporting Worksheet

definition
comment

Water Audit Report for: Pueblo Water
Reporting Year: 2019 | 1/2019 - 12/2019

te cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the
omponent (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<---------- Enter grading in column 'E' and 'J'---------- >

Master Meter and Supply

						Pcnt:
Volume from own sources:	?	9	8,456.177	MG/Yr	8	-3.00%
Water imported:		n/a		MG/Yr		
Water exported:	?	n/a		MG/Yr		
			8,717.708	MG/Yr		

Enter negative % or value
Enter positive % or value

PTION

					Pcnt:
Billed metered:	?	7	7,052.563	MG/Yr	
Billed unmetered:	?	10	0.000	MG/Yr	
Unbilled metered:	?	6	1,039.388	MG/Yr	
Unbilled unmetered:	?	5	108.971	MG/Yr	1.25%

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORI	?	**8,200.922**	MG/Yr
Supplied - Authorized		**516.786**	MG/Yr

Pcnt:

Unau	?		21.794	MG/Yr	0.25%

efault option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	?	9	144.131	MG/Yr	1.75%
Systematic data handling errors:	?	6	17.631	MG/Yr	0.25%

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

	?	**183.557**	MG/Yr

nnual Real Losses or CARL)

Losses = Water Losse	?	**333.229**	MG/Yr
		516.786	MG/Yr
NOI	?	**1,665.145**	MG/Yr

letered + Unbilled Unmetered

Length of mains:	?	8	573.0	miles	
er of active AND inactive service connections:	?	8	40,236		
Serv	?		70	conn./mile main	
ically located at the curbstop or property line?			Yes		

(length of service line, beyond the property

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

WAS v5.0

American Water Works Association.

Water Audit Report for: Pueblo Water

Reporting Year: 2019 | 1/2019 - 12/2019

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 80 out of 100 ***

	Apparent Losses:	183.557	MG/Yr
+	Real Losses:	333.229	MG/Yr
=	**Water Losses:**	**516.786**	MG/Yr
	Unavoidable Annual Real Losses (UARL):	266.75	MG/Yr
	Annual cost of Apparent Losses:	$519,467	
	Annual cost of Real Losses:	$140,942	Valued at **Variable Production Cost**

Return to Reporting Worksheet to change this assumpiton

ators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	19.1%	
	Non-revenue water as percent by cost of operating system:	3.6%	Real Losses valued at Variable Production Cost

nal Efficiency:	Apparent Losses per service connection per day:	12.50	gallons/connection/day
	Real Losses per service connection per day:	22.69	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.28	gallons/connection/day/psi

From Above, Real Losses = Current Annual Real Losses (CARL):	333.23	million gallons/year
Infra ? ture Leakage Index (ILI) [CARL/UARL]:	1.25	

indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

Appendix C: *CWCB Guidance Documents*

- IDENTIFICATION AND SCREENING OF FOUNDATIC

ctivities for Screening	State Statute Requirement	Identification		Qualitative Screenin		
		Existing/ Potential Activity	Targeted Customer Category	*Feasible to Implement*	*Cost < $5,000/ AF*	*Community benefits*
	V, VII					
rations		Existing	All			
oor)		Potential	Commercial			
		Existing	All			
		Existing	All			
on (BP2)						
		Existing				
		Existing				
ent Customer Types		Existing				
		Potential	All			
cres)		Potential	All			
ap Fees (BP1)	VII, VIII					
		Existing				
		Existing				
		Existing				
		Potential	Residential	x	x	
rol (BP3)	V					
		Potential	All	x	x	x
		Existing				
		Existing				

	x		commercial		x				supply
x			Residential, multi-family, commercial		x				Limited staff resources/ ample supply
x			Residential, multi-family, commercial		x				Limited staff resources/ ample supply
x			Residential, multi-family, commercial		x				Limited staff resources/ ample supply
x			Residential, multi-family, commercial		x				Limited staff resources/ ample supply
x			Residential, multi-family, commercial		x				Limited staff resources/ ample supply
x			Residential, multi-family, commercial		x				Limited staff resources/ ample supply
x			Residential, multi-family, commercial		x				Limited staff resources/ ample supply
x			All						Cost/ ample supply
x			All						Cost/ ample supply
x			All						Cost/ ample supply
x			All						Cost/ ample supply
x			All						Cost/ ample supply
x			All						Cost/ ample supply
x			All						Cost/ ample supply
x			All	x	x	x		x	Xeriscape Garden will be added to South Side Dam rehab project
x			All						Cost/ ample supply
x			All						Cost/ ample supply
	x		City Parks	x				x	
		x	Commercial						Limited staff resources/ cost
		x	Commercial						Limited staff resources/ cost
		x	Commercial						Limited staff resources/ cost
		x	Residential, multi-family		x				Demographics of Pueblo - not likely to be viable
		x	Residential, multi-family		x				Demographics of Pueblo - not likely to be viable
		x	Residential, multi-family		x				Demographics of Pueblo - not likely to be viable
		x	Residential, multi-family		x				Demographics of Pueblo - not likely to be viable
		x	Residential, multi-family		x				Demographics of Pueblo - not likely to be viable
		x	Residential, multi-family		x				Demographics of Pueblo - not likely to be viable
		x	Residential, multi-family		x				Demographics of Pueblo - not likely to be viable
		x	Residential, multi-family		x				Demographics of Pueblo - not likely to be viable

WORKSHEET F - IDENTIFICATION AND SCREENING OF ORDINANCES AND REGULATIONS

Water Efficiency Activities for Screening	State Statute Requirement	Identification					Qualitative Screening				Carry to Evaluation	Reason for Elimination
		Existing/ Potential Activity	SWSI Framework Levels: Level 1 Customer Type(s) within the Existing Service Area	Level 2 New Development	Level 3 Point of Sales on Existing Building Stock	Targeted Customer Category	*Feasible to Implement*	*Cost < $5,000/ AF*	*Community Benefits*	Notes on Additional Pros/Cons to Consider		
General Water Use Regulations	IX											
Water Waste Ordinance (BP 5)		Potential	x			Residential, multi-family, commercial	x	x	x	Easy to implement	x	
Time of Day Watering Restriction		Potential	x			Residential, multi-family, commercial	x	x		Not necessary for our supply		ample water supply
Day of Week Watering Restriction		Potential	x			Residential, multi-family, commercial	x	x		Not necessary for our supply		ample water supply
Landscape Design/Installation Rules and Regulations	IX											
Rules and Regulations for Landscape Design/Installation (BP 9)		Potential		x		All	x	x		Coordination would be challenging		ample water supply
Landscaper Training and Certification (BP 8)		Potential		x		All		x	x			This will not be effective until additional landscape requirements are in effect.
Irrigation System Installer Training and Certification (BP 8)		Potential		x		All		x	x			This will not be effective until additional landscape requirements are in effect.
Soil Amendment Requirements (BP 9)		Potential		x		All		x				This will not be effective until additional landscape requirements are in effect.
Turf Restrictions (BP 9)		Potential		x		All		x				This will not be effective until additional landscape requirements are in effect.
Outoor Water Audits/Irrigation Efficiency Regulations (BP 10)		Potential		x		All		x				Without a specific conservation coordinator, this would be too time consuming
Outdoor Green Building Construction (BP 8,9)		Potential		x		All		x				This will not be effective until additional landscape requirements are in effect.
Indoor and Commercial Regulations	IX											
High Efficiency Fixture and Appliance Replacement (BP 12)		Potential	x			Residential, multi-family, commercial						Limited staff resources
Commercial Cooling and Process Water Requirements (BP 14)		Potential	x			Residential, multi-family, commercial						Limited staff resources
Green Building Construction (BP 12)		Potential	x			Residential, multi-family, commercial						Limited staff resources
Indoor Plumbing Requirements (BP 12)		Potential	x			Residential, multi-family, commercial						Limited staff resources
City Facility Requirements (BP 12)		Potential	x			Residential, multi-family, commercial						Limited staff resources
Required Indoor Residential Audits (BP 13)		Potential	x			Residential, multi-family, commercial						Limited staff resources
Required Indoor Commercial Audits (BP 14)		Potential	x			Residential, multi-family, commercial						Limited staff resources
Commercial Water Wise Use Regulations (Car Washes, Restaurants, etc.)		Potential	x			Residential, multi-family, commercial						Limited staff resources
Integration of Land Use Efforts	IV(f)(i)											
Examine Existing Land Use Regulations for Barriers and Conflicts		Potential		x		Regional	x	x	x		x	
Adopt or Strengthen Water-Related Ordinances or Regulations		Potential								Pueblo Water's perview to adopt water-realted ordinances		
Water Conservation in New Development, Re-Development, and Annexation		Potential								Not necessary at this time, but will be discussed with Planning Department moving forward		
Incorporate Water Efficiency into Zoning Codes and Rezoning Procedures		Potential		x		Regional	x	x	x		x	
Subdivision or Site Plan Regulations that Include Water Conservation		Potential								Not necessary at this time, but will be discussed with Planning Department moving forward		
Implement Requirements that Contribute to Water Efficiency and Compact Infrastructure		Potential		x		Regional	x	x	x		x	
Water Efficient Landscape Code		Potential		x		Regional	x	x	x		x	
Building and Plumbing Codes		Potential								Demographics of Pueblo		
Ordinances Promoting Efficient Fixtures in Existing Buildings		Potential								Demographics of Pueblo		
Regional Coordination of Water Policy and Procedures		Potential								Comprehensive plan is a regional effort and includes water as a component		

AND SCREENING OF EDUCATION ACTIVITIES

creening	State Statute Requirement	Identification		Qualitative Screening				Carry to Evaluation	Eliminate
		Existing/ Potential Activity	Targeted Customer Category	*Feasible to Implement*	*Cost < $5,000/ AF*	*Community Benefits*	*Extra Comments*		
	VI								
		Potential	All	x		x		x	
		Potential	All		x	x	No conservation coordinator		x
		Existing	All		x		Existing		
		Existing	All				Existing		
		Potential	All	x	x	x		x	
		Potential	All	x	x	x		x	
	VI								
		Potential	All			x	Could contribute monetarily to garden shows	x	
		Potential	All		x		No conservation coordinator		x
		Potential	All	x	x		No conservation coordinator		x
		Potential	All	x		x	During rehab of the Southside Dam	x	
	IV(f)(i)								
		Potential		x	x	x		x	
o Educate the Public		Potential			x	x	Pueblo Water will take the lead on education		
		Potential					Not cost effective		x
As		Potential					Not significant water users/ enough HOAs in the community		x
nunities and the Public		Potential					Limited staff resources/ no conservation coordinator		x
		Potential		x		x	Limited staff resources/ no conservation coordinator		x

Appendix D: *Water Rates*

Inside City Limits:

I. Minimum monthly charge 0-2000 gallons

Meter Size	$ Charge	Meter Size	$ Charge
¾- inch	12.98	3-inch	82.86
1-inch	16.60	4-inch	125.19
1½-inch	27.63	6-inch	207.03
2-inch	44.18	8-inch	276.15

II. Rate per 1,000 gallons of water

Usage	$ Charge
0 – 2,000	Minimum [1]
Over 2,000	2.98

III. Multiple dwelling units

	Usage	$ Charge
First unit	0 – 2,000 gal Over 2,000 gal	Minimum [1] 2.98
Additional units	0 – 2,000 gal Over 2,000 gal	7.17 2.98

[1] Based on meter size

PRIVATE HRE PROTECTION

Diameter of Connection	.t MonthIv Rate
3-incb or smaller	16.64
4-incb	18.96
6-incb	30.14
8-inch	41.38
JO-inch	52.55
12-inch	63.78

PUBLIC FIRE PROTECTION

	$ Monthly Charge
Fire hydrant, each	20.70

WATER DISPENSING STATION

Gnllons usage	S Charge per gallon
All	0.008

METE.RED HYDRANT SALES

Gallons usu11e	$ Chnnrn oer 1.000 i,nllons
0 - 2.000	20.70
Ovcr2.000	4.48

Minimum Deposit: 3-inch Fire Hydr,mt. 52000 per meter
Minimum Deposit: I-inch Fire Hydrant. S750 per mcfer
Monthly Lute Read Fee: SI00 per meter
Estim11tcd Monthly Usugc: S0,000 gullons*
•Billed for any period in whrch the meter is 1101 available for a regular readi11g.

Outside City Limits:

I. Minimum monthly charge 0-2000 gallons

Meter Size	$ Charge	Meter Size	$ Charge
¾-inch	19.49	3–inch	124.32
1–inch	24.91	4-inch	186.42
1½-inch	41.41	6-inch	310.59
2-inch	66.26	8-inch	414.23

II. Rate per 1,000 gallons of water

Usage	$ Charge
0 – 2,000	Minimum [1]
Over 2,000	4.48

III. Multiple dwelling units

	Usage	$ Charge
First unit	0 – 2,000 gal Over 2,000 gal	Minimum [1] 4.48
Additional units	0 – 2,000 gal Over 2,000 gal	10.81 4.48

[1] Based on meter size

PRIVATE FIRE PROTECTION

Diometer of Connection	$ Monthlv Rate
3-inch or smaller	24.96
4-inch	28.45
6-inch	45.20
8--inch	62.09
10-inch	78.89
12-inch	95.66

PUBLIC FIRE PROTECTION

	$ Monthlv Chnr11e
Fire hvdranl, each	20.70

Appendix E: *Water Waste Regulation*

Sample Waste of Water Ordinance/ Article:

Section 1. Misuse Prohibited
Section 2. Intent
Section 3. Preventing Waste of Water
Section 4. Rules and Regulations
Section 5. Notification
Section 6. Violations and Penalties

Section 1. Misuse Prohibited.

(a) It is prohibited for any person to flagrantly or wantonly misuse or waste, or cause to be misused or wasted, water supplied by Pueblo Water. For purposes of this section, the following are specifically determined to constitute flagrant misuse and waste:
    a. Any irrigation of lawns or plants which, due to excess application of water, results in an excessive and/or prolonged flow of water off the property being irrigated.
    b. Use of any plumbing system, irrigation system, connection or fixture, which by reason of misuse, damage, disrepair, inadequate maintenance or dilapidation, wastes Pueblo Water's water.

Section 2. Intent.

(a) To reduce the waste of water resulting from excess watering, inefficient water use or release of excess water into the public right-of-way.
(b) To reduce irrigation water usage without compromising landscape quality by using improved watering practices.
(c) To reduce the waste of water by reason of neglect of indoor plumbing and outdoor irrigation systems and/or devices, connections or fixtures thereto.
(d) To maximize the useful benefits of water for Pueblo Water citizens and reduce the need for future capital investment to purchase and store additional water.

Section 3. Preventing Waste of Water.

(a) In order to prevent the waste of water, Pueblo Water's Board members authorizes the Executive Director to promulgate rules and regulations intended to prevent the waste of water. Said rules and regulations shall apply to all customers of the Pueblo Water's water system.

Section 4. Rules and Regulations.

(b) Rules and regulations promulgated by the Executive Director, pursuant to the authority of Section 3 above, shall include but not be limited to:
    a. Prohibiting excess watering practices that result in the waste of water;

b. Regulating outdoor water usage for the washing or power-washing of sidewalks, driveways, patios, housing, fences, windows, decks and other impervious surfaces except for reasons of health and safety or other approved reasons;
c. Regulating the use of water for construction purposes;
d. Regulating other water usage practices as may be necessary to prevent the waste of water.

Section 5. Notification.

(a) Upon the promulgation of Rules and Regulations pursuant to this Article, the Executive Director shall publish, post, issue notice to individuals observed to be engaged in the waste of water, or otherwise make available copies of said Rules and Regulations in the manner determined by the Executive Director or his/her designee as most appropriate to prevent the waste of water.

Section 6. Violations and Penalties.

(a) Any person violating any provision of this Article, or of the Rules and Regulations promulgated by the Executive Director pursuant to this Article, shall, upon confirmation of violation, be subject to a fee not to exceed $999.00 for each violation.
(b) The assessment of fees for violations of this Article or the Rules and Regulations promulgated hereunder will be through Pueblo Water's utility bill for the responsible party's billing account.
(c) The Executive Director may, as part of the Rules and Regulations promulgated pursuant to the Article, establish a progressive schedule of warnings and/or fees subject to the approval of such schedule by Pueblo Water's Board by resolution or motion.

Appendix F: *City Parks Cost Share Program*

Introduction and Background

The City Parks Department utilizes about 1,370 AF in parks through the City and approximately 60 AF in school parks for a total of 1,430 AF on average from 2015 – 2019. While this represents only 5% of total potable water use, the water is provided at no charge; therefore, a reduction in water use among City Parks would be financially beneficial for Pueblo Water.

Pueblo Water has been in contact with Parks Area Crew Leader, Mike Taft, as well as CPS Distributors Territory Manager, Patrick Riley to gather information about potential irrigation equipment as well as the needs and concerns of City Parks staff. Mike Taft had previously been in contact with Patrick Riley and has already determined the HydroPoint WeatherTrak controller is the best fit for Pueblo and one of the best water efficiency controllers in the country. WeatherTrak uses weather data from the previous day to automatically update irrigation schedules based on actual precipitation and characteristics about the turf type. Theoretically, this provides the ideal quantity of water for the grass, thereby improving water efficiency and park aesthetics. According to Patrick Riley, WeatherTrak Controllers are expected to last 12 years with some currently in-use exceeding 15 years. He stated that the majority of controllers reaching the 12-15 year mark only need small parts replacements rather than an entire controller replacement.

Fort Carson and the City of Colorado Springs have converted all their irrigation systems to the WeatherTrak controllers. Fort Carson saw a 30% reduction in consumption, equating to over 50 million gallons of water saved per year. Not only did it provide ample water savings, but it also boosted operational efficiency through its smart features. For example, WeatherTrak has a rain pause function which turned a 30+ man-hour job into a two-minute task for Fort Carson. While the reduced water use cannot be guaranteed, HydroPoint representatives indicate a 30% reduction is standard.

Current Data

The City Parks Department has already implemented one WeatherTrak controller and has seen its benefits. Between July and November of 2020, the City Parks Department saw a 13% reduction in water consumption compared to the same time period in 2019. Compared to 2019, 2020 saw less overall precipitation and average maximum daily temperatures were higher through July and November, except for September. Table 1 shows consumption, temperature, and precipitation for 2019 and 2020[1]. It is expected that with further refinement, the City Parks Department would see an even higher reduction in consumption due to the WeatherTrak controllers.

[1] Consumption is only shown for meter #29310756, which is associated with the area utilizing the WeatherTrak controller.

	Metered Consumption (thousand gallons)		Average Maximum Daily Temperatures (F)		Total Precipitation (in.)	
	2019	**2020**	**2019**	**2020**	**2019**	**2020**
July	1792	2362	93.03	93.58	2.98	1.16
August	1808	1690	92.68	94.19	0.67	1.11
September	1607	884	88.37	81.53	0.33	1.13
October	1186	596	64.68	69.00	1.41	0.73

Table 1: Consumption, Temperature and Precipitation Before and After WeatherTrak Controller

Cost Share Program

Pueblo Water is suggesting a cost-share program with the City Parks Department to help cover the cost of new WeatherTrak controllers and associated labor. There are three major components needed for the controller and associated irrigation system repairs: the WeatherTrak Controller, hydrometers and replacement of thermo-hydraulic (TH) valves throughout the system. All TH valves need to be replaced to work with the WeatherTrak controllers and ends up being a significant portion of the cost. Additionally, a hydrometer needs to be installed at every connection to municipal water. Please see Table 2 below for the total costs.

	Quantity	Equipment Cost	Labor Cost	Total Equipment Cost	Total Labor Cost
Controllers	183	$ 2,000.00	$ 257.84	$ 366,000.00	$ 47,184.72
Thermo-hydraulic (TH) Valves	820	$ 200.00	$ 392.84	$ 164,000.00	$ 322,128.80
Hydrometer	110	$ 800.00	$ 417.84	$ 88,000.00	$ 45,962.40
				$ 618,000.00	**$ 415,275.92**
Total Equipment and Labor	**$**				**1,033,275.92**

Table 2: Summary of Total Costs

In addition to the cost for implementation, there is an annual fee of $235 per controller, or $43,005 for all City Parks controllers per year. This cost-share will not contribute to the annual fee and should only be used towards equipment and/or labor costs.

Given a ten-year time frame to complete all controller installations, Pueblo Water proposes to pay 50% of the project per year, not to exceed $52,000 per year. If the project continues past ten years, Pueblo Water has the discretion to continue or discontinue the cost share at that time. The City Parks

Department does not have a budget or existing plan for implementation and further discussions will be required if Pueblo Water decides to move forward with the cost share.

It is anticipated that the completed project will result in a 30% reduction in water use compared to current. However, given the length of the project it can be assumed that the Parks Department will see approximately a 3% reduction in water consumption per year until year 10. In addition to the water savings, Pueblo Water could potentially see some financial savings as well. Between 2015 and 2019, the City Parks Department has used approximately 1,430 AF per year. Assuming a gradual declining trend in water consumption totaling 30% by the end of year 10, Pueblo Water can expect an ongoing reduction in water use of 430 AF per year after completion of the entire project. Much of the reduction in use will occur in the peak demand months of summer which is the most beneficial time since it could result in a reduced draw from reservoir storage. Under this scenario, Pueblo Water will pay $520,000 and can expect approximately $331,115 in production savings over the project term, given a variable cost of $0.43 per thousand gallons. These monetary values do not consider the potential to lease a portion of the saved water and only consider production savings. Therefore, there is the possibility of additional revenue from leasing the saved water.

WeatherTRAK® ET Pro3®

Smart Irrigation, Perfect Landscapes

The WeatherTRAK ET Pro3 smart irrigation controller uses ET Everywhere®, the most precise, high-resolution weather data available, to create specific schedules to maintain your landscape health with the least amount of water possible.

With its proven ability to tune irrigation to your unique landscape and site characteristics, the WeatherTRAK ET Pro3 controller reduces water waste by only irrigating when it is necessary – saving you time, resources, and money.

Get more done in less time with WeatherTRAK Central programming and management

Real-time flow alerts make every site and schedule perform more efficiently

Speed up wet checks, troubleshooting, and installs with WeatherTRAK Mobile

IRRIGATION TUNED BY THE CLOUD

WeatherTRAK algorithms consider factors such as weather, plant type, and soil type to know how much water is available to the plant within the soil. If the plant has enough water, irrigation isn't scheduled. These decisions are automatically planned and constantly optimized.

HydroPoint®

KEY FEATURES

Overview

- 12 to 96 stations - with backlit display and touch interface
- Six station modularity
- Five-year warranty
- Worry-free Wireless Warranty™ covers cellular technology upgrades

Programming Features

- Eight simultaneous programs with five program modes and two start times
- Program all settings at controller, or remotely
- Independent station programming (72 cycles/ station) with automated cycle and soak
- User-defined water days and water windows per program to comply with agency regulations
- Built-in WeatherTRAK Scheduling Engine optimizes by plant, soil, sprinkler, sun exposure, and slope data
- Automated daily runtime adjustments using site-specific ET Everywhere weather data
- Percent adjust to enable fine-tuning by station
- Automated skip days based on zone-specific soil moisture depletion
- Specific scheduling for sports turf and high desert sites
- Runtime rationing protects plant health under constricted water windows
- Stacked station manual watering from 1-99 minutes

Integrated Flow Features

- Mainline/catastrophic break detection and shutdown
- Real-time station-specific flow monitoring and control
- Local and remote station-learned flow
- Fault detection, diagnostics, and alerts
- Supports up to four flow sensor inputs and master valve outputs
- Supports normally open or normally closed master valves
- Customizable flow alert thresholds
- Upgradable to OptiFlow® for advanced flow management and multi-controller automatic scheduling
- Supports Data Industrial®, CST, Netafim™ flow sensors and custom “K and offset” values
- Compatible with WeatherTRAK FlowLink®, FlowShare, Flow3, and FlowHD

Hardware Features

- Integrated flow sensor support included
- Dedicated master valve and pump start
- Commercial-grade screw-less wire terminals
- Built-in amp meter for fault protection and diagnostics
- Cellular radio and first year of WeatherTRAK Central service included
- LTE cellular communication for the best coverage and performance
- 32-pin connector for hardware remote like the TRC Commander and Irritrol® ProMax™
- New features and firmware pushed over-the-air using WeatherTRAK Cloud Update
- Share one rain sensor across multiple controllers with RainShare™
- Robust built-in surge protection integrated directly into the controller

Input Power

120 VAC +/- 10%, (60 Hz) or 220 VAC +/- 10%, (60 Hz)

Output Power

24 VAC (60 Hz)

- 1.0 Amp (1000mA) max per station output including a pump start
- 1.0 Amp (1000mA) max per master valve output
- 3.0 Amps (80 VA) total load

Up to 17 terminal outputs energized simultaneously (8 stations, 1 manual, 4 pump starts, 4 master valves).

Consumptive Power

Idle State: 2.5 Watts
Maximum Power Requirements for Irrigation State: 70 Watts

Certifications

EPA WaterSense® Approved, FCC Certified, UL Listed , 100% SWAT-tested

Enclosure Options

Wall Mount Enclosures

- 16 gauge wall mount enclosure available in stainless and powder coated finishes
- Key-hole mounting for wall mount enclosures makes it easy to install
- Easily adapts to a small 14 gauge pedestal, also available in two different finishes

VIT Strong Box Stainless Steel
Pedestal Enclosures
Retrofit Chassis for Existing Enclosures
All come with key lock entry
NEMA-3R weather-resistant

STATION COUNT	POINTS OF CONNECTION SUPPORT
12 - 36	1 standard
36 - 48	2 (requires flow key)
72	3 standard
96	4 standard

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