



FORT COLLINS • LOVELAND WATER DISTRICT

2023 MUNICIPAL WATER EFFICIENCY PLAN UPDATE



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EXECUTIVE SUMMARY

The Fort Collins-Loveland Water District (FCLWD or District) has provided water services to citizens and businesses since 1961. The District is located approximately 50 miles north of Denver along the Colorado Front Range. The District currently serves over 65,000 water users across a broad area of Northern Colorado including parts of Fort Collins, Loveland, Timnath, Windsor and Larimer County.

FCLWD completed its first State-approved Water Efficiency Plan in 2008 and a subsequent update in 2015. The purpose of this Municipal Water Efficiency Plan (MWEP or Plan) update is to continue FCLWD's valuable planning efforts towards greater water efficiency, future demand planning, and the implementation of conservation programs and activities.

This report documents the District's water rights and systems, historical and projected water demands, planning process used to prepare this Plan, and targeted water efficiency activities to implement. Water efficiency planning was completed in accordance with CWCB's Municipal Water Efficiency Plan Guidance Document (*Guidance Document*). The benefits of water efficiency activities may include delaying the purchase of costly water supplies and infrastructure upgrades, reducing wastewater flows and treatment and associated costs, and improved water management and stewardship.

The District's water supply consists of CBT units and native water rights from diversion off the Cache la Poudre River. The District receives its treated water from the Soldier Canyon Water Treatment Authority (SCWTA), which is jointly owned by the Tri-Districts of FCLWD, NWCWD, and ELCO. The District owns and operates a water distribution network of over 400 miles of pipeline and associated facilities. The District continues to expand within its service area and between 2015 and 2022, the District added over 3,000 taps.

Between 2015 and 2021 FCLWD received an average of 10,795 AF of treated water from the Tri-Districts SCWTA. From 2015 through 2021, the FCLWD's billed water demand was 10,089 AF of treated water to meet residential, non-residential, irrigation and other customer usage, as well as non-revenue losses. The annual treated water demand is estimated to increase due to population growth and new development to 15,064 AF by the end of this Plan's planning period in 2032. Water savings from water efficiency activities developed in this Plan may save up to 1,229 AF per year of treated water demand. The savings from this planning effort will make a considerable contribution toward the water supplies needed to serve the 2033 demand.

Past and Current Water Efficiency Activities

The District has several current and on-going water efficiency activities, some of them have existed for a long time, and others were implemented after the 2008 and 2015 Municipal Water Efficiency Plan. **Table ES-1** lists the existing and on-going water efficiency activities.

Table ES-1: Fort Collins’ Existing and Ongoing Water Efficiency Activities

Water Efficiency Activities
Metering
Automatic Meter Reading (AMR) Installation and Operations
Meter Testing and Replacement
Meter Upgrades
Identify Unmetered/Unbilled Treated Water Uses
Data Collection - Monitoring and Verification
Upgrade Billing System to Track Use by Sufficient Customer Types
General Evaluation of Policies that Encourage Water Savings
Frequency of Meter Reading
Tracking Water Use for Large Customers
Water Use Efficiency Oriented Rates and Tap Fees
Water Rate Adjustments - Water Rate Structure Changes
Water Efficiency Rate Structure with Regular Updates to Rate Study
Volumetric Billing
Frequency of Billing
Inclining/Tiered Rates
Tap Fees with Water Use Efficiency Incentives
System Water Loss Management and Control
Leak Detection and Repair
Planning
Integrated Water Resources Plans
Master Plans/Water Supply Plans
Capital Improvement Plans
Feasibility Studies
Targeted Technical Assistance and Incentives
Low water use plantings
General Water Use Regulations
Time of Day Watering Restriction
Day of Week Watering Restriction
Education Activities
Bill Stuffers, Mass Mailings, Newsletter and Newspaper Articles
Website – Water Conservation Information, link to Water Energy Climate Calculator, and links to Northern Water’s Water Conservation webpages

Water savings from water efficiency activities are challenging to quantify, especially activities that are highly dependent on human behavior, such as public education programs. A straightforward way to evaluate water savings as a whole is by calculating the District’s per

capita water use to observe trends. FCLWD’s per capita water use shows a general downward trend since 1990 as depicted in **Figure ES-1**.

Water Usage (GPCD) Compared with Population

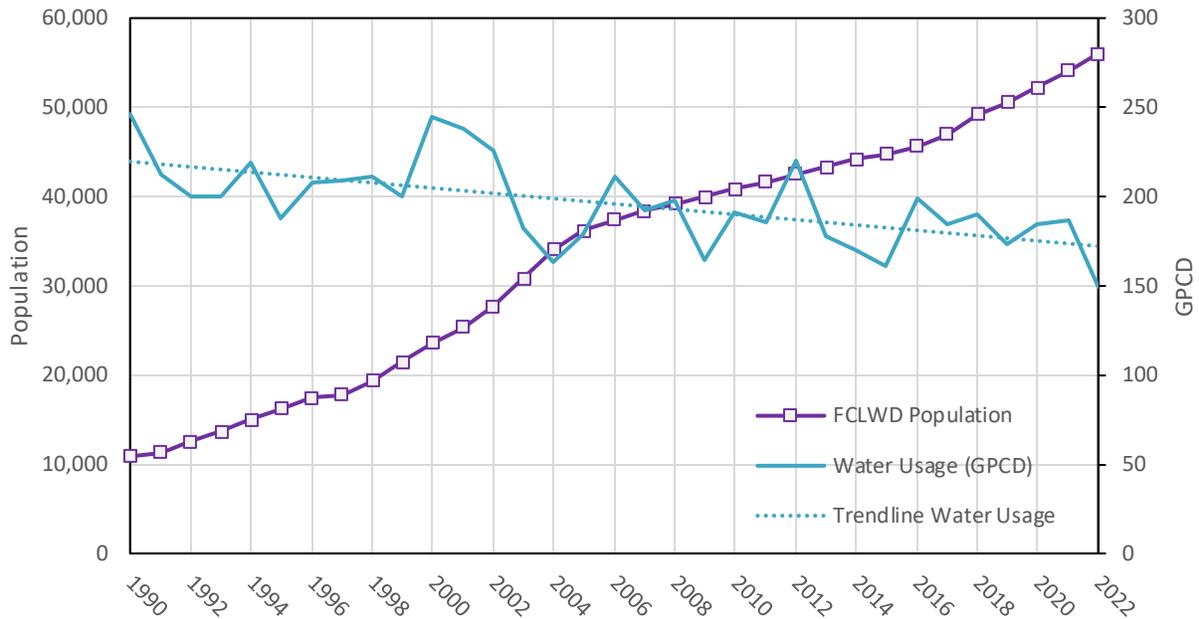


Figure ES-1: Treated Water Use and Population Trends

An initial set of water savings goals were developed in the beginning stages of this planning effort to guide the development of this Plan. The initial goals were used to screen and evaluate potential activities to ensure the District’s goals can be met with the water efficiency activities evaluated. The following initial goals were established by District Staff:

- The targeted water savings goal for this Plan will be to lower the treated water demand by 10% over the ten-year planning period, or approximately 1% per year.
- The targeted ten-year water reduction goals for the following customer categories were as follows:
 - Residential: 12%
 - Residential Multi-Family: 5%
 - Non-Residential: 3%
 - Irrigation: 10%
 - Other: 1%
 - Non-Revenue Water: 10% (i.e. a 10% reduction of current 7%), see page ES-5.
- Develop a water efficiency program that can be implemented within District staffing constraints and with Staff approval.
- Implement water efficiency activities that produce measurable water savings.

FCLWD used a four-phase process for selecting and fully evaluating water efficiency activities. The four phases include: 1) assessment; 2) identification; 3) qualitative screening; and 4) evaluation and selection.

The initial screening of the water efficiency activities with District Staff resulted in selecting 16 candidate activities for further evaluation. District Staff used the following criteria to screen potential activities:

- Staff approval
- Anticipated customer acceptance and participation
- Staff and financial resource limitations and grant opportunities
- Legal authority
- Tangible water savings

A second screening was accomplished by evaluating each activity based on a preliminary cost benefit analysis and the evaluation criteria. The following measures were eliminated in the second screening process:

- General Monitoring and Verification Activities
- Water Efficiency Rate Structure with Regular Updates to Rate Study
- Recycling Water Treatment Plant Filter Backwash
- Irrigation Equipment Retrofits – Wind/Rain Sensors
- Xeriscape Demonstration Garden and Education Programs

The District may re-evaluate these measures with future planning efforts. The following measures and activities were added during the second screening and evaluated in the cost benefit analysis:

- Conservation Taps
- Hydrant Flushing Filter Truck
- Turf Replacement Program
- Water Conservation Employee

The following 13 activities were selected for implementation by the District in this Plan:

Foundational Activities

- Automatic Water Meter Reading Installation and Operations and Meter Replacement Program/Meter Upgrades General Monitoring and Verification Activities
- Conservation Taps
- Leak Detection and Repair
- Hydrant Flushing Filter Truck
- Master Plans, Water Supply Plans and Land Use Planning

Targeted Technical Assistance and Incentives

- Residential Irrigation Audits (partner with Fort Collins)
- Smart Irrigation Controllers

- Rebates for Xeriscape Plants
- Turf Replacement Program

Ordinances and Regulations

- Watering Restrictions

Educational Activities

- General Education
 - Bill Stuffers
 - Newsletter
 - Newspaper Articles
 - Mass Mailings
 - Website updates
- Property Manager/HOA Irrigation Education Training
- Water Conservation Employee

Table ES-2 compares the anticipated water savings from the selected activities with the original goals and then adjusts the water saving goals for this Plan. Over the ten-year planning period, the selected activities provide an overall estimated water savings of 12,290 acre-feet. The adjusted goals reflect the goals believed to be obtainable by FCLWD Staff. After the goals were adjusted to reflect the expected water savings, the estimated water use reduction is 9 percent. Therefore, FCLWD will target an overall reduction from their forecasted water use by 9 percent over the planning period because of implementation of this Plan.

Table ES-2: Water Efficiency Goals Comparison

Water Use Categories:	Total Projected Water Use (2015 to 2024)	Reduction Goals for Planning Horizon		Adjusted Reduction Goals for Planning Horizon	
				Total Water Savings from Activities	Resulting Reduction
	(AF)	(%)	(AF)	(AF)	(%)
Residential (Res)	87,959	12.0%	10,555	3,009	3.4%
Residential Multi-family (RMF)	4,751	5.0%	238	663	14.0%
Non-Residential (NonRes)	14,619	3.0%	439	243	1.7%
Irrigation (IRR)	14,619	10.0%	1462	1,773	12.1%
Other	5,243	1.0%	52	11	0.2%
Non-Revenue Water	8,903	10.0%	890	6,591	74.0%
Total Water Production:	136,094				
Total Demand Reduction:			13,636	12,290	
Total Percent Reduction:			10.0%		9.0%

Implementation and Monitoring Plan

The implementation plan defines the process necessary to develop the selected water efficiency activities. The District Management team under the direction of the General Manager will be chiefly responsible for coordinating the implementation of this Plan. The most successful Plan is one that involves a team effort from many staff, other key personnel, and sometimes assistance outside of FCLWD’s employees.

Monitoring various types of data is beneficial in tracking the water savings generated from implementing an MWEF. A monitoring plan outlines the District’s process to monitor the progression of the implementation plan to ensure its success. The data, which will be collected during the monitoring period of the Plan, is presented in **Table ES-3**.

Table ES-3: Selection of Demand Data for Efficiency Plan Monitoring

Monitoring Data	HB 10-1051 Reporting Requirement				Selection			
	Annual	Monthly	Bi-	Daily	Annual	Monthly	Bi-	Daily
Total Water Use								
<i>Total treated water produced (metered at WTP discharge)</i>					X	X		X
<i>Total treated water delivered (sum of customer meters)</i>	√				X	X		
<i>Raw non-potable deliveries to SCWTA</i>					X	X		X
<i>Reclaimed water produced (metered at WWTP discharge)</i>								
<i>Reclaimed water delivered (sum of customer meters)</i>								
<i>Per capita water use</i>					X	X		
<i>Indoor and outdoor treated water deliveries</i>					X	X		
<i>Treated water peak day produced</i>					X	X		X
<i>Reclaimed water peak day produced</i>								
<i>Raw water peak day produced/delivered</i>								
<i>Non-revenue water</i>	√				X	X		
Water Use by Customer Type								
<i>Treated water delivered</i>		√			X	X		X
<i>Raw non-potable deliveries</i>								
<i>Reclaimed water delivered</i>								
<i>Residential per capita water use</i>					X	X		
<i>Unit water use (e.g. AF/account or AF/irrigated acre)</i>					X	X		
<i>Indoor and outdoor treated water deliveries</i>					X	X		
<i>Large users</i>					X	X		

Monitoring Data (cont.)	HB 10-1051 Reporting Requirement				Selection			
	Annual	Monthly	Bi-Monthly	Daily	Annual	Monthly	Bi-Monthly	Daily
Water Use by Customer Type								
<i>Treated water delivered</i>		√			X	X		X
<i>Raw non-potable deliveries</i>								
<i>Reclaimed water delivered</i>								
<i>Residential per capita water use</i>					X	X		
<i>Unit water use (e.g. AF/account or AF/irrigated acre)</i>					X	X		
<i>Indoor and outdoor treated water deliveries</i>					X	X		
<i>Large users</i>					X	X		
Other Demand Related Data								
<i>Irrigated landscape (e.g. AF/acre or number of irrigated acres)</i>					X			
<i>Precipitation</i>					X	X		
<i>Temperature</i>					X	X		
<i>Evapotranspiration</i>					X	X		
<i>Drought index information</i>					X			
<i>Economic conditions</i>					X			
<i>Population</i>					X	X		
<i>New taps</i>					X	X		

INTRODUCTION

The Fort Collins-Loveland Water District (FCLWD *or* District) has provided water services to citizens and businesses since 1961. The District is located approximately 50 miles north of Denver along the Colorado Front Range as shown in **Figure 1**. The District currently serves over 65,000 water users across a broad area of Northern Colorado including parts of Fort Collins, Loveland, Timnath, Windsor and Larimer County.

FCLWD completed its first State-approved Water Efficiency Plan in 2008 and a subsequent update in 2014. The purpose of this Municipal Water Efficiency Plan (MWEF or Plan) update is to continue FCLWD's valuable planning efforts towards greater water efficiency, future demand planning, and the implementation of conservation programs and activities.

The planning horizon for this Plan is ten years from 2023 to 2032. In this Plan update, the District will perform the five steps of municipal water efficiency planning as outlined in the CWCB's MWEF Guidance Document (Guidance Document):

1. Profile its existing water supply system
2. Profile its water demands and historical demand management
3. Integrate planning and water efficiency benefits and goals
4. Selection of water efficiency activities
5. Implement and monitor the Plan

There were several documents reviewed in the development of this Plan update including FCLWD's 2008 Water Conservation Plan, 2014 Water Efficiency Plan Update and FCLWD's website pages. There are many acronyms, terms, and terminology that are commonly used in water efficiency and planning, and some additional terms are common in this geographical area; a list of terms and their meanings is included in **Appendix A**.

SECTION 1.0 – PROFILE OF EXISTING WATER SUPPLY SYSTEM

1.1 Overview of Existing Water Supply System

Service Area

The Fort Collins-Loveland Water District has a service area with the approximate boundaries that are as follows and shown in **Figure 1**. Much of the northern boundary of the District is bordered by Harmony Road in Fort Collins, although several fingers of the northern boundary extend north of Harmony. A large portion of the southern boundary of the District is bordered by 57th Street in Loveland. To the east, the Larimer-Weld County line represents the boundary, and to the west, the foothills are essentially the District’s border. The service area incorporates portions of Fort Collins, Loveland, Windsor, and the town of Timnath. The remaining sections of the service area include the rural portions of Larimer County in between the municipal areas. In 1981 an Inter-governmental Agreement was established to keep the boundaries static. The service area currently covers approximately 60 square miles.

Table 1: Estimated District Population

Year	Population ⁽¹⁾	Growth Rate
2015	44,777	-
2016	45,672	2.0%
2017	47,000	2.9%
2018	49,258	4.8%
2019	50,551	2.6%
2020	52,224	3.3%
2021	54,104	3.6%
2022	56,052	3.6%
2023	63,210	11.3%

(1) Population estimated from number of taps,

Due to the unique demographics of the water district, the exact population is difficult to determine. Districts like FCLWD are comprised of different governing entities including portions of cities and towns (as mentioned previously) as well as rural county areas. Census data can be obtained for counties and municipalities, even regions, but data is not available for special districts. To estimate the population for FCLWD, the number of households was calculated from the tap data and multiplied by the average number of people per household per jurisdiction¹. This number represents information provided by District Staff as well as demographics from Fort Collins, Loveland, Timnath, Windsor, and Larimer County. The population estimates for the past eight years are presented in Table 1.

¹ Population estimates in 2022 and prior used an average of Census Household size of 2.37 and 2.67 multiplied by the number of dwelling units served. Beginning in 2023, the population estimate is calculated using the Census Household size per jurisdiction, ranging from 2.52 for unincorporated Larimer County to 3.3 for Timnath.

Water Supply

The District’s water supply consists of Colorado Big Thompson (CBT) units and native water rights from diversion off the Cache la Poudre River. The District owns 13,209 units of CBT water. The CBT system contains trans basin water that accumulates in the Colorado River Basin and is pumped from Lake Granby through the Adam’s Tunnel to the East Slope near Estes Park. Water is then distributed to several Front Range reservoirs. The CBT system was constructed by the Bureau of Reclamation between 1938 and 1957 and is maintained by the Northern Colorado Water Conservancy District (Northern Water).

The District also owns agricultural water rights that divert water from the Cache la Poudre River. They include shares in several ditch and reservoir companies. The companies, amount owned, average and firm yield are presented in **Table 2**. Many of these water rights are decreed for agricultural uses only, so they are exchanged on an annual basis for CBT water when possible. When no CBT water is available for exchange, the water rights are rented for agricultural use. North Poudre Irrigation Company (NPIC) owns 40,000 CBT units, so its shares include a CBT portion and a native agricultural portion. The CBT water is delivered equally to the 10,000 shares within the NPIC system for agricultural, municipal, or industrial use.

Table 2: FCLWD Water Supplies

Water Source	Yield (AF/year)	
	Currently Available	
	Average Yield	Dry-year Yield
<u>Single Use</u>		
Colorado Big Thompson Project	9,246	6,604
North Poudre Irrigation Company	3,117	3,117
Divide Canal Company Class A	2,381	1,588
<u>Reusable</u>		
Divide Canal Company Class B (Sand Creek)	128	63
Laramie-Poudre Tunnel	598	591
John R Brown (05CW264)	59	59
JR Brown (17CW3160)	44	44
Jackson Ditch (08CW277)	113	110
<u>Contract</u>		
Josh Ames C-BT Transfer from Fort Collins	175	175
Windsor Contract	370	370
<u>Storage</u>		
C-BT Carryover	2,602	2,602
Overland Ponds (Case No. 00CW251)	914	914
Horsetooth Account	400	

Water Source	Yield (AF/year)	
	Average Yield	Dry-year Yield
Pending		
NISP Firm Yield (Phase 1 & 2)	3,400	3,400
Unchanged		
New Mercer Ditch	37	36
Larimer County No. 2	10	6
TOTAL	23,194	19,679

The District receives its treated water from the Soldier Canyon Water Treatment Authority (SCWTA), which is jointly owned by the Tri-Districts of FCLWD, NWCWD, and ELCO. Through this ownership, FCLWD can participate in cooperative water system projects, which lowers the incremental cost for all participants through economies of scale.

The SCWTA is a regional water treatment plant located below the Soldier Canyon Dam on the northeast side of Horsetooth Reservoir (also depicted on **Figure 1**). The capacity of the treatment plant is currently at 60 MGD with plans to expand. Water is delivered to the plant from Horsetooth Reservoir which is part of the CBT Project. The District can also bring water to the plant through the jointly owned Pleasant Valley Pipeline, which is an eight mile long, 67-in diameter, raw water supply pipeline shared by the Tri-Districts, Fort Collins, and Greeley.

Along with the Pleasant Valley Pipeline, FCLWD and other water suppliers in the region have worked cooperatively to provide high quality water service to residents of northern Colorado. Other coordinated efforts include partnering with Greeley to purchase and develop raw water storage. Water is also exchanged year-round between the City of Fort Collins water treatment facility and SCWTA.

Key Existing Facilities

The SCWTA can treat up to 60 MGD, and there is a total of 9.25 million gallons (MG) of treated water storage at the four other storage facilities throughout the system. The system also includes eight pump stations. The Colorado-Big Thompson Project, as part of its system, has raw water storage; some additional raw water storage is also available to the Tri-Districts in the Overland Trail Ponds. More details will be discussed about the Overland Trail Ponds in Section 1.3.

The District owns and operates a water distribution network of over 400 miles of pipeline and associated facilities. The pipelines are well maintained with less than five breaks per year and non-revenue water of seven percent throughout the system. The District continues to expand within its service area and between 2015 and 2022, the District added over 3,000 taps.

FCLWD’s maintenance program includes annual flushing of water lines, periodic valve exercise and maintenance, and prompt leak repair. **Table 3** shows the miles for each diameter of pipe, ranging from one inch to 48 inches.

Every service connection on the District’s distribution system, regardless of use, is metered. Some accounts are also equipped with a rotating disk, positive displacement meter, and an individual pressure regulator for accurate measurement of the water delivered. Approximately 90 percent of the District customers’ meters are equipped with Automatic Meter Infrastructure (AMI) capabilities. All of the system meters are read once a month; this includes hydrant meters used by contractors that buy construction water from the District. The District has set up four billing cycles to distribute the frequency of readings. With the AMI meters, FCLWD can receive readings hourly; this capability is highly beneficial in researching potential leaks. For example, if a customer has a spike in use or if another customer has a steady use throughout the day and night, these may indicate possible problems. The District is confident that the design of their system accounts for all water use. The water use monitoring program the District has been using for the past ten years has been an integral part of the efforts to minimize system leakage.

Table 3: Water Transmission Pipe Lengths within District Service Area

Pipe Diameter (Inches)	2022 Pipe Length (Miles)
1	0.22
1 ½	0.03
2	1.97
2 ½	0.20
3	13.21
4	22.72
6	68.47
8	186.76
10	21.35
12	66.39
14	9.97
16	5.44
18	13.42
20	3.76
22	1.47
24	11.74
30	4.35
36	4.89
48	0.59
Total	437.0

1.2 Water Supply Reliability

The FCLWD is in Larimer County in the South Platte River Basin where the Statewide Water Supply Initiative (SWSI) 2010 identified a 58 percent gap between water needs and water supplies in the Basin by 2050. Water efficiency is one method the SWSI report identified for meeting this gap.

Water supply reliability is the ability of the District's water supplies to meet the needs of its customers during times of stress. The CBT Project imports an average of over 200,000 acre-feet (AF) of water each year to many public and private water users along the northern Front Range and northeastern Colorado for agricultural, municipal and industrial uses. The system has approximately 740,000 AF of gross storage and consists of 310,000 units. There is approximately 2.3 times the storage than would be needed to deliver a 100 percent quota. This makes the CBT system a robust water supply system.

In over fifty years of CBT project operation, the average yield has been 0.73 AF per unit and the commonly used average quota is 70 percent. The yield has never been less than 0.50 acre-feet per unit (50 percent quota) or more than 1.0 acre-feet per unit (100 percent quota). The historical annual quota established by the Northern Water Board is shown in **Figure 2**.

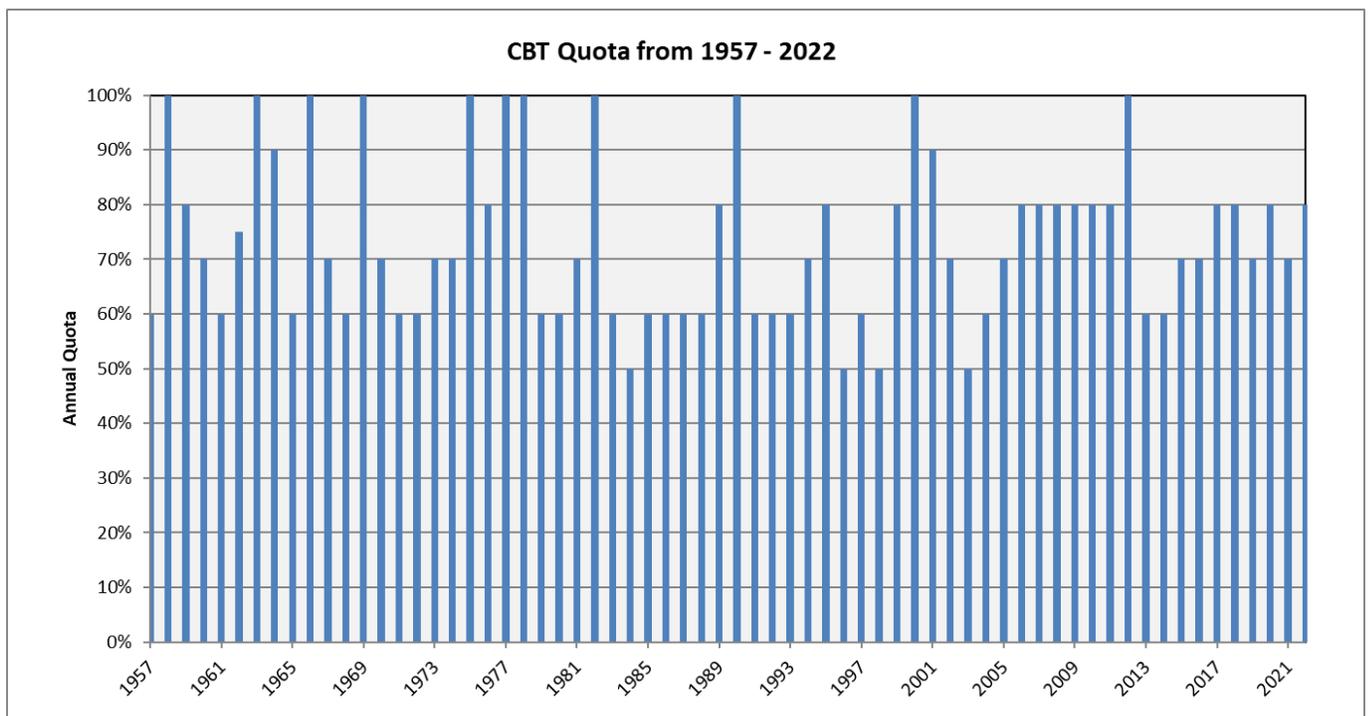


Figure 2: Historical CBT Quota

Northern Water defines a CBT carryover program to CBT Allottees, which allows CBT owners to carry over unused CBT from the previous year to the following year. Per the Northern Water's Annual Carryover Program Procedures:

The Board and District staff will review the advantages and consequences of the Annual Carryover Program on a continuing basis. While the Board recognizes the Program's benefit to many CBT Allottees, it may modify or discontinue the Annual Carryover Program at any time.

Considering this procedure, a 50 percent quota is what most water provider's use as the firm yield for CBT.

Other Factors that Potentially Impact Water Supply

The CBT supplies are stored in Lake Granby on the western slope of Colorado. Should a fire occur in the area, water quality would be a major issue for FCLWD and other CBT Allottees. There is a tremendous amount of beetle kill to trees surrounding Lake Granby, Grand Lake, and the other storage facilities of CBT. This beetle kill poses a potential increased risk to fire. FCLWD would be vulnerable to SCWTA abilities to treat degraded water quality. In actual experience after the East Troublesome fire, SCWTA did not experience issues due to the water flowing through many upstream reservoirs that settled out fire debris, and ash. FCLWD's water supplies would also be vulnerable to an extended drought. The District currently maximizes its carryover each year through Northern Water, but a multi-year drought would likely decrease or eliminate FCLWD's carryover account.

1.3 Supply-Side Limitations and Future Needs

Limitations with CBT

Current CBT supplies with other supplemental ditch rights are sufficient to meet FCLWD's water demands. To date, there have not been any potable supply shortages. However, it should be noted that the CBT system was originally designed as a supplemental supply to native water rights. Each year, the amount of water delivered by the CBT system (i.e. quota) was set based on demand. For example, in a dry year when water demands are highest, the quota would be set higher (i.e. 100 percent) to supplement reduced native supplies. Conversely, in a wet year, when native supplies are plentiful, the quota would be set lower (i.e. 50 percent). The years 2002 and 2003 were an exception when, for the first time in the system's history, the quota was set based on the limited supply in the CBT system. To maintain this delicate balance, and to prevent speculative water purchases, Northern Water has set limits on the amount of CBT water each entity can own in relation to its water demand.

A key limitation with CBT water is the fact that it is in great demand and is converting from agricultural (AG) use to municipal/industrial (M&I) use rapidly. The transition is illustrated in **Figure 3**. At this current rate of acquisition, it is projected that few (if any) CBT units will be available by the year 2040. Fairly recently, the oil and gas industry had been taking a significant amount of CBT water when it went to the open market. Another key limitation to CBT water is the inability for the water to be reused due to Northern Water policies. This second limitation curtails the possibility for efficiency activities that might help stretch the existing water supplies by reusing CBT water for irrigation or other non-potable uses. Even with these limitations, CBT

water is in high demand due to its high quality and other factors. The high demand and limited availability of CBT water has driven up the price considerably in the last 15 years as can be seen in **Figure 4**. In 2021, a number of CBT units were sold for \$62,000 a piece at an auction. That translates to about \$52,000 per AF of firm yield. In 2023, the rate per CBT share was about \$70,000.

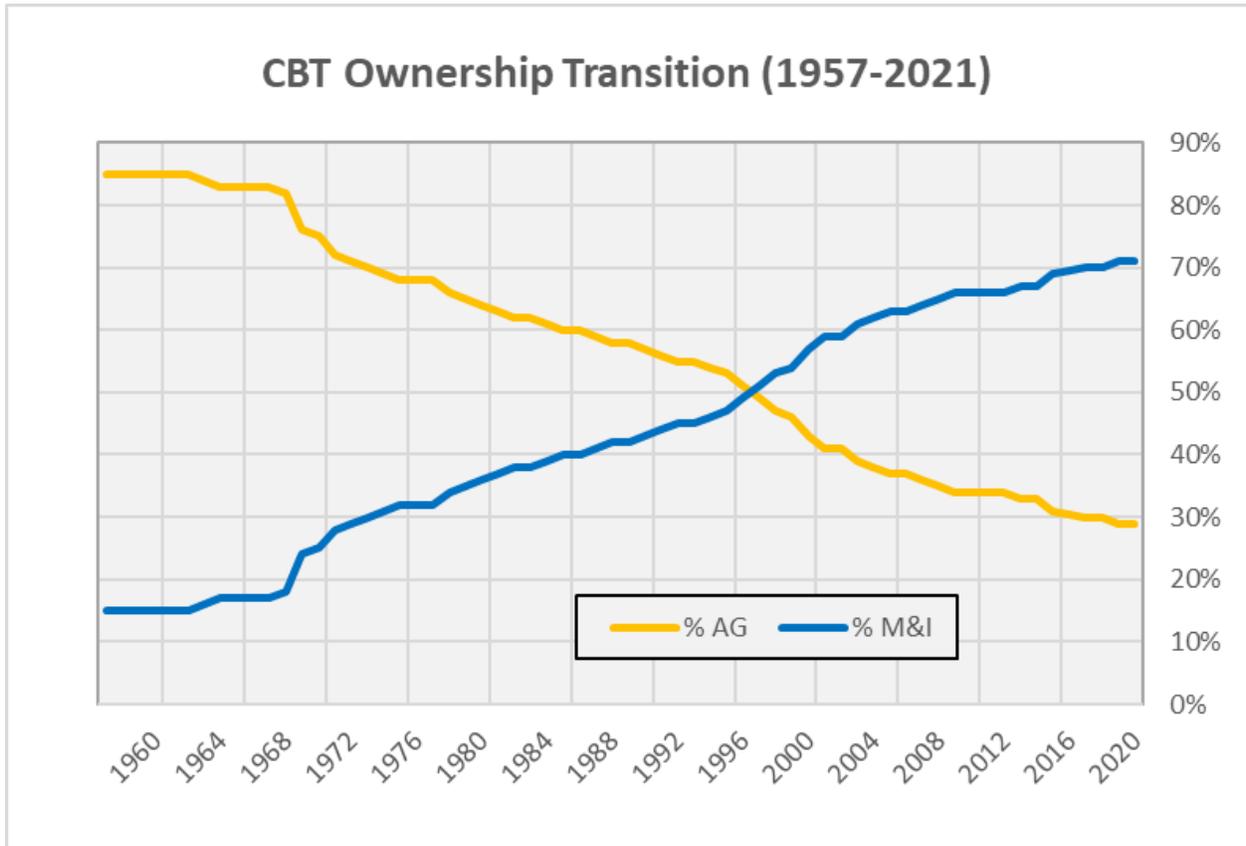


Figure 3: CBT Ownership Transition (1957-2021)

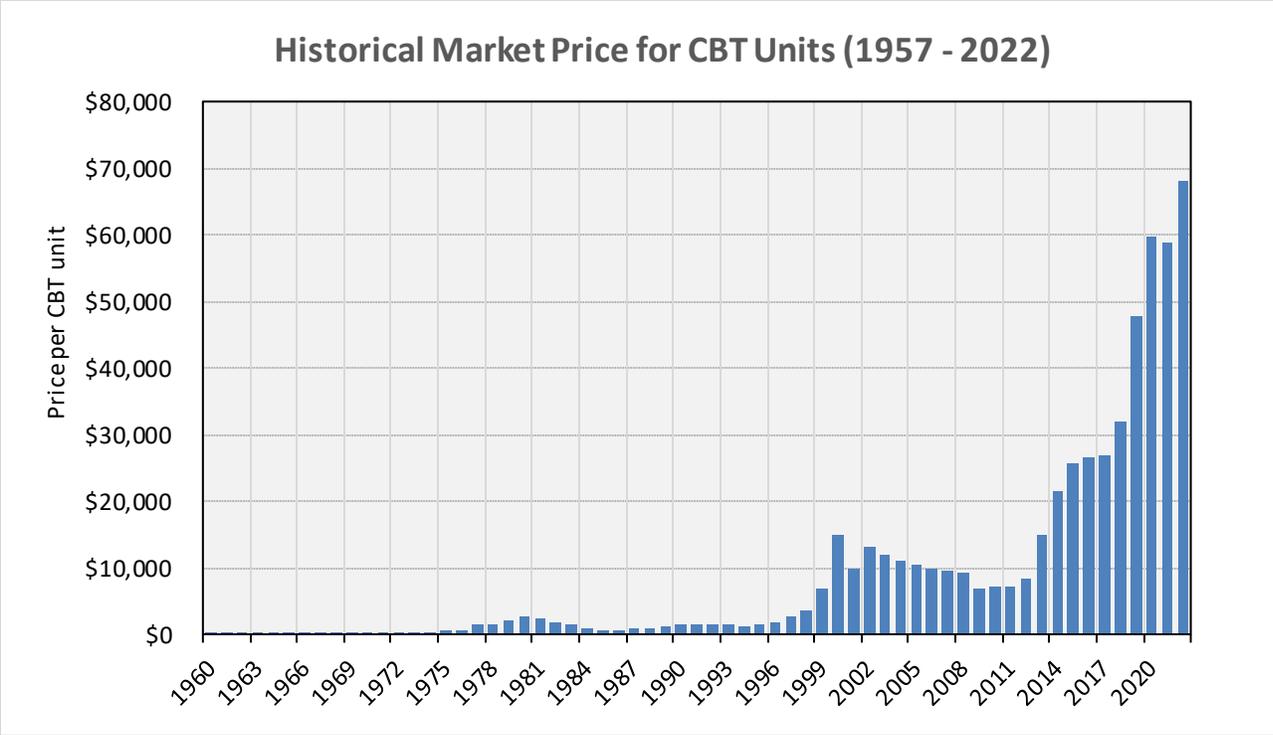


Figure 4: Historical Price for CBT Units

District System Limitations

The District is currently limited to the SCWTA as the sole source of treated water which in turn the water supply sources that can be delivered there. FCLWD is currently looking at a new WTP called Cobb Lake Regional Water Treatment Plant (CLRWTR).

A number of original pipelines from the District inception were installed between 1961 and 1963 and serve as the primary transmission. These pipes are nearing end of life and need to be assessed for replacement.

Future Needs and Planning Initiatives

In 1996, FCLWD submitted a Water Conservation Plan to the Colorado Water Conservation Board (CWCB) to meet the requirements of the Water Conservation Act of 1991. The plan focused mainly on education practices and reducing system losses. The District has completed two Water Efficiency Plan updates submitted in September 2008 and November 2016.

Water Master Plans are actively updated by the District. The Capital Improvement Plan (CIP) will assess current conditions of existing infrastructure, classify and rank potential risks, and identify upgrades and expansions of water supply, treatment, pipes, pump stations, and finished storage to meet both near term and long term build-out demands.

The District is partnering with other NISP participants to build a new treatment plant that will have the ability to treat a wider range of water sources and provide resiliency above what one treatment plant can provide.

Raw Water Storage

The District currently has limited raw water storage beyond that within the CBT system. Variability in the yield of Poudre basin water rights, both year to year and month to month, will require FCLWD to continue to develop raw water storage for the following purposes: 1) to store water during peak flow months (May, June and July) for use in months when the District's water rights yield little or no water, 2) to store water in years of surplus for use in years when a water supply deficit occurs, and 3) to store the historic return flow component of agricultural water rights converted to municipal use for year-round releases required to meet court-imposed return flow obligations.

To better utilize its Poudre River water rights and increase the yield of those water rights, the Tri-Districts conducted a raw water storage needs assessment in 2005. The results of the study showed that FCLWD would need 6,640 AF of storage at build-out. FCLWD plans to obtain storage capacity at several locations along the Poudre River. The District considered the following criteria when planning these storage project locations: 1) available for diversion at the Pleasant Valley Pipeline, 2) as close as possible to SCWTA and 3) downstream of the wastewater treatment facilities that will discharge reusable effluent that FCLWD can claim and capture.

Change of Use

Conversion of FCLWD's Poudre River and transmountain water rights from agricultural to municipal use requires detailed engineering analyses and applications to Water Court. The easiest change cases take at least three to five years before a decree is entered. The more complicated change cases can take as much as ten years and could cost millions of dollars. The engineering analyses required in Water Court applications that change the use of agricultural water focus on the historical consumptive use of the crops grown with the water right and return flows resulting from irrigation of those crops. Determination of the consumptive use and identifying the amount, location, and timing of return flows makes change cases increasingly complicated and costly. Even with these potential complications, the District continues to pursue opportunities to acquire additional shares of native Poudre River Water as they become available from ditch companies.

NISP

Northern Water is acting on behalf of FCLWD and 14 other northern Colorado communities and water providers to apply for a federal permit to build the Northern Integrated Supply Project (NISP). NISP is a regional water supply and storage project that will provide the participants with 40,000 AF of new municipal water storage and supply. The planned facilities include Glade Reservoir, Galeton Reservoir, a pumping facility, a pipeline to deliver water for exchange with two irrigation companies and needed improvements to an existing canal to fill Glade Reservoir.

Glade Reservoir will be an off-channel reservoir located near Ted's Place on Highway 287 north of Fort Collins. The reservoir will hold approximately 170,000 AF of water when constructed. Galeton Reservoir will also be an off-channel reservoir located north of the Town of Galeton (approximately 10 miles east of Ault). If the project makes it through the permitting process, FCLWD will be obligated to pay their pro-rata design and construction costs. NISP is currently estimated at approximately \$50,000 per AF and provides additional water supply and storage. A Record of Decision was recently entered giving the go-ahead for the project.

Overland Trail Ponds

In 2005, Lafarge West Inc. agreed to sell property it had been mining for a number of years to the District and several other water suppliers (Fort Collins, Greeley, ELCO, and NWCWD). The Lafarge property is located near the Town of LaPorte on the south side of the Poudre River immediately west of Taft Hill Road. Even though Lafarge (now Martin Marietta) no longer owns the property, it continues to mine gravel from the site. The purchasers have begun to develop the Lafarge site and several nearby properties into a series of water storage reservoirs. When completed, the Overland Trail Ponds project will store approximately 4,700 AF. Existing and future gravel pits on land owned by the water providers will continue to be sealed and configured to divert water from the Poudre River when it is available. Water stored in the Overland Trail Ponds will be released back to the Poudre to meet return flow obligations, exchanged for water diverted at the Pleasant Valley Pipeline, or pumped to SCWTA for treatment. Work on lining the existing gravel pits and installing the necessary infrastructure began in 2008. It will take approximately 20 years before all the property is mined and gravel pits are sealed.

SECTION 2.0 – PROFILE OF WATER DEMANDS AND HISTORICAL DEMAND MANAGEMENT

2.1 Demographics and Key Characteristics of the Service Area

FCLWD provides potable and fire protection water to a service area that encompasses approximately 60 square miles. The District provided service to 19,800 end user taps at the end of 2022. The demographics of the residential base have been continuously changing over the last few decades from rural to more urban and suburban customers. This transition has resulted in much higher landscape irrigation on individual lots as well as in neighborhood open spaces. The population of the District’s service area at the start of 2023 is estimated at 63,532 (this excludes Windsor and Spring Canyon wholesale residents).

The different customer categories within the District’s service area are Residential (Res), Residential Multi-Family (RMU), Non-Residential (NonRes), Irrigation (IRR), and Other. Much of the water use in FCLWD is residential development within the growth management areas of the surrounding communities. The various customer categories will be discussed in more detail later within Section 2.0. The District’s residential categories (Res and RMU) include single-family residences from low to high density as well as Multi-Family units and mobile homes. Some of the variety of housing, both in the foreground and background, within the District can be seen in **Figure 5**.



Figure 5: Example of Housing within FCLWD Service Area

The Non-Residential customer category includes numerous restaurants, retail and industrial establishments, four nurseries, two dairies, over ten public schools, over twenty churches, and a cemetery. The District also serves one master meter for use by the Town of Windsor.

The District has six potable water storage tanks throughout its system to provide a reliable supply to its constituents. The District also has a supervisory control and data acquisition (SCADA) system that measures the pressure throughout the system.

2.2 Historical Water Demands

Annual Treated Water

Between 2015 and 2021 FCLWD received an average of 10,795 AF of treated water from the Tri-Districts SCWTA. **Table 4** shows the annual treated water deliveries made to FCLWD from the SCWTA for the last five years.

Table 4: FCLWD Water Delivery

Year	Annual Treated Water Deliveries (AF)
2015	8,620
2016	10,878
2017	10,416
2018	11,541
2019	10,476
2020	11,541
2021	12,092
Average	10,795

Annual Non-Revenue Water

Annual non-revenue water, or unaccounted for water, consists of unbilled authorized uses (e.g. hydrant flushing), apparent losses, and real losses. Apparent losses consist of unauthorized consumption, customer metering inaccuracies, and data handling errors. Real losses consist of leaks in the water distribution system that does not reach the end user.

As presented in **Table 5**, District Staff estimated the non-revenue treated water for FCLWD averaged 706 AF during that period, or seven percent of the treated water delivered from SCWTA. This low loss rate is considered excellent by industry standards.

Annual Billed Water Use by Customer Category

Approximately 66 percent of the District’s billed water goes to residential water users (Residential and Residential Multi-Family). However, a significant portion also goes to Non-

Residential and Irrigation customers. The District’s average water demand for the past seven years for each customer category is shown in **Table 5**. The total billed water usage has ranged from 8,056 to 11,301 AF and averaged 10,089 AF. Also shown in **Table 5** is the total and residential (Residential and Residential Multi-Family combined) per capita water use, expressed as gallons per capita per day (GPCD). Residential GPCD is calculated by dividing residential water use (Residential and Residential Multi-Family) by the residential population. Total GPCD is calculated by dividing total water use by the residential population. Residential GPCD ranged from 112 to 140 GPCD with an average of 130 GPCD. Total GPCD ranged from 160 to 198 GPCD. These calculations were performed using the total billed usage and population estimates for the District.

Table 5: Annual Treated Water Use by Customer Category

Customer Category	2015	2016	2017	2018	2019	2020	2021	Average
	Values in AF unless otherwise noted							
Residential	5,357	6,895	6,548	7,479	6,607	7,479	7,815	6,883
Residential Multi-Family	271	304	316	371	326	371	1,299	465
Non-Residential	1,136	1,406	1,323	1,320	1,342	1,320	422	1,182
Irrigation	952	1,230	1,096	1,156	1,048	1,156	1,299	1,134
Other	340	330	451	459	466	459	466	425
Total Billed	8,056	10,166	9,734	10,786	9,790	10,786	11,301	10,089
Non-Revenue	564	712	681	755	685	755	791	706
Total Population	44,777	45,672	47,000	49,258	50,551	52,224	54,104	49,084
Residential GPCD ⁽¹⁾	112.2	140.3	130.4	142.3	122.4	133.8	150.4	133
Total GPCD	160.6	198.2	184.9	195.5	172.9	183.9	186.5	183

Figure 6 breaks out the water usage per category as an average percentage of the total raw water use for 2015 - 2021. It shows residential water use (Residential and Residential Multi-Family) makes up 66 percent of the total usage. Non-Residential and Irrigation combined make up nearly a quarter of the total usage at 12 percent and 11 percent respectively.

Residential

Residential water use includes both indoor and outdoor use. This customer category is typically single-family homes and constitutes the largest water use in the District at 63 percent of all raw water supplied. Residential water use in the District averaged 6,826 AF per year from 2015 – 2021.

Residential Multi-Family

Residential Multi-Family typically describes those residential communities that are made up of multiple dwellings within one structural unit. Examples of this might be apartment complexes and condominium units. Residential Multi-Family also includes several master meter communities; master meter communities include mobile home parks and subdivisions that

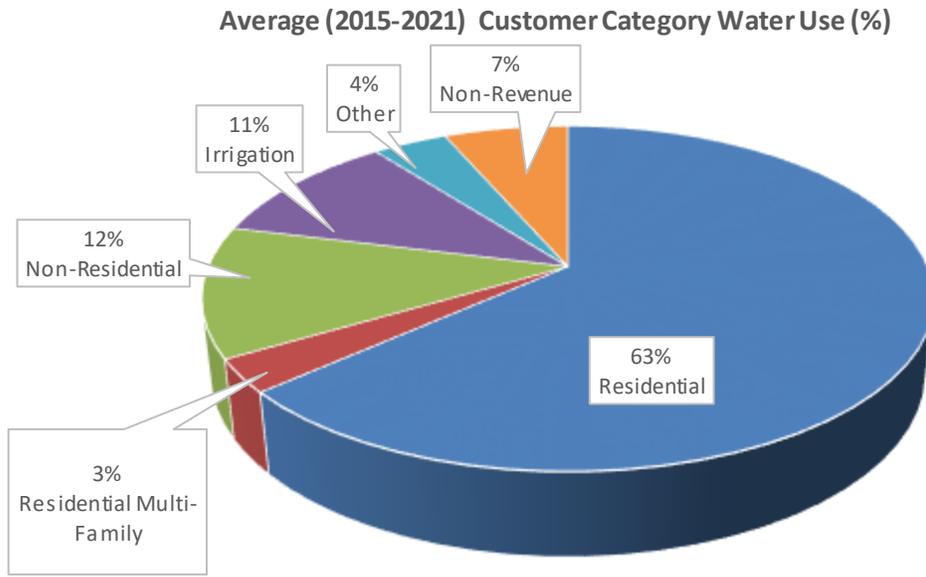


Figure 6: Raw Water Usage (average of 2015 – 2021)

have their own sub-metering and distribution systems. Residential Multi-Family water use in the District averaged 334 AF per year for 2015 – 2021 or three percent of all raw water supplied.

Non-Residential

Non-Residential water users in the District include office buildings, hotels, schools, retail stores, restaurants, car washes, nurseries (or tree farms), dairies, and some manufacturing and light industrial facilities. Non-Residential water use is the second largest water use category in the District and averaged 1,320 AF per year (2015 – 2021) which constituted 12 percent of the raw water supplied. Under the Non-Residential category, the District also supplies water for firefighting and other temporary uses such as construction and special events from the various hydrants in the service area. These temporary uses can be highly variable year to year, and much of it depends on demand for short-term use of water from hydrants.

Some of the largest Non-Residential water users in the District are dairies, nurseries, car washes and vehicle service centers, schools and municipal facilities, manufacturing facilities, and railroads.

Irrigation

During the years from 2015 through 2021, the District supplied an average 1,145 AF per year of potable water to Irrigation accounts. This accounted for 11 percent of the total raw water

supplied. These customers are typically Home Owner Associations (HOAs), parks, and open space areas.

Other

The master meter for the Town of Windsor is the primary user that falls under the Other category. Eight additional taps are available within the Other category and are occasionally used for various purposes. The District supplied an average of 424 AF per year (2015 – 2021) for such uses or 4 percent of the total raw water supplied.

Annual Non-Revenue Water

Every water distribution system has some degree of system loss. However, with systematic surveillance and repairs, the losses can be kept to a minimum. With the current water balance and pressure reports, consistent surveillance from maintenance personnel, unaccounted system losses in the District are very low compared to other water providers of a similar size. Annual non-revenue water consists of unbilled authorized uses, documented system losses, and unaccounted losses. District staff estimate approximately seven percent of the portion of water dedicated to the District at the SCWTA is lost. Even though this loss percentage is already fairly low, the District will continue to reduce the system losses and increase the efficiency of water distribution.

Indoor and Outdoor Demands

Indoor and outdoor use was estimated using the total usage per month for the last several years of data (2016 through 2020). The total monthly water use between the first of November and the end of February was assumed to be only associated with indoor use. This total divided by the number of days in the months from November through February was calculated as the average indoor use per day. The indoor use for the other months of the year (March through October) was calculated as the average indoor use per day multiplied by the days per month. The outdoor monthly use was assumed to be the difference between the total monthly use and the indoor monthly use. **Figure 7** is a chart breaking out the estimated average monthly indoor and outdoor water use. Over the years averaged, FCLWD customers consumed approximately 58 percent of the water for outdoor uses.

Average (2016 - 2020) Monthly Water Use

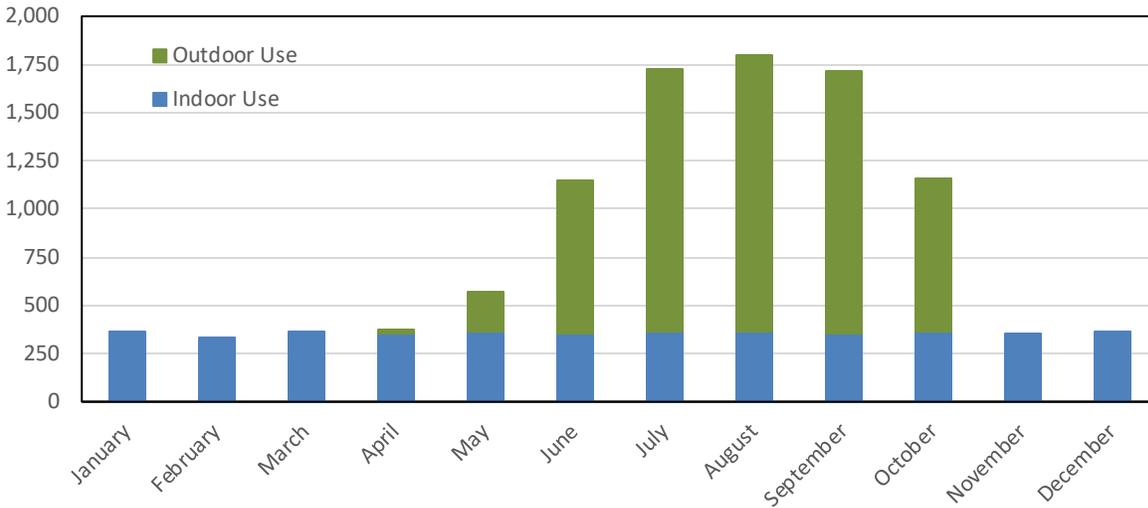


Figure 7: Average Monthly Indoor and Outdoor Water Use

2.3 Past and Current Demand Management Activities and Impact to Demands

The initial estimated water savings goal for this Plan was to lower the total water use by 10 percent. The District revisited and revised this goal, as necessary, as it further analyzed the realistic potential water savings that corresponded to the development of this Plan update.

Current Water Efficiency Measures

The District has several current and on-going water efficiency activities, some of them have existed for a long time, and others were implemented after the 2008 and 2015 Municipal Water Efficiency Plan. **Table 6** lists the existing and on-going water efficiency activities.

Table 6: FCLWD’s Existing and On-going Water Efficiency Activities

Water Efficiency Activities
Metering
Automatic Meter Reading (AMR) Installation and Operations
Meter Testing and Replacement
Meter Upgrades
Identify Unmetered/Unbilled Treated Water Uses
Data Collection - Monitoring and Verification
Upgrade Billing System to Track Use by Sufficient Customer Types
General Evaluation of Policies that Encourage Water Savings
Frequency of Meter Reading
Tracking Water Use for Large Customers

Water Efficiency Activities (cont.)
Water Use Efficiency Oriented Rates and Tap Fees
Water Rate Adjustments - Water Rate Structure Changes
Water Efficiency Rate Structure with Regular Updates to Rate Study
Volumetric Billing
Frequency of Billing
Inclining/Tiered Rates
Tap Fees with Water Use Efficiency Incentives
System Water Loss Management and Control
Leak Detection and Repair
Planning
Integrated Water Resources Plans
Master Plans/Water Supply Plans
Capital Improvement Plans
Feasibility Studies
Targeted Technical Assistance and Incentives
Rebates for Xeriscape Plants
General Water Use Regulations
Time of Day Watering Restriction
Day of Week Watering Restriction
Education Activities
Bill Stuffers, Mass Mailings, Newsletter and Newspaper Articles
Website – Water Conservation Information, link to Water Energy Climate Calculator, and links to Northern Water’s Water Conservation webpages

Water Savings Estimates Using Demand Data

Despite the resources available to estimate water savings, the savings of some activities, such as those that are highly dependent on human behavior (e.g. public education programs) are much more difficult to quantify and, in many cases, cannot be estimated with reasonable accuracy. Additionally, data was not collected for all the activities listed. For the activities that we were unable to quantify, demand data was used to estimate savings.

Related to the activities listed in **Table 6, Figure 8** illustrates an overall water efficiency trend: The population of FCLWD has had a steady increase; although the GPCD water usage has varied considerably year to year, the per capita usage has had a downward trend. Much of the variability in water usage can easily be linked to climate trends. The downward trend in usage, however, is a clear indication of the water savings that has occurred through both passive and active saving efforts.

Water Usage (GPCD) Compared with Population

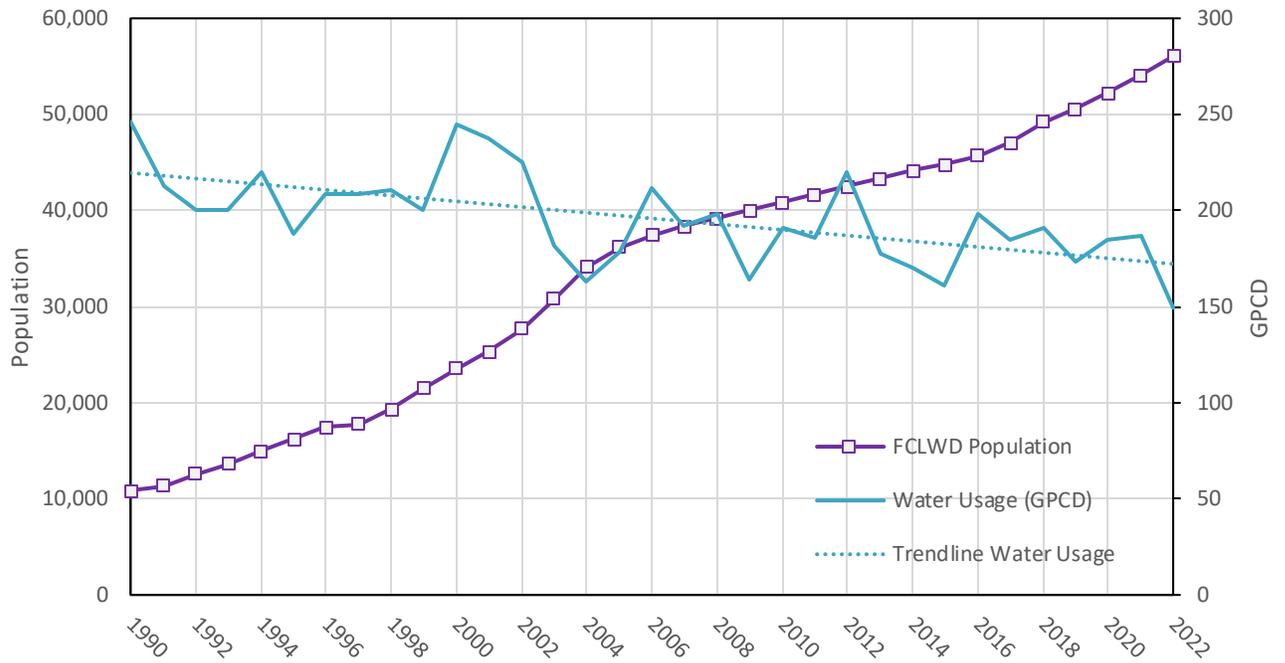


Figure 8: Population Compared with Per Capita Water Usage

SECTION 3.0 – INTEGRATED PLANNING AND WATER EFFICIENCY BENEFITS AND GOALS

3.1 Water Efficiency and Water Supply Planning

Forecasted Modified Water Demands

A modified demand forecast that includes the impacts of the proposed water efficiency activities is shown in **Figure 9**.

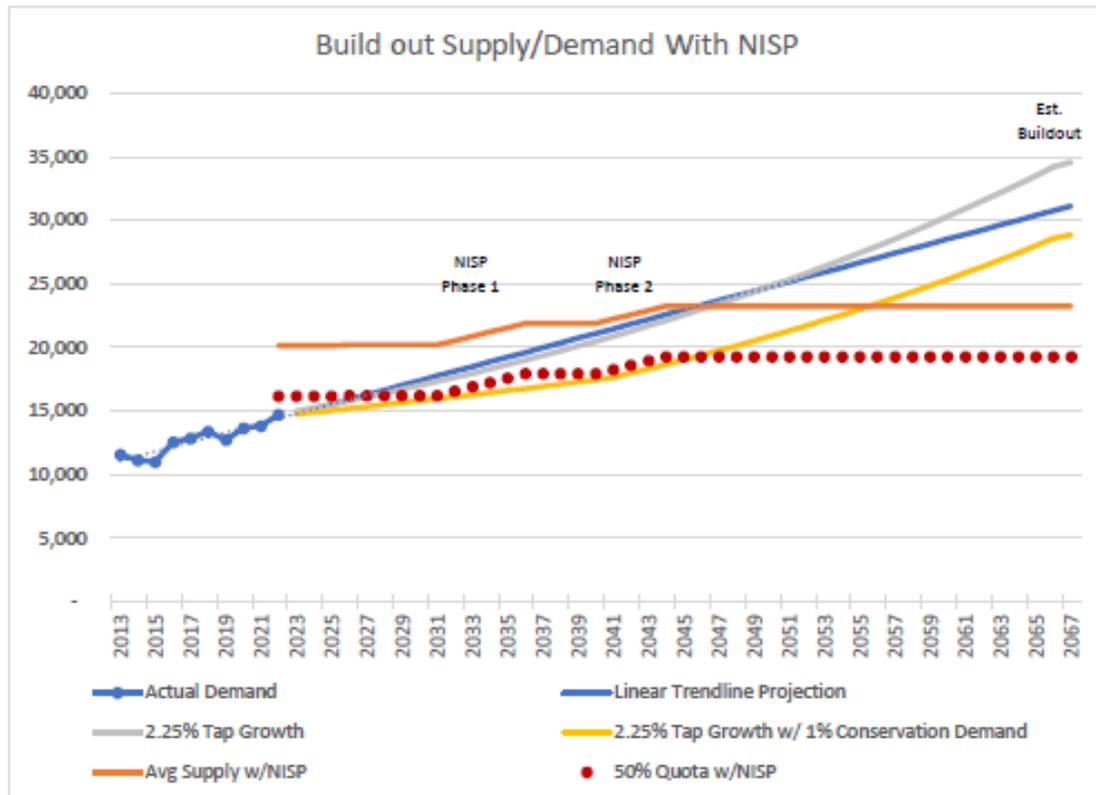


Figure 9: Demand Projections with Modified Demands

Figure 9 illustrates FCLWD’s estimated raw water demand growth vs current water supplies plus estimated NISP availability. The blue demand line is the linear statistical trendline based on FCLWD’s last nine years of demand growth of 4 percent. The grey and yellow lines are the projections of calculated demand provided by FCLWD Engineering; the yellow line includes an annual 1 percent reduction in demand due to conservation measures for the next 20 years.

FCLWD’s water supply shown as the orange line is the annual average yield of current supplies and is meant to show the impact without additional acquisitions. The yield from each water right in the portfolio varies slightly each year. The red dots represent

FCLWD's water supply with a 50 percent CBT quota. These are shown as single year events and are meant to reflect FCLWD's vulnerability to a 50 percent quota once estimated demand approaches this number.

3.2 Water Efficiency Benefits

Water efficiency planning is very important to FCLWD. The value of this water efficiency planning effort may include multiple benefits that will impact future water facilities and supply acquisitions. Conserving water will reduce demands and free up water supplies for increased growth and development. Additional water available will help cover shortages in droughts or other emergency situations; these benefits become even more valuable if a storage component is included. Smaller future demands will also help delay the need to purchase additional water supplies.

3.3 Water Efficiency Goals

Water efficiency goals are intended to lay out a set of targeted objectives that if accomplished, will result in the identified benefits. A preliminary set of goals has been developed prior to the selection of the water efficiency activities to provide a means to screen and evaluate the selected activities. Goals from the District's 2015 Water Efficiency Plan update have been assessed and incorporated into the new goal development process.

A meeting was initially held with District Staff to discuss water efficiency goals appropriate for FCLWD. The following preliminary goals were established by District Staff:

- The targeted water savings goal for this Plan will be to lower the total water use by 10 percent over the ten-year planning period.
- The targeted ten-year water savings goal for the following customer categories were as follows:
 - Residential: 12%
 - Residential Multi-Family: 5%
 - Non-Residential: 3%
 - Irrigation: 10%
 - Other: 1%
 - Non-Revenue Water: 10% (i.e. a 10% reduction of current 7%)
- Develop a water efficiency program that can be implemented within District staffing constraints and with Staff approval.
- Implement water efficiency activities that produce measurable water savings.

The success of the stated goals will be measured through monitoring of billing data, screening and evaluating activities that are acceptable to District Staff and soliciting District Board and community feedback on water efficiency activities.

SECTION 4.0 – SELECTION OF WATER EFFICIENCY ACTIVITIES

4.1 Summary of Selection Process

FCLWD used a four-phase process for selecting and fully evaluating water efficiency activities. The four phases include: 1) assessment; 2) identification; 3) qualitative screening; and 4) evaluation and selection.

Assessment, Identification and Qualitative Screening

Using the analysis performed and presented in Section 2.3, the District identified areas where water efficiency could be enhanced. FCLWD has low non-revenue water due in part to their existing efficiency activities. The District would like to continue these activities and focus on activities that assist with meeting their water efficiency goals.

We utilized Worksheets D-G from the Municipal Water Efficiency Plan Guidance Document to identify a list of water efficiency activities that are generally compatible with FCLWD's needs. A copy of Worksheets D-G can be found in **Appendix B** of this report. Other Worksheets from the Guidance Document utilized within the production of this Plan are also included in **Appendix B**.

The list of activities evaluated is organized according to the SWSI Levels Framework. The SWSI Levels Framework was developed as a component of the 2010 SWSI update to organize water efficiency activities into a model that assists municipalities in prioritizing and selecting activities. The framework may be represented as a cylinder consisting of the following four categories in **Figure 10**.

SWSI Levels Framework includes the following levels of water efficiency activities:

- **Foundational Activities** – Focus on system operations and water efficiencies, are under FCLWD's direct control and can improve the effectiveness of the planning effort by ensuring sufficient metering and data tracking.
- **Targeted Technical Assistance and Incentives** – Covers activities that FCLWD and their customers can do to improve existing water efficiency.
- **Ordinances and Regulations** – Includes regulatory activities designed to encourage water efficiency.
- **Education Activities** – Educate the public on the benefits of water efficiency, inform customers on how they can reduce their water usage, and publicize water efficiency activities that FCLWD is implementing.

Further discussion regarding the SWSI Levels Framework is provided in subsequent sections.

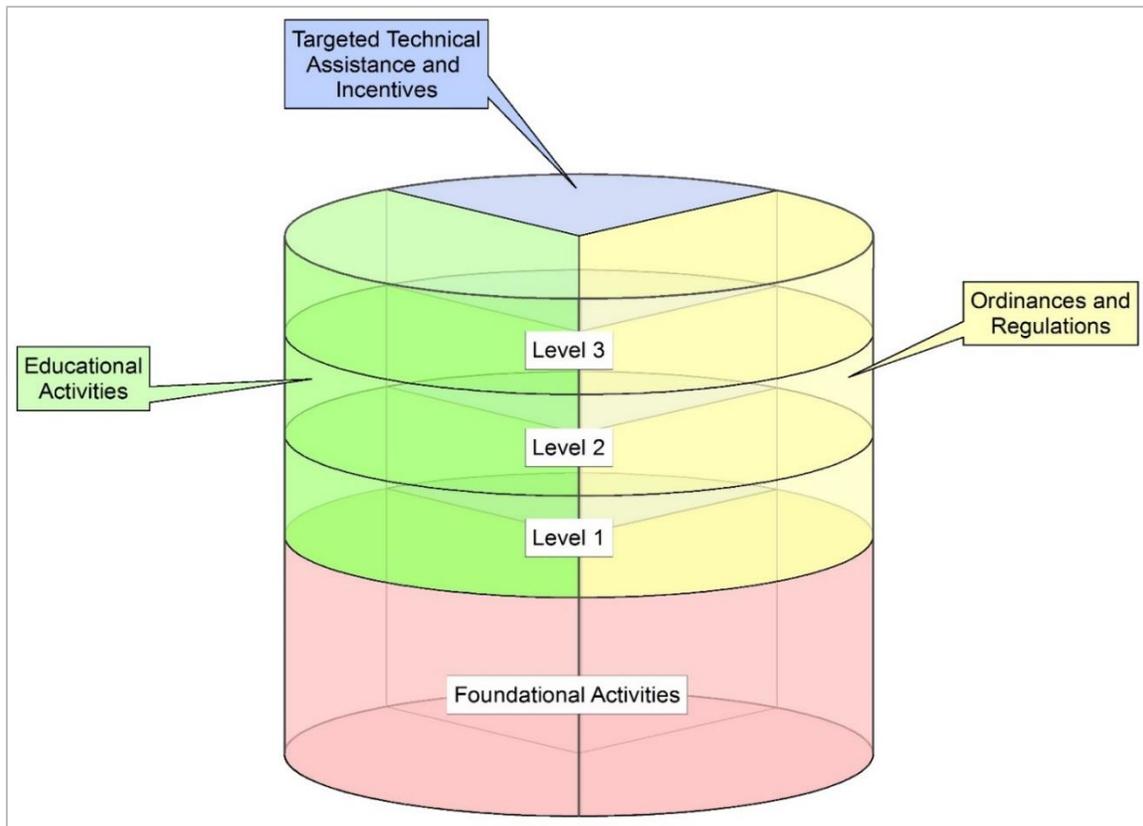


Figure 10: SWSI Levels Framework

District Staff developed qualitative screening criteria used to screen the preliminary list of activities. The screening criteria include: 1) Staff approval; 2) Anticipated customer acceptance and participation; 3) Staff and financial resource limitations and grant opportunities; 4) Legal authority (i.e. ordinances that District is unable to enforce); 5) Tangible water savings. Activities not meeting the screening criteria were eliminated. The specific reason for elimination of activities can be found in Worksheets D-G, located in **Appendix B**.

Evaluation and Selection

The evaluation and selection phase of the selection process involved development of evaluation criteria, evaluation of the activities, and selection of the final activities for implementation. The evaluation criteria were similar to the screening criteria and included:

- Staff approval
- Anticipated customer acceptance and participation
- Staff and financial resource limitations and grant opportunities
- Legal authority
- Tangible water savings

4.2 Evaluation of Candidate Activities

The initial screening of the water efficiency activities with District Staff resulted in selecting 16 candidate activities for further evaluation. Some of the activities have been combined within their SWSI Levels Framework to assist in evaluation and avoid double counting savings. The benefits and costs of the initially selected measures and programs are shown in **Table C1** in **Appendix C**. Details about the cost-benefit evaluation and information about each measure can be found in the following section with further detail available in **Appendix C**. The following activities were evaluated during the cost-benefit analysis.

Foundational Activities

- Automatic Water Meter Reading Installation and Operations
- Meter Testing and Replacement/Meter Upgrades
- General Monitoring and Verification Activities
- Water Efficiency Rate Structure with Regular Updates to Rate Study
- Leak Detection and Repair
- Recycling Water Treatment Plant Filter Backwash
- System Wide Water Audits
- Master Plans/Water Supply Plans

Targeted Technical Assistance and Incentives

- Residential Irrigation Audits (partner with Fort Collins)
- Irrigation Equipment Retrofits – Wind/Rain Sensors
- Smart Irrigation Controllers
- Rebates for Xeriscape Plants

Ordinances and Regulations

- Watering Restrictions

Educational Activities

- General Education
 - Bill Stuffers
 - Newsletter
 - Newspaper Articles
 - Mass Mailings
 - Website updates
- Xeriscape Demonstration Garden and Education Programs
- Property Manager/HOA Irrigation Education Training

Comparison of Costs and Benefits

As shown in **Table C1, Appendix C**, the estimated cost for the evaluated activities varied from \$0.03 per 1,000 gallons for the “*Conservation Taps*” to \$354.25 per 1,000 gallons for the trial “*Turf Replacement Program*”.

Additionally, we evaluated the value of water savings over the planning period (See **Table C1**). The District estimates that the value of the water saved is approximately \$3.77 per 1,000 gallons. Based on this estimated value, the overall value of savings over the planning period is approximately \$15 million.

4.3 Selection of Activities for Implementation

The second screening was accomplished by evaluating each activity based on the evaluation criteria discussed in Section 4.1. (staff approval, anticipated customer acceptance and participation, staff and financial resource limitations and grant opportunities, legal authority and tangible water savings). The following measures were eliminated in the second screening process:

- General Monitoring and Verification Activities
- Water Efficiency Rate Structure with Regular Updates to Rate Study
- Recycling Water Treatment Plant Filter Backwash
- Irrigation Equipment Retrofits – Wind/Rain Sensors
- Xeriscape Demonstration Garden and Education Programs

The District may re-evaluate these measures with future planning efforts. The following measures and activities were added during the second screening and evaluated in the Cost Benefit analysis:

- Conservation Taps
- Hydrant Flushing Filter Truck
- Turf Replacement Program
- Water Conservation Employee

Details about the final 13 activities chosen can be found in the following descriptions.

Foundational Activities

- **Automatic Water Meter Reading Installation and Operations and Meter Replacement Program/Meter Upgrades**
Automatic Metering Reading (AMR) refers to communication technology water utilities use to automatically collect water consumption and status data from water meters. AMR systems can be either walk-by or drive-by. The District has approximately 500 positive displacement meters that need to be upgraded to AMR meters. Additionally, this measure includes a program to meter fire hydrant uses.
- **Conservation Taps**
FCLWD allows new single family residential water taps for water users that do not need potable water for outdoor irrigation. Outdoor irrigation can easily double your water usage during the warm-weather months.

- **Leak Detection and Repair**

As mentioned in Section 2.3, the current leak detection program at FCLWD uses customer meters, pressure reducing vaults, SCADA and the billing database to track water use and leaks in the system. All known leaks in the distribution lines are repaired immediately.

- **Hydrant Flushing Filter Trucks**

Hydrant Flushing Filter Trucks, also known as NO-DES (Neutral Output Discharge Elimination System), flush accumulated sediment, rust, and biofilm from water mains before returning water to the distribution system without discharging thousands of gallons of potable water to waste. The trucks also help promote dialogue with water users, who are curious about the truck's function and provide an opportunity for innovation and education.



Figure 11: Fresno's NO-DES Truck. Source: www.no-des.com/resources

- **Master Plans, Water Supply Plans and Land Use Planning Efforts**

FCLWD plans to continue developing, updating, and evaluating these types of plans (i.e. Master Plans, Water Supply Plans, Capital Improvement Plans, and Water Efficiency Plans) that will improve its overall water efficiency and help plan for future use. The District would also like to focus on working with the cities they serve to help with land use planning efforts.

Targeted Technical Assistance and Incentives

- **Residential Irrigation Audits – Sprinkler Checkups**

FCLWD has partnered with Fort Collins to offer its customers that are within the City Limits to be able to benefit from this service. "Free sprinkler system assessments will be conducted by Fort Collins Utilities from June through August for residents of single-

family homes or homeowners' associations. Home assessments last up to two hours and are designed to help participants water more efficiently, resulting in healthier lawns and reduced water use."

- **Smart Irrigation Controllers**

FCLWD customers are eligible to receive a discount on the Rachio Smart Sprinkler Controller. This easy-to-install controller provides self-adjusting schedules that use customized yard details and watering science and technology to determine exactly how much to water and when. It also uses predictive technology to automatically skip watering before it starts raining, saving water and money.



Figure 12: The Rachio 3 Smart Sprinkler Controller. Source: rachio.com/products/rachio-3

- **Lawn Replacement Program – 1 year pilot program**

Resource Central's Lawn Replacement Program offers a mix-and-match solution for upgrading to a waterwise yard. Participants agree to remove at least 200 square feet of lawn through the program and replace it with water-wise gardens, permeable green landscaping, or other water efficient plant material. FCLWD could help cover a portion of the costs of removing turf and installing replacements. The District proposes to try this program for a year and evaluate the success of the program before continuing in subsequent years.

- **Rebates for Xeriscape Plants**

The District will offer rebates for Xeriscape plants for customers who want to beautify their yard while using less water than standard turf. These rebates may include Resource Central's Garden in a Box which offers an array of do it yourself Xeric garden kits, created by professional landscape designers for sun, shade and everything in between.



Figure 13: Garden in a Box Colorado Oasis

Source: resourcecentral.org/gardens/shop/colorado-oasis-2023

Ordinances and Regulations

- **Watering Restrictions**

Currently there are no specific restrictions on times during the day or days of week for watering. Customers are encouraged ("Conservation Tips") to irrigate landscaped areas before 10 a.m. and after 6 p.m. and to minimize or discontinue water use for non-essential purposes. Water supply is monitored throughout the year to determine what, if any, additional measures will be needed.

Educational Activities

- **General Education Activities**

General Educational Activities encompass a wide variety of media and may include Billing Statements that Encourage Water Savings, Bill Stuffers, Newsletters, Newspaper Articles, Mass Mailings, Social Networking, Citizen Advisory Boards, Customer Surveys, Focus Groups and Water Efficiency Page on FCLWD Website. For ease of evaluating and avoiding overlap of the costs and benefits, these activities were combined into one category.

- **Property Manager and HOA Irrigation Education Training**

This measure includes seminar-style training provided to property managers and HOAs to help them keep their systems as efficient as possible.

- **Water Conservation Employee**

FCLWD proposes to add a Water Conservation Employee. A water conservation expert can provide valuable information to customers that are interested in conserving water and investigate conservation strategies on a full-time basis.

The 13 selected water efficiency activities and associated water savings were arranged within the targeted customer categories to compare the anticipated savings more easily to the original

goals. Some of the measures contribute savings to more than one category. **Table 7** shows the water savings for the selected activities, sub-totaled for each category.

Table 7: Combined Water Savings of Selected Water Efficiency Activities

Conservation Measures and Programs	Estimated Annual Water Savings	Estimated Total Water Savings over Planning Period
	(MG)	(MG)
Non-Revenue Water		
Automatic Water Meter Reading Installation and Operations, Meter Replacement Program/Meter Upgrades	4.9	49
Leak Detection and Excess Water Use Monitoring	14.6	146
Hydrant Flushing Filter Truck	195.1	1,951
Water Conservation Employee	0.2	2.1
Subtotal - MG	214.8	2,147.7
Acre-Feet	659.1	6,591
Residential (Res)		
Conservation Taps	2.1	118
Master Plans, Water Supply Plans and Land Use Planning	7.2	72
Residential Irrigation Audits - Sprinkler Checkups	0.6	33
Smart Irrigation Controllers	2.4	132.2
Rebates for Xeriscape Plants	0.1	4.1
Turf Replacement (1 year program)	0.15	0.15
Time of Day Watering Restrictions	1.7	17.3
Education Activities (Combined areas)	57.5	575
Water Conservation Employee	2.9	28.8
Subtotal - MG	74.7	980.6
Acre-Feet	229.2	3,009
Residential Multifamily (RMF)		
Master Plans, Water Supply Plans and Land Use Planning	1.2	12
Smart Irrigation Controllers	2.3	127.2
Time of Day Watering Restrictions	0.035	0.352
Education Activities (Combined areas)	7.2	72
Water Conservation Employee	0.5	4.8
Subtotal - MG	11.2	216.0
Acre-Feet	34.3	663
Non-Residential (NonRes)		
Master Plans, Water Supply Plans and Land Use Planning	0.4	4
Smart Irrigation Controllers	0.6	31.2

Conservation Measures and Programs	Estimated Annual Water Savings (MG)	Estimated Total Water Savings over Planning Period (MG)
Non-Residential (NonRes) continued		
Time of Day Watering Restrictions	0.07	0.68
Education Activities (Combined areas)	0.8	8
Property Manager/HOA Irrigation Education Training	3.4	34.1
Water Conservation Employee	0.2	1.6
Subtotal - MG	5.4	79
Acre-Feet	16.5	243
Irrigation (IRR)		
Master Plans, Water Supply Plans and Land Use Planning	1.2	12.0
Residential Irrigation Audits - Sprinkler Checkups	0.6	35.1
Smart Irrigation Controllers	3.8	210.5
Time of Day Watering Restrictions	0.48	4.78
Education Activities (Combined areas)	7.2	71.7
Property Manager/HOA Irrigation Education Training	23.9	239.0
Water Conservation Employee	0.5	4.8
Subtotal - MG	37.7	578
Acre-Feet	115.7	1,773
Other		
Education Activities (Combined areas)	0.17	1.7
Water Conservation Employee	0.17	1.7
Subtotal - MG	0.3	3
Acre-Feet	1.1	11
Grand Total - (MG)	344	4,005
Acre-Feet	1,056	12,290

These savings were compared to the original goals set in Section 3. **Table 8** compares the anticipated water savings from the selected activities with the original goals and then adjusts the water saving goals for this Plan.

Over the ten-year planning period, the selected activities provide an overall estimated water savings of 12,304 acre-feet. The adjusted goals reflect the goals believed to be obtainable by FCLWD Staff. After the goals were adjusted to reflect the expected water savings, the estimated water use reduction is 9 percent. Therefore, FCLWD will target an overall reduction from their forecasted water use by 9 percent over the planning period because of implementation of this Plan.

Table 8: Water Efficiency Goals Comparison

Water Use Categories:	Total Projected Water Use (2015 to 2024)	Reduction Goals for Planning Horizon		Adjusted Reduction Goals for Planning Horizon	
				Total Water Savings from Activities	Resulting Reduction
	(AF)	(%)	(AF)	(AF)	(%)
Residential (Res)	87,959	12.0%	10,555	3,009	3.4%
Residential Multi-family (RMF)	4,751	5.0%	238	663	14.0%
Non-Residential (NonRes)	14,619	3.0%	439	243	1.7%
Irrigation (IRR)	14,619	10.0%	1462	1,773	12.1%
Other	5,243	1.0%	52	11	0.2%
Non-Revenue Water	8,903	10.0%	890	6,591	74.0%
Total Water Production:	136,094				
Total Demand Reduction:			13,636	12,290	
Total Percent Reduction:			10.0%		9.0%

SECTION 5.0 – IMPLEMENTATION AND MONITORING PLAN

5.1 Implementation Plan

The implementation plan defines the process necessary to carry out the selected water efficiency activities. A description of the steps the District will use to implement the water efficiency plan is presented in Worksheet J, **Appendix B**.

5.2 Monitoring Plan

Monitoring types of demand data can be beneficial in tracking the savings generated from implementing a water efficiency plan. Total treated water produced is monitored at SCWTA daily. Raw water delivered and treated water produced is monitored at the SCWTA daily. Customer accounts have the capability of being monitored on an hourly basis but are typically monitored monthly. Other categories of raw and treated water are monitored monthly. Still other categories are monitored and evaluated on a semi-annual or annual basis. The demand data which will be collected during the monitoring period of the Plan is presented in Worksheets K, **Appendix B**. An abbreviated table of Worksheet K is presented in the following, **Table 9**.

Table 9: Selection of Demand Data for Efficiency Plan Monitoring

Monitoring Data	HB 10-1051 Reporting Requirement				Selection			
	Annual	Monthly	Bi-Monthly	Daily	Annual	Monthly	Bi-Monthly	Daily
Total Water Use								
<i>Total treated water produced (metered at WTP discharge)</i>					X	X		X
<i>Total treated water delivered (sum of customer meters)</i>	√				X	X		
<i>Raw non-potable deliveries to SCWTA</i>					X	X		X
<i>Reclaimed water produced (metered at WWTP discharge)</i>								
<i>Reclaimed water delivered (sum of customer meters)</i>								
<i>Per capita water use</i>					X	X		
<i>Indoor and outdoor treated water deliveries</i>					X	X		
<i>Treated water peak day produced</i>					X	X		X
<i>Reclaimed water peak day produced</i>								
<i>Raw water peak day produced/delivered</i>								
<i>Non-revenue water</i>	√				X	X		

Monitoring Data (cont.)	HB 10-1051 Reporting Requirement				Selection			
	Annual	Monthly	Bi-Monthly	Daily	Annual	Monthly	Bi-Monthly	Daily
Water Use by Customer Type								
<i>Treated water delivered</i>		√			X	X		X
<i>Raw non-potable deliveries</i>								
<i>Reclaimed water delivered</i>								
<i>Residential per capita water use</i>					X	X		
<i>Unit water use (e.g. AF/account or AF/irrigated acre)</i>					X	X		
<i>Indoor and outdoor treated water deliveries</i>					X	X		
<i>Large users</i>					X	X		
Other Demand Related Data								
<i>Irrigated landscape (e.g. AF/acre or number of irrigated acres)</i>					X			
<i>Precipitation</i>					X	X		
<i>Temperature</i>					X	X		
<i>Evapotranspiration</i>					X	X		
<i>Drought index information</i>					X			
<i>Economic conditions</i>					X			
<i>Population</i>					X	X		
<i>New taps</i>					X	X		

FCLWD management team under the direction of the General Manager will be chiefly responsible for coordinating the implementation of this Plan. They also realize that the most successful Plan is one that involves a team effort from many staff, other key personnel, and sometimes assistance outside of FCLWD’s employees.

SECTION 6.0 – ADOPTION OF NEW POLICY, PUBLIC REVIEW AND FOMAL APPROVAL

6.1 Public Review Process

A public review process is required for all State approved plans. Since FCLWD has had a municipal water efficiency program in place since 1996, the public is likely familiar with the efficiency concepts and activities. For this water efficiency planning process, the public was notified of the 60-day comment period from [REDACTED]

[REDACTED]

[REDACTED]

6.2 Local Adoption and State Approval Process

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

6.3 Periodic Review and Update

The District plans to review and update this water efficiency plan every seven years. The next update is scheduled to be completed in 2030.

DEFINITION OF TERMS & TERMINOLOGY

This section provides an overview of some of the common terminology used in this document. Please note that this is not a comprehensive list of all terms and definitions. Other important terminology is reserved for discussion in the document.

<i>AF:</i>	Acre-foot: The amount of water it would take to cover one acre of land to a depth of one foot; approximately 325,851 gallons.
<i>AMI:</i>	AMI stands for Advanced Metering Infrastructure. AMI meters, also known as Smart meters are updated, digital versions of the traditional electrical meter attached to the outside of a home or business. These new meters not only measure how much water (electrical and other meters are also common) is used, but also at what times during the day. More advanced Smart meters are also designed to transmit pricing and water information from the utility company to the consumer (two-way communication). Utility companies who provide their customers with Smart meters are able to implement a variety of water reduction and saving programs, helping reduce the cost of providing water to a community.
<i>AMR:</i>	AMR stands for Automatic Meter Reading. It is an older technology that only collects electrical energy consumption and transfers that data from the electric meter on the home to the utility (one-way communication). Typically AMR meters are a “drive-by” type that require the utility to be in close proximity in order to read the meter. (also see AMI)
<i>CBT Quota:</i>	The percentage set by the NCWCD Board of Directors each water year which determines the amount of ac-ft per unit of CBT, i.e. 70% quota equals 0.7 ac-ft per CBT unit.
<i>CBT:</i>	Colorado Big Thompson
<i>CWCB:</i>	Colorado Water Conservation Board

<i>Demand management:</i>	The implementation of water efficiency activities to reduce water deliveries (demands) and or improve efficiencies within the distribution system. For purposes of this document, demand management refers to both system and customer water demands. Demand management is used interchangeably with water efficiency.
<i>Demand-side:</i>	The distribution and consumption of treated water supplies for domestic purposes or the delivery and use of reclaimed water or untreated raw (i.e. ditch water, groundwater) for non-potable purposes such as irrigation or industrial processes.
<i>Dual water supply systems:</i>	Water supply systems that use a combination of treated water to meet potable water needs and reclaimed water and/or non-treated water (i.e. untreated ditch water and groundwater) to meet non-potable water needs.
<i>ELCO:</i>	East Larimer County Water District
<i>ET Controllers:</i>	Evapo-transpiration controllers adjust the amount of water applied from sprinkler systems based on soil moisture and weather conditions.
<i>ET:</i>	Evapo-transpiration: The rate at which water is removed from the soil by evaporation and from plant surfaces by transpiration.
<i>FCLWD:</i>	Fort Collins-Loveland Water District
<i>GPCD:</i>	Gallons per capita per day: A measure of efficiency to determine the approximate amount of water that each resident within an area utilizes each day.
<i>Maximum Day:</i>	The largest amount of water used in a single day.
<i>MG:</i>	Million gallons
<i>MGD:</i>	Million gallons per day
<i>MWEP:</i>	Municipal Water Efficiency Plan
<i>NCWCD:</i>	Northern Colorado Water Conservancy District
<i>NEPA:</i>	National Environmental Policy Act
<i>NISP:</i>	Northern Integrated Supply Project

<i>Non-Potable Use:</i>	Water that is not treated and used for irrigation or other uses than potable. The District currently does not have a non-potable water supply.
<i>Non-revenue water:</i>	Annual non-revenue water (previously referred to as unaccounted for water) consists of unbilled authorized uses (i.e. hydrant flushing), apparent losses, and real losses ¹ . Real losses consist of leaks in the water distribution system that does not reach the end user. Apparent losses consist of unauthorized consumption, customer metering inaccuracies, and data handling errors.
<i>NPIC:</i>	North Poudre Irrigation Company
<i>NWCWD:</i>	North Weld County Water District
<i>Peak Hour:</i>	The largest amount of water used in a single hour – typically occurs on the Maximum Day.
<i>Phreatophytes:</i>	Species of plants and trees that consume groundwater through their root zones below the water table such as Cottonwood and Russian Olive trees.
<i>PIF:</i>	Plant Investment Fee, fee charged to developers for on-going maintenance cost of infrastructure replacement and repair.
<i>Potable Use:</i>	Water that is treated to drinking water standards for municipal use, including residential and commercial use. The District's CBT water is used for potable use.
<i>SCWTA:</i>	Soldier Canyon Water Treatment Authority
<i>SFE:</i>	Single Family Equivalent, unit of measure used in planning to adjust water use for multi-family dwellings, such as townhomes or condominiums, to a single residential equivalent.
<i>Supply-side:</i>	Water supply operations and facilities that include the diversion, extraction, storage, and transmission of untreated water.
<i>SWSI:</i>	State Wide Supply Initiative

¹ Source: American Water Works Association. 2006 *Water Conservation Programs – A Planning Manual. Manual of Water Supply Practices M52*. First Edition.

System water demand:	Volume of water necessary to meet customer water needs within a certain period of time. System water demand is typically measured at the point of discharge from the water treatment plant and includes non-revenue water. In dual water supply systems, system water demand may also include the distribution and delivery of non-potable water (i.e.: reclaimed water and untreated ditch and groundwater) to meet irrigation needs.
Water efficiency:	Water efficiency includes the practices, techniques, and technologies that extend water supplies either directly through water savings or through substituting alternative supplies such as reuse. For purposes of this document, water efficiency is inclusive of water conservation and is used instead of "water conservation." The term water efficiency captures the essential objective of a local plan which is to improve the efficiency of a municipal demand and water supply system. Water efficiency includes both system demands and customer water demands. <i>Note: CWCB's former 2005 Water Conservation Plan Development Guidance Document and other literature on conservation and water use efficiency distinguish supply-side and demand-side water use efficiency. These resources generally characterize demand-side as technical efficiencies (e.g. water efficient toilets) and behaviors (e.g. taking shorter showers) that save water at the end use/water user level. Supply-side refers to water efficiency at the system level such as the repair of pipeline leaks and water reuse. For purposes of this Plan, the distinction between these water efficiency encompasses both supply and demand side efficiencies.</i>
Water efficiency activities:	Traditionally water efficiency activities have been referred to as water conservation measures and or water conservation programs. For purposes of this document, measures and programs are replaced with water efficiency activities. Water efficiency activities encompass all efforts to either save water or improve efficiencies within a water supply system.
Wind and Rain Sensor:	A device that is connected to the irrigation system controller that will temporarily shut off irrigation when a pre-determined amount of rain or wind is detected.
WTP:	Water treatment plant

WORKSHEET D - IDENTIFICATION AND SCREENING OF FOUNDATIONAL ACTIVITIES

Water Efficiency Activities for Screening <small>[1]</small>	State Statute Requirement <small>[2]</small>	Identification		Qualitative Screening <small>[5]</small>						Carry to Evaluation <small>[6]</small>	Reason for Elimination <small>[7]</small>
		Existing/Potential Activity <small>[3]</small>	Targeted Customer Category <small>[4]</small>	Staff approval	Anticipated customer acceptance and participation	Staff and financial resource limitations	Legal authority	Tangible water savings	Notes on Additional Pros/Cons to Consider		
Metering (BP1)											
Automatic Meter Reading (AMR) Installation and Operations	V, VII	E	All Categories	X	X	X	X	X		X	
Meter Testing and Replacement	V	E	Non-Revenue	X	X	X	X	X		X	
Meter Upgrades	V	E	Non-Revenue	X	X	X	X	X		X	
Identify Unmetered/Unbilled Treated Water Uses	V	E	Non-Revenue	X	X	X	X	X			All known treated water uses are monitored
Data Collection - Monitoring and Verification (BP2)											
Frequency of Meter Reading	VII	E	All Categories [b]	X	X	X	X	X		X	Capable of reading multiple times per day if needed (research potential leaks)
Tracking Water Use by Customer Type	VII	E	All Categories [b]	X	X	X	X	X			Part of existing billing system
Upgrade Billing System to Track Use by Sufficient Customer Types	VII	E	All Categories [b]	X	X	X	X	X		X	Part of existing billing system
Tracking Water Use for Large Customers	VII	E/P	All Categories [b]				X				This is difficult due to large volume of data analysis. Potentially have AI solutions for this.
General Evaluation of Policies that Encourage Water Savings		E	All Categories [b]	X	X	X	X	X		X	
Water Use Efficiency Oriented Rates and Tap Fees (BP1)											
Volumetric Billing	VII, VIII	E	All Categories [b]	X	X	X	X	X		X	
Water Rate Adjustments	VII, VIII	E	All Categories [b]	X	X	X	X	X		X	
Frequency of Billing	VII	E	All Categories [b]	X	X	X	X	X		X	
Inclining/Tiered Rates	VII, VIII	E	All Categories [b]	X	X	X	X	X		X	
Rate Study with Regular Updates	VII, VIII	E/P	All Categories [b]	X	X	X	X	X		X	
Water Budgets	VII, VIII	P	All Categories [b]				X	X			Not interested in further evaluation
System Water Loss Management and Control (BP3)											
System Wide Water Audits	V	E	Non-Revenue	X	X	X	X	X		X	
Water Reuse System			Non-Revenue								We are currently under obligation to return back into system.
Control of Apparent Losses (with Metering)	V		Non-Revenue								Not interested in further evaluation
Leak Detection and Repair	V	E	Non-Revenue	X	X	X	X	X		X	
Water Line Replacement Program	V	E	Non-Revenue	X	X	X	X	X			District repairs leaks as needed.
Recycling WTP filter backwash	V	E	Non-Revenue								Not interested in further evaluation
Planning (BP2)											
Integrated Water Resources Plans		E	All Categories	X	X	X	X	X		X	District will evaluate the costs and benefits of all these planning efforts combined
Master Plans/Water Supply Plans		E	All Categories	X	X	X	X	X			
Capital Improvement Plans		E	All Categories	X	X	X	X	X			
Feasibility Studies		E	All Categories	X	X	X	X	X			
Land Use Planning and Coordination with Municipalities		P	All Categories	X	X	X	X	X			
Staff (BP4)											
Water Conservation Coordinator		P	All Categories	X	X	X	X	X		X	

Customer Category Abbreviations: Res = Residential, RMF = Residential Multi-family, NonRes = Non-Residential, IRR = Irrigation

Instructions:

- [1] This column provides a list of possible activities & identifies the Best Practice activity as defined in the Colorado WaterWise Guidebook of Best Practices (BP) for Municipal Water Conservation in Colorado. List additional activities identified through the planning process.
- [2] This column identifies, by roman numeral, the elements that correspond with the best practices and that shall be fully considered in the planning process per Colorado State Statute 37-60-126.
- [3] Specify whether the activity is "Existing" or a "Potential" activity to carry through screening by entering an "E" or "P", respectively.
- [4] As applicable, specify which customer category (residential, commercial, etc.) is/would be impacted by the activity.
- [5] Enter screening criteria based on qualitative goals developed in Step 3 and insert an "X" for activities that meet the listed screening criteria.
- [6] Based on the screening process, indicate which activities will be carried onto the evaluation phase with an "X".
- [7] If eliminated via screening, comment on why.

Notes:

- [a] All categories except Other
- [b] All categories except Non-Revenue

WORKSHEET E - IDENTIFICATION AND SCREENING OF TARGETED TECHNICAL ASSISTANCE INCENTIVES

Water Efficiency Activities for Screening [1]	State Statute Requirement [2]	Existing/Potential Activity [3]	Identification				Targeted Customer Category [5]	Qualitative Screening [6]						Carry to Evaluation [7]	Reason for Elimination [8]
			SWSI Framework Levels [4]			Staff approval		Anticipated customer acceptance and participation	Staff and financial resource limitations	Legal authority	Tangible water savings	Notes on Additional Pros/Cons to Consider			
Level 1 Municipal Uses	Level 2 Customers with the Largest Water Use	Level 3 Customer Type(s) in Service Area													
Installation of Water Efficient Fixtures and Appliances															
Indoor Residential Water Audits	I			X	X	Res									Not interested in further evaluation at this time
Faucet and Showerhead Retrofits (e.g. aerator installation)	I			X	X	Res									
<i>Add additional activities</i>															
Low Water Use Landscapes															
Removal of Phreatophytes	II		X	X	X	Non-Revenue									None are located near existing water supply
Residential Irrigation Audits	II	E		X	X	Res, IRR	X	X	X	X			X		
Outdoor Irrigation Controllers	II	E/P	X	X	X	All Categories (a) (b)	X	X	X	X	X		X		
Irrigation Scheduling/Timing	II		X	X	X	All Categories (a) (b)								Not interested in further evaluation at this time	
Irrigation Equipment Retrofits - Wind/Rain Sensors	II	P	X	X	X	All Categories (a) (b)	X	X	X	X	X		X		
Water- Efficient Industrial and Commercial Water-Using Processes															
Commercial Indoor Fixture and Appliance Rebates/Retrofits	III			X		NonRes								The District would like to pursue other measures at this time	
Commercial and Industrial Water Audits	III			X	X	NonRes									
Pre-Rinse Spray Valve (PRSV) Upgrades	III					NonRes									
Incentives															
Toilet Rebates	X			X	X	Res, RMF								Not interested in further evaluation at this time	
Showerhead Rebates	X			X	X	Res, RMF									
Water Efficient Faucet or Aerator Rebates	X			X	X	Res, RMF									
Water Efficient Washing Machine Rebates	X			X	X	Res, RMF									
Water Efficient Dishwasher Rebates	X			X	X	Res, RMF									
Efficient Irrigation Equipment Rebates	X			X	X	Res, RMF, IRR									
Landscape Water Budgets Information and Customer Feedback	X					Res, RMF, IRR									See also Low Water Use Landscapes above
Xeriscape Incentives	X			X	X	Res, RMF, IRR								See Education Screening	
Give-aways														Not interested in further evaluation at this time	
Garden In a Box - Resource Central		E/P											X		

Customer Category Abbreviations: Res = Residential, RMF = Residential Multi-family, NonRes = Non-Residential, IRR = Irrigation

Instructions:

- [1] This column provides a list of activities & if applicable, identifies the Best Practice activity as defined under *Colorado WaterWise Guidebook of Best Practices (BP) for Municipal Water Conservation in Colorado*. List additional activities identified through the planning process.
- [2] This column identifies, by roman numeral, the elements that correspond with the best practices and that shall be fully considered in the planning process per Colorado State Statute 37-60-126.
- [3] Specify whether the activity is an "Existing" or "Potential" activity to carry through screening by entering an "E" or "P", respectively.
- [4] Specify which level the historical/potential activities fall under by entering an "X" in the appropriate column.
- [5] As applicable, specify which customer category (residential, commercial, etc.) is/would be impacted by the activity.
- [6] Enter screening criteria based on qualitative goals developed in Step 3 and insert an "X" for activities that meet the listed screening criteria.
- [7] Based on the screening process, indicate which activities will be carried on the evaluation phase with an "X".
- [8] If eliminated via screening, comment on why.

Notes:

- [a] All categories except Other
- [b] All categories except Non-Revenue

WORKSHEET F - IDENTIFICATION AND SCREENING OF ORDINANCES AND REGULATIONS

Water Efficiency Activities for Screening [1]	State Statute Requirement [2]	Existing/Potential Activity [3]	Identification				Targeted Customer Category [5]	Qualitative Screening [6]						Carry to Evaluation [7]	Reason for Elimination [8]
			SWSI Framework Levels [4]					Staff approval	Anticipated customer acceptance and participation	Staff and financial resource limitations	Legal authority	Tangible water savings	Notes on Additional Pros/Cons to Consider		
			Level 1 Customer Type(s) within the Existing Service Area	Level 2 New Development	Level 3 Point of Sales on Existing Building Stock										
General Water Use Regulations															
Water Waste Ordinance (BP 5)	IX	E/P	X			All Categories (a) (b)	X								Policies of this type are difficult to enforce due to District's legal authority.
Time of Day and Day of Week Watering Restriction	IX	E/P	X			All Categories (a) (b)	X		X	X				X	Watering Restrictions are only put in place during severe drought due to difficulty enforcing the policy.
Landscape Design/Installation Rules and Regulations															
Rules and Regulations for Landscape Design/Installation	IX			X		All Categories (a) (b)									These regulations exist at some level for other entities within the District service area, however they cannot be controlled or enforced by the District
Restrictive Covenants Ordinance	IX		X			Res, RMU									
Soil Amendment Requirements (BP 9)	IX			X		All Categories (a) (b)									
Indoor and Commercial Regulations															
Requiring Wind and/or Rain Sensors for Commercial and Open Space Irrigation	IX		X	X		NonRes, IRR									Not interested in further evaluation at this time
Commercial Cooling and Process Water Requirements (BP 14)															
Green Building Construction (BP 12)															
Indoor Plumbing Requirements (BP 12)															
City Facility Requirements (BP 12)															
Required Indoor Residential Audits (BP 13)															
Required Indoor Commercial Audits (BP 14)															
Commercial Water Wise Use Regulations (Car Washes, Restaurants, etc.)															

Customer Category Abbreviations: Res = Residential, RMF = Residential Multi-family, NonRes = Non-Residential, IRR = Irrigation

Instructions:

- [1] This column provides a list of possible activities & if applicable identifies the Best Practice activity as defined under Colorado WaterWise Guidebook of Best Practices (BP) for Municipal Water Conservation in Colorado. List additional activities identified through the planning process.
- [2] This column identifies, by roman numeral, the elements that correspond with the best practices and that shall be fully considered in the planning process per Colorado State Statute 37-60-126.
- [3] Specify whether the activity is an "Existing" or "Potential" activity to carry through screening by entering an "E" or "P", respectively.
- [4] For current/historical activities, specify which level the activities fall under by entering an "X" in the appropriate column.
- [5] As applicable, specify which customer category (residential, commercial, etc.) is/would be impacted by the activity.
- [6] Enter screening criteria based on qualitative goals developed in Step 3 and insert an "X" for activities that meet the listed screening criteria.
- [7] Based on the screening process, indicate which activities will be carried on the evaluation phase with an "X".
- [8] If eliminated via screening, comment on why.

Notes:

- [a] All categories except Other
- [b] All categories except Non-Revenue

WORKSHEET G - IDENTIFICATION AND SCREENING OF EDUCATION ACTIVITIES

Water Efficiency Activities for Screening [1]	State Statute Requirement [2]	Identification				Targeted Customer Category [5]	Qualitative Screening [6]						Carry to Evaluation [7]	Reason for Elimination [8]
		Existing/Potential Activity [3]	WSI Framework Levels [4]				Staff approval	Anticipated customer acceptance and participation	financial resource limitations	Legal authority	Tangible water savings	Notes on Additional Pros/Cons to Consider		
			Level 1 One-Way	Level 2 One-Way with Feedback	Level 3 Two-way communication									
Customer Education (BP6)														
Bill Stuffers	VI	E	X			All Categories (b)	X	X	X	X			X	
Billing Statements that Encourage Water Savings							X	X	X	X			X	
Newsletter	VI	E	X			All Categories (b)	X	X	X	X			X	
Newspaper Articles	VI	E	X			All Categories (b)	X	X	X	X			X	
Mass Mailings	VI	E	X			All Categories (b)	X	X	X	X			X	
Web Pages	VI	E	X			All Categories (b)	X	X	X	X			X	
Water Fairs	VI	E	X			All Categories (a) (b)								Not interested in further evaluation at this time
K-12 Teacher and Classroom Education Programs	VI			X		All Categories (a) (b)								This activity is already taken care of within the school districts
Send ET irrigation scheduling information in water bill or posted on website	VI		X			All Categories (b)								Will re-evaluate with future planning efforts
Interactive Websites	VI		X			All Categories (b)	X	X	X	X			X	
Social Networking (e.g. Facebook)	VI					All Categories (b)	X	X	X	X			X	
Customer Surveys	VI					All Categories (b)	X	X	X	X			X	
Focus Groups	VI					All Categories (b)	X	X	X	X			X	
Citizen Advisory Boards	VI	E				All Categories (b)	X	X	X	X			X	
Add additional activities	VI													
Technical Assistance														
Customer Water Use Workshops	VI					All Categories (a) (b)								Not interested in further evaluation at this time
Property Manager/HOA Irrigation Education					X	NonRes, IRR	X	X	X	X	X		X	
Landscape Design and Maintenance Workshops	VI					NonRes, IRR								Not interested in further evaluation at this time
Xeriscape Demonstration Garden/Xeriscape Programs	VI					All Categories (a) (b)	X	X	X	X			X	
Water Conservation Expert Available	VI				X	All Categories	X	X	X	X	X		X	See Foundational Activities
Add additional activities	VI													

Customer Category Abbreviations: Res = Residential, RMF = Residential Multi-family, NonRes = Non-Residential, IRR = Irrigation

Instructions:

- [1] This column provides a list of possible activities & if applicable identifies the Best Practice activity as defined under Colorado WaterWise Guidebook of Best Practices (BP) for Municipal Water Conservation in Colorado. List additional activities identified through the planning process.
- [2] This column identifies, by roman numeral, the elements that correspond with the best practices and that shall be fully considered in the planning process per Colorado State Statute 37-60-126.
- [3] Specify whether the activity is an "Existing" or "Potential" activity to carry through screening by entering an "E" or "P", respectively.
- [4] For current/historical activities, specify which level the activities fall under by entering an "X" in the appropriate column.
- [5] As applicable, specify which customer category (residential, commercial, etc.) is/would be impacted by the activity.
- [6] Enter screening criteria based on qualitative goals developed in Step 3 and insert an "X" for activities that meet the listed screening criteria.
- [7] Based on the screening process, indicate which activities will be carried on the evaluation phase with an "X".
- [8] If eliminated via screening, comment on why.

Notes:

- [a] All categories except Other
- [b] All categories except Non-Revenue

WORKSHEET J - IMPLEMENTATION PLAN

Selected Water Efficiency Activities [1]	Period of Implementation [2]	Implementation Actions [3]	Milestone Deadlines [4]	Entity/Staff Responsible for Implementation [6]	Coordination and Public Involvement [7]
Foundational Activities					
<i>Automatic Water Meter Reading Installation and Operations and Meter Replacement Program/Meter Upgrades</i>	<i>ongoing</i>	Continue present plan (reevaluate in 7 years)	none specified		
<i>Conservation Taps</i>	<i>ongoing</i>	Continue present plan	none specified		
<i>Leak Detection and Repair</i>	<i>ongoing</i>	Continue present plan	none specified		
<i>Hydrant Flushing Filter Truck</i>	<i>2024</i>	Continue present plan	begin hydrant flushing by 2024/2025		
<i>Master Plans/Water Supply Plans/Land Use Planning</i>	<i>ongoing</i>	Continue present plan. Coordinate with municipalities for land use planning	none specified		
Targeted Technical Assistance and Incentives					
<i>Residential Irrigation Audits (partner with Fort Collins)</i>	<i>ongoing</i>	Continue present plan. Inform customers of availability	none specified		Coordinate with City of Fort Collins
<i>Outdoor Irrigation Controllers</i>	<i>ongoing</i>	Continue present plan. Inform customers of availability	none specified		
<i>Garden in a Box</i>	<i>ongoing</i>	Continue present plan. Inform customers of availability	none specified		
<i>Turf Replacement Program</i>	<i>2024</i>	Setup Pilot Program			
Ordinances and Regulations					
<i>Watering Restrictions</i>	<i>ongoing</i>	Continue present plan	none specified		
Education Activities					
<i>General Education</i>	<i>ongoing</i>	Continue present plan	none specified		
<i>Property Manager/HOA Irrigation Education Training</i>	<i>2024</i>	Coordinate training	none specified		
<i>Water Conservation Employee</i>	<i>2024</i>	Begin process for hiring employee	none specified		

Instructions:

- [1] Provide the list of water efficiency activities selected for implementation during Step 4.
- [2] Provide period in which activity is going to be implemented.
- [3] Include information on specific actions necessary to implement the activities (e.g. advertise rebates to public).
- [4] Indicate timing of when the action are scheduled to be implemented (e.g. when leaks will be repaired, when rebate program will start, etc.).
- [5] Insert anticipated annual costs.
- [6] Specify which entity/staff responsible for implementing the activities.
- [7] If applicable, comment on necessary coordination among staff/other entities and how the public will be involved. This includes educational campaigns, feedback, direct participation in certain actions, etc.
- [8] Add any additional comments.

WORKSHEET K - SELECTION OF MONITORING DEMAND DATA FOR MONITORING PLAN

Monitoring Data [1]	HB 10-1051 Reporting Requirement [2]				Selection [3]				Entity/Staff Responsible for Data Collection and Evaluation [4]	Schedule/Timing of Monitoring [5]	Comments [6]
	Annual	Monthly	Bi-Monthly	Daily	Annual	Monthly	Bi-Monthly	Daily			
Total Water Use											
Total treated water produced (metered at WTP discharge)					X	X		X	SCFP		
Total treated water delivered (sum of customer meters)	√				X	X			SCFP		
Raw non-potable deliveries to SCFP					X	X		X	SCFP		
Reclaimed water produced (metered at WWTP discharge)											
Reclaimed water delivered (sum of customer meters)											
Per capita water use					X	X			Engineering/Admin.		e.g. method of calculation
Indoor and outdoor treated water deliveries					X	X			Engineering/Admin.		e.g. estimation method
Treated water peak day produced					X	X		X	SCFP		
Reclaimed water peak day produced											
Raw water peak day produced/delivered											
Non-revenue water	√				X	X			Engineering/Admin.		
<i>Insert other demand data</i>											
Water Use by Customer Type											
Treated water delivered		√			X	X		X	Engineering/Admin.		
Raw non-potable deliveries											
Reclaimed water delivered											
Residential per capita water use					X	X			Engineering/Admin.		e.g. method of calculation
Unit water use (e.g. AF/account or AF/irrigated acre)					X	X			Engineering/Admin.		e.g. method of calculation
Indoor and outdoor treated water deliveries					X	X			Engineering/Admin.		e.g. estimation method
Large users					X	X			Engineering/Admin.		note: could either specify use of individual customers or show aggregate total
<i>Insert other demand data</i>											
Other Demand Related Data											
Irrigated landscape (e.g. AF/acre or number of irrigated acres)					X				Engineering/Admin.		specify whether total irrigated lands in service area and/or per customer types (e.g. parks)
Precipitation					X	X			Engineering/Admin.		
Temperature					X	X			Engineering/Admin.		
Evapotranspiration					X	X			Engineering/Admin.		
Drought index information					X				Engineering/Admin.		
Economic conditions					X				Engineering/Admin.		
Population					X	X			Engineering/Admin.		
New taps					X	X			Engineering/Admin.		
<i>Insert other demand related data</i>											

Instructions:

- [1] This worksheets provides a list of possible demand data. Add additional demand data provider would like to monitor.
- [2] Specifies annual reporting requirements per HB 10-1051.
- [3] Select demand data provider plans to use to monitor effectiveness of water efficiency activities by inserting an "X" in appropriate boxes.
- [4] Specify staff/entity responsible for data collection and evaluation.
- [5] Specify the timing and/or set schedule in which data will be collected and evaluated.
- [6] Add any additional comments.

Water Efficiency Activities for Evaluation	Existing/ Potential Activity	Targeted Customer Category	Evaluation								
			Projected Water Savings					Estimated Annual Implementation Cost (cost/year)	Estimated Cost over Planning Period	Value of Water Savings over Planning Period (Water Value is \$3.77/1,000)	Benefit-Cost Ratio
			Total Water Savings over the Planning Period (MG)	Total Water Savings over the Planning Period (AF)	Average Annual Water Savings (MG/yr)	Average Annual Water Savings (AF/yr)	Cost per 1,000 gal Saved				
Foundational Activities											
<i>Automatic Water Meter Reading Installation and Operations and Meter Replacement Program/Meter Upgrades</i>	E	Non-Revenue	49.5	151.88	4.95	15.19	\$4.21	\$20,850	\$208,500	\$186,580	0.89
<i>Conservation Taps</i>	E	Res	118.0	362.14	2.15	6.58	\$0.03	\$370	\$3,700	\$444,874	120.24
<i>Leak Detection and Repair</i>	E	Non-Revenue	145.6	446.71	14.56	44.67	\$0.44	\$6,400	\$64,000	\$548,765	8.57
<i>Hydrant Flushing Filter Truck [c]</i>	P	Non-Revenue	1950.5	5985.91	195.05	598.59	\$0.28	\$504,000	\$540,000	\$7,353,445	13.62
<i>Master Plans/Water Supply Plans/Land Use Planning</i>	E	All Categories [a][b]	99.7	305.92	9.97	30.59	\$0.98	\$9,733	\$97,333	\$375,816	3.86
Targeted Technical Assistance and Incentives											
<i>Residential Irrigation Audits (partner with Fort Collins)</i>	E	Res, IRR	68.1	209.08	1.24	3.80	\$2.38	\$16,200	\$162,000	\$256,845	1.59
<i>Smart Irrigation Controllers</i>	E/P	All Categories [a][b]	501.1	1537.86	9.11	27.96	\$0.44	\$22,140	\$221,400	\$1,889,202	8.53
<i>Rebates for Xeriscape Plants</i>	E/P	Res	4.1	12.63	0.07	0.23	\$38.89	\$16,000	\$160,000	\$15,511	0.10
<i>Turf Replacement Program [d]</i>	P	Res	0.15	0.46	0.15	0.46	\$354.25	\$53,000	\$53,000	\$564	0.01
Ordinances and Regulations											
<i>Watering Restrictions</i>	P	All Categories [a][b]	23.1	70.88	2.31	7.09	\$0.28	\$640	\$6,400	\$87,074	13.61
Education Activities											
<i>General Education</i>	E	All Categories [b]	728.1	2234.46	72.81	223.45	\$0.85	\$62,100	\$620,998	\$2,744,937	4.42
<i>Property Manager/HOA Irrigation Education Training</i>	P	NonRev, IRR	273.1	838.05	27.31	83.80	\$0.60	\$16,400	\$164,000	\$1,029,508	6.28
<i>Water Conservation Employee</i>	P	All Categories	43.7	134.08	4.37	13.41	\$14.65	\$64,000	\$640,000	\$164,708	0.26
			Total	12,290.06		1,055.82			\$2,941,331	\$15,097,829	

[a] All categories except Other

[b] All categories except Non-Revenue

[c] \$500,000 of the Estimated Annual Implementation Cost is a one time capital expense and not an ongoing expense

[d] Costs and savings shown is for a one year trial. Future years will be determined after trial period

Total Projected Treated Water Delivery (2023 - 2032) AF =	136,566
Total Savings =	9.0%
Goal =	10%

Automatic Water Meter Reading Installation, Operations and Meter Replacement Program/Meter Upgrades

Automatic Metering Reading (AMR) refers to communication technology water utilities use to automatically collect water consumption and status data from water meters. AMR systems can be either walk-by or drive-by. The District has approximately 500 positive displacement meters that need to be upgraded to AMR meters. Additionally, this measure includes a program to meter fire hydrant uses.

Planning Period	2023 to 2032
Years in Planning Period	10
Program Length	10 years

Estimated Water Savings

Customer Category	Avg. Annual Water Use over Planning Period (MG)	Estimated Annual Savings Rate	Estimated Annual Water Savings (MG/yr)
Non-Revenue Water	291.12	1.7%	4.949

Estimated Annual Water Savings 4.95 MG/yr
 Estimated Savings over Planning Period 49.49 MG

Notes:

Estimated savings rate are used until more data can be obtained to establish an actual savings rate.

Costs

Total Cost to Water Provider

Labor Costs

Staff Hours	50 /year
Hourly Cost	\$37.00 /hour
Annual Labor	<u>\$1,850</u> /year

Material Costs

Unit Cost	<u>\$380.00</u>
Number of Meters/Year	50
Annual Materials	<u>\$19,000</u> /year

Notes:

Estimated annual staff time is estimated at approximately 50 hours. This time includes water savings tracking.

Estimated Annual Implementation Cost	<u>\$20,850</u> /year
Estimated Cost over Planning Period	<u>\$208,500</u>
Value of Water Savings over Planning Period (\$3.77/1,000 gal)	<u>\$186,580</u> /1000 gallons
Cost per 1000 Gallons Saved	<u>\$4.21</u>

Conservation Taps

FCLWD allows new single family residential water taps for water users that do not need potable water for outdoor irrigation. Outdoor irrigation can easily double your water usage during the warm-weather months.

Planning Period	2023 to 2032
Years in Planning Period	10
Program Length	10 years

Estimated Water Savings

Customer Category	Estimated Annual Water Savings gallons/yr/tap	Annual Program Participants (taps)
Residential (Res)	85,821	25

Estimated Annual Water Savings	2.1	MG/yr
Estimated Savings over Planning Period	118.00	MG

Costs

Total Cost to Water Provider

Labor Costs	
Staff Hours	10 /year
Hourly Cost	\$37.00 /hour
Annual Staff Costs	\$370.00
Third Party Costs (Rate study)	\$0.00 /year
Evaluation and Follow-up Costs (Labor/Consultant)	/year
Annual Labor	\$370 /year

Notes:

Annual staff costs include coordination with consultants.

Annual Revenue Lost due to water savings is not incorporated into the Total Cost to Water Provider because these costs are absorbed and included in the rate adjustments to the customers.

Total Cost to Water Provider

Estimated Annual Implementation Cost	\$370 /year
Estimated Cost over Planning Period	\$3,700
Value of Water Savings over Planning Period (\$3.77/1,000 gal)	\$444,874 /1000 gallons
Cost per 1000 Gallons Saved	\$0.03

Leak Detection and Excess Water Use Monitoring

The current leak detection program at FCLWD uses customer meters and Census monitoring to track water use and leaks in the system.

Planning Period	2023 to 2032
Years in Planning Period	10
Program Length	10 years

Estimated Water Savings

Annual Estimated Savings Rate	5.0%
Annual Estimated Non-Revenue Water without Savings	291.12 MG/yr
Estimated Annual Water Savings	14.56 MG/yr
Estimated Savings over Planning Period	145.6 MG

Notes:

2022-2023 average system unaccounted leakage/loss rate was 7%. Savings is the estimated production (without savings) equals the current projected water usage including metered and non-revenue water.

Costs

Total Cost to Water Provider

Labor Costs

Staff Hours	80	/year
Hourly Cost	\$80.00	/hour
Annual Staff Costs	\$6,400.00	
Third Party Costs (Leak Detection Consult)		/year
Evaluation and Follow-up Costs (Labor/Consultant)		/year
Annual Labor	\$6,400	/year

Notes:

Annual staff costs include analysis of customer data, evaluating pressure tests, etc.

Estimated Annual Implementation Cost	\$6,400 /year
Estimated Cost over Planning Period	\$64,000
Value of Water Savings over Planning Period (\$3.77/1,000 gal)	\$548,765 /1000 gallons
Cost per 1000 Gallons Saved	\$0.44

Hydrant Flushing Filter Truck

Hydrant Flushing Filter Trucks, also known as NO-DES (Neutral Output Discharge Elimination System), flush accumulated sediment, rust, and biofilm from water mains before returning water to the distribution system without discharging thousands of gallons of potable water to waste. The trucks also help promote dialogue with water users, who are curious about the truck's function and provides an opportunity for innovation and education.

Planning Period	2023 to 2032
Years in Planning Period	10
Program Length	10 years

Estimated Water Savings

Annual Estimated Savings Rate	67.0%
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Notes:

Staff estimates that these filter trucks could save the District as much as 600 acre-feet per year. A reduction of 67% of the projected annual non revenue water use was assumed.

Category	Average Water Use MG	Estimated Annual Water Savings gallons/yr
Non Revenue Water	291.12	195,051,588

Estimated Annual Water Savings	195.05	MG/yr
Estimated Savings over Planning Period	1,950.5	MG

Costs

Total Cost to Water Provider

Labor Costs

Staff Hours	50	/year
Hourly Cost	\$80.00	/hour
Annual Staff Costs	\$4,000	
One Time Truck Cost	\$500,000.00	
Evaluation and Follow-up Costs		/year
Annual Labor	\$4,000	/year

Notes:

Estimated staff costs for Staff to spend approximately 50 hours per year at \$80.00/hour.

Although some revenue may be lost on the demand side, more revenue will likely be realized on the supply side.

Estimated Annual Implementation Cost	\$4,000	/year
Estimated Cost over Planning Period	\$540,000	
Value of Water Savings over Planning Period (\$3.77/1,000 gal)	\$7,353,445	/1000 gallons
Cost per 1000 Gallons Saved	\$0.28	

Master Plans, Water Supply Plans and Land Use Planning Efforts

FCLWD plans to continue developing, updating, and evaluating plans (i.e. Master Plans, Water Supply Plans, Capital Improvement Plans, and Water Efficiency Plans) that will improve its overall water efficiency and help plan for future use. The District would also like to focus on working with the cities they serve to help with land use planning efforts.

Planning Period	2023 to 2032
Years in Planning Period	10
Program Length	10 years

Estimated Water Savings

Annual Estimated Savings Rate 0.25%

Notes:

A conservative reduction of 0.25% of projected annual water use was assumed.

Category	Average Water Use MG	Estimated Annual Water Savings gallons/yr
Residential (Res)	2,876.07	7,190,171
Residential Multifamily (RMF)	478.02	1,195,044
Non-Residential (NonRes)	155.34	388,338
Irrigation (IRR)	478.02	1,195,044

Estimated Annual Water Savings 9.97 MG/yr
 Estimated Savings over Planning Period 99.7 MG

Costs

Total Cost to Water Provider

Labor Costs

Staff Hours	<u>122</u>	/year
Hourly Cost	<u>\$80.00</u>	/hour
Annual Staff Costs	<u>\$9,733.33</u>	
Third Party Costs	<u>\$0.00</u>	/year
Evaluation and Follow-up Costs		/year
Annual Labor	<u>\$9,733.33</u>	/year

Notes:

Estimated staff costs for Staff to spend approximately 90 hours per year at \$80.00/hour to assist with these plans for the District.

Estimated Annual Implementation Cost	<u>\$9,733</u>	/year
Estimated Cost over Planning Period	<u>\$97,333</u>	
Value of Water Savings over Planning Period (\$3.77/1,000 gal)	<u>\$375,816</u>	/1000 gallons
Cost per 1000 Gallons Saved	<u>\$0.98</u>	

Residential Irrigation Audits - Sprinkler Checkups

FCLWD has partnered with Fort Collins to offer its customers that are within the City Limits to be able to benefit from this service. "Free sprinkler system assessments will be conducted by Fort Collins Utilities from June through August for residents of single-family homes or homeowners associations. Home assessments last up to two hours and are designed to help participants water more efficiently, resulting in healthier lawns and reduced water use."

Planning Period	2023 to 2032
Years in Planning Period	10
Program Length	10 years

Estimated Water Savings

Annual Estimated Savings Rate	5%
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Customer Category	Outdoor Water Use Per Tap gallons/tap	Estimated Annual Water Savings gallons/yr/tap	Annual Program Participants (taps)	Total Estimated Annual Savings MG/yr	Total Estimated Savings over Planning Period (MG)
Residential (Res)	85,821	4,291	140	0.601	33.04
Irrigation (IRR)	1,275,913	63,796	10	0.638	35.09

Estimated Annual Water Savings	1.239	MG/yr
Estimated Savings over Planning Period	68.1	MG

The outdoor use estimates are based on the following approximations for each customer category: Residential = 60%, Residential Irrigation = 100% Assumed a conservative estimate of 5% savings of projected outdoor water usage and that customers have to put Auditor's advice and suggestions into practice. Program Participants based on past program participation provided by the District.

Costs

Total Cost to Water Provider

Labor Costs	
Staff Hours	15 /year
Hourly Cost	\$80 /hour
Annual Labor	\$1,200 /year
Materials Costs	
Audit Cost	\$100
Number of Participants	150 /year
Annual Cost	\$15,000 /year

Notes:

Costs include staff time for implementing (approximately 10 min. per participant). Scheduling and coordination is all done by City of Fort Collins.
Third Party Costs include Fort Collins' time.
Residential audits = \$100/audit

Estimated Annual Implementation Cost	\$16,200 /year
Estimated Cost over Planning Period	\$162,000
Value of Water Savings over Planning Period (\$3.77/1,000 gal)	\$256,845 /1000 gallons
Cost per 1000 Gallons Saved	\$2.38

Smart Irrigation Controllers

FCLWD customers are eligible to receive a discount on the Rachio Smart Sprinkler Controller. This easy-to-install controller provides self-adjusting schedules that use customized yard details and watering science and technology to determine exactly how much to water and when. It also uses predictive technology to automatically skip watering before it starts raining, saving water and money.

Planning Period	2023 to 2032
Years in Planning Period	10
Program Length	10 years

Estimated Water Savings

Annual Estimated Savings Rate	20%
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Customer Category	Outdoor Water Use Per Tap gallons/tap	Estimated Annual Water Savings gallons/yr/tap	Annual Program Participants (taps)	Total Estimated Annual Savings MG/yr	Total Estimated Savings over Planning Period (MG)
Residential (Res)	85,821	17,164	140	2.403	132.16
Residential Multifamily (RMF)	462,687	92,537	25	2.313	127.24
NonResidential	113,403	22,681	25	0.567	31.19
Irrigation (IRR)	1,275,913	255,183	15	3.828	210.53

Estimated Annual Water Savings	9.111	MG/yr
Estimated Savings over Planning Period	501	MG

Rachio estimates a savings of up to 50% of outdoor water use. Number of program participants is estimated based on total anticipated tap growth. Estimated Savings over Planning Period is calculated by compounding the estimated annual water savings per the total number of participants for each given year.

Costs

Total Cost to Water Provider

Labor Costs

Staff Hours	20.5	/year
Hourly Cost	\$80	/hour
Annual Labor	\$1,640	/year

Materials Costs

Sensor Cost	\$100	
Number of Participants	205	/year
Annual Cost	\$20,500	/year

Notes:

Costs include staff time for implementing (approximately 10 min. per participant).

FCLWD covers a portion of controller costs to encourage purchase and installation.

Estimated Annual Implementation Cost	\$22,140	/year
Estimated Cost over Planning Period	\$221,400	
Value of Water Savings over Planning Period (\$3.77/1,000 gal)	\$1,889,202	/1000 gallons
Cost per 1000 Gallons Saved	\$0.44	

Rebates for Xeriscape Plants

The District wants to offer rebates for Xeriscape plants for customers who want to beautify their yard while using less water than standard turf. These rebates may include Resource Central's Garden in a Box. Resource Central offers an array of do it yourself Xeric garden kits, created by professional landscape designers for sun, shade and everything in between. These plant by number gardens can have a significant conservation impact.

Planning Period	2024 to 2033
Years in Planning Period	10
Program Length	10 years

Estimated Water Savings

Annual Estimated Savings Rate 25%¹

Customer Category	Avg. Annual Outdoor Water Use Over the Planning Period (gal/tap)	Estimated Annual Water Savings (gal/tap/yr)	Annual Program Participants (taps)
Residential (Res)	85,820.8	374	200

Estimated Annual Water Savings 0.07 MG/yr
 Estimated Savings over Planning Period 4.1 MG

Notes:

¹ The "Annual Estimated Saving Rate" represents a 25% savings of water for the turf area replaced with the Garden in the Box plants and not a 25% savings overall.

This measure affects projected outdoor water usage for the listed Customer Categories. Other customer categories may also benefit, but participation would be considerably less given the demographics or the very small percentage of customers within those categories.

It is estimated that approximately 40% of total customer use is outdoor use. Each garden is estimated to use up to 60% less water than the same area of turf, but irrigation systems need to be adjusted for benefit to be realized. A garden typically covers 100 sq ft. Assumption was made that same area of turf will be replaced with same area of xeriscaping. Irrigation requirements = approximately two AF/acre for turf = 748 gal/garden saving. This estimate was cut in half due to other potential problems.

Costs

Total Cost to Water Provider

Labor Costs	
Staff Hours	100 /year
Hourly Cost	\$60.00 /hour
Annual Staff Costs	\$6,000.00
Evaluation and Follow-up Costs (Labor/Consultant)	\$0.00 /year
Annual Labor	<u>\$6,000.00</u> /year
Materials Costs	
Associated Costs	\$50.00 /garden or plants
Number of Participants	200 /year
Annual Materials	<u>\$10,000.00</u> /year

Notes:

Staff cost include approximately 1/2 hour per participant. Resource Central offers end consumers a discount through the water provider.

Water user would cover remaining cost of garden. Grant money may be available to cover the costs of gardens

Estimated Annual Implementation Cost	<u>\$16,000</u> /year
Estimated Cost over Planning Period	<u>\$160,000</u>
Value of Water Savings over Planning Period (\$3.77/1,000 gal)	<u>\$15,511</u> /1000 gallons
Cost per 1000 Gallons Saved	<u>\$38.89</u>

Turf Replacement Program - 1 year pilot program

Resource Central's Lawn Replacement Program offers a mix-and-match solution for upgrading to a waterwise yard. Participants agree to remove at least 200 square feet of lawn through the program and replace it with water-wise gardens, permeable green landscaping or other water efficient plant material. FCLWD could help cover a portion of the costs to remove turf and install

Planning Period	2024 to 2033
Years in Planning Period	10
Program Length	1 years

Estimated Water Savings

Annual Estimated Savings Rate ¹

Customer Category	Avg. Annual Outdoor Water Use Over the Planning Period (gal/tap)	Estimated Annual Water Savings (gal/tap/yr)	Annual Program Participants (taps)
Residential (Res)	85,820.8	1,496	100

Estimated Annual Water Savings 0.15 MG/yr
 Estimated Savings over Planning Period 0.15 MG

Notes:

¹ The "Annual Estimated Saving Rate" represents a 25% savings of water for the turf area replaced and not a 25% savings overall.

This measure affects projected outdoor water usage for the listed Customer Categories. Other customer categories may also benefit, but participation would be considerably less given the demographics or the very small percentage of customers within those categories. It is estimated that approximately 60% of total customer use is outdoor use. Assumption was made that same area of turf will be replaced with same area of xeriscaping. Irrigation requirements = approximately two AF/acre for turf = 1,496 gal/turf removed. This estimate was cut in half due to other potential problems.

Costs

Total Cost to Water Provider

Labor Costs	
Staff Hours	50 /year
Hourly Cost	\$60.00 /hour
Annual Staff Costs	\$3,000.00
Evaluation and Follow-up Costs (Labor/Consultant)	\$0.00 /year
Annual Labor	<u>\$3,000.00</u> /year
Materials Costs	
Associated Costs	\$500.00 /garden or plants
Number of Participants	100 /year
Annual Materials	<u>\$50,000.00</u> /year

Notes:

Staff cost include approximately 1/2 hour per participant. Resource Central, through the water provider, offers end consumers a credit towards a Lawn Removal Service discount, free low-water Garden In A Box kits, or both.

Water user would cover remaining cost of garden. Grant money may be available to cover the costs of gardens

Estimated Annual Implementation Cost	<u>\$53,000</u> /year
Estimated Cost over Planning Period	<u>\$53,000</u>
Value of Water Savings over Planning Period (\$3.77/1,000 gal)	<u>\$564</u> /1000 gallons
Cost per 1000 Gallons Saved	<u>\$354.25</u>

Watering Restrictions

Currently there are no specific restrictions on times during the day or days of week for watering. Customers are encouraged ("Conservation Tips") to irrigate landscaped areas before 10 a.m. and after 6 p.m. and to minimize or discontinue water use for non-essential purposes. Water supply is monitored throughout the year to determine what, if any, additional measures will be needed.

Planning Period	2023 to 2032
Years in Planning Period	10
Program Length	10 years

Estimated Water Savings

Annual Estimated Savings Rate	0.10%
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Notes:

A conservative estimate of 0.1% savings of projected outdoor water usage was assumed.

Customer Category	Outdoor Water Use Gal	Estimated Annual Water Savings gallons/yr
Residential (Res)	1,728,251,099	1,728,251
Residential Multiuse (RMU)	35,237,817	35,238
Non-Residential (NonRes)	68,140,621	68,141
Irrigation (IRR)	478,017,491	478,017

Estimated Annual Water Savings	2.31	MG/yr
Estimated Savings over Planning Period	23.1	MG

Costs

Total Cost to Water Provider

Labor Costs

Staff Hours	8	/year
Hourly Cost	\$80.00	/hour
Annual Staff Costs	\$640.00	
Annual Labor	\$640.00	/year

Notes:

Costs include staff time for implementing water restrictions.

Estimated Annual Implementation Cost	\$640	/year
Estimated Cost over Planning Period	\$6,400	
Value of Water Savings over Planning Period (\$3.77/1,000 gal)	\$87,074	/1000 gallons
Cost per 1000 Gallons Saved	\$0.28	

Educational Activities

Analysis of costs and benefits for educational activities are combined as shown below. Activities include Billing Statements that Encourage Water Savings, Bill Stuffers, Newsletter, Newspaper Articles, Mass Mailings, Social Networking, Citizen Advisory Boards, Customer Surveys, Focus Groups and Water Efficiency Page on FCLWD Website.

Planning Period	2023 to 2032
Years in Planning Period	10
Program Length	10 years

Estimated Water Savings

Customer Category	Avg. Annual Water Use over Planning Period (MG)	Estimated Annual Savings Rate	Estimated Annual Water Savings (MG/yr)
Residential (Res)	2,876.07	2.0%	57.52
Residential Multifamily (RMF)	478.02	1.5%	7.17
Non-Residential (NonRes)	155.34	0.5%	0.78
Irrigation (IRR)	478.02	1.5%	7.17
Other	171.44	0.10%	0.17

Estimated Annual Water Savings	72.8	MG/yr
Estimated Savings over Planning Period	728	MG

Costs

Total Cost to Water Provider

Labor Costs

Staff Hours	40	/year
Hourly Cost	\$80.00	/hour
Annual Labor	\$3,200.00	/year

Materials Costs

Unit Cost (cost of Bill Stuffers)	\$0.50	/participant
Third Party Costs	\$48,000.00	/year
Avg. Number of Participants (receiving bill stuffers) over Planning Period	21,800	/year
Annual Materials	\$58,899.82	/year

Notes:

Staff hours include time spent preparing newsletter, updating website, and preparing bill stuffers.

In 2022 there were over 19,000 active tap accounts. The average affected number of taps during the planning period is projected to be approximately 21,800.

Estimated Annual Implementation Cost	\$62,100	/year
Estimated Cost over Planning Period	\$620,998	
Value of Water Savings over Planning Period (\$3.77/1,000 gal)	\$2,744,937	/1000 gallons
Cost per 1000 Gallons Saved	\$0.85	

Property Manager/HOA Irrigation Education Training

This measure includes a seminar style training provided to property managers and HOAs.

Planning Period	2024 to 2023
Years in Planning Period	10
Program Length	10

Estimated Water Savings

Annual Estimated Savings Rate **5%**

Notes:

Customer Category	Average Outdoor Water Use gallons	Estimated Annual Water Savings gallons/yr
Non-Residential (NonRes)	68,140,621	3,407,031
Irrigation (IRR)	478,017,491	23,900,875

Estimated Annual Water Savings **27** MG/yr
 Estimated Savings over Planning Period **273** MG

Costs

Total Cost to Water Provider

Labor Costs

Staff Hours	80	/year
Hourly Cost	\$80.00	/hour
Annual Staff Costs	\$6,400.00	
Third Party Costs	\$0.00	/year
Evaluation and Follow-up Costs (Labor/Consultant)	\$0.00	/year
Annual Labor	\$6,400.00	/year

Materials Costs

Number of Participants	10	/year
Material Cost per Participant	\$1,000.00	/ participant
Annual Materials Budget	\$10,000	/year
Annual Materials	\$10,000.00	/year

Notes:

Cost includes seminar preparation and instruction. Staff hours include time spent coordinating education opportunities and ordering and preparing educational materials.

Material budget is approximately \$1000 per class participant. With an estimated seminar attendance size of 10 participants.

Estimated Annual Implementation Cost	\$16,400.00	/year
Estimated Cost over Planning Period	\$164,000.00	
Value of Water Savings over Planning Period (\$3.77/1,000 gal)	\$1,029,508	/1000 gallons
Cost per 1000 Gallons Saved	\$0.60	

Water Conservation Employee

FCLWD proposes to add a Water Conservation Employee

Planning Period	2023 to 2032
Years in Planning Period	10
Program Length	10 years

Estimated Water Savings

Annual Estimated Savings Rate 0.10%

Notes:

This measure has the potential to improve all categories. This measure also potentially overlaps with other efficiency measures and programs, therefore a conservative reduction of 0.10% of projected annual water use was assumed.

Category	Average Water Use MG	Estimated Annual Water Savings gallons/yr
Non-Revenue Water	210.02	210,018
Residential (Res)	2,876.07	2,876,068
Residential Multifamily (RMF)	478.02	478,017
Non-Residential (NonRes)	155.34	155,335
Irrigation (IRR)	478.02	478,017
Other	171.44	171,444

Estimated Annual Water Savings 4.37 MG/yr
 Estimated Savings over Planning Period 43.7 MG

Costs

Total Cost to Water Provider

Notes:

This would be a full time salaried position.

Labor Costs

Annual Salary	\$64,000.00	/year
Evaluation and Follow-up Costs	\$0.00	/year
Annual Labor	<u>\$64,000.00</u>	/year

Estimated Annual Cost	<u>\$64,000.00</u>	/year
Estimated Cost Over Planning Period	<u>\$640,000.00</u>	
Value of Water Savings over Planning Period (\$3.77/1,000 gal)	<u>\$164,708</u>	/1000 gallons
Cost per 1000 Gallons Saved	<u>\$14.65</u>	