Water Conservation Plan

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Prepared by:

Peter Mayer, Aquacraft, Inc.

Laurie D'Audney & Dennis Bode, Fort Collins Utilities

City of Fort Collins Utilities

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EXECUTIVE SUMMARY

The city of Fort Collins is located 65 miles north of Denver in Larimer County, nestled against the foothills of the Rocky Mountains. The Poudre River winds its way through north Fort Collins before reaching the South Platte River to the east. Fort Collins is home to over 131,000 residents and 25,000 students enrolled at Colorado State University.

The City of Fort Collins Utilities provides water, wastewater, stormwater and electric services to the Fort Collins community. In 2007, the Utilities served 8.8 billion gallons of water to approximately 128,000 people. Because the service area boundary does not coincide with the city limits, the Utilities serves water to some customers outside the city limits, and not all those within the city.

Water sources are solely surface supply from a wide variety of water rights. The City's water comes from the Poudre River Basin and the Colorado-Big Thompson (C-BT) Project (which includes Horsetooth Reservoir).

The City views the water conservation program as an important proactive response to supply variability and climate change. Reducing indoor demand through improved technology, leak reduction and behavior change (all elements of the City's conservation program) will improve system reliability and resilience to supply variability year round. Reducing outdoor demand through improved irrigation efficiency and landscape transformation (key elements of the City's conservation program) improves reliability during summer months when demand peaks, providing additional water availability for storage and environmental flows.

Faced with a drought in 1977, the Utilities created a part-time position dedicated to water conservation. Following the position expanding to full-time in 1990, the *1992 Water Demand Management Policy* set out 12 measures and two water use goals. Plans to develop a new document for the conservation program began with the adoption of the *2003 Water Supply and Demand Management Policy*.

The State of Colorado Water Conservation Act of 2004 (HB 1365) requires entities that supply 2,000 acre-feet or more annually to submit a water conservation plan to the Colorado Water Conservation Board (CWCB) before receiving financial assistance from the CWCB or the Colorado Water Resources and Power Development Authority. Although Fort Collins isn't seeking funds from either State agency, this plan was developed based on the CWCB's guidance documents.

Goals and Recommendations

Fort Collins Utilities has established a goal for the conservation program of reducing water use to 140 gallons per capita per day (gpcd) by 2020 (normalized to account for weather conditions). This goal represents realistic and achievable demand reductions in all customer sectors in Fort Collins. Achieving this goal within the planning period will provide an additional measure of reliability to the water supply system to ensure high quality service to customers in case of future drought, climate change and unforeseen shortages.

The conservation program recommended in this plan includes all measures from Fort Collins Utilities' current program. The recommended program represents a significant expansion of the current program and targets residential and commercial customers, and indoor and outdoor water use. The program also includes an effort to reduce water loss from 6 percent down to 5 percent.

Under current climate conditions, this program will save an estimated 2,300 acre-feet if continued at the same level through the planning period to 2020. Table ES.1 presents a summary of the forecast demands and water savings developed for this conservation plan.

Table ES.1: Summary of forecast demand and savings

Forecast	Average Use (Ac-ft/year)	2020 Forecast Demand (Ac-ft/year)	Savings vs. Pre-2002 Use (Ac-ft/year)	Savings vs. Baseline Use (Ac-ft/year)
Pre-2002 (1998-2001)	34,000	39,700	N/A	N/A
Baseline (2003-2007)	27,500	31,800	7,900	N/A
Current Program		30,800	8,900	1,000
Recommended Program		29,500	10,200	2,300

Benefits of Water Conservation

The City of Fort Collins is committed to expanding its conservation efforts. The City believes water conservation is of vital importance for many reasons, including to:

- Foster a conservation ethic and eliminate waste.
- Demonstrate a commitment to sustainability.
- Provide water for multiple beneficial purposes.
- Reduce costs for the Utility and for customers.
- Prepare for forecasted climate change.

Implementation and Monitoring

The new measures introduced in this plan will be implemented over a three year period. Fort Collins Utilities will monitor implementation and impacts of the conservation plan on a regular basis. Regular demand monitoring will provide information on water use and progress toward the stated conservation goals. Adjustments to the program will be made as warranted due to new technology or programs becoming outdated, changes in climate and any other unforeseen circumstances. A complete formal review and revision of the conservation plan will be completed within five years.

Public Review and Adoption

A 60-day public review period of the conservation plan took place from October 8 to December 7, 2007. During the review period, 34 comments were received and the plan was updated in response. The plan will be presented to the Fort Collins City Council for adoption.

KEY UTILITY INFORMATION

The city of Fort Collins is located 65 miles north of Denver in Larimer County, nestled against the foothills of the Rocky Mountains. The Poudre River winds its way through north Fort Collins before reaching the South Platte River to the east. With an average of 300 days of sunshine per year and low humidity, Fort Collins averages 15 inches of precipitation annually.

Fort Collins is home to over 131,000 residents and 25,000 students enrolled at Colorado State University. The city began as a hub for agricultural production, but has shifted its focus to a high-tech economy. Between 1995 and 2005, the population grew an average of three percent annually. As expected, the growth rate has become much slower; it was 1.6 percent for 2006.

WATER SYSTEM PROFILE

This section provides a summary of the physical characteristics of the existing water system, including water sources, system limitations, costs and pricing, policies and planning initiatives and conservation activities.

Physical Characteristics of the Existing Water Supply System

In 2007, Fort Collins Utilities served 8.8 billion gallons of water to approximately 128,000 people. One water treatment facility and 530 miles of water main deliver treated water to customers. Two water reclamation facilities treat wastewater before it's returned to the river.

The Utilities service area boundary does not coincide with the city limits. Some customers outside the city limits are served, but not all those within the city. Fort Collins-Loveland Water District (FCLWD) and East Larimer County Water District (ELCO) provide water to some areas within the city limits and will most likely serve additional city residents in the future.

Fort Collins Utilities serves some areas outside the city limits, primarily to the northwest of Fort Collins, including water provided to West Fort Collins Water District (WFCWD). Figure 1 shows the different service areas with respect to the Fort Collins Urban Growth Area (UGA).

Table 1 summarizes service area characteristics, water production and water demand by customer sector.

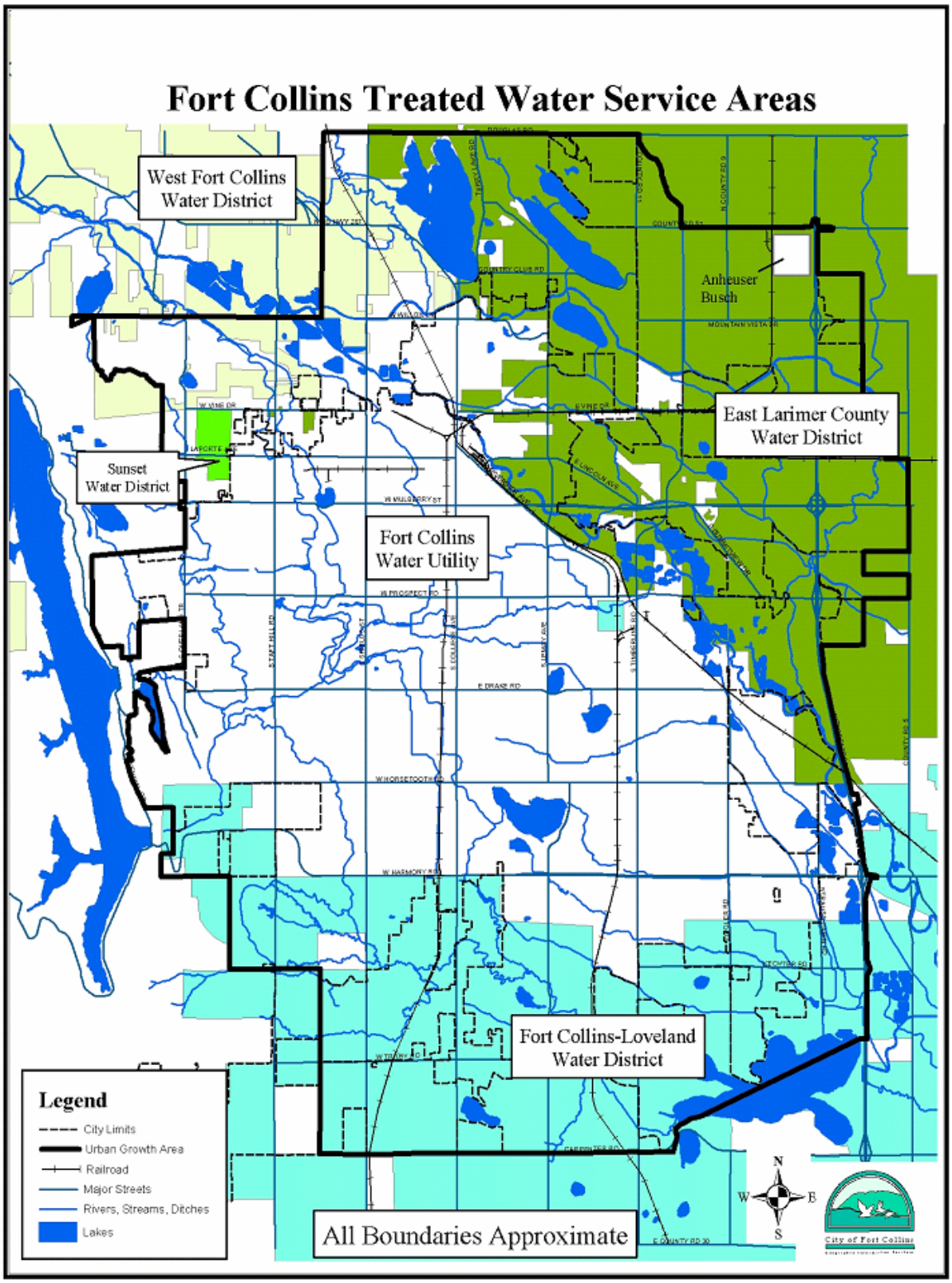

Figure 1: Treated water service area

Table 1: Water system profile, 2007

Service Characteristics	**Number**		
Estimated service population	128,400		
Estimated service area (sq. miles)	35		
Miles of mains	530		
Number of treatment plants	1		
Number of separate water systems	0		
Interconnection with other systems	6		
Annual Water Supply	**Annual volume (MG)**	**Number of intakes or source points**	**Percent metered**
Groundwater	0	0	N/A
Surface water (treated & raw)	23,900	9	100%
Purchases: raw	0	0	N/A
Purchases: treated	0	0	N/A
Total annual water supply	23,900	9	100%
Service Connections	**Connections**	**Water sales (MG)**	**Percent metered**
Residential, single-family	27,720	3,081	100%
Residential, multi-family	2,104	987	100%
Commercial & Industrial	2,103	3,557	100%
City government	199	137	100%
Wholesale	1	164	100%
Outside City customers	1,394	294	100%
Total	33,521	8,220	100%
Treated Water Demand	**Annual volume (MG)**	**Percent of total**	**Per connection (MG)**
Residential	4,232	37	0.14
Nonresidential	3,694	33	1.60
Wholesale	164	1	164
Outside City	294	3	0.21
City Raw water (Parks, etc.)	1,190	10	N/A
Raw water obligations	1,140	10	N/A
Nonaccount water: system losses	640	6	N/A
Total system demand (total use)	11,354	100	N/A
Treated Water Average & Peak Demand	**Volume (MG)**	**Total supply capacity**	**Percent of total capacity**
Average-day demand	24.2	87	28%
Maximum-day demand	47.5	87	55%
Maximum-hour demand	N/A	N/A	N/A
Planning	**Prepared a plan**	**Date**	**Filed with state**
Capital, facility or supply plan	Yes	2003	No
Drought or emergency plan	Yes	2003	No
Water conservation plan	Yes	2008	Not yet

Sources of Water

Water sources are solely surface supply from a wide variety of water rights. The City's water comes from the Poudre River Basin and the Colorado-Big Thompson (C-BT) Project (which includes Horsetooth Reservoir). Figure 2 shows the location of some of the City's key facilities related to delivering water from these sources. These facilities include the diversion structure and pipeline off the Poudre River, Joe Wright Reservoir, Michigan Ditch and the water treatment facility. Also shown are Horsetooth Reservoir and Halligan Reservoir operated by the Northern Colorado Water Conservancy District (NCWCD) and North Poudre Irrigation Company (NPIC), respectively.

Poudre River

The following sources are generally available for diversion from the Poudre River. The City diverts its Poudre River flows to the water treatment plant through two pipelines located on the main stem of the river.

Senior Direct Flow Decrees: The City has five very senior direct flow decrees on the Poudre River that are available to the City most of the time. Only in very severe dry periods are the diversions limited.

Junior Direct Flow Decrees: These junior rights are only in priority during the peak runoff period when most of the other rights on the Poudre River have been satisfied. In dry years, the City may not be able to divert anything under these rights.

Pleasant Valley and Lake Canal Shares: The City of Fort Collins owns about 70% of the shares in this mutual irrigation company. The amount of water the City is entitled to divert to meet treated water demands depends on the number of shares the City designates for such use and which priorities owned by the irrigation company are in priority during the season.

Southside Ditches: The City owns shares of stock in the Arthur, Larimer No. 2, New Mercer and Warren Lake irrigation companies, referred to as the Southside Ditches. With 13 separate priorities, yields vary considerably from year to year. Much of the yield comes from a couple of large junior rights and normally occurs during June.

Michigan Ditch and Joe Wright Reservoir System: This system consists of a ditch that diverts water from the Michigan River drainage across the divide into the Poudre River Basin, Joe Wright Reservoir and storage capacity in Meadow Creek Reservoir. Joe Wright Reservoir includes about 6,500 acre-feet of active storage and is the only storage facility owned by the City. There are usually periods during the peak runoff season in which the reservoir is full and Michigan Ditch water is available if it can be taken directly to meet demands. Joe Wright Reservoir is used primarily to regulate the annual Michigan Ditch flows and has limited carryover capacity to provide drought protection for the City. The City also has storage capacity in Meadow Creek Reservoir, which is used to release water to downstream senior rights on the Michigan River.

Water Supply and Storage Company Shares: The City owns about 26 shares in this irrigation company. Since the City-owned shares are not presently decreed for municipal use, this water is usually rented back for agricultural use. During the last 40 years, the City has obtained shares of several local irrigation company stocks by developers satisfying the City's raw water requirements.

Horsetooth Reservoir

Water from Horsetooth Reservoir, a part of the C-BT Project, can be delivered to the City's water treatment facility or to the Poudre River. Although the C-BT project includes a large amount of storage, including Horsetooth Reservoir, the City currently has a limited ability to carry over water in C-BT reservoirs for drought protection. Currently, the NCWCD allows a 20 percent carryover allowance, which can only be C-BT project water (as opposed to the excess Poudre River water). The following sources are available for use from Horsetooth Reservoir.

Colorado-Big Thompson (C-BT) Water: The City presently owns about 18,850 units of C-BT water. Deliveries depend on the annual "quota" set by NCWCD each year. For the most part, this water is the most flexible source that the City owns and can be used to fill gaps from other sources.

Windy Gap Water: The City receives Windy Gap water from Platte River Power Authority (PRPA) as payment for 4,200 acre-feet of reusable effluent made available to PRPA by the City. The reusable effluent is the result of the Reuse Plan that involves the City, PRPA, and the Water Supply and Storage Company (WSSC). The 4,200 acre-feet of Windy Gap water is dedicated for large contractual use that requires reusable water. As part of the Reuse Plan, the City is required to deliver 1,890 acre-feet of single use water to the WSSC.

North Poudre Irrigation Company (NPIC) Shares: The City currently owns about 3,550 shares of NPIC. Each share consists of native water supply (which is primarily decreed for agricultural use) and 4 units of C-BT water. Until the agricultural portion of each share is changed for municipal purposes, the City can only use the C-BT portion of the shares to meet treated water demands.

West Fort Collins Water District (WFCWD) Water: Through an agreement with the WFCWD, the City provides treated water to their customers and in return, gets reimbursed with an equivalent amount of C-BT water. In recent years, the amount transferred to the City has been about 600 acre-feet each year.

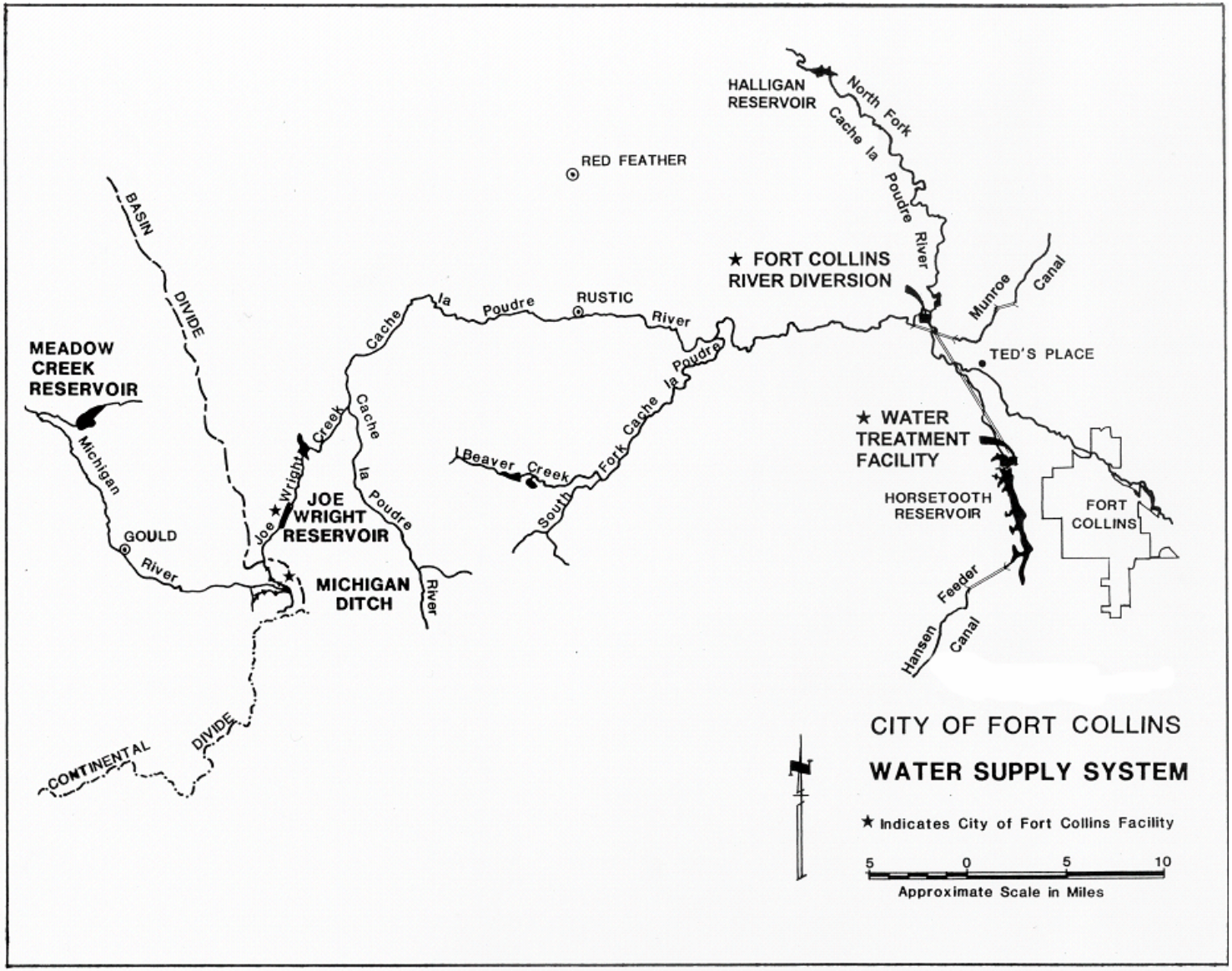

Figure 2: Water supply system

The C-BT water and part of the NPIC water provide the most flexible water supplies since they are available in Horsetooth Reservoir where they can be stored until needed to meet demands. If the water from these sources is in excess of the current year City demands, they can usually be leased for agricultural use in the area. Because of this, in most years it is desirable to use other sources to meet City demands prior to using the C-BT and NPIC supplies.

An important part of the City's water supplies are sources that are reusable. Typically, this is water that is imported from another basin or comes from specific in-basin sources that may be totally consumed through succession of identified uses. For Fort Collins, this includes much of the Michigan Ditch and Joe Wright Reservoir water, Windy Gap water and Southside Ditches water that has been converted from agricultural use to municipal use. Approximately 20 percent of the City's supplies are reusable. Much of this is used as part of a Reuse Plan which involves the City, a local irrigation company and Platte River Power Authority (PRPA). Reusable sources owned by the City and the irrigation company are used through the City and the reusable effluent is used by PRPA. In turn, PRPA provides Windy Gap water to the City where much of it is used by a customer that requires a source of reusable water. The plan results in the efficient use of a good part of the City's reusable supplies.

The City of Fort Collins has a policy of acquiring and maintaining a water supply that is sufficient to meet or exceed the demands during a severe drought that has been defined as a 1-in-50 year drought. The City owns water rights that average over 70,000 acre-feet per year if they were fully usable; however, because of various legal and capacity constraints the present firm yield available for municipal use is about 31,000 acre-feet.

Firm Yield Concept

The yield from the City's supply sources varies considerably from year to year. Because of this, demands cannot easily be compared to the average annual supply yields. Instead, it is necessary to make an analysis of how the supplies and demands compare during a series of critically dry (or drought) years. A concept often referred to as "firm yield" is used by many entities to measure the ability of their water supply system to meet water demands through a series of drought years.

Firm yield is commonly determined by calculating the maximum constant base demand that can be met with the available supply during a representative hydrologic period. For this determination, it is assumed that both the demand contributors (population, irrigated acres, etc.) and the supply owned (storage capacity, water rights, shares of stock, etc.) are held constant during each trial run of the hydrologic study period. This procedure results in a firm yield or safe average annual demand (SAAD) that can be met with the current supply system. Once this is determined, one can compare the present average annual demand with the firm yield to determine the margin of safety or reserve supply.

The issue that often comes up in discussions about firm yield is whether the representative hydrologic study period contains the type of drought for which protection is desired. Many entities simply take a recent 20 or 30 year historic period and assume that if they can make it through any droughts contained in that period, their supply is adequate. Without knowing something about the severity of the drought in a historical period, the use of such a period may not be adequate. The *Fort Collins Drought Study*, completed in 1985, was done primarily to study the effects of prolonged droughts and to define them in terms of the probability of their occurrence. In this study, synthetic hydrologic traces were produced based on statistical

parameters of the historic data available. This allowed analysis of numerous artificial drought periods and a determination of representative droughts with calculated return frequencies. Once this was determined, a computer model was used to determine the SAAD that could be met for each drought type.

Raw Water Requirements

When new development occurs within the current Utility service area, developers are assessed a raw water requirement (RWR). This practice originally began in the 1960s when two acre-feet per acre of land developed was required. In the early 1970s this was changed to three acre-feet per acre. Because water use varied considerably depending on the type of use for any given area, a study was done in 1983-84 to develop another method of assessing the raw water requirements. The resulting system, still in use, attempts to more closely assess the requirements based on actual use.

For residential development, a formula was adopted that considers the density of residential development. Water use is estimated by considering both indoor and outdoor use. The RWR is calculated by multiplying the water use estimate by a "water supply factor" that is used to reflect the variability in supply and demand from year to year as well as other unaccounted for water use. The equation presently used to determine the residential RWR is as follows:

RWR = 1.92 x ((.18 x Number of Dwelling Units) + (1.2 x Net Acres))

The water supply factor was originally set at 1.6; however, following the adoption of the 1988 *Water Supply Policy*, the water supply factor was increased by 20% to 1.92.

Non-residential requirements are based on tap size. Water use was analyzed for all non-residential customers for a given tap size and the requirements were based on those results. Since there is a lot of variability within each tap size, a raw water surcharge is assessed for any annual use exceeding an annual allotment. Requirements vary from .90 acre-feet for a 3/4 inch meter to 14.40 acre-feet for a 3 inch meter. If the water tap is above the 3 inch size, the RWR is based on an estimate of water use.

Developers and builders may satisfy the raw water requirements by turning over water rights acceptable to the City or paying cash in-lieu-of the water rights. Cash in-lieu-of payments can be used to purchase additional water rights when appropriate or acquire other means of increasing the City's water supply, such as developing storage capacity. The cash fee has been periodically adjusted over the years to reflect the price of water rights on the market.

System Limitations

The full use of the City's water rights in a given year can be reduced by several physical and legal constraints. A primary physical constraint is the lack of storage capacity to manage and regulate the water rights owned by the City. Additional water storage capacity is needed to increase the yield and reliability of its water supply system. Short-term storage is needed for operational flexibility and to meet return flow obligations inherent with converted irrigation shares.

Long-term carryover storage is needed to capture water during wetter years for use during drier years. Both types of storage are needed to increase the reliability and redundancy desired to meet the water needs of our customers. In November 2003, City Council approved a resolution to exercise an option to acquire Halligan Reservoir and its enlargement potential. In 2004, the City

signed a cooperative agreement with partners and submitted a letter of intent to pursue the project to the U.S. Army Corps of Engineers (COE). If the project is approved by the COE after an extensive environmental review and preparation of an Environmental Impact Statement, it is expected that the City will have an additional storage capacity of up to 12,000 acre-feet to help make more efficient use of its water supplies and provide a more reliable level of drought protection.

The amount of additional reservoir capacity needed is somewhat dependent on the ultimate demand level that results from water conservation efforts. In general, as demand goes down, the amount of storage capacity needed also decreases. The relationship between water demand level and storage capacity needed will be further developed and refined as part of the evaluation of the proposed storage project. Variability in both water demands and water availability, particularly in light of the uncertainty of climate changes, provides a challenge in projecting needed storage capacity to help meet reliability criteria.

Table 2: Summary of system conditions

Planning Questions	**Yes**	**No**	**Comment**
Is the system in a designated critical water supply area?		X	
Does the system experience frequency shortages or supply emergencies?		X	
Does the system have substantial unaccounted-for and lost water?		X	
Is the system experiencing a high rate of population and/or demand growth?		X	
Is the system planning substantial improvements or additions?	X		See discussion of water storage and Halligan Reservoir project.
Are increases to wastewater system capacity anticipated within the planning horizon?	X		

Water Costs and Pricing

All Fort Collins Utilities water customers are metered. Historically, residential customers paid a set rate per 1,000 gallons regardless of water use. Since January 2003, single-family and duplex water rates are tiered. For many years, commercial customers have had a two-tier water rate. Beginning in 2003, commercial and multi-family customers are billed seasonal rates–with higher rates from May through September. Commercial rates still have a second tier for higher water use. Table 3 presents the 2008 residential water rates and rate structure utilized by Fort Collins.

Table 3: Residential water rates, 2008

		Single-Family	Duplex
	Base Charge	$12.72	$15.51
Tier	**Tier Size**	**$/1,000 gal.**	**$/1,000 gal.**
1	0-7,000 gal	$1.97	
	0-9,000 gal		$1.97
2	7,001-13,000 gal	$2.26	
	9,001-13,000 gal		$2.26
3	Over 13,000 gal	$2.60	$2.60

Current Policies and Planning Initiatives

Water Supply and Demand Management Policy

The City's *1988 Water Supply Policy* and *1992 Water Demand Management Policy* were combined and updated when City Council adopted the *2003 Water Supply and Demand Management Policy*. The 2003 Policy provides general criteria for decisions regarding water supply projects, acquisition of water rights and demand management measures. One key provision of the Policy is a goal of reducing water use from the previous target of 195 gallons per capita per day (gpcd) to 185 gpcd (normalized to account for weather variations). The Policy includes tools to meet this goal through educational programs, rate structures, incentive programs, and regulatory and operational measures. Another key provision in the Policy provides that the City will pursue the acquisition or development of additional storage capacity. Other provisions include maintaining a water supply shortage response plan, use of surplus raw water, fostering regional cooperation, protecting raw water quality and encouraging stream flow and ecosystem protection and recreational/aesthetic flows.

Water Supply Shortage Response Plan

In response to the severe drought year 2002 and in anticipation of continuing drought conditions, the City developed the *Water Supply Shortage Response Plan*, adopted by the City Council in April 2003. The plan dictates the steps to be taken when there are water supply shortages and contains four different response levels based on the severity of the shortage. Although the Utility's main objective is to provide customers with an adequate and reliable water supply, there will be times when the City's water supply is projected to be less than anticipated demands. A response plan enables the City to quickly make the necessary adjustments in order to reduce water demands to a level that matches supply. It is anticipated that this plan will be reviewed periodically and may be changed in the future to match the City's changing water supplies, facilities and operations.

Improving System Reliability in Response to Climate Change and Supply Variability

The City acknowledges the best available scientific information on global climate change predicts changes that could impact the Fort Collins water supply system. These changes could include reduced snow pack, earlier runoff, hotter and drier summers, and an increased recurrence of drought. The City views the water conservation program as an important proactive response to these potential changes. Reducing indoor demand through improved technology, leak reduction,

and behavior change (all elements of the City's conservation program) will improve system reliability and resilience to supply variability year round. Reducing outdoor demand through improved irrigation efficiency and landscape transformation (key elements of the City's conservation program) improves reliability during summer months when demand peaks, providing additional water availability for storage and environmental flows.

A key element to improving system reliability and resiliency in Fort Collins is storage. If conserved water is to be used to help improve reliability, some portion of the conserved water must be stored for use at a later date. Reducing demand by itself may offer some reliability benefits, but during a water shortage such as a drought having water in storage is critical for maintaining essential services. Future water supply planning efforts should carefully examine the beneficial uses of conserved water for Fort Collins.

Historic Water Demand

Water use can vary for many reasons, including changes in weather, population, drought awareness, rates and conservation efforts. Over the last 15 years, low-flow plumbing standards have lowered water use through natural attrition and new construction.

Table 4 shows the history of water demand for the past 20 years. Figure 3 shows the population and annual demand in a graphical format. Annual water use in 2004 was lower than the second lowest use for this period in 1995. Per capita use has been below 185 gpcd since the 2002 drought when only 9.3 inches of precipitation fell and restrictions were in place. Table 5 shows the number of accounts in each customer category from 2002–2007. Fewer than 1,000 new accounts were added during this time indicating the relatively modest rate of growth in the system. Table 6 provides the water use in each customer category from 2002–2007. Overall demand in these recent years has been less than in the previous period even though the number of accounts has increased. Table 7 presents the average per account water use by customer category from 2002–2007.

Table 4: Historic water demand

Year	Service Area Population	Annual Precipitation (inches)	Annual Water Use (MG)	Average Day Use (MGD)	Peak Day Use (MGD)
1989	93,600	12.9	9,548	26.2	60.6
1990	95,900	17.3	9,289	25.5	58.6
1991	97,200	14.1	9,020	24.7	55.9
1992	99,000	20.7	8,604	23.5	45.6
1993	101,400	17.3	8,384	23.0	52.5
1994	103,500	13.4	9,119	25.0	54.4
1995	106,200	20.2	8,069	22.1	55.5
1996	107,800	14.7	9,099	24.9	51.5
1997	111,500	24.8	8,768	24	58.9
1998	113,900	16.5	9,350	25.6	59.3
1999	115,900	20.7	9,000	24.7	53.7
2000	118,300	11.3	10,295	28.2	55.9
2001	121,300	12.3	9,978	27.3	55.8
2002	123,700	9.3	9,599	26.2	51.4
2003	125,500	18.2	8,280	22.6	46.9
2004	125,800	18.1	7,984	21.8	42.3
2005	126,900	16.2	8,497	23.3	50.1
2006	127,800	11.2	9,268	25.4	48.9
2007	128,400	13.7	8,860	24.2	47.5

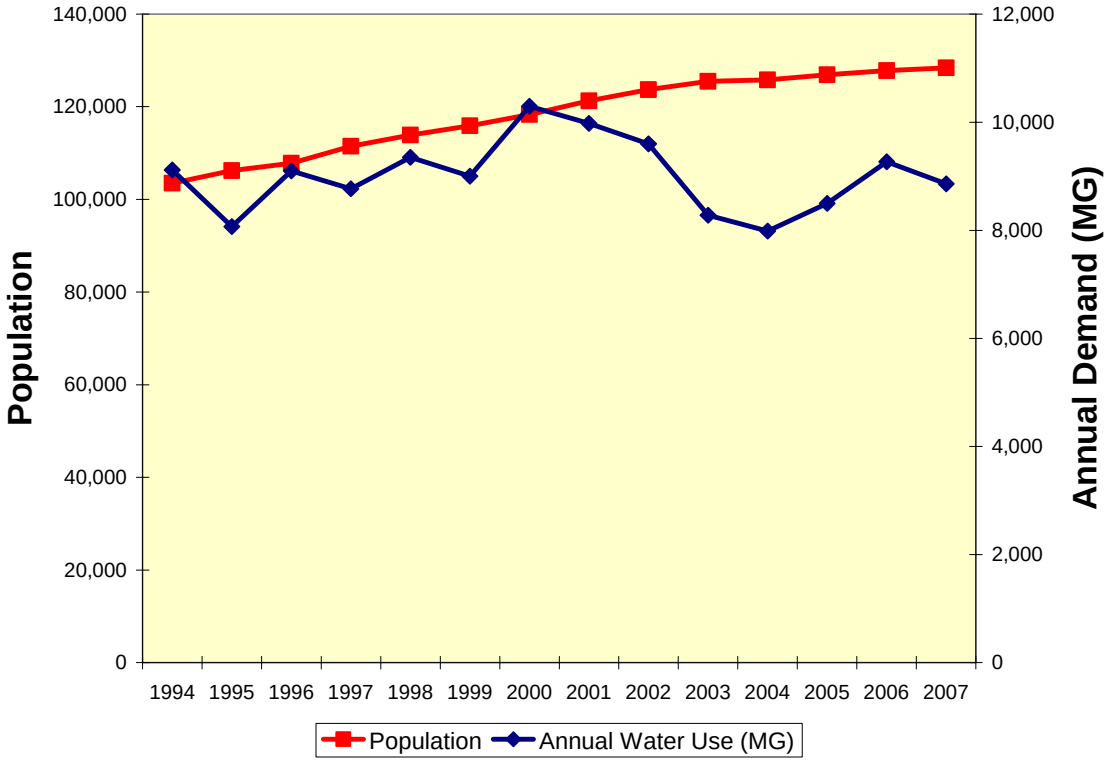

Figure 3: Population and annual water use

Table 5: Number of accounts by customer category

Account Category	2002	2003	2004	2005	2006	2007
Single-Family	26,160	26,091	26,168	26,272	26,413	26,555
Duplex	1,187	1,189	1,178	1,171	1,171	1,165
Multi-Family	1,962	2,013	2,049	2,072	2,094	2,104
Commercial	1,890	1,933	1,978	2,027	2,069	2,103
City Government	178	176	188	186	194	199
West Fort Collins WD	1	1	1	1	1	1
Outside City Customers	1,408	1,323	1,327	1,351	1,370	1,394
Total	32,786	32,726	32,889	33,081	33,312	33,521

Table 6: Water use by customer category

Customer Category	2002 Water Use (MG)	2003 Water Use (MG)	2004 Water Use (MG)	2005 Water Use (MG)	2006 Water Use (MG)	2007 Water Use (MG
Single-Family	3,433	2,886	2,555	2,802	3,204	2,938.
Duplex	167	144	131	137	151	143
Multi-Family	1,027	934	922	937	996	987
Commercial*	3,687	3,229	3,376	3,389	3,648	3,557
City Government	125	122	108	135	165	137
West Fort Collins WD	181	152	145	164	167	164
Outside City Customers	367	286	265	269	303	294
System Losses**	613	527	481	663	635	640
Total	9,599	8,280	7,984	8,497	9,268	8,860

Table 7: Average annual per account water use by customer category

Customer Category	2002 Avg. per acct. use (gal.)	2003 Avg. per acct. use (gal.)	2004 Avg. per acct. use (gal.)	2005 Avg. per acct. use (gal.)	2006 Avg. per acct. use (gal.)	2007 Avg. per acct. use (gal.)
Single-Family	131,223	110,626	97,630	106,660	121,285	110,644
Duplex	141,025	121,182	110,965	116,958	128,908	122,489
Multi-Family	523,265	463,779	449,999	451,987	475,682	469,229
Commercial	1,950,800	1,670,684	1,706,679	1,671,721	1,762,374	1,691,314
City Government	698,833	694,648	577,093	726,493	851,554	686,922
Outside City Customers	260,401	216,004	199,958	199,470	221,041	211,186

Indoor vs. Outdoor Water Use

Precipitation levels and daily temperatures during the watering season cause water use to vary considerably from year to year. For Fort Collins, the chart below shows the percentage of water used indoors versus outdoors per year. Indoor water use remains fairly consistent while outdoor water use fluctuates. Close to 40 percent of the annual water use is for outdoor watering between April and October.

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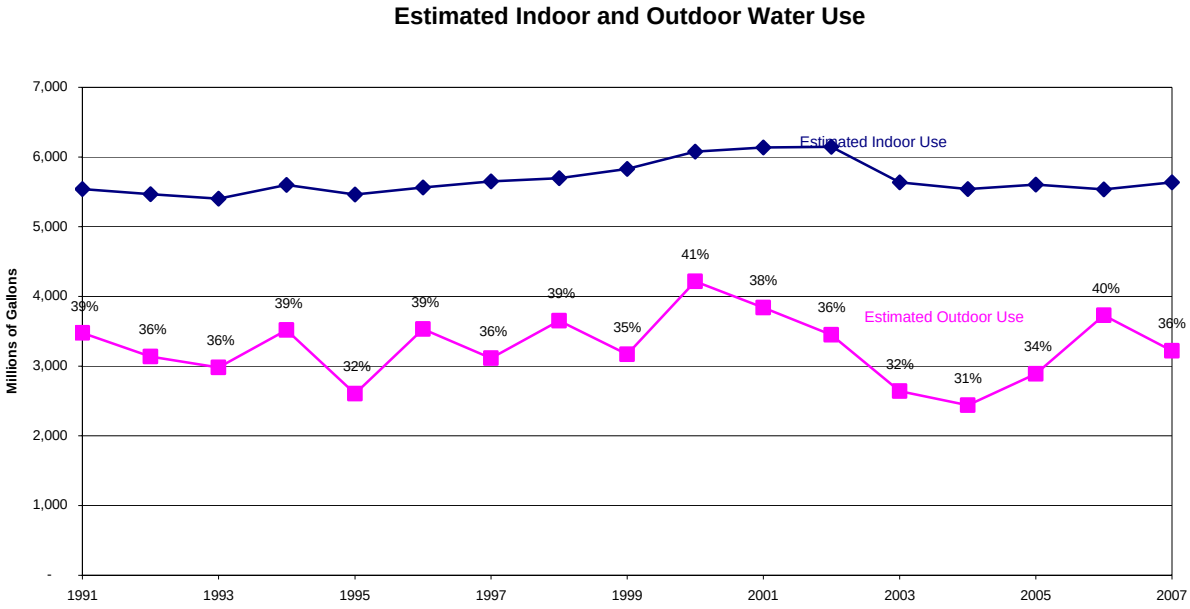

Figure 4: Estimated indoor and outdoor demand, Fort Collins Utilities

Per Capita Water Use

Table 8 shows per capita water use for 1994-2007. Fort Collins has seen a significant decrease in water use over the past 15 years. Per capita use has decreased from around 200 gpcd in the 1990s to below 160 gpcd during the last 5 years, a decrease of about 20 percent. Analyzing how much of that reduction can be attributed to the City's water conservation measures is difficult. Tiered and seasonal water rates, continuing drought awareness, low-flow plumbing standards and metered water taps have also contributed. Water use can vary for many reasons, including changes in weather, seasons, household size and income.

Per capita water use estimates can misrepresent water use trends over time. Population is not the sole determinant of water use. Precipitation levels and daily temperatures during the watering season cause water use to vary considerably from year to year.

Table 8: Per capita water use

Year	Actual Per Capita Use (gpcd)	Normalized Per Capita Use* (gpcd)	Actual Peak Day Demand (gpcd)	1 in 50 Normalized Peak Day Demand** (gpcd)
1994	211	208	491	511
1995	181	205	492	526
1996	203	206	443	527
1997	188	196	496	509
1998	196	201	487	501
1999	185	198	435	473
2000	211	204	440	477
2001	198	198	428	503
2002	183	189	378	411
2003	154	157	346	383
2004	146	150	307	327
2005	155	155	365	363
2006	172	156	353	350
2007	162	156	342	356

Notes:

* Normalized values are adjusted to estimate average expected use based on "normalized" 1930-1995 weather conditions.

** 1 in 50 peak use is expected to occur once in 50 years. Log-Pearson type III distribution applied. Values include all water demands except large contractual use. Since the severe drought year 2002, actual and normalized use values have been significantly lower due to changes in water conservation programs and practices.

Comparison with Other Colorado Utilities

Comparing water use patterns between utilities is a challenging exercise as it is often impossible to compare demands in an “apples to apples” manner. By examining the annualized average per household winter consumption for single-family customers (a reasonable estimate of annual indoor use) it is possible to make a fair comparison. Table 9 presents a comparison of single-family residential per household indoor demands in five Front Range utilities.

Table 9: Comparison of single-family per household indoor demands, 2005-2006

City	Avg. SF Indoor Demand (gal/day)	Annual Indoor (gal)
Boulder	151.5	55,300
Northglenn	153.4	56,000
Fort Collins	157.5	57,500
Denver	174.0	63,500
Aurora	174.5	63,700

During this time period, water use in Fort Collins was toward the lower end of this group. Northglenn and Boulder were approximately 4 gallons per day (gpd) lower and Denver and Aurora approximately 17 gpd higher than Fort Collins. Assuming 2.7 people per household in Fort Collins, this suggests that residents in Fort Collins use approximately 58 gpcd for indoor purposes. The national average (measured in 1999 as part of the AWWA *Residential End Uses of Water* study) was 69.3 gpcd. Subsequent water use studies conducted by Aquacraft have shown

that homes equipped with high efficiency toilets and water conserving clothes washers can reduce their demand to 40 gpcd (EPA Combined Retrofit Studies, 2004). This suggests that while Fort Collins is below the national average for single-family indoor water use, significant indoor conservation potential may exist (approximately 30%).

Current Water Conservation Program

Faced with a drought in 1977, the Utilities created a part-time position dedicated to water conservation. In 1990, the position expanded to full-time and conservation projects and educational efforts increased. The Fort Collins City Council adopted the *Water Demand Management Policy* in 1992, setting two goals for lowering demand and 12 measures for achieving those goals.

The effects of a more recent drought in 2002-2003 greatly impacted water use and the City's water conservation program. As awareness of the drought grew, the City's outreach efforts expanded, restrictions were put in place and regional media coverage affected how customers used water. Water use began declining in 2002 and has remained at a lower level since then. New programs introduced in 2003 included clothes washer rebates, a new water conservation curriculum for youth, a *Water Shortage Response Plan* and various regulatory measures.

During 2003, the *1992 Water Demand Management Policy* was updated and combined with the *1988 Water Supply Policy*. Resolution 2003-104, a *Water Supply and Demand Management Policy*, was adopted by City Council in September 2003. The resolution provides general criteria for decisions regarding water supply projects, acquisition of water rights and demand management measures. Demand management tools include educational programs, rate structures, incentive programs, and regulatory and operational measures.

In 2007, Fort Collins became a partner in the U.S, EPA's WaterSense program, a new national water efficiency effort. WaterSense is a voluntary partnership program sponsored by the EPA with the mission of protecting the future of our nation's water supply by promoting and enhancing the market for water-efficient products and services. As the water counterpart to the EnergyStar program, WaterSense has begun labeling products that offer a 20 percent efficiency improvement to help consumers conserve water when they install new plumbing fixtures and appliances.

Current Goals

As part of this plan, Fort Collins Utilities has established a goal for the conservation program of reducing water use to 140 gallons per capita per day (gpcd) by 2020 (normalized to account for weather conditions). This goal represents realistic and achievable demand reductions in all customer sectors in Fort Collins under existing climate conditions. Achieving this goal within the planning period will provide an additional measure of reliability to the water supply system to ensure high quality service to customers in case of future drought, climate change and unforeseen shortages.

Current Conservation Program

Fort Collins Utilities' water conservation program offers a diverse range of activities targeted at all water demand sectors in the service area. Fort Collins has implemented a conservation oriented increasing tiered water rate structure designed to encourage efficient use. Following descriptions of the current programs, Table 10 summarizes those conservation program activities.

Education and Public Information

Conservation public information campaign - Staff respond to residential and commercial customers with water use or billing questions and requests for water conservation information. Water conservation information is disseminated via a wide range of media; including bill inserts, bus benches and brochures. Displays are set up at various community events; including the Sustainable Living Fair, Thursday Night Music and More, and others. Topics include water-saving tips, technology and techniques, Xeriscape and lawn watering.

Adult education programs - The Utilities provides programs about Xeriscape landscaping, watering techniques and practices and general water conservation. A daily Lawn Watering Guide is published in the *Fort Collins Coloradoan* during the watering season.

Business environmental programs - A series of programs is offered to commercial customers on a variety of environmental topics, including water conservation. Staff provides newsletters, mailings, meetings and seminars on topics of interest to specific businesses, such as restaurants, hotels, car washes, landscapers and large accounts.

School education programs - Presentations and hands-on activities are provided to school classes on water topics, including the history of water in Fort Collins, water use and conservation, water chemistry and watersheds. Dr. WaterWise is a water conservation curriculum introduced in 2003 to classrooms during the drought. Fort Collins Utilities is a co-sponsor of the annual Children's Water Festival.

Conservation giveaways - Water conservation kits with indoor or outdoor water-saving devices are offered periodically free of charge through coupons in utility bills.

Water Rates and Usage Information

Increasing block rate structure – Tiered rates for single-family residential customers are designed to charge an incrementally higher amount for higher water use.

Seasonal rate structure - Commercial and multi-family customers are billed with a seasonal block rate structure with higher rates from May through September. Commercial rates have a second tier for higher water use.

Indoor Fixtures and Appliances - Residential

Residential clothes washer rebates - The Utilities offers a $50 rebate for customers who purchase high-efficiency clothes washers. Rebate costs are split between water and electric utility funds. Some commercial rebates may also be given. Approximately 900 rebates are given each year.

Dishwasher rebates – New in 2007, this program offers a $25 rebate when a qualifying dishwasher is purchased. The cost of the rebates is shared with the electric utility fund.

Zero-interest Loan Program (ZILCH) - Loans are provided at no interest to residential customers for water conservation improvements. Loans are available for water service line replacements and high efficiency clothes washers.

Outdoor Efficiency – Landscape and Irrigation

Sprinkler system audits – Available to homeowners and homeowner associations, Utilities auditors perform a sprinkler system assessment and show sprinkler operators how to water more efficiently. Approximately 250 audits are completed each year.

Xeriscape Demonstration Garden - Staff oversees maintenance of the City's Xeriscape Demonstration Garden and provides tours at organized events and upon request.

Raw water for City irrigation - Raw water is used to irrigate 80% of the City's parks, cemeteries and golf courses.

Indoor Fixtures and Appliances – Commercial, Industrial, Institutional (CII)

CII facility audits - Staff performs facility water audits to assess water use and make recommendations for improved efficiency. Many of these audits are done in conjunction with the Climate Wise program.

Hotel and restaurant conservation material distribution – A three-card set is available for hotels and other lodging establishments to inform guests about importance of water conservation to our area, and encourage the reuse of towels and linens. Tent cards are available for restaurants telling customers that "water is served upon request."

Water Reuse Systems

Large customer reuse - Treated wastewater from the Drake Water Reclamation Facility is pumped to Rawhide Power Plant for landscaping and cooling water.

Backwash water recycling - Backwash water recycling equipment at the water treatment facility treats backwash water and recycles it to the beginning of the treatment process.

Regulatory Measures

Wasting water ordinance - Staff enforces the section of the City Code that prohibits wasting water. Wasting water complaints are investigated. Complaints are used as an education tool, but enforcement by ticketing is also an option.

Restrictive covenants ordinance - City Council adopted Ordinance No. 083, 2003 that prohibits homeowner association's covenants from banning the use of Xeriscape or requiring a percentage of landscape area to be planted with turf.

Soil amendment ordinance - City Council adopted Ordinance No. 084, 2003 that requires builders to amend the soil for new properties.

Water Supply Shortage Response Plan – This plan has a series of measures to be enacted, including water restrictions, for four levels of water shortage.

Landscape and irrigation standards - New development landscape and irrigation plans are reviewed for compliance with the Land Use Code's water conservation standards. As part of these standards, a rain shut-off device is required for commercial sprinkler systems.

Operational Measures

Utility water loss program – All utilities "lose" water to leaks in the distribution system, meter inaccuracy, billing errors, and other normal conditions associated with the standard operation of

a treated water delivery system. System water loss programs generally involve finding and repairing leaks in the water distribution system—often the most easily addressed and economically sensible manner to tackle system loss. The Fort Collins program entails listening for leaks and pinpointing their locations using sonar equipment. It takes crews two years to survey the 500 miles of water mains. The goal is to reduce water wasted from water main leaks. Catching leaks before they have surfaced saves water and costs of excavation and repairs.

Water conservation upgrades at City LEED buildings - The City is committed to building new City buildings to the LEED Gold standard (Silver standard in some cases). Water conservation upgrades are part of this commitment.

Table 10: Current water conservation program measures

Program/Measure	Date of Implementation
Education and Public Information	
Conservation public information campaign	1977
Adult education programs	1977
Business environmental programs	2004
School education programs	1977
Conservation giveaways	1990
Water Rates and Usage Information	
Increasing block rate structure – Res.	2003
Seasonal rate structure – Comm. & MF	2003
Indoor Fixtures and Appliances - Residential	
Residential clothes washer rebates	2003
Dishwasher rebates	2007
Zero-interest loan program	1994
Outdoor Efficiency - Landscapes and Irrigation	
Sprinkler system audits	1999
Xeriscape Demonstration Garden	1986
Raw water for City irrigation	1900
Indoor Fixtures and Appliances - CII	
CII facility audits	2004
Hotel and restaurant conservation materials	2003
Water Reuse Systems	
Large customer reuse	1980
Backwash recycling at water treatment facility	2003
Regulatory Measures	
Wasting water ordinance	1964
Restrictive covenants ordinance	2003
Soil amendment ordinance	2003
Water Shortage Response Plan	2003
Landscape & irrigation standards	1994
Operational Measures	
Utility water loss program	1993
Water conservation upgrades at City LEED buildings	2006

POPULATION AND WATER DEMAND PLANNING PROJECTIONS

Forecasting Method

During the development of the *2003 Water Supply and Demand Management Policy*, considerable effort was made to forecast future population and water demand. This data was updated in 2006 when additional planning information became available. It is this updated data that is reflected in this section of the conservation plan.

Estimating the future population to be served water by Fort Collins Utilities was quite challenging since its service area boundary does not coincide with the city limits. This is further complicated because the boundaries vary for other utility services (electric, wastewater and stormwater). The Fort Collins-Loveland Water District (FCLWD) and the East Larimer County Water District (ELCO) provide water to some areas within the city limits and will most likely serve additional city residents in the future. The Utilities also serves some areas outside the city limits, primarily to the northwest of Fort Collins, including water provided to the West Fort Collins Water District (WFCWD). All of these factors were considered in estimating the population for the Utilities water service area. Figure 1 shows the different service areas with respect to the Fort Collins Urban Growth Area (UGA).

The projected population estimates for the Utilities water service area were based on the Traffic Analysis Zone (TAZ) information developed for the City of Fort Collins and Larimer County. The TAZ information is based on selected zones in and around the city that correlate with the City and County zoning designations, which dictate the type of development and their densities.

The population within the Utilities water service area was obtained by cross-referencing the service area with the TAZs. Future population projections were based on projected in-fill for each of the TAZs and it was assumed that the rate of growth will be similar to past patterns. Projections were made through the year 2035 to provide a long-term look at the effects of growth. Fort Collins anticipates that more of its growth toward build out will occur in the next 15 years (2008–2023) compared with the following years (2024–2035).

Fort Collins planning boundaries are clearly defined and unlikely to change significantly. As time goes on there will be less and less land available for development. The anticipated slowing population growth over time (i.e. decay in the growth rate) is expected to translate into slowing water demand growth at the end of the planning period as well. Demand projections developed for this study reflect this anticipated change in growth rate over time. Although the projections will be updated from time to time and will not match the actual growth precisely, it is believed that these projections provide a reasonable basis for the planning needed to project future water supplies and demands.

Although the Utilities water service area is limited by the surrounding water districts, the City currently has some water sale and exchange agreements to supply water to these water districts. With these agreements in place, and the potential for more in the future, additional population was added for growth within the City but which is outside the current water service area. It is estimated that by 2035 an additional 10,000 people will be served by the Utilities that is within the service area of the water districts. Currently, it is estimated that the Utilities will serve water to a total population of about 157,700 people by the year 2035.

Population was used as the primary factor in determining projected water use. It is expected that most growth in the community will be made up of a similar proportion of residential, commercial and other uses as presently exists. Because of this, treated water demands were forecast based on two main components. The first is what has been referred to as population-based demand, per capita water use multiplied by the population. The second component is an estimated use for large contractual users that the Utilities has an obligation to serve.

Since significant large contractual use can skew the per capita demand rates calculated for the City's water use, it was not used in the gpcd method of calculating future water needs. Instead, large contractual demands were estimated on an individual basis and added to the population related demand. During the treatment process, a small percentage of the water is lost. This is added to the demands to reflect the amount of raw water supply that needs to be delivered to the treatment facility. Based on these assumptions and criteria, treated water demands were calculated as shown in the following section.

Previous Treated Water Demand Projections

Table 11 shows a summary of the Utilities water service area historic use from 1960 and the projected demand through 2035 for the utility projected service area. Two different water demand projections are shown. The first scenario, shown under the heading of 185 gpcd, reflects the projections that were used in the development of the *2003 Water Supply and Demand Management Policy*. The second scenario, shown under the heading of 161 gpcd, reflects the current number that is being considered for purposes of water supply planning. Because of the significant reductions in use for the last several years, it seems prudent to adjust the numbers that are used for planning purposes. Even though the water conservation goal of 140 gpcd is believed to be obtainable, there are many uncertainties regarding the future reliability of the City's water supply. Future issues, such as climate change, make it important to continue to plan for a slightly higher water demand for purposes of developing the City's supply system. Figure 5 presents the same data in graphical format.

Raw Water Demand Projections

In addition to treated water demands, the Utilities has various raw water demands that are met with available supplies. These demands include raw water for irrigation of parks, golf courses, a cemetery, school grounds and various other greenbelt areas. The current raw water demands range from about 3,000 to 4,000 acre-feet per year and are in addition to the supplies needed to meet treated water demands. There are also several raw water obligations totaling approximately 4,000 acre-feet per year that need to be met because of various exchanges and agreements. Although it is anticipated that the demand for raw water will increase in the future, these demands will probably be met with water rights provided to the City (in addition to the projected water rights acquisitions through the raw water requirements that will meet treated water demands).

Table 11: Historic and projected population and treated water demand (1960–2035)

	Historic Service Area[1]		Projected Service Area[1]		
	Population (1,000)	Demand[2,4] (Ac-ft)	Population (1,000)	Demand[3,4]	
				185 GPCD (Ac-ft)	161 GPCD (Ac-ft)
1960	27.5	7,277			
1965	38.2	10,109			
1970	48.4	12,808			
1975	60.4	15,984			
1980	73.7	19,504			
1985	85.0	22,494			
1990	95.9	29,316			
1995	106.2	30,168			
2000	118.0	31,690			
2005	130.3	32,694			
2010			137.4	34,219	30,416
2015			144.4	36,497	32,498
2020			148.5	38,144	34,032
2025			152.4	39,749	35,529
2030			155.1	41,098	36,803
2035			157.7	42,425	38,059

Notes:

1. The Historic Service Area includes the City's current utility service area plus the area served by the West Fort Collins Water District. The 2005-2035 values also include water delivered to the Fort Collins-Loveland Water District special agreement area.
2. Based on 225 gpcd for 1960-1990, 210 gpcd for 1995, 198 gpcd for 2000, and 161 gpcd for 2005; plus large contractual demands ranging from 3,750 ac-ft in 1990 to 4,010 ac-ft in 2005.
3. Based on the stated amount of gpcd for the 2010-2035 planning period; plus large contractual demands increasing from 4,760 ac-ft in 2010 to 8,510 ac-ft in 2035 during the projected period.
4. An additional 5% for 1960-2000 and 3% for 2005-2035 of treated water use is included to process the water. The drop in amounts is due to backwash recycling implemented in 2003.

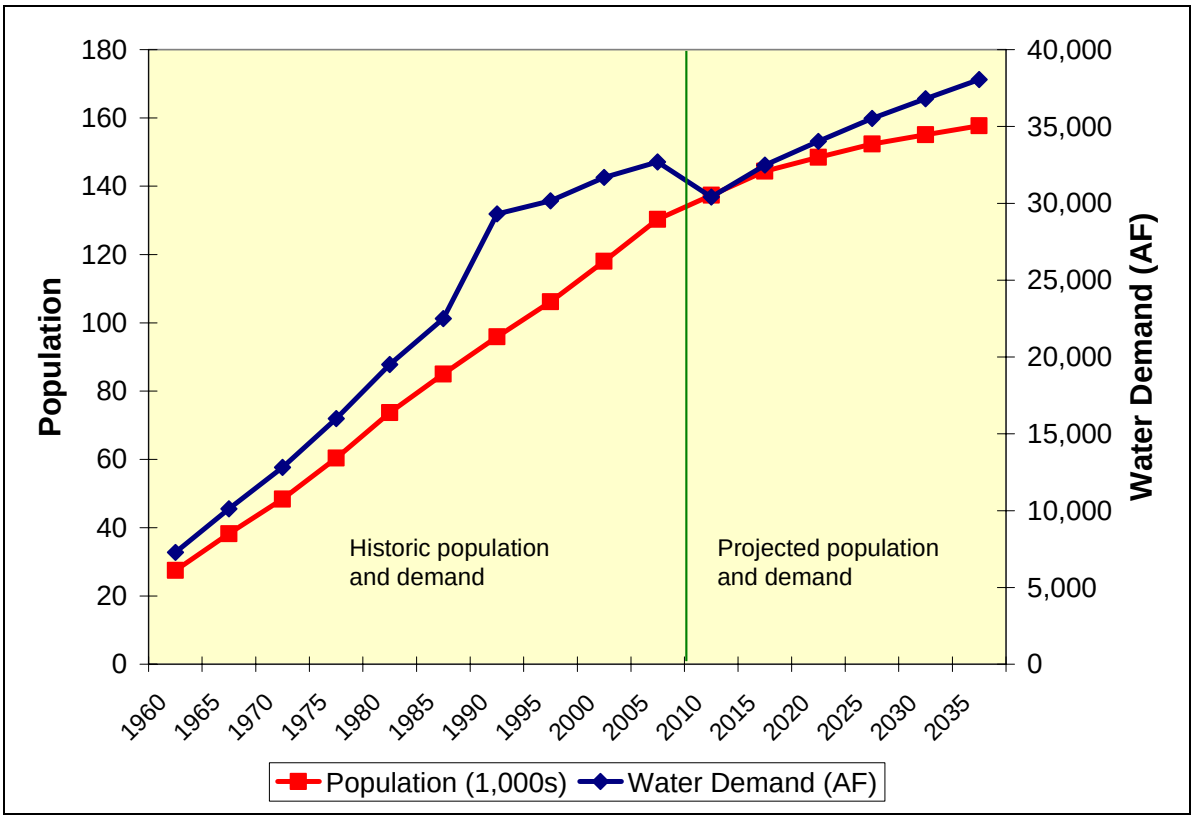

Figure 5: Historic and projected population and treated water demand (from previous studies)

PROPOSED WATER SUPPLY PROJECTS

Integrated Resources Planning in Fort Collins – Water Supply and Demand Management

In planning for a safe, secure, and sustainable water future, the City of Fort Collins employs an integrated resources planning strategy that carefully considers a range of supply and demand management options. In confronting the future water supply uncertainties posed by climate change and the potential for increased and extended droughts, the City has opted for a diversified approach that increases storage capacity (and hence flexibility in system operations) and an expanded water conservation program to reduce demand and improve system reliability and resilience to drought.

The combination of increased storage and reduced demand through conservation offers the best water management option for meeting future supply challenges. The proposed Halligan Reservoir enlargement will provide increased water storage which is the primary physical constraint the City faces in managing and regulating its water rights portfolio. When combined with the anticipated demand reductions from the City's expanded water conservation program, this integrated strategy will help improve Fort Collins' ability to weather the expected impacts of climate changes during the next few decades and beyond. Emerging global climate models suggest temperatures will rise causing higher water demands and more frequent and intense drought periods. Either water conservation or storage by itself, while beneficial, would not provide the same level of flexibility and drought resilience.

Expanded water conservation offers cost-effective water supply that can be stored for drought, leased for agriculture, or potentially used for beneficial environmental enhancement efforts such as in-stream flow programs. However, water conservation savings must be quantified and proven sustainable if they are to be relied upon for various beneficial uses. Increased storage provides a physical location for conserved water and enables Fort Collins to take full advantage of savings achieved by customers.

Potential Facility Needs

The City of Fort Collins is fortunate in that most of the infrastructure is in place to support the projected level of water use as defined in the *2003 Water Supply and Demand Management Policy*. The peak day capacity of the Water Treatment Facility is 87 million gallons per day, which is higher than the projected peak demand level for build-out in the Utility service area. In addition, there is adequate capacity in the major transmission lines to support projected peak day demands.

The primary water facility needs are related to additional water storage capacity that is required to meet the policy drought criteria. Fort Collins requires both short-term and long-term carryover storage to maximize operational flexibility and system reliability and to take advantage of anticipated conservation savings. Short-term storage is needed for operational flexibility and to meet return flow obligations inherent with converted irrigation company shares. Long-term carryover storage is needed to capture excess water in wetter years and water conserved by Fort Collins citizens. This provides a source of water in drought years to provide the desired level of water system reliability.

WATER CONSERVATION PROGRAMS AND MEASURES

Conservation Goals and Identified Programs and Measures

Water Conservation Goal

In 2007, Fort Collins Utilities set a goal of reducing water use to 140 gallons per capita per day (gpcd) by 2020. This goal represents realistic and achievable demand reductions in all customer sectors in Fort Collins, based on current water demand factors. Achieving this goal in the 12 year planning period will provide an additional measure of reliability to the water supply system to ensure high quality service to customers in case of future drought, climate change and unforeseen shortages. It will be necessary, in particular, to monitor the effects of expected climate change impacts on water use. This is particularly true for the outdoor component of use and may require that some adjustments be made to the goal in the future. Adapting to changes in the supply and demand conditions is a normal element of water conservation planning.

The City will implement the necessary water conservation practices and programs to reduce its water use to reach the 140 gpcd goal by 2020. The gallons per capita calculation is made by dividing total treated water produced for use by City customers (adjusted for large contractual customers and other sales or exchange arrangements) by the estimated population of the City's water service area. It is also "normalized" by adjusting it for weather conditions so it is representative of a year with average precipitation and temperatures.

Benefits of Water Conservation

Water conservation is of vital importance to the City of Fort Collins. Although there are many reasons to implement and expand water conservation efforts, a few key ones include:

To foster a conservation ethic and eliminate waste. The success of the City's water conservation program depends on the cooperation of its customers. Instilling a conservation ethic is an important first step to changing habits and attitudes toward water use. The objective of the 140 gpcd level of use is to provide adequate water to customers, while reducing unnecessary use and waste. Much of indoor water use is for fundamental and public health purposes, such as drinking, flushing and cleaning, not only in homes but also in businesses, schools and industry. Adequate quantities of water are necessary to meet these important functions. Outdoor water use is primarily watering landscapes. Adequate supplies are needed to maintain trees, bushes and other vegetation at a level desired by the community and which provides desirable benefits to the urban environment. Even at 140 gpcd, outdoor water use will continue to constitute about one-third of the total use by Fort Collins' customers.

To demonstrate a commitment to sustainability. The City has an approved *Action Plan for Sustainability* that states, "Being sustainable means considering the environmental, financial and human impacts of all of our decisions. It means recognizing new challenges that result from finite resources. It means considering the long term impacts of our actions." In addition, the Utilities is launching the *21st Century Utilities* project with the purpose of "inspiring community leadership by reducing environmental impact while benefiting customers, the economy and society."

The City believes it's important to conserve water because it's good stewardship; it's the responsible way to manage a vital resource. Sustainability means not only conserving water, but also efficiently managing our water supply portfolio in a manner that is environmentally responsible and will best serve our community's residents.

To provide water for multiple beneficial purposes. The City owns a portfolio of water rights that produces a plentiful supply of water in most years. The yield of these water rights varies considerably and in times of severe drought the supply system may be stressed resulting in the need for extra conservation measures. In most years, however, the City has supplies that are surplus to its normal municipal demands. One reason for an aggressive water conservation program is to be able to provide more water for beneficial uses beyond normal municipal purposes. For example, the area around Fort Collins continues to be a productive agricultural area that produces many crops that provide a local food source and provides additional economic activity to the area. These remaining agricultural areas also provide significant open space outside of Fort Collins that is desired by many residents. Making some of the City's surplus water available for these purposes also provides supplemental revenue for the Utility and its customers. The potential environmental benefits of conserved water are also important. Providing additional flow for the local stream systems, in-stream flow programs, improvements in water quality, improvements in aquatic and riparian ecosystems, enhanced recreational opportunities, and aesthetics are all potential benefits of water conservation in Fort Collins.

To reduce costs. There are costs associated with varying levels of water use in Fort Collins. These include costs for the Utility as a whole and for individual customers. Utility costs, which are also passed on to customers, include any water system infrastructure costs dependent on the level of water use or water flow. These costs may include water rights acquisition, enhanced or

expanded treatment, distribution and storage facilities, environmental and agricultural impacts, and legal issues. Ongoing variable charges related to the level of use are typically for items such as energy for pumping and chemicals for treatment. These costs extend beyond the direct financial impact to the Utility and include the anticipated costs and impacts associated with long-term climate change and the hazards associated with the use of certain chemicals. From the customer perspective, lowering Utility water bills through conservation can reduce other costs indirectly. These savings may come from reductions in the energy required for heating water, reduced use of fertilizer and landscape chemicals, and reduced landscape maintenance costs. Fort Collins seeks to minimize both direct and indirect costs to citizens while providing all of the benefits of the efficient use of water.

To prepare for forecasted climate change. Climate change may have significant impacts on both water demands and water supplies in the time frame of this plan. Numerous studies on climate change and the general impacts that are expected in the field of water supply and demand have been produced by reputable scientific organizations such as the Intergovernmental Panel on Climate Change, National Center for Atmospheric Research, American Water Works Association Research Foundation, the Association of Metropolitan Water Agencies and the American Society of Civil Engineers.

Although additional research is still needed to determine the extent of local impacts, there is general consensus that climate change in the Mountain West will likely include the following changes:

- Increased evapotranspiration rates, increasing the water required to maintain landscaping.
- More frequent dry spells and a longer growing season.
- Changes in seasonal snow pack.
- Earlier spring snowmelt and runoff.
- Changes in the distribution of precipitation over the year.

These changes are expected to accelerate over the decades ahead and impacts may depend largely on factors such as population growth, economic growth and technological changes. Utilities will likely face significant challenges in the years ahead managing both water demands and water supplies.

In the area along the Front Range of northern Colorado, it is particularly difficult to project future temperature and precipitation trends. One such attempt, averaging the results of several Global Climate Models (GCM), results in some potential scenarios for this area. These models suggest that temperatures could increase an average of about 2 degrees Celsius by 2040 and 3 degrees by 2070. The change in precipitation shows an average annual increase of about 1% by 2040 and 2% by 2070. The distribution over the year changes and it is expected to be wetter during the winter months and drier during the spring and summer months.

From a water demand perspective, hotter and drier conditions during the growing season will result in more evapotranspiration and water use for many trees, lawns and other vegetation. In Fort Collins, outdoor water use is about one-third of total use on an annual basis. Based on current use patterns and conditions, a 10% increase in outdoor water use could result in an increase of about 7 gpcd. A 20% increase in outdoor water use translates to an increase of 14 gpcd. Without conservation and/or significant changes in landscaping choices, outdoor water use will likely increase over the coming decades as customers strive to maintain their landscapes in a hotter and longer growing season.

It is currently difficult to predict how climate change will alter the quantity and timing of runoff. Many models suggest that there will be less runoff in the spring and early summer from snowmelt. Models also suggest that the variability and duration of wet periods and droughts will be more severe. The yield of the City's current water rights portfolio could vary more from year to year, resulting in an increase of water "short" years. This in turn would make meeting demands more challenging. There may also be some years that are wetter than what has been experienced in the past.

With many uncertainties regarding both water supply and demand, it is prudent to prepare for a wide range of conditions in the future. Additional reductions in water use through thoughtful conservation measures are a prudent and sensible approach to begin confronting this uncertainty. Planning for adequate reservoir capacity to help balance the swing in supplies available between wet and dry periods is also a prudent and sensible approach. Fort Collins seeks to combine these efforts to provide for a sustainable water future in the face of great challenges and uncertainty.

Document the Goal Development Process

In September 2003, the Fort Collins City Council adopted the *Water Supply and Demand Management Policy*. The objective of the Policy was, "to provide a sustainable and integrated approach to (1) providing an adequate and reliable supply of water for the beneficial use by customers and the community and (2) managing the level of demand and the efficient use of a scarce and valuable resource." The Policy set a goal of 185 gpcd by 2010. This goal made sense at the time; however per capita water use has been significantly lower since 2002. A new water use goal of 140 gpcd by 2020 was established as part of the process of developing this plan

CONSERVATION PROGRAMS AND DEMAND FORECASTS

Demand forecasts were prepared for each of the scenarios described below including the Baseline (no conservation) scenario. The forecasting methodology uses current per capita demand as the basis and then forecasts future demand using Fort Collins population planning projections. The impact of different conservation program measures reduces the per capita demand incrementally by year depending upon the proposed implementation schedule. Care has been taken to properly assign program impacts and to avoid double counting reductions.

Baseline: Demand Forecast Without Conservation Program

The baseline forecast represents a projection without any water conservation program. This forecast provides a way to examine the impacts of the current conservation program and the recommended expanded program against a hypothetical baseline without conservation. The forecast includes anticipated changes in growth rates based on current planning projections. Growth rates are expected to gradually decline over the next couple of decades as the City approaches build-out. The baseline forecast includes the following assumptions (many of which are included in the Level 1 and Level 2 forecasts as well):

- The Projected Service Area includes the City's current utility service area plus some of the new growth in the UGA that is not already served by the surrounding water districts that the City plans to serve.
- The demand forecast is based on 153 gpcd at the beginning of the 13 year planning period (2008-2020); plus large contractual demands increasing from 4,010 ac-ft in 2005 to 6,476 ac-ft in 2020 during the projected period.

- The demand forecast includes the assumption of 6% losses in the treated water system.
- This forecast does not include the impacts of an ongoing water conservation program. This baseline provides a way to show the impact and potential savings of the current program.

Level 1: Current Program

Fort Collins Utilities' current water conservation program is broad-based and designed to reduce demand in most customer sectors. Key elements of the current program include: public education and information, an increasing block rate billing structure and seasonal rates for commercial customers, rebates for efficient residential clothes washers, an innovative zero-interest loan program, irrigation audits, several ordinances, and a utility water loss detection program. A detailed description of the current programs is provided earlier in this report.

The Level 1 current conservation program will save an estimated 1,000 acre-feet if continued at the same level through the planning period to 2020.[1]

Level 2: Recommended New Program

The Level 2 program includes all elements from the current program and the following additional program measures. The Level 2 conservation program will save an estimated 2,300 acre-feet if continued at the same level through the planning period to 2020. See Table 16 for an overview of the recommended program, including current and new measures.

The following new conservation measures are included in the Level 2 program. Program costs and savings estimates are presented in Table 12. These measures are planned to be phased in over three years.

Education and Public Information

Public information campaign expansion – This measure would increase the amount of outreach to customers through print and radio advertising, more bus benches and other venues for increased visibility of water conservation messages. Efforts may include partnerships with home builders, local nurseries, Colorado State University, regional water suppliers and/or others.

Water conservation recognition awards – Residential and commercial customers would be recognized for their water conservation efforts.

Water Rates and Usage Information

Online access to water use history – Customers who have online access to their water bills can track and compare their monthly and seasonal water use. This program will be implemented along with online bill payments.

Online water use calculator – A water use calculator can provide feedback to customers about how efficiently they are using water. Customers will be able to customize the calculator with their household parameters and historic water consumption.

[1] These savings estimates do not include the impact of the Fort Collins increasing block and seasonal water rate structure. Rate structure impacts were not evaluated in the preparation of this plan.

Fixtures and Appliances – Residential

High efficiency toilet rebates – High Efficiency Toilets (HETs) are typically dual flush or pressure assisted models that use an average of 1.28 gallons per flush (gpf) or less. Some HETs use only 1 gallon per flush and have passed tests for effective waste removal. Performance tests for these products are now available and there are many HET models that perform as well or better than standard 1.6 gpf fixtures. This program would offer a $50 rebate for the purchase and installation of an HET toilet.

Low income retrofit program – This program will provide low income single- and multi-family households with toilet, showerhead and faucet aerator retrofits. It is envisioned that all equipment will be provided and installed free of charge to the customer. This program may be administered as part of the City's REACH and LEAP weatherization programs.

Zero-interest loan program expansion – Fort Collins currently offers zero interest loans to customers for replacing aging water service lines and purchasing high-efficiency clothes washers. This would expand the loan program to possibly include high efficiency toilets, smart irrigation controls, Xeriscape and/or other technologies as appropriate.

Research: Water end use study for homes – This measure would include a survey of the City to determine how water is being used in homes, including gallons per flush of toilets. It would also track water usage for irrigating landscapes. This information would help to target programs appropriately to have a greater impact on water use.

Outdoor Efficiency – Landscapes and Irrigation

Xeriscape design clinics – This program would offer homeowners an educational program and one-on-one landscape design assistance from a professional. Customers would pay a fee to participate.

Irrigation technology rebates – One of the most promising new technologies for water conservation with automatic irrigation systems is "smart control". These controllers use prevailing weather conditions or soil moisture measurements to automatically adjust irrigation applications to meet the real-time water needs of the plants. This equipment is more expensive than conventional irrigation control and this program would offer rebates to customers ranging from $50-150 (depending upon the product and number of irrigation zones impacted). The average rebate amount is estimated to be $85.

Large HOA irrigation efficiency grants – This program would offer HOAs with large landscapes a grant averaging $1,300 per customer for the purpose of improving irrigation efficiency through improved distribution uniformity, leak repair, and weather-based scheduling. This program would be tied directly to Fort Collins Utilities' current irrigation audit program. Five large HOA customers per year would be targeted.

Research: Determine irrigated area for lots – This measure would use GIS and other technologies to determine the square feet of irrigated area for each City lot. This information would help in providing water budgets and efficiency reports to customers.

Fixtures and Appliances – Commercial, Industrial, & Institutional

CII facility audit program expansion – This measure would hire contract labor to perform more complex assessments than our current program at industrial facilities.

Commercial clothes washer rebates – This program will offer rebates for the purchase of water (and energy) efficient clothes washers for the commercial, industrial, and institutional (CII) sector. Although commercial customers can currently apply for rebates for residential washers, this program would include coin-operated and other commercial washers.

Commercial high-efficiency toilet and urinal rebates – Similar to the residential HET incentive described earlier, this program expands the rebate offer to commercial customers and also includes efficient urinals. Savings are estimated to be comparable to residential installations.

Financial incentives for commercial water-saving upgrades – This program aims to overcome barriers to implementing water efficiency upgrades in the CII sector (e.g. cooling tower conductivity control, leak detection and repair, fixture replacement, etc.). Customers would submit a proposal for improvements and estimated water savings. Incentives would be based on the amount of documented saved water.

Restaurant pre-rinse spray valve distribution – Restaurants and commercial food service operators use pre-rinse spray valves to rinse trays of dishes prior to washing them in a large commercial dishwasher. Historically these valves have flowed at anywhere from 3 to 10 gallons per minute (gpm). New high-efficiency spray valves use 1.6 gpm or less and utilize venturi valve technology to ensure a high-pressure spray with less water. Distribution programs of pre-rinse spray valves have been a success in numerous water districts in California, Washington, and Colorado. New spray valves cost less than $40 each. Most utilities have simply given these devices away and many have installed them as well to ensure they are utilized. Satisfaction surveys have shown that customers prefer the new valves.

Regulatory Measures

Landscape and irrigation standards update – In 1994, City Council adopted landscape and irrigation standards for water conservation. With revisions to these standards, water efficiency can be improved. An interdepartmental team, along with outside professionals, would review the current documents and consider appropriate revisions. The new standards may include a provision for dedicated irrigation taps for large landscapes, irrigation system efficiency requirements and/or limiting turf in narrow strips, among other measures. These new standards may result in the need to hire an additional FTE for compliance and outreach.

Operational Measures

Utility water loss program enhancement – This measure would change the methodology of the City's current water loss program by implementing the new industry standard, the IWA/AWWA water loss methodology. This new methodology offers a new set of tools for quantifying water loss in a utility. The IWA/AWWA Water Audit Method is effective because it features sound, consistent definitions for the major forms of water consumption and water loss encountered in drinking water utilities. It also has a set of rational performance indicators that evaluate utilities on system-specific features such as the average pressure in the distribution system and miles of water main. Once implemented, this method can be used to track and assess water loss over time and to develop effective tools for reducing real and apparent losses. The goal of this effort will be to reduce what is currently described as unaccounted for water from 6 percent per year to 5 percent per year by 2026. However it should be understood that the results of changing methodologies are uncertain. The impacts for Fort Collins could be larger or smaller than estimated here. Furthermore it is uncertain what budget is required to implement the new

methodology. Fort Collins currently budgets $70,000 per year for leak detection and water loss control. For the purposes of this plan, a one time cost of $200,000 has been allotted for implementing the new IWA/AWWA methodology in the first year. It is anticipated that these costs could go back down to $70,000 after the initial audit is complete, but initial outlay requirements are not fully known.

Water conservation upgrades at City facilities – One of the goals of the City's conservation program is to demonstrate a water conservation effort. This measure would provide upgrades of water-efficient indoor fixtures and sprinkler system equipment at City facilities.

Table 12: Level 2 new measures - estimated costs and water savings

Note: Some staff labor will be absorbed within existing programs. All measures do not have quantified water savings.

Program/Measure	New FTE	Labor Cost	$/ Customer (i.e. rebate)	# of Customers Impacted (or rebates)	Annual program/ measure cost	Total annual cost (labor & program costs)	Anticipated annual water savings in gallons	Annual Savings (AF)	Cost of Saved Water ($/AF)	Implementation Difficulty (1 = easy, 5 = difficult)
Education and Public Information										
Public information campaign expansion	0.1	$10,000	N/A	N/A	$10,000	$20,000	750,000	2.3	$8,689	2
Water conservation recognition awards	0.05	$5,000	N/A	N/A	$1,000	$6,000	Unknown			2
Water Rates and Usage Information										
Online access to water history	0	0	N/A	N/A	N/A	N/A	Unknown			2
Online water use calculator	0	0	N/A	N/A	N/A	N/A	Unknown			1
Indoor Fixtures and Appliances - Residential										
High efficiency toilet rebates	0.1	$10,000	$50	1,000	$50,000	$60,000	9,000,000	27.6	$1,991	2
Low income retrofit program	0.05	$5,000	$400	25	$10,000	$15,000	1,250,000	3.8	$3,910	3
Zero-interest loan program expansion	0	0	N/A	N/A	N/A	N/A	500,000	1.5	$0	2
Research: Water end use study for homes	0.05	$5,000	N/A	N/A	$50,000	$55,000	0	0	0	3
Outdoor Efficiency – Landscapes & Irrigation										
Xeriscape design clinics	0.05	$5,000	$50	75	$3,750	$8,750	750,000	2.3	$3,801	2
Irrigation technology rebates	0.1	$10,000	$85	175	$14,875	$24,875	3,500,000	10.7	$2,316	3
Large HOA irrigation efficiency grants	0.05	$5,000	$1,300	5	$6,500	$11,500	1,250,000	3.8	$2,998	2
Research: Determine irrigated area for lots	0.05	$5,000			$50,000	$55,000	0	0		3
Indoor Fixtures & Appliances – CII										
CII facility audit program expansion	0.4	$40,000	N/A	40	$10,000	$50,000	1,000,000	3.1	$4,887	3
Commercial clothes washer rebates	0	0	$100	10	$1,000	$1,000	90,000	0.3	$3,620	3
Commercial toilet and urinal rebates	0.1	$10,000	$50	1,000	$50,000	$60,000	1,800,000	5.5	$2,715	2
Financial incentives for commercial water-saving upgrades ($ based on savings)	0.15	$15,000	$1,000	25	$25,000	$40,000	2,500,000	7.7	$5,213	3

Program/Measure	New FTE	Labor Cost	$/ Customer (i.e. rebate)	# of Customers Impacted (or rebates)	Annual program/ measure cost	Total annual cost (labor & program costs)	Anticipated annual water savings in gallons	Annual Savings (AF)	Cost of Saved Water ($/AF)	Implementation Difficulty (1 = easy, 5 = difficult)
Restaurant pre-rinse spray valve distribution	0.1	$10,000	$100	50	$5,000	$15,000	650,000	2.0	$7,500	2
Regulatory Measures										
Landscape and irrigation standards update	1	$100,000	N/A	N/A	$10,000	$110,000	5,000,000	15.3	$7,168	3
Operational Measures										
Utility water loss program enhancement	0	0	N/A	N/A	$70,000	$70,000	4,890,000	15	$4,666	4
Water conservation upgrades at City facilities (indoor & outdoor)	0.05	$5,000	N/A	N/A	$40,000	$45,000	1,500,000	4.6	$9,782	2

Demand Forecasts

Demand forecasts were prepared for each of the scenarios described above including the Baseline (no conservation) scenario. Results are shown in Figure 6. Three demand forecasts are included in Figure 6 and the forecasting methodology is discussed below.

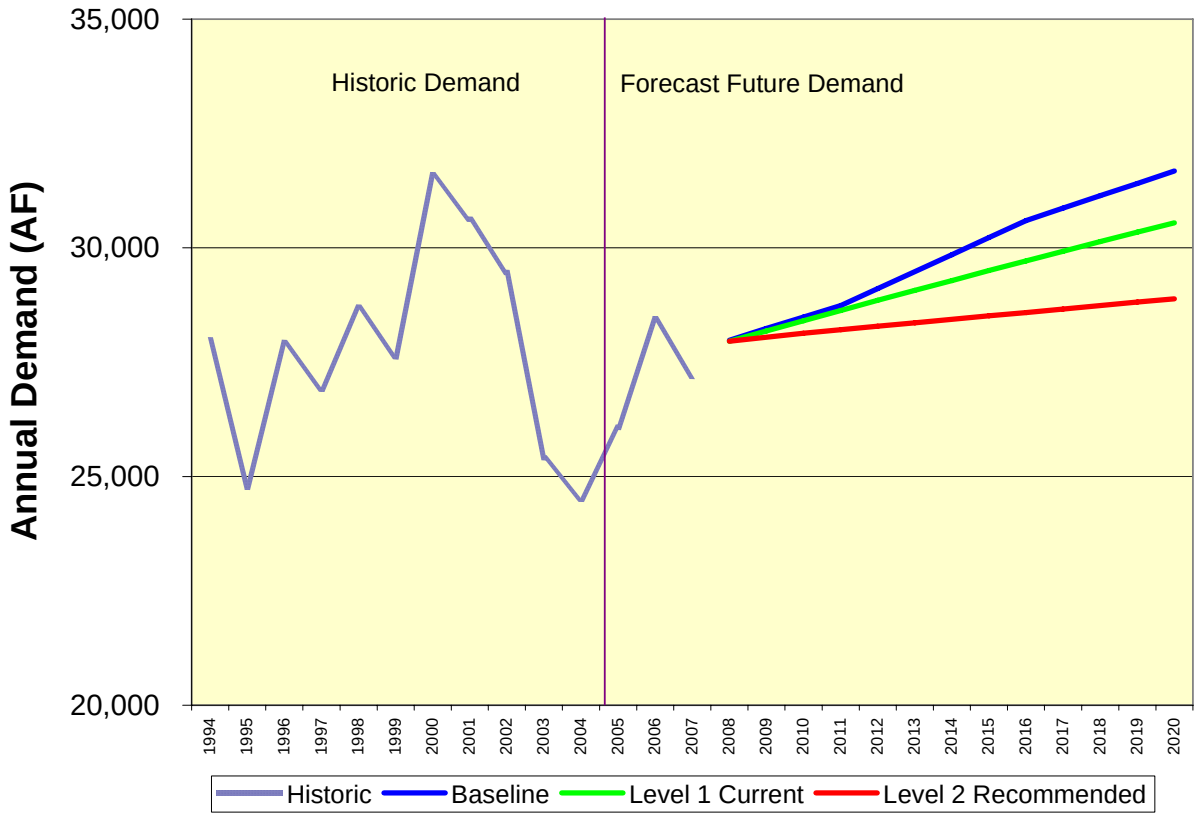

Figure 6: Demand forecasts under different conservation scenarios

Baseline – Without Conservation (blue line)

2020 demand = 31,800 Ac-ft
2020 per capita use = 153 gpcd (not including contractual demands)
Estimated change from 2003-2007 average per capita (155 gpcd) = 1.3% reduction

This forecast represents a baseline projection without any water conservation program. This forecast provides a way to examine the impacts of the current conservation program. The forecast includes anticipated changes in growth rates based on current planning projections. More accelerated growth occurs in the next 10 years and it then slows approaching build out.

This approach assumes that all new customers will essentially have demands that are identical to the existing customer base and it further assumes that no efficiency improvements will be made by the current customer base. This methodology likely over-estimates future demand. The *Energy Policy Act of 1992* requires all toilets sold in the U.S. be 1.6 gallons per flush or less and also sets maximum flow rate standards for showerheads and faucets. New U.S. Department of Energy standards for clothes washers will provide for market transformation to more water efficient machines over the next 10-20 years. These policies essentially assure that new

customers will use less water indoors than existing customers *and* that existing customers will likely become more water efficient over time through the natural replacement of old fixtures and appliances. Barring the widespread adoption of a new water consuming technology that could increase per capita demand or an unexpected population surge, the assumptions of this forecasting methodology could slightly overestimate future demand in Fort Collins given the current conservation program.

Given the recent changes in per capita demand in Fort Collins resulting from the drought of 2002, the assumptions used in this forecast are reasonable. Consequently, the estimated impacts of the conservation programs will be more modest than they would have been had per capita use not changed so dramatically already. It is assumed that sizeable portions of the easy conservation savings have already been achieved. Historic demand is also shown in Figure 6 to illustrate this point.

Level 1 - Current Conservation Program (green line)

Forecast 2020 demand = 30,800 Ac-ft
Forecast water savings in 2020 = 1,000 Ac-ft
Estimated 2020 per capita use = 147 gpcd (not including contractual demands)
Estimated reduction from 2003-2007 average per capita (155 gpcd) = 5.2%

This forecast projects demand in Fort Collins assuming the current conservation program (described earlier in this document) continues at a similar funding level (adjusted for inflation).

Level 2 – Recommended New Program (red line)

Forecast 2020 demand = 29,500 Ac-ft
Forecast water savings in 2,300 = Ac-ft
2020 per capita use = 139 gpcd (not including contractual demands)
Estimated reduction from 2003-2007 average per capita (155 gpcd) = 10.3%

This forecast projects demand in Fort Collins assuming the Level 2 conservation program (described earlier in this document) is fully implemented starting in 2008.

Summary of Forecast Demands

Summaries of the demand forecasts presented above are presented in Table 13 and Table 14. Demand and savings in acre-feet are shown in Table 13. Forecast per capita demands and savings percentages are shown in Table 14. The recommended program will save an estimated 2,300 Ac-ft/year by 2020. Under this scenario, per capita demand will be reduced to 139 gpcd. Table 15 provides the percent of the estimated 2020 attributable to indoor measures, outdoor measures, and utility water loss control.

Table 13: Summary of forecast demand and savings (acre-feet per year)

Forecast	Average Use (Ac-ft/year)	2020 Forecast Demand (Ac-ft/year)	Savings vs. Pre-2002 Use (Ac-ft/year)	Savings vs. Baseline Use (Ac-ft/year)
Pre-2002 (1998-2001)	34,000	39,700	N/A	N/A
Baseline (2003-2007)	27,500	31,800	7,900	N/A
Current Program		30,800	8,900	1,000
Recommended Program		29,500	10,200	2,300

Table 14: Summary of forecast demand and savings (gallons per capita per day)

Forecast	Average Use (gpcd)	2020 Forecast Demand (gpcd)	Savings vs. Pre-2002 Use (%)	Savings vs. Baseline Use (%)
Pre-2002 (1998-2001)	200	200	0%	N/A
Baseline (2003-2007)	155	153	-23.5%	-1.3%
Current Program		147	-26.5%	-5.2%
Recommended Program		139	-30.5%	-10.3%

Table 15: Breakdown of 2020 water savings by category

	Indoor	Outdoor	Water Loss Control	Total
Current Program	55.6%	35.4%	9.0%	100.0%
Recommended Program	50.5%	32.8%	16.7%	100.0%

IMPLEMENTATION PLAN FOR RECOMMENDED CONSERVATION PROGRAM

The recommended conservation program will be implemented over a three year period. Table 16 shows the recommended program, including current and new measures. The table also shows which customer classes will be impacted, whether a measure affects indoor or outdoor use, the type of measure, and if it's an existing or new measure.

Table 16: Conservation measures for recommended program

Measure	Customers				Water Use		Type of Measure		Existing or New	
	RSF	RMF	CII	City	Indoor	Outdoor	Comm	DSM	Exist	New
Education and Public Information										
Conservation public information campaign	X	X	X	X	X	X	X		X	
Public information campaign expansion	X	X	X	X	X	X	X			X
Adult education programs	X	X			X	X	X		X	
Business environmental programs		X	X		X	X	X		X	
School education programs	X	X			X	X	X		X	
Conservation giveaways	X	X			X	X	X		X	
Water conservation awards	X	X	X	X	X	X	X			X
Water Rates and Usage Information										
Increasing block rate – Res.	X				X	X			X	
Seasonal rates – Comm. & MF		X	X	X	X	X			X	
Online access to water history	X	X	X		X	X	X			X
Online water use calculator	X				X	X	X			X
Indoor Fixtures and Appliances - Residential										
Residential clothes washer rebates	X	X			X			X	X	
High efficiency toilet rebates	X	X			X			X		X
Dishwasher rebates	X	X			X			X		X
Low income retrofit program	X				X			X		X
Zero-interest loans for conservation	X				X		X		X	
Zero-interest loan program expansion	X				X	X	X			X
Research: Water end use study	X				X	X	X			X
Outdoor Efficiency - Landscapes and Irrigation										
Sprinkler system audits	X	X					X		X	
Xeriscape Demonstration Garden	X	X	X	X		X	X		X	
Xeriscape design clinics	X	X				X	X			X
Irrigation technology rebates	X	X	X			X		X		X
Large HOA irrigation efficiency grants		X				X		X		X
Raw water for irrigation at parks, cemeteries and golf courses				X		X			X	
Research: Determine irrigated area for lots	X	X	X	X		X	X			X
Indoor Fixtures and Appliances - Comm., Indust., Institutional (CII)										
CII facility audits			X		X	X	X		X	
Facility audit program expansion			X		X	X	X			X
Commercial clothes washer rebates			X		X			X		X
Commercial toilet and urinal rebates			X		X			X		X

Measure	Customers				Water Use		Type of Measure		Existing or New	
	RSF	RMF	CII	City	Indoor	Outdoor	Comm	DSM	Exist	New
Financial incentives for commercial water-saving upgrades			X		X	X		X		X
Hotel and restaurant conservation materials			X		X		X		X	
Restaurant pre-rinse spray valve distribution			X		X			X		X
Water Reuse Systems										
Large customer reuse			X	X	X	X			X	
Backwash recycling at water treatment facility				X				X	X	
Regulatory Measures										
Wasting water ordinance	X	X	X	X	X	X			X	
Restrictive covenants ordinance		X	X			X			X	
Soil amendment ordinance	X	X	X	X		X			X	
Water Shortage Response Plan	X	X	X	X	X	X			X	
Landscape & irrigation standards for new development		X	X	X		X	X		X	
Landscape & irrigation standards update	X	X	X	X		X	X			X
Operational Measures										
Utility water loss program				X				X	X	
Water loss program enhancement				X				X		X
Water conservation upgrades at City LEED buildings				X	X	X	X		X	
Water conservation upgrades at City facilities				X	X	X		X		X

Key:
RSF – Residential Single Family
RMF – Residential Multi-family
CII – Commercial, Industrial, Institutional
City – City government
Indoor – effects indoor water use
Outdoor – effects outdoor water use
Comm – Community water conservation program
DSM – demand-side management measure
Exist – existing measure
New – new measure

Ongoing Monitoring

Fort Collins Utilities will monitor implementation and impacts of the conservation plan on a regular basis. Regular demand monitoring will provide information on water use and progress toward to the stated conservation goals. Utilities staff will continue to produce an annual report on the conservation program that includes a detailed description of plan implementation as well as the measured impacts on usage.

Plan Refinement

Fort Collins Utilities understands that the conservation plan and program will need regular review and refinement to ensure that the goals are met. As has been done since the program's inception in 1977, adjustments to the program will be made as warranted due to new technology or programs becoming outdated. A complete formal review and revision of the conservation plan will be completed five years after adoption.

COMPLIANCE WITH STATE PLANNING REQUIREMENTS

Colorado Statutes Title 37 Water and Irrigation – Colorado Water Conservation Board (CWCB) and Compacts 37-60-126 requires a state approved water conservation plan for covered entities as a condition of seeking financial assistance from the CWCB. Key planning requirements of the statute include the following items:

1. Consideration of specific conservation measures and programs including – (I) fixtures and appliances; (II) water-wise landscapes; (III) CII measures; (IV) water reuse systems; (V) water loss and system leakage; (VI) information and education; (VII) conservation oriented rate structure; (VIII) technical assistance; (IX) regulatory measures; (X) incentives and rebates.
2. Role of conservation in the entity's supply planning.
3. Plan implementation, monitoring, review and revision.
4. Future review of plan within 7 years.
5. Estimated savings from previous conservation efforts as well as estimates from implementation of current plan.
6. A 60-day minimum public comment period.

This section of the plan details Fort Collins' compliance with this statute.

Fort Collins Compliance

Fort Collins Utilities developed this conservation plan to achieve full compliance with the Colorado statute. Each element of compliance is documented below.

1. Consideration of specific conservation measures -

- *Fixture and appliances* – Current program includes residential clothes washer rebates; faucet aerator, and showerhead distribution. Level 2 program includes residential HET toilet incentives, commercial toilet and urinal incentives, restaurant pre-rinse spray valve distribution.
- *Water wise landscape* – Current program includes sprinkler system audits. Recommended program includes expanded audits, Xeriscape design clinics, irrigation

technology rebates. HOA irrigation efficiency grants, and research to measure irrigated areas.

(III) *CII measures* – Current program includes a business program series and facility water audits. Level 2 program includes distribution of pre-rinse rinse spray valves in restaurants, incentives for CII efficiency upgrades, and commercial toilet and urinal rebates.

(IV) *Water reuse systems* – Current program includes reuse water for cooling and irrigation at the local power plant; backwash recycling at the water treatment facility. Additional small scale reuse systems were found either not cost effective for Fort Collins or were not compliant with the Utilities' water rights holdings.

(V) *Water loss and system leakage reduction* – Current program includes a utility water loss reduction program. Fort Collins has included implementation of the IWA/AWWA water loss methodology in Level 2.

(VI) *Information and public education* – Current program includes a local conservation public information campaign; school education program; business environmental series; adult education programs. Level 2 program includes an expanded public information campaign with new partnership efforts.

(VII) *Water rate structure* – Current program includes a three-tier increasing block rate structure for residential; seasonal rates for commercial customers. Level 2 program includes online access to water use history and an online water use calculator.

(VIII) *Regulatory measures* – Current program includes requirement for rain shutoff devices for new commercial development; water waste ordinance; landscape and irrigation standards for new development; restrictive covenants ordinance; soil amendment ordinance for new development. Level 2 program includes required dedication irrigation tap for new large landscapes and an update of the City's landscape and irrigation standards.

(IX) *Incentives* – A broad range of incentive and rebate programs are included in the measures described above.

2. **Role of conservation in Fort Collins supply planning.** Fort Collins takes water conservation seriously and has had a staff position for dedicated to water conservation since 1977. Resolution 2003-104, a *Water Supply and Demand Management Policy*, was adopted by City Council in September 2003. The resolution provides general criteria for decisions regarding water supply projects, acquisition of water rights and demand management measures.
3. **Plan implementation, monitoring, review and revision.** Fort Collins has developed a specific plan implementation program along with monitoring mechanisms and scheduled review and revisions. Details of this effort are described in the preceding section of this document.
4. **Future review of plan within seven years.** Fort Collins Utilities intends to review and update the water conservation every five years. The next review is scheduled to occur in 2012.
5. **Estimated savings from previous conservation efforts and current plan.** The Fort Collins water conservation program has been active since 1977. Since 1994 weather normalized per capita demand has been reduced by 25 percent. Not all of this reduction can be fairly

attributed to the conservation program (the 2002 drought had a measurable impact), but the data show a distinct water savings trend. Savings from the conservation program recommended in this plan are estimated to be an additional 10.3 percent by 2020.

6. **Public comment period.** A public review of the conservation plan took place from October 8 to December 7, 2007. Thirty-four comments were received and revisions were made to the plan in response to the comments.