FORT COLLINS-LOVELAND WATER DISTRICT

WATER CONSERVATION PLAN

September 2008

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EXECUTIVE SUMMARY

Fort Collins-Loveland Water District (FCLWD) is a Colorado Special District that was formed in 1962. It historically provided water to rural customers located in a 60-square mile service area south and east of the City of Fort Collins. The District now serves more than 13,500 urban customers including low, medium and high-density subdivisions as well as retail and service-oriented commercial accounts in portions of Fort Collins, Loveland, Windsor, Timnath, and Weld and Larimer Counties.

In order to optimize its water supplies and system through practical water conservation practices, the District has developed a Water Conservation Plan in accordance with the Water Conservation Act of 2004 and to meet the provisions of Colorado Revised Statute section 37-60-126. The Plan will also qualify FCLWD for funding from the Colorado Water Conservation Board (CWCB) or the Colorado Water Resources and Power Development Authority (CWRPDA).

Water Conservation Goals

Measures implemented from the District's 1996 Water Conservation Plan include a leak detection program and public education. Unaccounted-for losses were reduced to a total of 12% and the residential per-capita water use is at 143 gpcd.

In order to meet preliminary water savings goals for this Water Conservation Plan, a universal list of water conservation measures and programs was subject to an initial screening, cost-benefit analysis and final screening. To help refine the initial goals established for specific water use categories, the final selection of measures and programs were grouped into the same categories and the estimated water savings totaled. The original goals were adjusted to reflect expected water savings.

The goal for this Plan is to reduce the overall water use by 13% or 1,194 acre-feet (AF) per year. This savings will come from water use categories that were identified through the planning process for potential water savings: Residential, Commercial, Irrigation and Unaccounted-for System Losses.

Evaluation and Selection of Conservation Measures and Programs

In order to reach the most customers, the Board and staff felt that all of the leak detection, education and audit measures selected after the first screening were worth implementing. The rebate measure for faucets was eliminated for this planning period. The measures were grouped for easier implementation and the second ranking, more than anything, suggests an order of importance. The results of the first and second screening are shown in Table ES-1.

Table ES.1 – First and Second Ranking of Selected Conservation Measures and Programs

Conservation Measure or Program	First Rank	Group	Staff & Board Approval	Cost	Additional Staff Time	Public Acceptance	Total of Scoring	Second Rank	Combination of First and Second Ranking
Improving utilization of billing software	1	Utility	1	1	2	2	6	2	3
Recycling WTP filter backwash	2	Utility	1	2	1	1	5	1	3
Improved Leak Detection & Repair Program	3	Utility	1	4	1	1	7	3	6
Installing radio telemetry on existing meters	4	Utility	1	4	1	1	7	3	7
Send ET irrigation scheduling in water bill and on website	6	Educational	2	1	3	1	7	3	9
Children's water festivals	7	Educational	2	1	2	1	6	2	9
Irrigation system audits for irrigation taps	5	Incentive	2	3	2	2	9	5	10
Water waste ordinance	9	Regulatory	2	1	1	1	5	1	10
Water rates to encourage water conservation	8	Regulatory	2	2	2	3	9	5	13
Public education - website development in addition to existing bill stuffers	10	Educational	2	2	3	1	8	4	14
Online residential audit	11	Incentive	3	1	2	1	7	3	14
Faucet aerators for distribution	12	Incentive	3	2	1	1	7	3	15
Post commercial BMPs on website or as bill stuffers	13	Educational	3	1	3	1	8	4	17
Commercial audit	14	Incentive	3	3	2	2	10	6	20
Residential audit	15	Incentive	3	2	2	2	9	5	20

Note: 1 is the best, 4 is the worst.

Implementation Plan

All of the proposed water conservation measures and programs will require staff resources for planning and coordination before implementation. This will require some strategy in implementing the most beneficial measures first. To create an implementation schedule, two things were considered in addition to the results of the first and second rankings:

1) Whether the measure or program was in existence
2) Ease of implementation

The implementation of this Water Conservation Plan will be accomplished in two phases, which are shown in Table ES-2.

The District is committed to implementing the selected measures/programs and will set aside money in the annual budget and pursue CWCB implementation grant money to accomplish this goal. Table ES-2 shows measures that have been identified for grant money and their order of urgency and contribution to overall water savings.

Table ES.2 – FCLWD Implementation Plan

Conservation Measure or Program	Phase to Implement	Grant Required?	Grant order	Start Date	Action Required	Ten Year Cost without Lost Revenue	Percent of Overall Water Savings
Improving utilization of billing software	1	yes	1	September 1, 2009	Apply for Grant	$250,000	13.5%
Recycling WTP filter backwash	1	no		on-going	Continue as is	$50,000	2.0%
Improved Leak Detection & Repair Program	1	no		on-going	Install fiberglass sleeves on large mains	$250,000	4.7%
Installing radio telemetry on existing meters	1	yes	1	on-going	Continue program as is and apply for a grant	$150,000	13.5%
Send ET irrigation scheduling in water bill and on website	1	no		July 1, 2009	Calculate monthly ET, add to website	$4,000	10.7%
Children's water festivals	1	no		July 1, 2009	Add to website	$4,500	5.4%
Irrigation system audits for irrigation taps	2	possible	3	January 1, 2010	Draft agreement with City of Fort Collins	$7,800	4.4%
Water waste ordinance	1	no		July 1, 2009	Pass Board policy	$9,200	5.9%
Water rates to encourage water conservation	2	yes	2	September 1, 2010	Apply for Grant	$30,000	23.8%
Public education - website development in addition to existing bill stuffers	1	possible	4	July 1, 2009	Hire web developer	$16,000	8.9%
Online residential audit	2	no		July 1, 2010	Research and add to website	$8,400	1.3%
Faucet aerators for distribution	2	no		January 1, 2010	Research and order aerators, add to website	$4,800	3.6%
Post commercial BMPs on website or as bill stuffers	2	no		July 1, 2010	Research Commercial BMPs, add to website	$4,250	0.1%
Commercial audit	2	possible	3	January 1, 2010	Draft agreement with City of Fort Collins	$4,050	0.4%
Residential audit	2	possible	3	January 1, 2010	Draft agreement with City of Fort Collins	$12,550	1.6%
					Total	$788,950	

CHAPTER 1 - INTRODUCTION

Water conservation is fast becoming a key component of water resource planning across the nation, especially in the western United States. A meaningful and effective water conservation plan is a key element to accomplishing efficient water delivery while minimizing system costs and protecting a valuable and limited resource.

Water supplies in Colorado are limited by compacts with neighboring states and variable availability from year to year. Growth on the Front Range of Colorado has slowed since the 10% annual growth rates we saw in the 1990's. However, it continues to increase at an average rate of 3%.

Additionally, under the Colorado Revised Statute 37-60-126 prompted by the Water Conservation Act of 2004, water providers delivering over 2,000 acre-feet (AF) are required to have a State-approved water conservation plan on file with the Colorado Water Conservation Board (CWCB), Office of Water Conservation and Drought Planning. Any entity that serves 2,000 AF must have a State-approved Water Conservation Plan to qualify for funding from CWCB or the Colorado Water Resources and Power Development Authority.

Fort Collins-Loveland Water District (FCLWD) is committed to optimizing its water supplies and system through practical water conservation practices. The benefits will include delaying the purchase of costly water supplies and infrastructure upgrades and reducing wastewater flows and treatment. The purpose of this Water Conservation Plan is to guide FCLWD in the process of water conservation planning and implementation. The planning horizon for this plan is ten years, from 2008 to 2017.

Historically, FCLWD was a rural water provider serving customers located south and east of the City of Fort Collins. In the past, the District served low-density rural subdivisions, dairies, farmsteads, and rural residential acreages. Due to its proximity to the Cities of Fort Collins and Loveland, the District is now an urban water provider serving low, medium and high-density subdivisions as well as more retail and service-oriented commercial accounts.

FCLWD serves portions of Fort Collins, Loveland, Windsor, Timnath, and Weld and Larimer Counties. The service area is approximately 60 square miles and is shown in Figure 1.1. The Town of Windsor is a wholesale account and is responsible for acquiring its own raw water supplies, which they transfer to FCLWD on an annual basis for treatment and delivery. Since Windsor is responsible for its own water planning, it is not part of this planning study.

Regional Cooperation

FCLWD is one of three water districts (FCLWD, East Larimer County Water District (ELCO), and North Weld County Water District (NWCWD), collectively known as the Tri-Districts) that share ownership of the Soldier Canyon Filter Plant (SCFP), a regional water treatment facility. Through this ownership, FCLWD is in a position to participate in cooperative water system projects, which lowers the incremental cost for all participants through economies of scale.

FCLWD and other water suppliers in the region have worked cooperatively to provide high quality water service to residents of northern Colorado. Water providers in the Fort Collins area have created partnerships to jointly construct and operate a number of critical water facilities. The Pleasant Valley Pipeline, an eight mile long, 67-in diameter raw water supply pipeline is shared by the Tri-Districts, Fort Collins, and Greeley.

The Tri-Districts are a partner with Greeley in the purchase and development of gravel pits for raw water storage. The proposed enlargement of Halligan Reservoir is being sponsored by Fort Collins, but includes FCLWD and several other project beneficiaries, including North Poudre Irrigation Company (NPIC). Water is exchanged year round between the City of Fort Collins water treatment facility and SCFP.

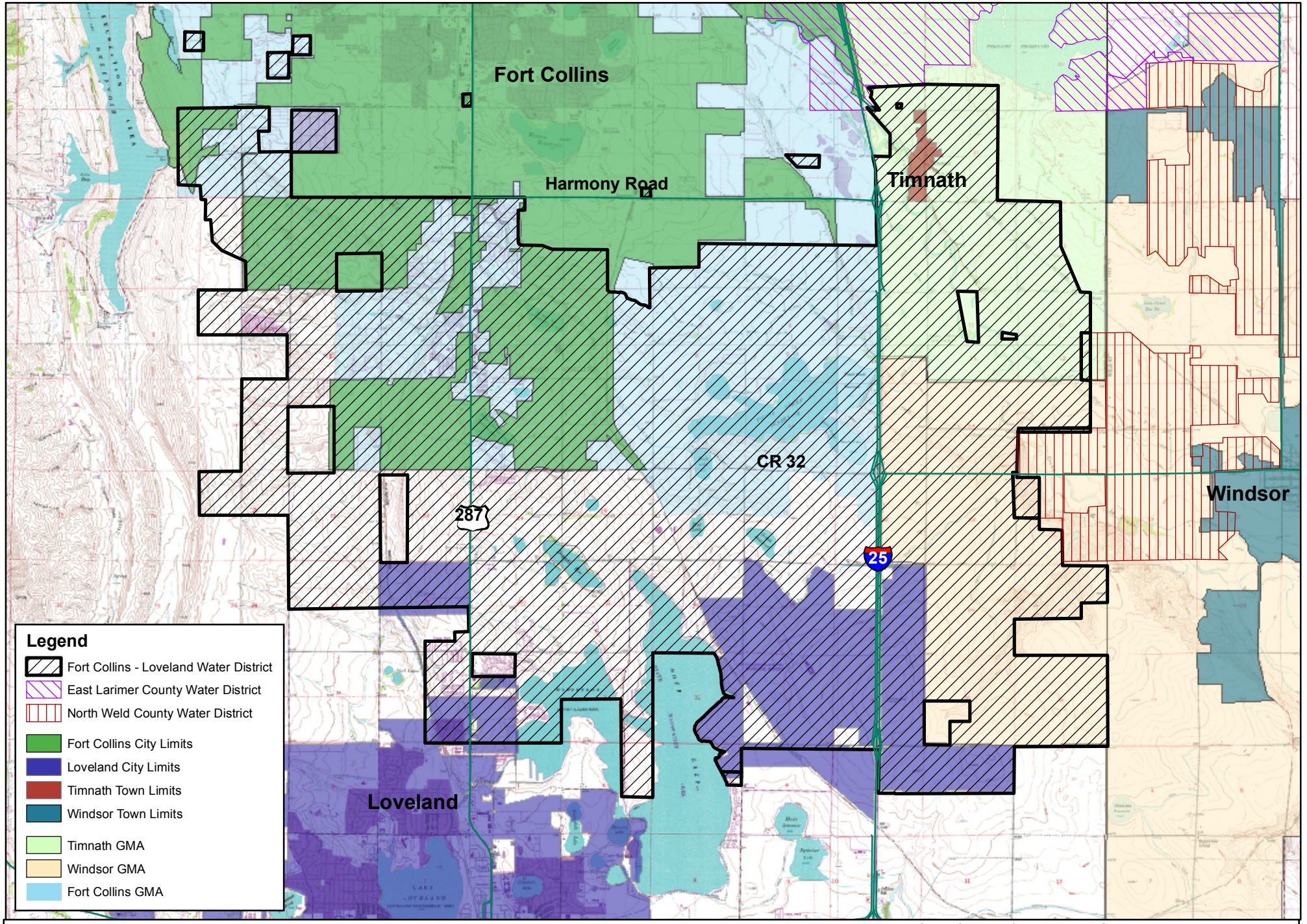

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Figure 1.1 - FCLWD Service Area

CHAPTER 2 - DEFINITION OF TERMS

Acre-foot (AF):	The amount of water it would take to cover one acre of land to a depth of one foot; approximately 325,851 gallons.
CBT:	Colorado Big Thompson Project
CBT Quota:	The percentage set by the Northern Water Board of Directors each water year which determines the amount of AF per unit of CBT, i.e. 70% quota equals 0.7 AF per CBT unit.
CWCB:	Colorado Water Conservation Board
ELCO:	East Larimer County Water District
ET:	Evapotranspiration is the rate at which water is removed from the soil by evaporation and from plant surfaces by transpiration.
ET Controller:	"Smart" technology that automatically controls the water application rate in a sprinkler system based on ET calculations using weather-collecting instrumentation.
FCLWD:	Fort Collins-Loveland Water District
GPCD:	Gallons per capita per day
Maximum Day:	The largest amount of water used in a single day.
MGD:	Million gallons per day
NEPA:	National Environmental Policy Act
NISP:	Northern Integrated Supply Project
Northern Water:	Northern Colorado Water Conservancy District
Non-Potable Use:	Water that is not treated and used for irrigation or other uses than potable.

NPIC:	North Poudre Irrigation Company
NWCWD:	North Weld County Water District
Peak Hour:	The largest amount of water used in a single hour – typically occurs on the Maximum Day.
PIF:	Plant Investment Fee, fee charged to developers for on-going maintenance cost of infrastructure replacement and repair.
Potable Use:	Water that is treated to drinking water standards for municipal use, including residential and commercial use.
SCFP:	Soldier Canyon Filter Plant
SWSI:	State Wide Supply Initiative
Wind and Rain Sensor:	A device that is connected to the irrigation system controller that will temporarily shut off irrigation when a pre-determined amount of rain or wind is detected.

CHAPTER 3 - PROFILE EXISTING WATER SYSTEM

Characteristics of FCLWD Water Supply System

Population and Service Area

FCLWD began serving an area of approximately 60 square miles from the time it was formed in 1962. This area is bounded on the north by the City of Fort Collins, the west by the foothills, the south by the City of Loveland, and the east by the Town of Windsor and NWCWD. The service area has not changed significantly and in 1981 an Intergovernmental Agreement was establish to keep the boundaries static. No changes to the service area are expected other than small exceptions where appropriate.

FCLWD currently serves a population of approximately 38,850 in portions of Fort Collins, Loveland, Windsor and Larimer and Weld County and all of the Town of Timnath. An exact population count is difficult to obtain since census data is not collected for special districts. The District uses 2.8 people per household to estimate population. This is slightly lower than the 3.0 people per household for Larimer County shown on the Colorado Department of Local Affairs (CDOLA) website based on Census data, but considers the lower value of 2.5 people per household estimated for Loveland and Fort Collins.

Water Distribution System

FCLWD shares ownership in the SCFP where its raw water is treated. The SCFP is located at the Soldier Canyon Dam on the north east side of Horsetooth Reservoir and its capacity is 52 million gallons per day (MGD).

SCFP operates under an Amended Intergovernmental Agreement between the three Districts that own the plant. Executed in December 1995, the Agreement establishes SCFP as a separate governmental entity created under the provisions of C.R.S. §29-1-203. The Agreement confirms an undivided one-third ownership in the facility by each District and establishes the method of payment for capital improvements and treated water. A Steering Committee consisting of two members from each District governs operations at the SCFP.

There is a total of 11.58 million gallons of treated water storage at the water treatment plant and four other storage facilities throughout the system. The system also includes eight pump stations. There is currently no raw water storage except for that within the Colorado-Big Thompson Project (CBT) system.

Pipelines from the SCFP to the District were installed during 1962 and 1963. The most common type of pipe initially installed was steel and asbestos concrete

(AC). Most of the water lines installed at that time are still in use. A large majority of the pipes installed in the last 25 years have been PVC. Other types of main water lines installed include ductile iron, cast iron and copper.

As of January of 2008, the District maintains 383 miles of pipeline. The pipelines are well maintained with less than five breaks per year and approximately 7% losses throughout the system. The maintenance program includes annual flushing of water lines, periodic valve maintenance and prompt leak repair. The following table shows the miles for each diameter of pipe, ranging from one inch to 48 inches.

Table 3.1 - Water Transmission Pipe Lengths

Pipe Diameter (Inches)	Pipe Length (Miles)
1	0.07
2	1.22
2-1/2	0.20
3	17.93
4	24.58
6	69.01
8	144.33
10	18.37
12	55.85
14	10.28
16	5.69
18	13.54
20	4.02
22	1.47
24	7.96
30	3.43
36	4.82
48	0.59
Total	383.35

Service Connections and Water Demand

The majority of FCLWD customers are urban residential. This has changed significantly over the last 25 to 30 years from the original rural domestic and agricultural accounts. However, the District still has two dairies that it serves.

FCLWD currently bills customers by tap size. However, commercial, residential and irrigation accounts can be pulled out of the database for evaluation. The portion of the District service area that is currently showing the most growth is in the Timnath Growth Management Area and will consist mainly of residential customers with supporting retail.

At the end of 2007, the District was serving 13,704 residential, commercial and irrigation customers plus one master meter to the Town of Windsor. The water demand for these customers in 2007 was 7,971 AF and the 2007 delivery to Windsor was 337 AF.

Each meter is read and billed monthly. All accounts in the FCLWD system are metered and some accounts are equipped with a rotating disk, positive displacement meter and an individual pressure regulator for accurate measurement of the water delivered.

Sources of Water Supply

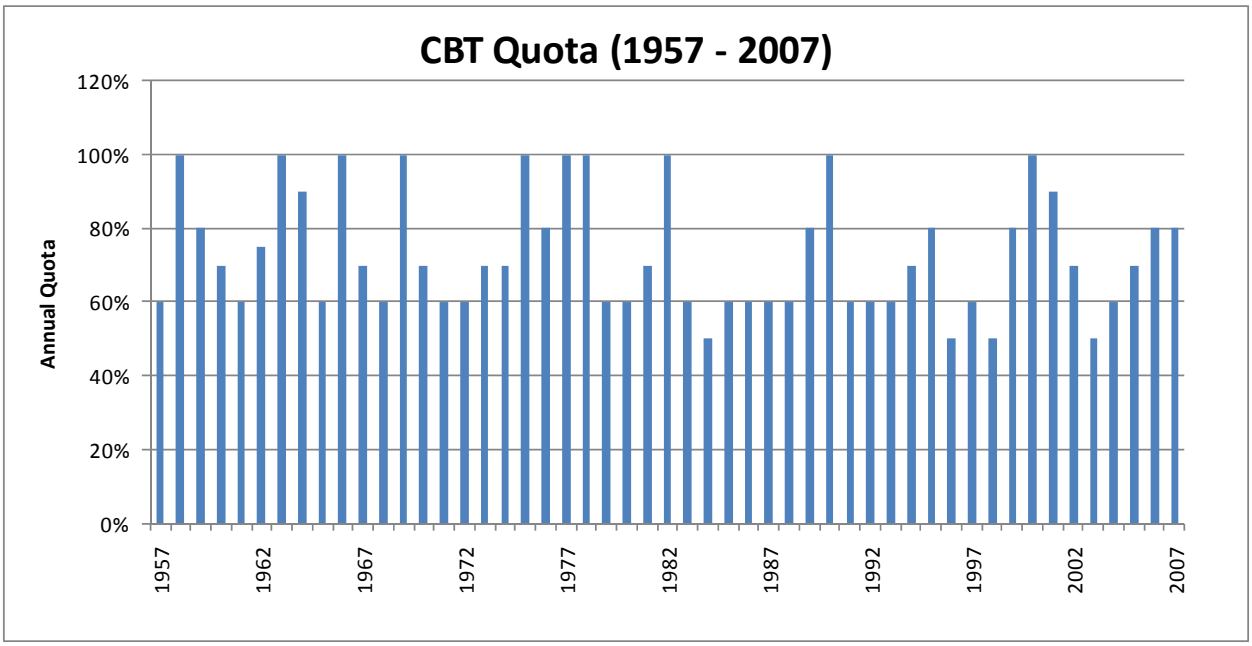
CBT Water

In 1961, when FCLWD was formed, most of water rights in the region's rivers and reservoirs had already been claimed. That water had been claimed in the 1860's and 1870's by cities, irrigators and mutual ditch companies. The only reliable and affordable source of water available to the District was from the CBT Project. CBT facilities divert water from the western slope of Colorado to the Front Range to supplement the region's native water supply. It is the largest trans-mountain water diversion project in Colorado. It was constructed by the Bureau of Reclamation between 1938 and 1957 and is maintained by the Northern Colorado Water Conservancy District (Northern Water). The Project imports an average of 213,000 AF of water each year to northeastern Colorado for agricultural, municipal and industrial uses.

The yield of CBT units is established each year by the Northern Water Board through what is known as the quota setting process. The basis for setting the quota is to attempt to make every year look like an average year. The Northern Water Board examines the region's native supply and local storage before declaring a quota that meets the supplemental need of the region as a whole. As a result, the quota is lower in wet years because native supplies are plentiful and local reservoirs are full, so less CBT water is required to satisfy water demands.

In over fifty years of operation, the average yield has been 0.73 AF per unit and the commonly used average quota is 70%. The yield has never been less than 0.50 AF per unit (50% quota) or more than 1.0 AF per unit (100% quota). The annual quota established by the Northern Water Board over the years is shown in Figure 3.1.

Figure 3.1 – Annual CBT Quota History



Native Water Supplies

The District owns agricultural water rights that divert water from the Cache la Poudre River. They include shares in the following mutual companies: North Poudre Irrigation Company (NPIC), Divide Canal and Reservoir Company, Windsor Reservoir and Canal Company, Jackson Ditch Company, Josh Aims Ditch Company, and John R. Brown Ditch Company.

These water rights are decreed for agricultural uses only, so are exchanged on an annual basis for CBT water when possible. When no CBT water is available for exchange, the water rights are rented for agricultural use. NPIC owns 40,000 CBT units, so its shares include a CBT portion and a native agricultural portion. The CBT water is delivered equally to the 10,000 shares within the NPIC system for agricultural, municipal or industrial use.

The District has a pending water court case to change the use of the John R. Brown Ditch shares to include additional uses such as municipal. Some of the District's agricultural water rights will be used to satisfy return flow obligations and depletions required in its change-of-use decree. Remaining agricultural water rights will be exchanged as long as possible and eventually converted for municipal use.

In anticipation of the gradual disappearance of available CBT water, the District committed funds in 1997 to study the feasibility of a pipeline that would deliver Poudre River water to the SCFP. The project became known as the Pleasant Valley Pipeline and eventually grew into a partnership between the Cities of Greeley and Fort Collins

and the Tri-Districts. Construction on the pipeline began in April 2003 and was completed in the spring of 2004.

The various water rights currently owned by the District and the approximate yield of those water rights are listed in Table 3.2.

Table 3.2 – FCLWD Water Supplies

Source	Shares or Units Owned	Average yield	Dry Year Yield
Transbasin Water		(AF)	(AF)
CBT	9810	6867	4905
NPIC - CBT Water	1262	3534	2524
Native Poudre River Water			
NPIC - Native Water	1262	2145	1262
Divide Canal & Reservoir Co. (Class A Shares)	230	230	94
Windsor Reservoir & Canal	550	550	
Jackson Ditch Company Shares	107	107	107
Josh Aims		300	
John R. Brown Ditch (6.4% of Original Decree for 8 cfs)[1]		61	
Total		11588	7630

Notes: 1. Conversion from agricultural to municipal use pending in Water Court Case No. 2005-CW-264
2. Native NPIC and John Brown Ditch not available for domestic use and not included in total

System Limitations

Along with areas of high water use, system limitations can provide insight into how and where to set water conservation goals. Discussions here will include both current and potential system limitations. Ideally, conservation can help mitigate a portion of the limitations and improve the reliability and efficiency of the system.

Statewide Water Supply Initiative

In 2003, the Colorado General Assembly authorized CWCB to implement the Statewide Water Supply Initiative (SWSI) as a result of growing pressure on water supplies in Colorado and the 2002 drought. The study identified current and future water demands, available water supplies, and existing and planned water supply projects in eight major river basins in the State.

The study found a state-wide water supply gap of 118,200 AF by 2030 between projected demands and fully implemented water supply processes and projects, which is 20% of the 2030 demand. The gap in the South Platte Basin, where FCLWD is located, is 90,600 AF or 22% of the South Platte Basin 2030 demand. This makes pursuit of all possible future water supplies very important to the District, including conservation.

Growth

A high rate of growth is expected in the Timnath GMA as well as the area surrounding the City of Fort Collins. The average projected growth rate for the District through the ten-year planning period is 3% until 2012 and 2.5% through the end of the planning horizon in 2017. This rate is based on planned developments and the planning efforts of the all the entities served by the District reported in the 2008 Treated Water Master Plan.

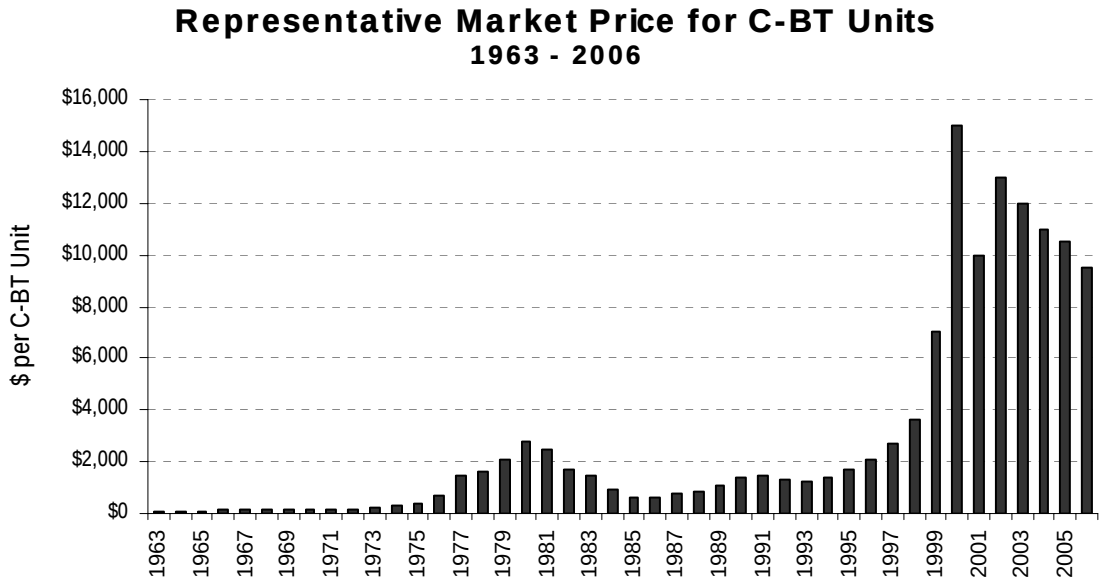
Careful planning is required to provide adequate water supply for new growth. While the majority of the new demand will be for residential use, supporting commercial and open space irrigation will accompany this growth at a similar rate as in the past. Build-out demand for the District is projected to be reached in 2032 and the water shortage for the District at that time will be approximately 4,404 AF in an average water supply year and 8,362 AF in a dry year. These shortages will need to be met through additional purchases, participation in new water supply projects, and conservation.

Future Water Supply

Increasing pressure on water from population growth in the Front Range has driven the price of water up significantly in the last ten to 15 years. The main water sources that the District is considering for future supply are CBT, native Poudre River shares, a water storage project called Halligan-Seaman Enlargement, and a new water supply project called the Northern Integrated Supply Project (NISP). Windy Gap water could also be used by the District, but is not being considered at this time.

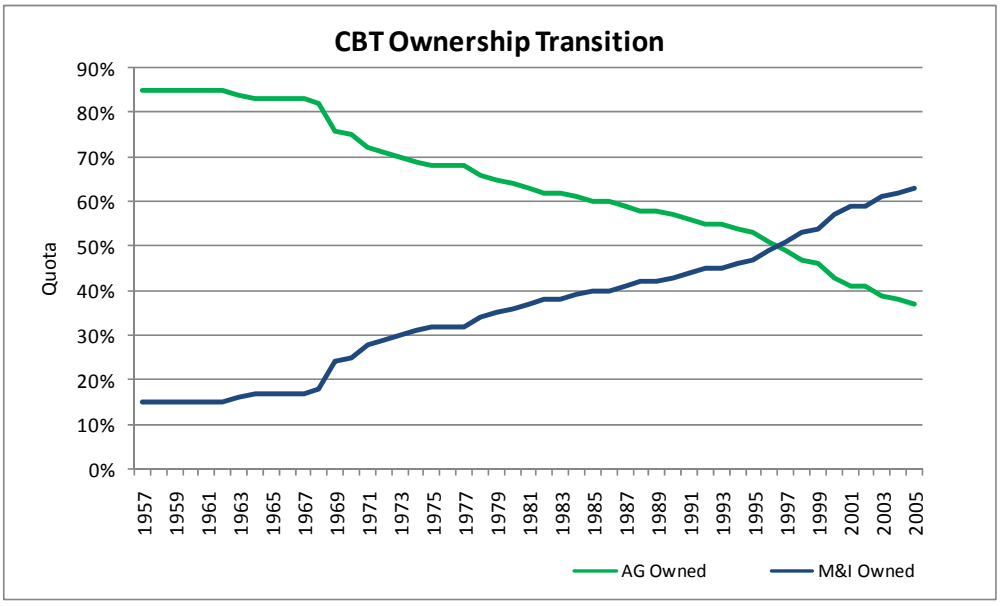
In 1963, CBT water could be purchased for $100 per unit from farmers that felt they had more water than they could use. The current market price is approximately $9,500 per unit or $13,600 per AF assuming a 70% quota. Figure 3.2 shows how the price of CBT units has varied from 1963 to 2006.

Figure 3.2 – Price of CBT Units



CBT water can still be purchased from farmers and ditch companies, but it rarely represents a farmer's surplus water supply like it did historically. It is usually sold to finance continued agricultural operations, settle an estate or accommodate development of farmland. In 1957, 85% of the CBT units were owned by individual farmers and mutual ditch companies. By the end of 2005, only 35% of the CBT units were owned by individuals and mutual ditch companies. Figure 3.3 shows the transfer of CBT units from agricultural ownership to municipal and industrial ownership over the life of the CBT Project.

Figure 3.3 – CBT Ownership Transfer



At the current rate of acquisition by cities and water districts, it is projected that few if any CBT units will be available for purchase by the year 2020. However, the construction of other regional projects such as the Windy Gap Firming Project and NISP may take some pressure off of the CBT system. If so, CBT supplies could be available through 2025 or 2030.

Halligan-Seaman Enlargement, NISP, and the Windy Gap Firming Project are currently in the National Environmental Policy Act (NEPA) permitting process. Construction of these projects will occur only if a permit is obtained from the federal government and all NEPA requirements are satisfied.

FCLWD is currently participating in Halligan-Seaman and NISP. If the projects make it through the permitting process, FCLWD will be obligated to pay their pro-rata design and construction costs. NISP is currently estimated at approximately $10,100 per AF and provides additional water supply and storage. Halligan-Seaman provides additional storage only, which will increase the dry year yield of existing supplies, and is currently estimated to cost $7,500 per AF of capacity.

Raw Water Storage

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

Change of Use

Conversion of FCLWD's Poudre River and transmountain water rights from agricultural to municipal use requires detailed engineering analyses and applications to Water Court. The easiest change cases take at least three to five years before a decree is entered. The more complicated change cases can take as much as ten years and could cost millions of dollars.

The engineering analyses required in Water Court applications that change the use of agricultural water focuses on the historical consumptive use of the crops grown with the water right and return flows resulting from irrigation of those crops. Determination of the consumptive use and identifying the amount, location and timing of return flows makes change cases increasingly complicated and costly. FCLWD currently has one change case before Water Court filed jointly with the Tri-Districts. Within the next few years, additional applications may be submitted to change the use of water rights owned by the District.

Unaccounted-for Water Use

There are two types of water losses that occur in water utilities, apparent losses and real losses. Apparent losses are paper losses that can be caused by customer meter inaccuracies, billing system data errors or unauthorized consumptions. Real losses are those that are physically lost within the distribution system, including the water treatment process.

The District has been working for well over ten years to reduce the real system losses. Regular valve maintenance, pipeline upgrades and prompt leak repair have been standard operating procedures since before the 1996 Water Conservation Plan. The entire system is metered and the high water users have been evaluated and updated for correct meter sizing to avoid meter slippage. The system contains more than 30 pressure reducing vaults to reduce main line pressure and consequential leakage and a pressure survey is completed annually. The current real losses are approximately 7%.

The current apparent losses are approximately 5% and have not received as much attention as real losses. This is an area that the District would like to explore in this conservation planning effort. The billing system is currently used to track water use by tap size. The District also has a SCADA system that measures the pressure throughout the system.

Water Costs, Billing Practices and Pricing

Revenue from Metered Water Sales

The metered revenue comes from all customer accounts except construction meters. These are temporary uses and not consistent year to year. The metered revenue for 2007 was $6,129,107. This is 43% of the total revenue for the District.

Billings and Collections

The District mails monthly statements to each customer based on a billing cycle. The District has four different billing cycles in a month. When the District bills a customer for the third time without receiving a payment, the customer is given a “pay by” date or the District will discontinue service notice. A late fee on delinquent accounts (two months) is assessed. A fee will be charged if it is necessary to notify a customer of discontinuation of service for non-payment. A returned check fee is assessed if a check is returned for insufficient funds.

The District maintains a list that shows the number of premises that are more than two months past due, the number of premises that were previously shut off, the number of premises that have made arrangements to pay, the number of premises to receive doorhangers, and the number of premises to actually shut off. The list is updated monthly.

Charges for Water Service

Water rates for the District are based on the traditional objectives in rate structure design including: 1) basing the rates on the actual cost of service, 2) providing adequate and stable revenues, 3) providing fairness or equitability among customer classes and volume users, and 4) ease of implementation and administration.

The rates for the District, effective November 2007, are shown in Table 3.3. These rates are adequate for the current level of water use within the District. However, an increase in water conservation will produce a direct reduction in revenue.

The most effective way to encourage efficient water use is through rates. In 2003, temporary drought rates were implemented to try to reduce water usage by 20%. The drought rates included a base rate and four inclining tiers. As part of this conservation effort, the District's rate structure will be evaluated to consider potential water savings and lost revenue due to conservation.

Table 3.3 – FCLWD Monthly Water Service Rates

Meter Size (Inches)	Base Water Fee per Month	Rate per 1,000 gallons (less than 16,000 gallons)	Rate per 1,000 gallons (more than 16,000 gallons)
5/8	$11.82	$1.00	$1.75
3/4	$11.82	$1.00	$1.75
1	$17.22	$1.00	$1.75
1 1/2	$30.60	$1.00	$1.75
2	$46.73	$1.00	$1.75
3	$89.77	$1.00	$1.75
4	$179.54	$1.00	$1.75
Apartments, mobile home parks, and other multi-unit dwellings will be billed for the number of units in this manner:			
Number of units x	$11.82	$1.00	$1.75

Policies and Planning Initiatives Affecting Water Use

Rules and Regulations

The District enacted higher water rates for the drought conditions in 2003. These rates are reserved for drought emergencies and were effective in reducing the water use. The rates are shown in Table 3.4.

Table 3.4 – Residential Drought Rates

Residential Drought Water Rates	
Base Rate	$11.82
Water Use per Month	**Cost per 1,000 Gallons**
Up to 15,999 Gal.	$1.00
16,000 to 24,999 Gal.	$2.25
25,000 to 33,000 Gal.	$3.50
Over 33,000 Gal.	$4.75

Previous Studies

A Water Master Plan was completed by the District in 2008. This plan addresses system upgrades for distribution lines, storage tanks and pumping facilities to meet the future demands to build-out. It also suggests water supply needs based on CBT purchases.

In 1996, FCLWD submitted a water conservation plan to CWCB to meet the requirements of the Water Conservation Act of 1991. The plan focused mainly on education practices and reducing system losses.

Current Water Conservation Activities

Conservation programs currently promoted by FCLWD are summarized below:

Public Education

FCLWD has an annual budget for public education. The District provides information promoting voluntary upgrades to water-efficient fixtures, low water use landscaping and efficient irrigation, and other efficiency measures in their newsletters and bill inserts.

Leak Detection

The current leak detection program at FCLWD uses customer meters, pressure reducing vaults, SCADA and the billing database to track water use and leaks in the system. All billed water is compared to water produced at the filter plant monthly to determine overall differences. Each customer meter is programmed to alert for high or low use compared to normal to identify leaks past the customer tap or malfunction of the meter itself. The customer meters are being retrofitted with radio read meters that can be monitored more easily and provide real time data. The billing software will be updated to show this real time data and provide more effective monitoring of the system.

All known leaks in the distribution lines are repaired immediately. Leaks found on customer service lines are reported to the customer and the District provides assistance

to that customer for repair. All new and replacement water lines are pressure tested after installation to ensure that they meet established guidelines for water loss. Distribution lines are replaced on an as-needed basis. District maintains more than 30 pressure reducing vaults which reduce the main line pressures thereby reducing the chance for leaks in the distribution system. SCADA monitors the flows throughout the system including the pipelines, pressure reducing valves, and tanks.

Billing and Meter Reading Practices

The District reads meters and sends bills each month. The District uses rotating disk, positive displacement meters and an individual pressure regulator on service connections that need them to regulate pressure and accurately measure the water delivered to the customer.

Meter Upgrades

FCLWD has evaluated the highest water customers to determine the correct meter size for each. Meter sizes have been upgraded as required to eliminate meter slippage.

Recycled Filter Backwash

Water treatment facilities like SCFP most commonly use carbon filters to remove organic solids from water in the treatment process. These filters become less efficient over time because of the solids collecting in them. Water is flowed backward through the filters periodically to remove the solids and restore the efficiency of the filters. The SCFP collects all of this backwash water in settling ponds adjacent to the plant. After settling, this water is drained from the top of the settling ponds and returned to the filter plant for treatment. Approximately 5% of the total water production is recycled backwash water that has been treated.

CHAPTER 4 - WATER USE AND DEMAND FORECAST

2007 Water Use

Use by Customer Description

The majority of the water use in FCLWD is residential development within the growth management areas of the surrounding communities. The demographics of the residential base have been changing from rural to urban customers. This results in much higher landscape irrigation on individual lots as well as in neighborhood open spaces. The residential water use in 1995 was 73% of overall use compared to 92% in 2007.

Table 4.1 shows a general breakdown of customer types in the District and the corresponding percent of taps and water use. The commercial and irrigation categories include two nurseries, two dairies, seven schools, two churches, four golf courses with non-potable water supplies for irrigation, a cemetery and numerous restaurant, retail and industrial establishments.

Table 4.1 – 2007 Percent of Taps and Water Use

Customer Description	Taps	Water Use
Residential	97.5%	91.6%
Irrigation	1.0%	7.5%
Commercial	1.5%	0.9%

Water Use by Tap Size

The total numbers of taps are shown Table 4.2. The ¾-inch tap is the standard residential tap size, but also includes some commercial accounts like office buildings or warehouses with limited water use. The larger taps include commercial, industrial, schools, and multi-family customers. The number of new taps added annually averaged 742 from 2003 to 2007. This went from 1,004 new taps in 2003 to 345 new taps in 2007, which reflects the slowdown in growth that the Front Range is currently experiencing.

Table 4.2 - FCLWD Taps by Size

Fort Collins - Loveland Water District Taps						
Year	3/4"	1"	1-1/2"	2"	3"	Total Taps
2003	10588	147	201	55	8	10,999
2004	11672	168	243	58	8	12,149
2005	12426	175	253	60	8	12,922
2006	12843	187	260	61	8	13,359
2007	13170	194	265	66	9	13,704

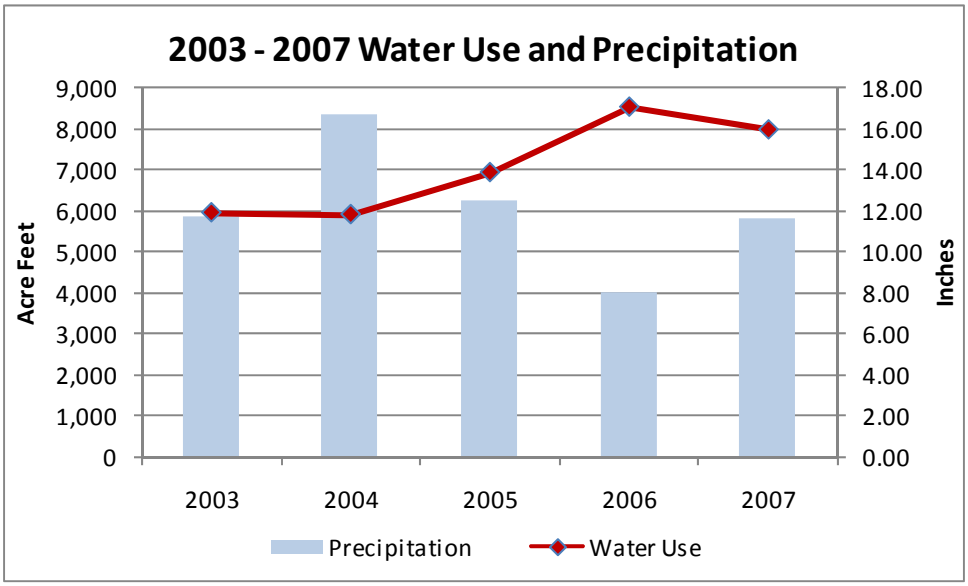
Table 4.3 shows the water use for each tap size category and the total water use for the District in 1,000 gallons and AF. Water restrictions were implemented in 2003 due to the drought. The effect of the restrictions lingered into 2004 and beyond, but is gradually tapering off.

Table 4.3 - FCLWD Water Use in 1,000 Gallons

Water Use in 1,000 gallons							
Year	3/4"	1"	1-1/2"	2"	3"	Total	Total AF
2003	1,549,106	73,928	182,048	101,691	27,410	1,934,183	5,936
2004	1,522,119	79,261	201,074	89,211	28,090	1,919,755	5,892
2005	1,817,343	89,477	222,951	99,861	25,954	2,255,586	6,922
2006	2,244,118	104,046	277,536	127,761	25,775	2,779,235	8,529
2007	2,103,571	99,425	255,605	116,160	22,643	2,597,404	7,971

Water use can also be affected by the timing and amount of precipitation throughout the year. Precipitation in 2006 was quite low, which accounts for some of the increased water use that year. Precipitation was above average in the spring and fall of 2007, reducing the water use required for outdoor irrigation. Table 4.4 shows the average precipitation of the Central Fort Collins and Loveland weather stations recorded on the Northern Water website from 2003 to 2007. The total water use for 2003 to 2007 is also shown on the table.

Table 4.4 - Average Annual Precipitation of Central Fort Collins and Loveland Weather Stations



The water use per tap in Table 4.5 and 4.6 shows a very typical water use pattern for customers in this area. The residential use is 0.5 AF per tap and the commercial use gradually increases with the increasing tap size. The common annual residential water use for this area is 0.5 AF, which includes the majority of the ¾-inch taps.

In the District billing database, 130 irrigation taps were identified that vary in size from one inch to three inches. The average use in 2006 of those taps is 5.25 AF per tap.

Table 4.5 – FCLWD Historic Water Use in 1,000 gallons per Tap

Water Use per Tap in 1,000 gal/tap						
Year	3/4"	1"	1-1/2"	2"	3"	Total Use per Tap
2003	146	503	906	1,849	3,426	176
2004	130	472	827	1,538	3,511	158
2005	146	511	881	1,664	3,244	175
2006	175	556	1,067	2,094	3,222	208
2007	160	513	965	1,760	2,516	190
Ave.	151	511	929	1,781	3,184	181

Table 4.6 – FCLWD Historic Water Use in AF per Tap

Water Use per Tap in AF/Tap						
Year	3/4"	1"	1-1/2"	2"	3"	Total Use per Tap
2003	0.4	1.5	2.8	5.7	10.5	0.5
2004	0.4	1.4	2.5	4.7	10.8	0.5
2005	0.4	1.6	2.7	5.1	10.0	0.5
2006	0.5	1.7	3.3	6.4	9.9	0.6
2007	0.5	1.6	3.0	5.4	7.7	0.6
Ave.	0.5	1.6	2.9	5.5	9.8	0.6

Per Capita Water Use

Per capita water use, both system-wide and residential, is a commonly used way to gage an entity's water use habits. System-wide per capita use can vary significantly between entities depending on the type of non-residential water users within the system.

The system-wide per capita water use for FCLWD is shown in Table 4.7. A dairy that the District serves is a high water user and was taken out to show a more realistic per capita use for the system. The per capita use for only the ¾-inch taps is also shown. This represents the majority of the residential users in the District with some low-water-use commercial users represented as well. The per capita uses show the affects of the watering restrictions and the lingering nature of those restrictions.

Table 4.7 – FCLWD Water Use in Gallons per Capita per Day

Year	System Wide GPCD	GPCD less Dairy Use	GPCD for 3/4" Taps
2003	172	167	138
2004	155	150	123
2005	171	166	138
2006	204	199	164
2007	185	181	150
Ave.	177	173	143

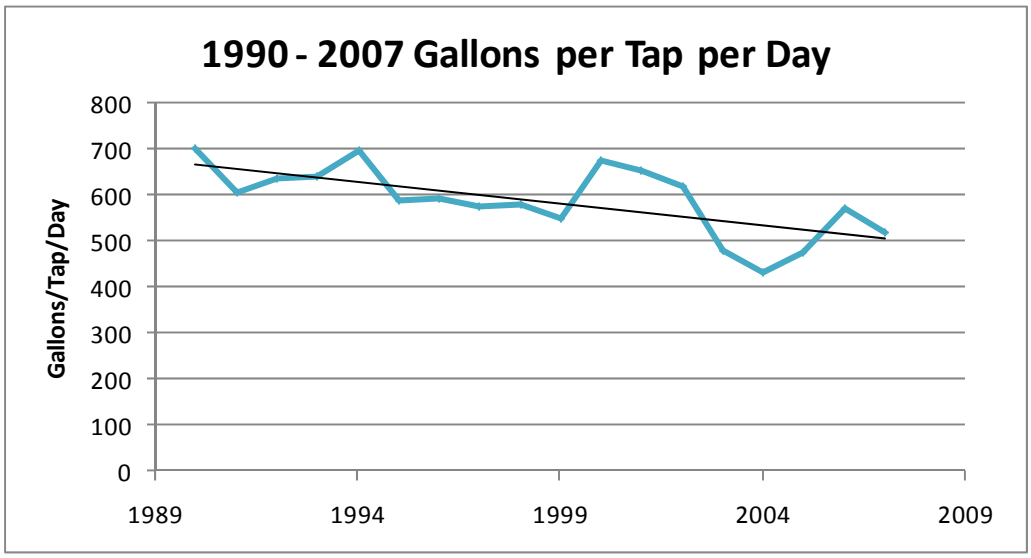
Note: 2007 Dairy use is 60,586,000 gallons

Water Use Trend

In September 1996, the District completed and submitted its first water conservation plan to CWCB to satisfy the requirements of the Water Conservation Act of 1991. The water use shown in that report illustrated a downward trend in water use per tap from

the gradual conversion of rural water users to urban water users in both the residential and commercial categories.
The 1996 Water Conservation Plan focused mainly on system loss measures and public education. This was a good introduction to the District's customers to water conservation at a time when the Front Range was becoming more aware of the constraints on the region's water supply. It was also effective in lowering the District's system losses. The benefit of conservation is sometimes difficult to measure, but the District has seen a downward trend in its water use in recent years.

Figure 4.1 – FCLWD Historic Water Use per Tap per Day

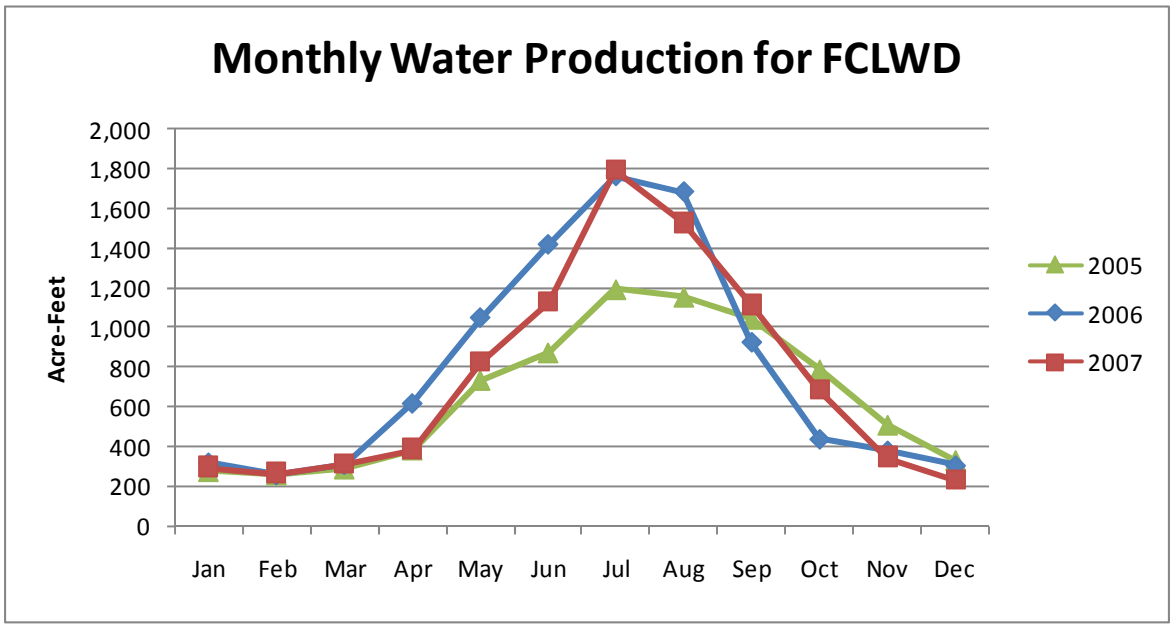


Seasonal Variation

The annual water use pattern for 2005 through 2007 is shown in Figure 4.2. Monthly deliveries from SCFP were used to illustrate the seasonal variation of water use for the District. The 2005 use is lower than the other years due to higher precipitation and some lingering impacts from drought restrictions.

Outdoor use can be separated from indoor use by first finding an average of the monthly use from December to March. This is subtracted from each of the months April through November and those amounts are totaled for the annual amount of outdoor use. The percentage of outdoor use to total annual use can then be found. The average percent of outdoor use from 2005 to 2007 is 60% and was fairly consistent year to year.

Figure 4.2 – FCLWD Monthly Water Use



Water Demand Forecast

In order to plan for infrastructure upgrades and capital improvement projects, FCLWD has recently updated their 1994 Treated Water Master Plan. Estimates of future water demands are needed to size the capacity of the planned upgrades in a hydraulic model used by the District for planning purposes.

For the 2008 Master Plan, tap projections were first established and then associated water demand calculated. To project the tap demand, a layer of the existing population and existing taps were overlaid onto a land use map of the District service area. The remaining potential development was then filled in according to the planned land use.

The residential water demand was calculated using an average-day demand of 0.33 gallons per minute per day per tap. This value comes from the District's billing software. The non-residential water demand was calculated using an average-day demand per acre according to different ranges of lot sizes. An average value of 1,500 gallons per day per acre was determined and used to make the estimated projections.

Using this method, the build-out tap count was determined to be 26,000 taps. To determine the build-out date, a 3% growth rate was used until 2012 and then 2.5% until build-out was attained in 2032. This growth rate was determined from careful study of the surrounding area and historic trends. This method of finding the future water demand was evaluated and determined to be appropriate for use in this Water Conservation Plan.

To better evaluate the water use by types of water users, the tap count and water use was broken into Residential, Commercial and Irrigation categories. To do this, the residential, commercial and irrigation tap count was evaluated for 2007, and the resulting numbers used to separate the categories through build-out. Table 4.8 projects the number of taps for each of these categories. The commercial tap count is higher than irrigation at 1.5% vs. 1%, but as can be seen in Table 4.9, the water use is lower at 1% vs. 7.5%, respectively.

Table 4.8 – FCLWD Tap Projection through Build-Out

	Total Taps	Residential Taps at 97.5%	Commercial Taps at 1.5%	Irrigation Taps at 1%
2007	13,748	13,404	206	137
2008	14,160	13,806	212	142
2009	14,585	14,220	219	146
2010	15,023	14,647	225	150
2011	15,473	15,086	232	155
2012	15,938	15,540	239	159
2013	16,336	15,928	245	163
2014	16,745	16,326	251	167
2015	17,163	16,734	257	172
2016	17,592	17,152	264	176
2017	18,032	17,581	270	180
2018	18,483	18,021	277	185
2019	18,945	18,471	284	189
2020	19,419	18,934	291	194
2021	19,904	19,406	299	199
2022	20,402	19,892	306	204
2023	20,912	20,389	314	209
2024	21,434	20,898	322	214
2025	21,970	21,421	330	220
2026	22,520	21,957	338	225
2027	23,083	22,506	346	231
2028	23,660	23,069	355	237
2029	24,251	23,645	364	243
2030	24,857	24,236	373	249
2031	25,479	24,842	382	255
2032	26,116	25,463	392	261

As shown in Table 4.9, the non-residential water use has hovered around 10% of the total water use in the last few years and has come down from approximately 27% in 1995. The non-residential consumption is expected to remain fairly steady through build-out.

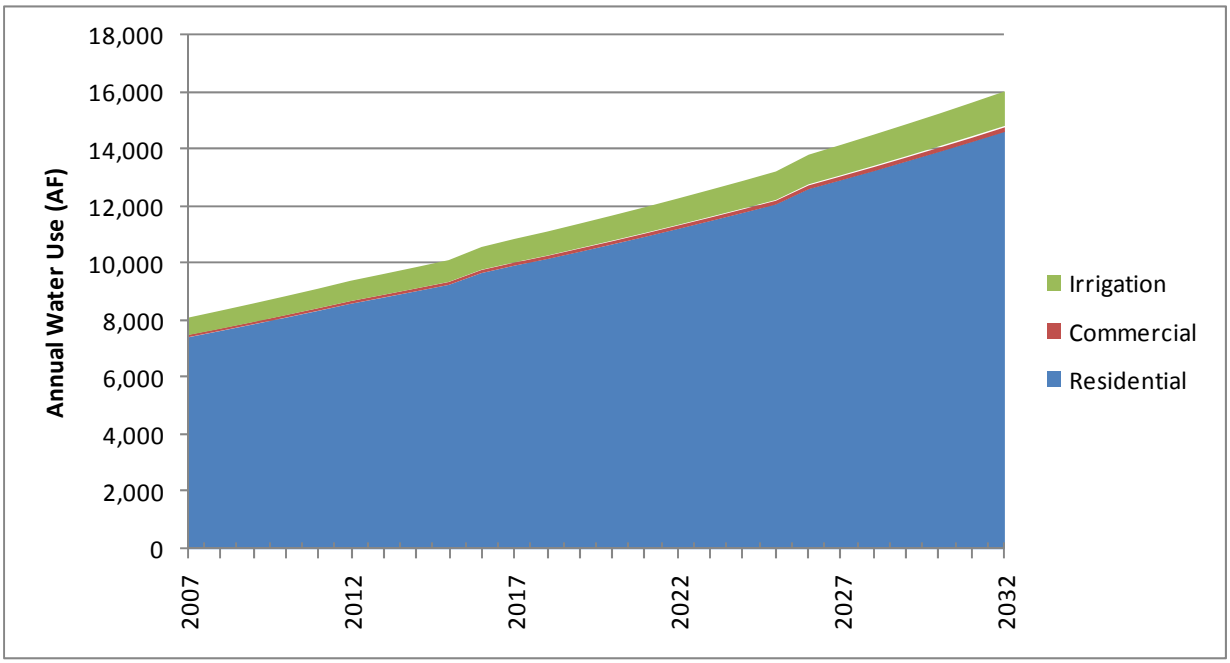
Table 4.9 – FCLWD Projected Water Use through Build-Out

	Total Water Use (AF)	Residential Water Use at 91.5% (AF)	Commercial Water Use at 1% (AF)	Irrigation Water Use at 7.5% (AF)
2007	8,103	7,414	81	608
2008	8,346	7,637	83	626
2009	8,597	7,866	86	645
2010	8,855	8,102	89	664
2011	9,120	8,345	91	684
2012	9,394	8,596	94	705
2013	9,629	8,811	96	722
2014	9,870	9,031	99	740
2015	10,116	9,256	101	759
2016	10,571	9,672	106	793
2017	10,853	9,930	109	814
2018	11,106	10,162	111	833
2019	11,384	10,416	114	854
2020	11,668	10,676	117	875
2021	11,960	10,943	120	897
2022	12,259	11,217	123	919
2023	12,566	11,498	126	942
2024	12,880	11,785	129	966
2025	13,202	12,080	132	990
2026	13,790	12,618	138	1,034
2027	14,135	12,934	141	1,060
2028	14,488	13,257	145	1,087
2029	14,851	13,589	149	1,114
2030	15,222	13,928	152	1,142
2031	15,602	14,276	156	1,170
2032	15,992	14,633	160	1,199

The water use projections are shown in Figure 4.3. Since the District's service area is fixed, the projected estimate is not likely to change significantly. The build-out water use is approximately 16,000 AF and will serve an estimated population of 72,800.

There are limitations to water demand projections, and it is important to recognize that external factors such as growth rate can impact the projections. Projections are intended to be approximate forecasts that demonstrate general trends and not to be interpreted as exact targets or absolute predictions of what will occur.

Figure 4.3 – FCLWD Projected Water Use per Category



CHAPTER 5 - PROPOSED FACILITIES

Identification of Future Needs

Participation in Regional Projects

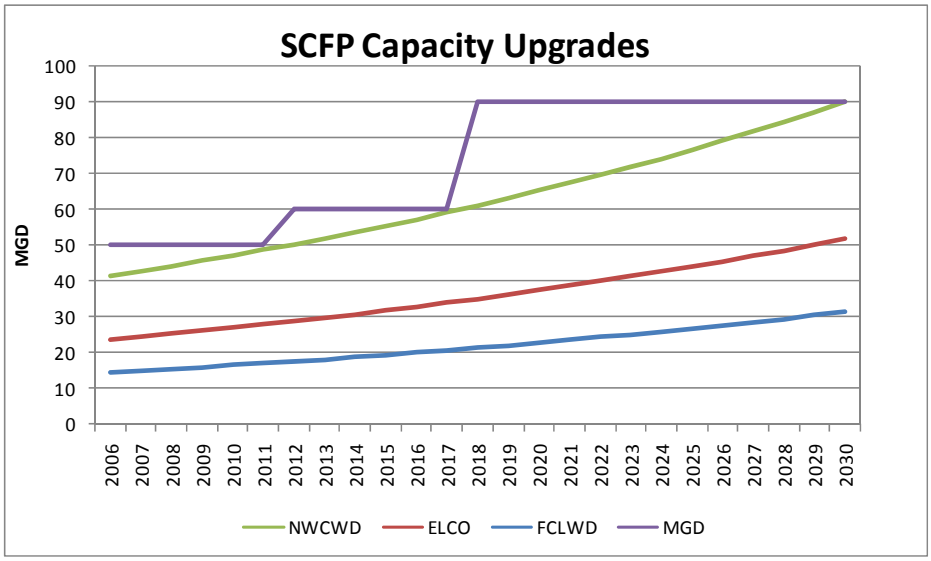
The District and other water providers in the Fort Collins area have historically planned and constructed projects cooperatively. The schedule for those projects is driven by the collective needs of all participants rather than the needs of any one entity. The advantages of combining resources and constructing single projects at one time rather than several projects over an extended period of time far outweigh the cost of funding improvements sooner than they would otherwise be required. Some of the facility needs discussed in this section are being planned in conjunction with one or more water suppliers.

Water Treatment Capacity

Each of the Tri-Districts owns an equal share of SCFP, but funds expansion and improvement based on its respective water use. FCLWD currently uses approximately 40% of the water produced at SCFP.

The treatment capacity needs of the three Districts were projected in August of 2002. In the study report, it was determined that SCFP would need to be expanded from 50 MGD to 60 MGD by the year 2012 and from 60 MGD to 90 MGD by the year 2018. In 2006, the peak-day demand at the SCFP was 38 MGD. Figure 5.1 compares projected water demands of the three Districts that own SCFP to the existing and future treatment plant capacity.

Figure 5.1 - SCFP Treatment Capacity and Projected District Demands



The 10 MGD treatment plant expansion planned for 2012 will replace tube settlers in existing basins with dissolved air flotation equipment. Four new filter basins will also be constructed. Utilization of existing basins inside the treatment facility will make the next 10 MGD plant expansion relatively inexpensive.

Table 5.1 shows preliminary cost estimates for the planned expansion. Costs and capacities shown in Table 5.1 are for the total project. The cost of the plant expansion will be shared among the Tri-Districts. The District would pay its proportionate share of project costs based on its relative water use at the time of construction.

Table 5.1 - Estimated Cost of SCFP Expansion Planned for 2012

	SCFP Estimated Cost	Estimated Cost for FCLWD
Permitting	N/A	N/A
Land Acquisition	N/A	N/A
Construction	$3,600,000	$1,440,000
Subtotal	$3,600,000	$1,440,000
Design & Construction Contingency (20%)	$720,000	$288,000
Subtotal	$4,320,000	$1,728,000
Engineering (12%)	$518,400	$207,360
Total	$4,838,400	$1,935,360
Capacity	10 MGD	4 MGD
Unit Cost of Capacity	$4.84 per gallon	$4.84 per gallon
Present Value of Unit Cost of Capacity @ 5%	$3.80 per gallon	$3.80 per gallon

Potential FCLWD Facility Needs

Table 5.2 presents a summary of the capital improvements identified in the 2008 FCLWD Master Plan. Each item has been assigned a timeframe for implementation and a cost.

Table 5.2 – FCLWD 2008 CIP Summary

Priority	Capital Improvement	Year	Cost
1	14” AC Line Replacement	2009-2012	$2,268,000
2	Overland Trail Pump Station	2009	$1,000,000
3	New 24” Waterline in Harmony Road to Timnath	2010	$1,676,700
4	Increased Capacity at Taft Hill Pump Station	2010	$1,289,250
5	New 12” Waterline in Carpenter Road	2011	$224,100
6	New 24” Waterline in Ziegler Road	2012	$2,347,650
7	2 MG Storage Tank in Timnath	2020	$3,337,875
8	New 12” Waterline at the Airport	2015	$189,000
	Total Cost		**$12,332,575**

Raw Water Storage

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

NISP

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

Glade Reservoir will be an off-channel reservoir located near Ted's Place on Highway 287 north of Fort Collins. The reservoir will hold approximately 170,000 AF of water when constructed. Galeton Reservoir will also be an off-channel reservoir located near the Town of Galeton.

Halligan Reservoir

The District and other northern Colorado water suppliers (NWCWD, ELCO, Fort Collins, and NPIC) have applied for a federal permit to enlarge Halligan Reservoir from 6,400 AF to approximately 40,000 AF.

Halligan Reservoir was constructed in 1909 by NPIC on the North Fork of the Poudre River near Livermore and historically supplemented NPIC's irrigation deliveries. In 2003, the City of Fort Collins purchased the reservoir from NPIC. The following year, the District and its partners in SCFP agreed to participate with the City of Fort Collins in exploring the feasibility of enlarging the reservoir to store water for municipal uses. Since the enlargement of Halligan will inundate existing wetlands, the project must complete public scoping, alternative analysis and environmental assessments required under NEPA.

Overland Trail Ponds

In 2005, Lafarge West Inc. agreed to sell property it had been mining for a number of years to the District and several other water suppliers (Fort Collins, Greeley, ELCO, and NWCWD). The Lafarge property is located near the Town of LaPorte on the south side of the Poudre River immediately west of Taft Hill Road. Even though Lafarge no longer

owns the property, it continues to mine gravel from the site. The purchasers plan to develop the Lafarge site and several nearby properties into a series of water storage reservoirs. When completed, the Overland Trail Ponds project will store approximately 4,700 AF.

Existing and future gravel pits on land owned by the water providers will be sealed and configured to divert water from the Poudre River when it is available. Water stored in the Overland Trail Ponds will be released back to the Poudre to meet return flow obligations, exchanged for water diverted at the Pleasant Valley Pipeline or pumped to SCFP for treatment.

Work on lining the existing gravel pits and installing the necessary infrastructure will begin in 2008. It will take approximately 20 years before all the property is mined and gravel pits are sealed.

CHAPTER 6 - WATER CONSERVATION GOALS

Water Conservation Goals

Water conservation goals can be both qualitative and quantitative. There are regional and environmental benefits to water conservation that can be important, but not as easy to define and measure. The District has some qualitative goals that will be discussed and quantitative goals that will be estimated based on areas of highest use.

Establishing water conservation goals is an iterative process that begins with quantifying the future demand for water based on current water-use habits and identifying areas water use can feasibly and effectively be reduced. Reduction of future water demand through water conservation can potentially delay planned water supply acquisition and the need for infrastructure improvements.

Since FCLWD has partners in its water treatment plant and raw water storage projects, these costs will not be as easily delayed. However, distribution system upgrades and water supply acquisition can potentially be delayed. These cost savings are compared to the cost of implementing the Water Conservation Plan.

Qualitative Goals

Early discussions with FCLWD staff centered on the reasons the District is pursuing a Water Conservation Plan. Due to the recent competition for water and the permitting of new water sources in the region, water conservation expectations have been increasing. The District has some qualitative goals for water conservation that are described below and how the District is attempting to meet these goals.

1. Comply with conservation requirements and expectations for the NEPA permitting of Halligan Enlargement Project and NISP.

   The trend in the western United States has moved toward integrating water conservation efforts into water resource management before developing costly water supply projects. Water conservation cannot meet future demand alone, but it should be included in water planning and must be developed as much as possible. A component of the District's future water supply will include water conservation

2. Establish, via the billing component, a monitoring system that collects a sufficient amount of data to effectively measure water use, water use trends, water system losses, and water savings from conservation measures and programs.

   Adequate water use monitoring is needed to evaluate changes in water use due not only to water conservation programs, but also to water rate changes, weather, economics, housing trends, etc. Data can be collected from water sales by account type or customer class on a monthly basis and evaluated for average, indoor and outdoor use. The District has a robust billing system that is adequate, but has more potential than what is currently being utilized. The goal is to use the software to its potential for effective and efficient water use tracking and projection.

Quantitative Goals

The main water uses in the District are Residential, Commercial and Irrigation. Water savings goals were established for each of these categories. Unaccounted-for losses, which includes water produced and treated but not paid for, was split between Real System Losses (physical leakage from the distribution system and WTP), and Apparent System Losses (meter inaccuracies, billing system data errors and unauthorized consumption). Water saving goals were also set for both system losses. Table 6.1 shows the District's water conservation goals.

The AF of reduced water use is found by multiplying the percent reduction goal by the planning period projected water use for each category. The AF reduction for real system losses is simply 1% of the total projected water use and for apparent system losses, 4% of the total projected water use.

Table 6.1 – FCLWD Water Conservation Goals

Water Use Categories:	2007 Water Use (AF)	Average of Projected Annual Water Use (2008 to 2017) (AF)	Reduction Goals for Planning Horizon (%)	(AF)
Residential	7,306	7,678	8%	614
Commercial	70	84	5%	4
Irrigation	595	629	10%	63
Real System Losses (7%)	634	667	1%	95
Apparent System Losses (5%)	453	477	4%	381
Total Demand Reduction:				1158
Total Water Production:	9,058	9,535		
Total Percent Reduction:				12%

Residential

The residential water use is 91.5% of the District's total water use. This category consists of urban growth that was rapid throughout the 1990's and continues to develop, and rural housing that has accumulated since the District was formed. Total annual tap growth from 1991 to 2004 averaged 8.9% with 96% of that growth attributed to residential accounts. The nature of this growth trend was toward new developments with robust landscaping requirements both on individual lots as well as open spaces within the developments. The goal for this category is to lower the use by 8% or 614 AF for the ten-year planning horizon.

Commercial

Commercial water use for the District is currently 1% of total water use. The category consists of some industrial operations, schools, churches, an airport, and a small amount of restaurants and retail establishments. The goal for commercial water savings for this planning horizon is moderately set at 5% or 4 AF. Results of the plan may reveal useful information about the commercial category that can be used for the next water conservation plan.

Irrigation

Irrigation water use for the District is 7.5% of total use. Between HOA open spaces and other outdoor irrigation, there is high potential for water savings within this category. The goal set for this category for the planning horizon is to reduce irrigation water use by 10% or 63 AF. This is reasonable for the area and nature of the current irrigation practices.

Real System Losses

Real losses due to leakage have been a focus for the District for a long time, especially in the last ten years. Meters have been installed and updated on all taps and pressure reducing valves and a SCADA system added to monitor high pressures that could lead to leakage. Leaks are monitored and repaired immediately. Although the District's system leakage is at a reasonable level, it will strive to reduce the leakage by 1%, from 7% to 6%.

Apparent System Losses

Improvements to data collection for the District could lead to a better understanding and documentation of water use. The billing software used for data recording has much more potential than is being utilized for record keeping and quality control. Radio transmitters are being installed on individual customer meters to reduce reading error and better track meter slippage. The goal for apparent system losses is to reduce them by 4%, from 5% down to 1%.

These reductions for both real and apparent losses will result in a total system loss of 7%, which is an excellent level of loss control to strive for in a system the size of FCLWD.

Goal Development Process

The development of water-savings goals for FCLWD was a collaborative process involving Clear Water Solutions and the District staff. Information was gathered from billing records and existing planning documents to properly characterize the system, resources and water use for FCLWD. Development of this data showed FCLWD's highest water use customers and customer categories, seasonal usage, system limitations and losses, and outlined the District's existing conservation measures/programs and their measured effectiveness.

Once the largest areas of water use were identified, we met with staff to discuss water-savings goals and the potential methods to reach those goals. Initial reduction percentages were established and a universal list of measures and programs were compiled for consideration. The goals focused on the water use areas that could be successfully impacted considering factors such as water savings potential, costs, control, and public acceptance.

CHAPTER 7 – CONSERVATION MEASURES AND PROGRAMS

Water Conservation Measures and Programs

We reviewed numerous resources to compile a universal list of conservation measures and programs including the CWCB Guidance Document, City of Fort Collins conservation measures/programs, ELCO's Water Conservation Plan and water conservation practices for other Front Range communities, Great Western Institute water conservation workshops, and many water conservation reference materials.

Through this research, a universal list of measures and programs was created that was appropriate for FCLWD and met the requirements of CWCB. Both *supply-side* and *demand-side* measures were considered. The measures and programs were grouped further into four major categories: Utility Maintenance, Regulatory Controls, Educational Programs, and Rebates and Incentives. The groupings help to define the nature of each program/measure and provide some organization to the District staff for planning implementation.

Through the conservation measures and programs development process, some key concepts became apparent:

- While the District has an existing conservation plan, there are areas that could be improved to result in additional water conservation.
- The District is not in a position to enforce certain conservation policies and regulations.
- There is an opportunity to partner with the City of Fort Collins on certain efforts.

Screening Criteria

The universal list of measurements and programs was screened with a list of criteria established by the District. The criteria selection was a result of previous Board Meeting discussions and staff knowledge of the customer base. Each measure and program in the universal list in Table 7.1 was screened using the following criteria:

1. Staff and Board approval
2. Customer acceptance and participation
3. Staff and financial resource limitations
4. Legal authority

Screening of Conservation Measures and Programs

The purpose of the initial screening was to create a final list of measures and programs that *would be evaluated further in the planning process* via a cost-benefit analysis. A meeting was held with FCLWD's staff to discuss each measure/program on the universal list and eliminate ones that were not feasible using the established screening criteria.

The list of measures was also evaluated to determine if the CWCB Minimum Required Water Conservation Plan Elements were addressed. The elements required by CWCB to be evaluated that pertain to measures and programs are listed as follows:

- Water-efficient fixtures and appliances, including toilets, urinals, showerheads, and faucets
- Low water use landscapes, drought resistant vegetation, removal of phreatophytes, and efficient irrigation
- Water-efficient industrial and commercial water-using processes
- Water reuse systems
- Distribution system leak identification and repair
- Dissemination of information regarding water use efficiency measures, including by public education, customer water use audits, and water-saving demonstrations
- Water rate structures and billing systems designed to encourage water use efficiency in a fiscally responsible manner
- Regulatory measures designed to encourage water conservation
- Incentives to implement water conservation techniques, including rebates to customers to encourage the installation of water conservation measures

Each measure and program is described below in Table 7.1 with the resulting decision from the screening process and whether it addresses the CWCB minimum requirements. Existing measures are highlighted in green.

Table 7.1 – Universal List of Conservation Measures and Programs

	Conservation Measure or Program	CWCB Requirement	Further Evaluation	Comment
Supply side measures & programs	**Utility Maintenance Programs**			
	Leak detection & repair program	X	yes	Reduce by 1%; from 7% to 6%
	Installing radio telemetry on existing meters		yes	This program is in progress and will be complete in approx. 6 years.
	Recycling WTP filter backwash		yes	Saves 5% of production water
	Water reuse system	X	no	Studies currently being undertaken; will consider next planning horizon.
	Regulating fire hydrant use		yes	Fire hydrant use is currently not monitored or billed. Billing and monitoring would become standard operation.
	Improving utilization of billing software	X	yes	Research, design and implementation of data collection in existing billing software will reduce apparent losses from 5% to 1%.
Demand side measures & programs	**Regulatory Controls**			
	Landscape & irrigation system standards for new development	X	no	These regulations exist at some level for other entities within the FCLWD service area, however they cannot be controlled or enforced by FCLWD staff.
	Restrictive covenants ordinance	X	no	
	Soil amendment ordinance for new landscapes	X	no	
	Water rates to encourage water conservation	X	yes	A rate study is needed to evaluate cost of service vs. conservation costs and add ways to encourage conservation.
	Water waste ordinance		yes	This would not be strictly policed, but would allow and encourage customers to be vigilante about reporting water wasting activities.
	Removal of phreatophytes e.g. cottonwoods	X	no	Phreatophytes use an abundance of groundwater. None are located near existing water supply.
	Requiring wind and/or rain sensors for commercial and open space irrigation	X	no	This may occur as a result of commercial and irrigation audits and will be the responsibility of the customer.
	Educational Measures			
	Public education - newsletter, bill stuffers, website	X	yes	New FCLWD website will included water conservation section with tips and links.
	Children's water festival	X	yes	Local festivals put on by Northern Water will be advertised on the website.
	Post commercial BMPs on website or as bill stuffers	X	yes	These will be posted on the water conservation portion of the website.
	Send ET irrigation scheduling in water bill		yes	This can be calculated based on historic ET averages and sent in the water bill.
	Designated water conservation officer		no	This is not an efficient use of resources.
	School education program	X	no	This is already taken care of within school districts.
	Rebates and Incentives			
	Residential audit	X	yes	Web-based and actual audits could be offered. Existing web based audit tools can be added as a link on the FCLWD website.
	Rebate programs for toilets, clothes washers, dishwashers, faucets and showerheads	X	maybe	The Board would like to pursue other measures at this time and get them established.
	Xeriscape incentive for all categories	X	no	Resources are not currently available for this measure, however, links will be posted on the website to local Xeriscape Gardens including the ones at Northern Water, Loveland and Fort Collins.
	Irrigation system audit & improvements for irrigation taps	X	yes	FCLWD can Partner with the City of Fort Collins to conduct audits. Improvements would be identified in audit and be the responsibility of customer.
	Commercial & Industrial water audits	X	yes	FCLWD can Partner with the City of Fort Collins to conduct audits. Improvements would be identified in audit and be the responsibility of customer.
	Promote Hospitality BMPs	X	no	This measure may occur as result of commercial audits.
	Wind and/or rain sensor rebates for residential	X	no	The Board is would like to pursue other measures at this time and get them established.
	Rebates for ET (SMART) sprinkler system controllers	X	no	The Board is would like to pursue other measures at this time and get them established.
	Distribute pre-rinse spray heads to restaurants & institutions	X	no	This measure may occur as result of commercial audits.
	Irrigation system rebate for residential and commercial	X	no	The Board is would like to pursue other measures at this time and get them established.
	Commercial toilet rebates	X	no	The Board is would like to pursue other measures at this time and get them established.

CHAPTER 8 – EVALUATION AND SELECTION

The FCLWD Board and staff have a good knowledge of where potential water savings exist and what will be acceptable to the public within their service area. FCLWD recognizes that there are benefits to addressing system wide and accounting issues before pursuing other measures. The District also knows that assessing water use through audits is a good place to start.

The initial screening of the measures and programs with FCLWD's staff resulted in eliminating thirteen measures and selecting fifteen for further evaluation. The grouping of the measures enabled us to consider like measures and avoid double counting savings. The benefits and costs of the fifteen measures and programs are shown in Table 8.1.

Estimated Costs and Water Savings of Conservation Options

Prior to evaluating the potential cost effectiveness of the measures, it is important to understand the magnitude of typical indoor and outdoor uses and the contribution of each to total demand. There is a wide range of use related to each indoor and outdoor measure that can affect the potential water savings and cost effectiveness accordingly. The assumptions for calculating water savings used for this analysis were on the conservative end of the ranges found in the available water conservation research to avoid overestimating savings.

Many resources were used to estimate water savings including Amy Vickers Handbook of Water Use and Conservation, studies and papers from California and Arizona, local studies available from the American Water Resource Association (AWRA), the Environmental Protection Agency (EPA), Western Resource Advocates, information from Colorado municipalities, and the CWCB website. Interviews with conservation program directors from surrounding public water service entities provided additional water savings information and added a local perspective.

Table 8.1 provides an annual cost-benefit analysis for all of the measures and programs previously identified to be evaluated further. A planning horizon of ten years is used to quantify the full benefit of these measures and programs. The costs and water savings over the planning period are calculated assuming the measures/programs all start in year one. This provides an equitable ranking of the measures, so they can be compared on an apples-to-apples basis. In reality, the measures and programs will be implemented according to the implementation schedule developed in Chapter 10 and available budget.

The first five columns (Columns A-E) of Table 8.1 identify the conservation measure or program and quantify the costs to FCLWD. These costs include unit

or annual costs for materials, staff time, and one-time start up costs. The table then quantifies water savings annually and for the entire ten-year planning horizon. Annual water savings and projected lost revenue are based on full implementation. This gives the District an idea of the anticipated water savings and revenue impacts after full implementation.

The cost per 1,000 gallons of water saved is found by dividing the total cost by the total water savings for the entire ten year period. The measures and programs are then ranked by cost per 1,000 gallons saved, starting with a rank of one for the lowest cost. This ranking helps to determine which measures will be more effective and to suggest a useful order of implementation.

Table 8.1 – Cost/Savings Analysis of Conservation Measures and Programs

Conservation Measure or Program	Total Cost to FCLWD				# of Units per Year	Gallons Saved per Unit per Year	Estimated Annual Water Savings after full Implementation (gallons)	Estimated Total Water Savings over Planning Period (gallons)	Annual Revenue Loss Related to Water Savings after full implementation ($1.75/1,000 gallons[2])	Estimated Annual Cost	Estimated Total Cost over Planning Period including Set-up and Lost Revenue	Cost per 1000 Gallons Saved	Rank	Assumptions and Calculations - Estimates only, based on current research and empirical results of other entities.
	Cost per Unit (B)	One time Set up Labor (C)	Annual Labor (D)	Annual Materials (E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	
Utility Maintenance Programs														
Improved Leak Detection & Repair Program			$25,000				21,749,153	1,196,203,420	$0	$25,000	$250,000	$0.21	3	Lining mainline pipes with fiberglass will reduce distribution system losses by 1%. This is a ten year program and will result in 0.1% reduction per year. savings are split with Recycling backwash (70:30)
Installing radio telemetry on existing meters			$25,000				62,140,437	412,177,521	$0	$25,000	$150,000	$0.36	4	This is an ongoing program that will improve reading accuracy and customer control of water use. An estimated 4% reduction in annual water use is split between this and billing system upgrades. Six years left in program for .67% reduction per year.
Recycling WTP filter backwash			$5,000				9,321,066	512,658,609	$0	$5,000	$50,000	$0.10	2	This practice will continue to saving 5% of production water; savings for this plan are 1% of reduction split with Leak Detection (30:70)
Improving utilization of billing software		$10,000					62,140,437	412,177,521	$0	$10,000	$10,000	$0.02	1	Improvements include, but not limited to real time reading and flagging of radio meters. An estimated 4% reduction in annual water use is split between this and meter telemetry. Assume accomplished in first year.
Regulatory Controls														
Water rates to encourage water conservation		$30,000					109,367,170	984,304,528	$191,393	$191,393	$1,752,533	$1.78	8	Assume a conservative reduction of 4% of total billed water.
Water waste ordinance		$1,200	$800				27,341,792	273,417,925	$47,848	$48,648	$487,681	$1.78	9	Estimate a 1% water savings of total annual delivery. Staff time spent taking calls and investigating leaks.
Educational Programs														
Public education - website development in addition to existing bill stuffers		$2,000	$400	$1,000			41,012,689	410,126,887	$71,772	$73,172	$733,722	$1.79	10	Assume 1.5% savings of projected total water use in planning period. Cost to develop website is split among public education, water festivals and commercial BMPs, (80%:10%:10%). Annual cost for bill stuffers.
Children's water festivals		$250	$200				25,017,740	250,177,401	$43,781	$43,981	$440,060	$1.76	7	Assume 1% savings of Projected Residential water use.
Post commercial BMPs on website or as bill stuffers		$250	$400				273,418	2,734,179	$478	$878	$9,035	$3.30	13	Assume 1% savings of Projected Commercial water use.
Send ET irrigation scheduling in water bill and on website			$400				49,215,226	492,152,264	$86,127	$86,527	$865,266	$1.76	6	ET scheduling is sent in May water bill. Assume 3% savings of projected outdoor water use (60%) of Residential, Commercial and Irrigation accounts.

Conservation Measure or Program	Total Cost to FCLWD: Cost per Unit (B)	One time Set up Labor (C)	Annual Labor (D)	Annual Materials (E)	# of Units per Year (F)	Gallons Saved per Unit per Year (G)	Estimated Annual Water Savings after full Implementation (gallons) (H)	Estimated Total Water Savings over Planning Period (gallons) (I)	Annual Revenue Loss Related to Water Savings after full implementation ($1.75/1,000 gallons[2]) (J)	Estimated Annual Cost (K)	Estimated Total Cost over Planning Period including Set-up and Lost Revenue (L)	Cost per 1000 Gallons Saved (M)	Rank (N)	Assumptions and Calculations - Estimates only, based on current research and empirical results of other entities.
Rebates and Incentives														
Online residential audit	$0	$400	$800		200	7,550	6,040,000	33,220,000	$10,570	$11,370	$81,069	$2.44	11	Audit tool will be available on the website. Assume annual participation of 200 households (appr. 1.5%) and 2% savings of ave. household use (151,000 gal).
Residential audit	$75	$50	$500		100	15,100	7,550,000	41,525,000	$13,213	$21,213	$196,320	$4.73	15	Audit done by Fort Collins. Assume 100 participants per year and 5% savings of average use (151,000 gal.) per household.
Irrigation system audits for irrigation taps	$150	$50	$250		35		20,204,800	194,649,300	$35,358	$40,858	$159,805	$0.82	5	Assume 35 of 140 existing irrigation taps are targeted per year for four years. Assume 50% of the accounts make the necessary repairs for a 20% savings[1] of current water use per tap. Studies show water savings of 20-50%. Audits performed by Fort Collins .
Commercial audit	$150	$50	$250		10	18,000	1,800,000	9,900,000	$3,150	$4,900	$34,875	$3.52	14	Audit done by Fort Collins. Target 10 companies per year starting with highest users up to 100 companies. Assume 10% savings of ave. comm. use of 180,000 gal.
Faucet aerators for distribution	$4	$400	$400		100	18,500	16,650,000	83,250,000	$29,138	$29,938	$269,838	$3.24	12	0.5 gpm aerator vs. typical 2.2 gpm saves an average of 18,500 gal. annually per aerator according to manufacturer. Estimate out of 4,900 pre-1997 homes, 100 aerators will be installed per year (appr. 2% participation) up to 900 total.

Notes: 1 Based on "Handbook of Water Use and Conservation" by Amy Vickers

2 Based on current water rate for FCLWD of $1.75/1,000 gal. for all accounts above 16,000 gallons

Column Explanations:

(B) Cost of audits
(C) Labor involved in set up program or measure
(D) Labor involved each year for operation of measure or program
(E) Materials needed each year for each unit if listed or for the whole measure or program
(F) Number of accounts expected to participate each year
(G) Gallons of water saved per unit as a result of participating in the program or measure
(H) Total water savings seen in a year from the measure or program after full implementation
(I) Total water savings seen over entire ten year planning period; considers gradual implementation per year
(J) Revenue the District will not be paid if the water savings occur, based on second level of water rate for all customers
(K) Estimated annual cost after full implementation
(L) Total cost to implement and operate measure or program over entire ten year planning period, including annual operation, one time set up costs and annual revenue lost due to water savings
(M) Cost per 1000 gallons saved = total cost over 10 year period divided by total water saved over 10 year period

Comparison of Benefits and Costs

The resulting rank of measures by cost-benefit is shown in Table 8.2. The cost per 1,000 gallons saved ranges from two cents to $4.73. Keeping in mind that the costs include lost revenue, it is not surprising that the first four ranked measures are supply side measures that address system losses and have no associated lost revenue. These are the most effective measures to implement in a conservation plan to avoid wasting water.

The subsequent rankings are a result of the ratio of cost and lost revenue to water savings. For instance, water rates to encourage water conservation saves a lot of water, but also results in a lot of lost revenue, so it ranks lower than one might expect. Something that is not considered at this time is how a change in rate structure could compensate for the overall cost of a conservation plan including lost revenue. This could be further explored in a rate study. The lost revenue in this analysis is based on current rates.

Irrigation audits result in large water savings as compared to the cost of implementation, whereas residential audits rank lower because there are more of them and they do not save as much water per audit. This is only a cost ranking and there are other factors to consider, which can be accomplished in a second screening.

The total cost of implementation without considering lost revenue is shown on Table 10.1. These costs will occur incrementally over the ten year planning horizon. For instance, the cost for leak detection and installing radio telemetry on the meters will be spread evenly across the ten year planning horizon. Some of the cost will be spread out across two years or the time it takes to set up the measures. The annual lost revenue at the current water rates after full implementation of the plan will be $532,827.

Table 8.2 – Cost/Benefit Ranking

Conservation Measure or Program	Cost/1,000 Gallons Saved	First Rank
Improving utilization of billing software	$0.02	1
Recycling WTP filter backwash	$0.10	2
Improved Leak Detection & Repair Program	$0.21	3
Installing radio telemetry on existing meters	$0.36	4
Irrigation system audits for irrigation taps	$0.82	5
Send ET irrigation scheduling in water bill and on website	$1.76	6
Children's water festivals	$1.76	7
Water rates to encourage water conservation	$1.78	8
Water waste ordinance	$1.78	9
Public education - website development in addition to existing bill stuffers	$1.79	10
Online residential audit	$2.44	11
Faucet aerators for distribution	$3.24	12
Post commercial BMPs on website or as bill stuffers	$3.30	13
Commercial audit	$3.52	14
Residential audit	$4.73	15

Evaluation Criteria

After each of the conservation measures and programs were ranked by *cost per 1,000 gallons saved*, as shown in Table 8.2, the next step was to select conservation measures and programs for implementation. Similar criteria as was used in the first screening were used for the selection of conservation measures and programs for implementation. The criteria used for selection are as follows:

1. Staff and Board approval
2. Financial implications
3. Additional staff time required

4. Public acceptance

Selected Conservation Measures and Programs

The public is ever changing in the high growth environment of the northern Front Range and has varying ideas of what water conservation means. Some customers are driven by financial savings, some for the good of the environment and some will only conserve water by regulatory mandates. Hence, FCLWD wants its list of conservation measures and programs to be as far-reaching as practical, thus reaching the largest pool of its customers while still being possible to implement at this time.

The second screening was accomplished by evaluating each measure/program on a scale of one to four for each screening criteria, one being the highest score and four the lowest. The scores were then totaled and a ranking determined from the total scores, lowest to highest.

After evaluating the second screening, the Board and staff feel that all of the measures in this list are worth implementing for this planning period. The second ranking helps to suggest an order of importance. The results of the first ranking and the second ranking were combined and the measures/programs were listed in the order of this combination. Table 8.3 below shows the first ranking, second ranking and the combination of the two ranks.

Table 8.3 – Secondary Screening of Water Conservation Measures and Programs

Conservation Measure or Program	First Rank	Group	Staff & Board Approval	Cost	Additional Staff Time	Public Acceptance	Total of Scoring	Second Rank	Combination of First and Second Ranking
Improving utilization of billing software	1	Utility	1	1	2	2	6	2	3
Recycling WTP filter backwash	2	Utility	1	2	1	1	5	1	3
Improved Leak Detection & Repair Program	3	Utility	1	4	1	1	7	3	6
Installing radio telemetry on existing meters	4	Utility	1	4	1	1	7	3	7
Send ET irrigation scheduling in water bill and on website	6	Educational	2	1	3	1	7	3	9
Children's water festivals	7	Educational	2	1	2	1	6	2	9
Irrigation system audits for irrigation taps	5	Incentive	2	3	2	2	9	5	10
Water waste ordinance	9	Regulatory	2	1	1	1	5	1	10
Water rates to encourage water conservation	8	Regulatory	2	2	2	3	9	5	13
Public education - website development in addition to existing bill stuffers	10	Educational	2	2	3	1	8	4	14
Online residential audit	11	Incentive	3	1	2	1	7	3	14
Faucet aerators for distribution	12	Incentive	3	2	1	1	7	3	15
Post commercial BMPs on website or as bill stuffers	13	Educational	3	1	3	1	8	4	17
Commercial audit	14	Incentive	3	3	2	2	10	6	20
Residential audit	15	Incentive	3	2	2	2	9	5	20

Note: 1 is the best, 4 is the worst.

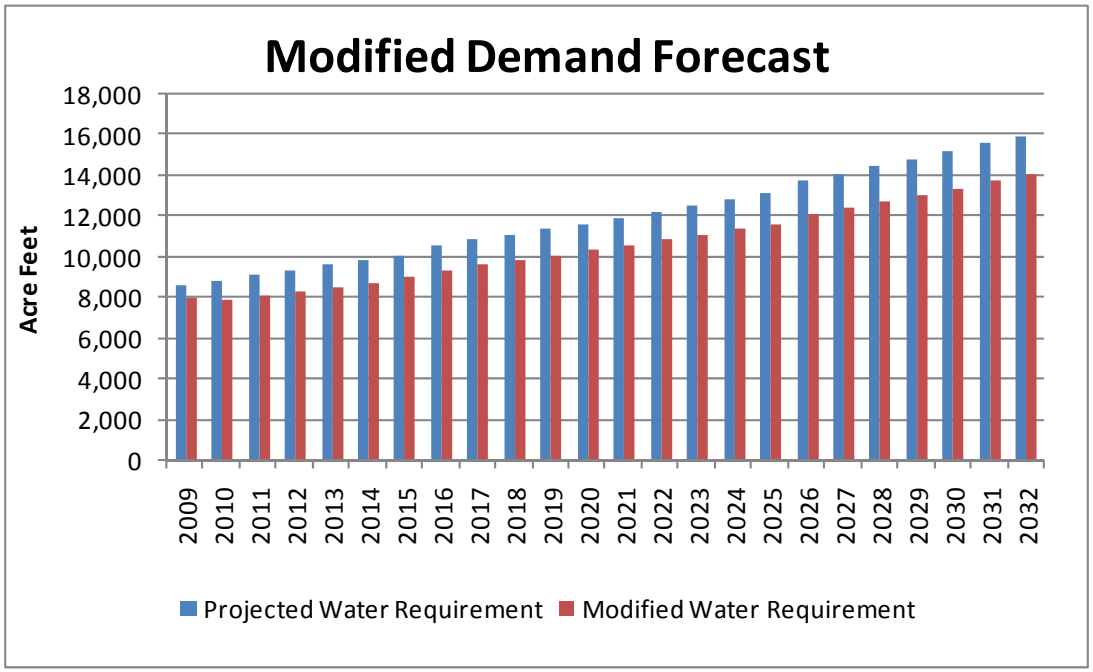
CHAPTER 9 – FORECAST MODIFICATION AND RESOURCE INTEGRATION

Modified Demand Forecast

The total demands for FCLWD are shown in the following graph with and without water conservation. The water savings shown illustrate approximately half of the measures implemented in 2009 and the other half in 2010. The savings are compiled according to the assumptions used in the cost-benefit analysis and are carried through build-out. Effects of implementing the water conservation measures will last well beyond the planning horizon.

The goal for water savings after full implementation of the conservation plan is 1,194 AF. The goal is to achieve this savings by 2018.

Figure 9.1 – Comparison of Demand Forecast with and without Conservation



Water Supply and Capacity Upgrade Forecast Modification

FCLWD's main plan for acquiring new water supply to meet future demand is to purchase CBT units and participate in NISP along with other gravel pit and transmountain water development. The number of CBT Units needed to meet future demand is projected in the 2008 Water Master Plan using a 73% yield of the units.

By 2018, an additional 2,584 CBT units are needed. If the Water Conservation Plan is fully implemented, the required number of CBT units using a 73% yield per unit goes down by 1,636 units. That would reduce the 2018 CBT unit needs to 948. At today's price of approximately $9,500 per CBT unit, that equates to a savings of 15.5 million dollars.

Due to the cooperative efforts for the regional joint water treatment plant and raw water storage, lowering the average, peak and forecasted demand through water conservation will not change the schedule of these projects. It will, however, extend the life of FCLWD's existing water supplies and hopefully provide FCLWD with some flexibility in the future depending on the actual growth and demand patterns.

Storage reservoirs planned by FCLWD will be constructed to their maximum capacity according to the schedule determined by the Tri-Districts. The District has to take full advantage of its opportunities since there are so few sites available to develop raw water storage. Any storage capacity developed before it is needed by the District will be rented to other water providers or reserved for drought protection.

Summary of Modifications and Benefits of Conservation

One of the biggest benefits to implementing water conservation is to delay the need for more expensive water acquisition. For FCLWD, capital improvement projects may not be delayed substantially, but the water demand in 2018 will be 1,194 AF less than what is forecasted. This translates to a savings of $15.5 million in CBT unit acquisition.

For comparison, the cost to implement the entire conservation plan without considering lost revenue is $788,950. The lost revenue can be offset with rate structure changes. It is apparent that the conservation plan could save the District money.

Another way to show the benefit of conservation is to show the cost of a tap fee in terms of cost per 1,000 gallons similar to the cost-benefit analysis. New customer accounts at the District are required to pay a plant investment fee, which covers the tap and distribution system upgrades, and cash-in-lieu of water. Table 9.1 shows the required fees for a ¾-inch tap as a cost per 1,000 gallons of water.

Table 9.1 – Incremental Water Supply Costs

Single Family Residential Water Tap Requirement	
CBT Water Costs - Cash-in-Lieu (0.7 AF)	$12,500
Tap Fee - PIF	$5,300
Total Tap Fee	$17,800
Cost per AF	$25,429
Cost per 1,000 Gallons	$78

The cost of the most expensive selected measure is $4.73/1,000 gallons for residential audits. The cost to implement all of the selected measures/programs over the ten-year planning horizon is $1.03/1,000 gallons. This compares very favorably to the tap and water fee cost of $78/1,000 gallons.

Final Water Conservation Plan Goals

In Chapter 6 we established water conservation goals for the primary customer categories and system losses: Residential, Commercial, Irrigation, Real System Losses, and Apparent System Losses. The water use reduction goals were 8%, 5%, 10%, 1%, and 4%, respectively.

The water savings from the conservation measures and programs in Table 8.1 were combined into the same water use categories, so we could see if the goals were attainable. Table 9.2 compares the estimated savings from the selected measures and programs to the originally established water-savings goals. The goals are then adjusted in the last two columns, based on the expected water savings from the selected measures/programs.

Table 9.2 – FCLWD Water Conservation Goals vs. Estimated Water Savings

Water Use Categories:	2007 Water Use	Average Projected Annual Water Use (2008 to 2017)	Reduction Goals for Planning Horizon		Annual Water Savings from Selected Programs	Resulting Reduction	Revised Reduction Goals for Planning Horizon	
	(AF)	(AF)	(%)	(AF)	(AF)	(%)	(%)	(AF)
Residential	7,306	7,678	8%	614	769	10%	10%	768
Commercial	70	84	5%	4	12	14%	10%	8
Irrigation	595	629	10%	63	102	16%	15%	94
Real System Losses (7%)	634	667	1%	95	95	1%	1%	95
Apparent System Losses (5%)	453	477	4%	381	381	4%	4%	381
Total Demand Reduction:				1158	1360			1347
Total Water Production:	9,058	9,535						
Total Percent Reduction:				12%	14%			14%

The estimated water savings from the residential measures and programs were slightly higher than our initial water savings goal, so this goal was increased to 10% to match the estimated savings.

The estimated water savings from commercial measures were substantially higher than the originally established goal. At this point in time, little is known about this category and the interest that will be generated. The goal therefore has been increased to 10%. FCLWD will commit to the commercial and industrial audits to better understand the water use in this category.

The irrigation water savings are also higher than the established goal. There is a wide range of water saving potential in this category and is therefore hard to predict. We will increase our goal to 15% for this category.

CHAPTER 10 – PLAN OF IMPLEMENTATION AND MONITORING

Implementation Schedule

All of the proposed water conservation measures and programs will require staff resources for planning and coordination before implementation. This will require some strategy in implementing the most beneficial measures first. To create an implementation schedule, the ranking results were used as well as two other considerations: 1) whether the measure or program was in existence and 2) how easily the measure or program could be implemented. The implementation of this Water Conservation Plan will be accomplished in two phases.

Leak detection, WTP backwash recycling, and installing radio telemetry are on-going measures and will be implemented first or continued. The billing system improvements are crucial for monitoring water use and especially water savings. This will be implemented as soon as possible.

The water audits for both residential and commercial will be accomplished in partnership with the City of Fort Collins or through a third party consultant. Fort Collins already has staff that conducts the audits, making this an easy program to implement. The website is another crucial measure because it is the most effective way to communicate with and educate the District customers and will be implemented in the first phase. The remaining measures are not as crucial or will take more time and can be implemented in the second phase.

Table 10.1 shows the phase that each measure or program could be implemented along with an estimated date for implementation and required activities. The ten year cost of each measure/program is also shown and the percent of water savings to total water savings to help guide prioritizing the implementation.

Table 10.1 – Water Conservation Plan Implementation Schedule

Conservation Measure or Program	Phase to Implement	Grant Required?	Grant order	Start Date	Action Required	Ten Year Cost without Lost Revenue	Percent of Overall Water Savings
Improving utilization of billing software	1	yes	1	September 1, 2009	Apply for Grant	$250,000	13.5%
Recycling WTP filter backwash	1	no		on-going	Continue as is	$50,000	2.0%
Improved Leak Detection & Repair Program	1	no		on-going	Install fiberglass sleeves on large mains	$250,000	4.7%
Installing radio telemetry on existing meters	1	yes	1	on-going	Continue program as is and apply for a grant	$150,000	13.5%
Send ET irrigation scheduling in water bill and on website	1	no		July 1, 2009	Calculate monthly ET, add to website	$4,000	10.7%
Children's water festivals	1	no		July 1, 2009	Add to website	$4,500	5.4%
Irrigation system audits for irrigation taps	2	possible	3	January 1, 2010	Draft agreement with City of Fort Collins	$7,800	4.4%
Water waste ordinance	1	no		July 1, 2009	Pass Board policy	$9,200	5.9%
Water rates to encourage water conservation	2	yes	2	September 1, 2010	Apply for Grant	$30,000	23.8%
Public education - website development in addition to existing bill stuffers	1	possible	4	July 1, 2009	Hire web developer	$16,000	8.9%
Online residential audit	2	no		July 1, 2010	Research and add to website	$8,400	1.3%
Faucet aerators for distribution	2	no		January 1, 2010	Research and order aerators, add to website	$4,800	3.6%
Post commercial BMPs on website or as bill stuffers	2	no		July 1, 2010	Research Commercial BMPs, add to website	$4,250	0.1%
Commercial audit	2	possible	3	January 1, 2010	Draft agreement with City of Fort Collins	$4,050	0.4%
Residential audit	2	possible	3	January 1, 2010	Draft agreement with City of Fort Collins	$12,550	1.6%
					Total	$788,950	

Public Participation

One of the CWCB requirements for a Water Conservation Plan is to publish a draft plan, give public notice of the plan, make the plan publicly available, and solicit comments from the public for not less than a 60-day period.

Through this water conservation planning process, the public was notified and given 60 days to comment. The plan was available on FCLWD's website and in its office for review. Written comments and responses to those comments are included in Appendix C.

Monitoring and Evaluation

Monitoring the success of this Water Conservation Plan includes measuring water use as well as money spent on the selected conservation measures and programs. FCLWD will measure water use in the customer categories that have been targeted for water savings.

FCLWD currently collects water use per tap size and will continue to do so to monitor the water use. This will also provide a comparison to past water use per tap. Monitoring water use per customer category will be evaluated as part of the billing system evaluation and update and implemented early in the program for better tracking of water savings. Participants in the audit programs can be recorded and individual accounts tracked for specific water reductions.

Expenditures for conservation will be documented by District staff and reported to the District Board on a regular basis. This will be valuable information in evaluating the cost-benefit ratio and to validate the success of implementing the selected conservation measures and programs. Since the programs will be implemented in phases, there will be time to evaluate and establish the appropriate method to monitor success of each program and measure.

Plan Updates and Revisions

The required schedule for updating the Water Conservation Plan is seven years. The progress towards achieving the water savings goals will be monitored on an annual basis by the District. FCLWD will update this plan prior to seven years if implementation and actual water savings deviate too much. This deviation may be caused by several factors including higher than expected growth, less than anticipated participation or the inability to implement the plan due to lack of funding.

Plan Adoption and Approval

After the public comments have been incorporated into the plan, the FCLWD Board will formally adopt the plan prior to submittal to CWCB for final approval.

CWCB will provide written notification of approval, conditional approval, or disapproval within 90 days of submittal. Conditions for conditional approval or disapproval will be addressed if necessary. Implementation will begin after CWCB approval is received. It is only after final CWCB approval that FCLWD will be eligible for a water-efficiency grant through CWCB for plan implementation.

REFERENCES:

American Water Works Association, 2006. Water Conservation Programs – A Planning Manual, Manual of Water Supply Practices M52.

The Brendle Group, June 2006. Northern Colorado Action Plan for Industrial, Commercial, and Institutional (ICI) Water Conservation.

Fort Collins-Loveland Water District, September 17, 1996. Water Conservation Plan.

Klien, Bobbie, Kenney, Doug, Lowrey, Jessica, and Goemans, Chris. Factors Influencing Residential Water Demand: A Review of the Literature (Updated 1/12/07).

The Engineering Company, July 16, 1994. Water Distribution System Master Plan Update.

TST, Inc. Consulting Engineers. Fort Collins-Loveland Water District Master Plan 2008.

TZA Water Engineers, Inc., August, 2005. Evaluation of Raw Water Storage Needs.

U.S. Environmental Protection Agency, 2007. Cases in Water Conservation: How Efficiency Programs Help Water Utilities Save Water and Avoid Costs.

U.S. Environmental Protection Agency, August 6, 1998. WATER CONSERVATION PLAN GUIDELINES , Appendix B.

Vickers, Amy, 2001. Handbook of Water Use and Conservation : Home, Landscapes, Business, Industries, Farms. WaterPlow Press, Amherst, MA.

Water Conservation Alliance of Southern Arizona, 2003. Evaluation and Cost Benefit Analysis of Municipal Water Conservation Programs.

Western Resource Advocates, 2006. Water in the Urban Southwest.

APPENDIX A

Public-Review Process

Public Review Process

The Fort Collins-Loveland Water District held its public-review period from August 3, 2008 through September 25, 2008 with an extended period to October 10, 2008 on the website. Notification was posted in the Fort Collins Coloradoan and the Loveland Reporter Herald on August 3, 2008 and August 5, 2008 respectively, announcing the review period and that a draft plan would be available for the public to review at the FCLWD office. An announcement asking for public comments and draft plan was also posted on the FCLWD website on August 3, 2008.

Account #: 003300

RECD AUG 11 2008

FORT COLLINS COLORADOAN

Invoice Text Fort Collins - Loveland Water District (

Fort Collins - Loveland Water District (FCLWD) has completed a draft Water Conservation Plan. The goal of the plan is for FCLWD to develop strategies and programs for efficient and sustainable water use. FCLWD completed a Water Conservation Plan in 1996 and implemented emergency drought water rates in 2003. The Existing conservation efforts from the 1996 include:

" Aggressive leak detection and repair program
" Public Information in billing and newsletters

Before finalizing the Water Conservation Plan, FCLWD is seeking input from its customers. FCLWD shall have a 60 day public review period beginning with the date of this notice through September 25, 2008. A complete draft copy will be kept at FCLWD's office located at 5150 Snead Drive, Fort Collins.

All written comments should be received by Karen Holt at the front desk prior to October 3, 2008. Comments can be mailed or dropped off at our office at 5150 Snead Drive, Fort Collins, CO 80525

34108735
Ft Collins Coloradoan
August 3, 2008

STATE OF COLORADO)
) ss: AFFIDAVIT OF PUBLICATION
COUNTY OF LARIMER)

Nicole Cumming, being duly sworn, deposes and says that said is the legal clerk of the Fort Collins Coloradoan; that the same is a daily newspaper of general circulation and printed and published in the City of Fort Collins, in said county and state; that the notice or advertisement, of which the annexed is a true copy, has been published in said daily newspaper for

1 Day;

that the notice was published in the regular and entire issue of every number of said newspaper during the period and time of publication of said notice, and in the newspaper proper and not in a supplement thereof; that the first publication of said notice was contained in the issue of said newspaper on

Sunday, August 3, 2008

that the last publication thereof was contained in the issue of said newspaper on

Sunday, August 3, 2008

that said Fort Collins Coloradoan has been published continuously and uninterruptedly during the period of at least six months next prior to the first publication of said notice or advertisement above referred to; that said newspaper has been admitted to the United States mails as second-class matter under the provisions of the Act of March 3, 1879, or any amendments thereof; and that said newspaper is a daily newspaper duly qualified for publishing legal notices and advertisements within the meaning of the laws of the State of Colorado.

Nicole Cumming
Legal Clerk

Subscribed and sworn to before me, within the County of Larimer, State of Colorado this

Monday, August 04, 2008

My Commission expires 1/16/11

ANNE-MARIE BLANCHARD NOTARY PUBLIC STATE OF COLORADO

Notary Public

Legal No. 0034108735

Delivered to:
FORT COLLINS LOVELAND WATER,
5150 SNEAD DR
FORT COLLINS, CO 80525-3764

Affidavit Prepared
Monday, August 4, 2008
8:58 am

AFFIDAVIT OF PUBLICATION

REPORTER-HERALD

State of Colorado
County of Larimer

I, the undersigned agent, do solemnly swear that the DAILY REPORTER-HERALD is a daily newspaper published in the City of Loveland, County of Larimer, State of Colorado, and which has general circulation therein and in parts of Larimer and Weld Counties; that said newspaper has been continuously and uninterruptedly published for a period of more than six months next prior to the first publication of the annexed legal notice of advertisement, that said newspaper has been admitted to the United States mails as second-class matter under the provisions of the Act of March 3, 1879, or any amendments thereof, and that said newspaper is a daily newspaper duly qualified for publishing legal notices and advertisements within the meaning of the laws of the State of Colorado; that a copy of each number of said newspaper, in which said notice of advertisement was published, was transmitted by mail or carrier to each of the subscribers of said newspaper, according to the accustomed mode of business in this office.

That the annexed legal notice or advertisement was published in the regular and entire edition of said daily newspaper once; and that one publication of said notice was in the issue of said newspaper dated

August 5 , 2008 .

Mary DeLaura

Agent

Subscribed and sworn to before me this day of

August 5 , 2008.

Debra K. Rysavy

Notary Public

FEE $ **13.86**

DEBRA K. RYSAVY NOTARY PUBLIC STATE OF COLORADO

MY COMMISSION EXPIRES
APRIL 30, 2009
201 E. 5TH ST.
LOVELAND,
COLORADO 80537

Notice

Fort Collins - Loveland Water District (FCLWD) has completed a draft Water Conservation Plan. The goal of the plan is for FCLWD to develop strategies and programs for efficient and sustainable water use. FCLWD completed a Water Conservation Plan in 1996 and implemented emergency drought water rates in 2003. The Existing conservation efforts from the 1996 include:

- Aggressive leak detection and repair program
- Public information in billing and newsletters

Before finalizing the Water Conservation Plan, FCLWD is seeking input from its customers. FCLWD shall have a 60 day public review period beginning with the date of this notice through September 25, 2008. A complete draft copy will be kept at FCLWD's office located at 5150 Snead Drive, Fort Collins.

All written comments should be received by Karen Holt at the front desk prior to October 3, 2008. Comments can be mailed or dropped off at our office at 5150 Snead Drive, Fort Collins, CO 80525.

Publish:
Loveland Daily Reporter-Herald
August 5, 2008

APPENDIX B

FCLWD Board Plan Adoption

FORT COLLINS•LOVELAND WATER DISTRICT

RESOLUTION OF THE FORT COLLINS – LOVELAND WATER DISTRICT
REGARDING ADOPTION OF A WATER CONSERVATION PLAN

Resolution 08-01

Whereas, the Board of Directors of the Fort Collins – Loveland Water District ("District") recognized the importance of conserving water and improving water use efficiency; and

Whereas, under the Colorado Revised Statute 37-60-126 prompted by the Water Conservation Act of 2004, requiring water providers delivering over 2000 acre feet or more per calendar year are required to develop, adopt, and make publicly available and implement a water use efficiency plan; and

Whereas, a Draft Water Conservation Plan ("Plan") that describes the role of water use efficiency plans in the District's water supply planning was presented for review and comment at the Board Meeting held on July 15, 2008; and

Whereas, a public notice announcing the availability of the Plan for review and comment was published and the Plan was publicly available for a period of not less than sixty (60) days; now, therefore,

BE IT RESOLVED, that the Board of Directors of the Fort Collins – Loveland Water District hereby adopts the Water Conservation Plan attached hereto as Exhibit "A" and incorporated herein by reference.

Passed and adopted at a regular meeting of the Board of Directors of the Fort Collins – Loveland Water District held this 21st day of October, 2008.

By: _____
Chairman

FORT COLLINS - LOVELAND WATER DISTRICT
LARIMER
SEAL
COUNTY
COLORADO

ATTEST:

_____
Michael D. DiTullio, District Manager

5150 Snead Drive Fort Collins, CO 80525 Phone (970)226.3104 Fax (970)226.0186

APPENDIX C

Public Comments and Response

Currently the Fort Collins-Loveland Water District has completed its 60-day public review period for the Water Conservation Plan beginning on August 3, 2008 and ending on October 10, 2008. A public notice was posted in the following newspapers, Fort Collins Coloradoan and the Loveland Reporter-Herald and on the District's website at www.fclwd.com. During the public review period the District received no public comments on the Water Conservation Plan.