



November 14, 2014

Mr. Ben Wade
Colorado Water Conservation Board
Conservation and Drought Planning Section
1313 Sherman Street, 7th Floor
Denver, Colorado 80203

Subject: Town of Erie Conservation Plan Submittal

Dear Mr. Wade:

The Town of Erie (Erie) is pleased to submit our Water Conservation Plan (Plan) for your review and approval. We are excited about the opportunity this Plan will offer in enhancing our conservation efforts.

We contracted with AMEC Environment and Infrastructure to assist in the development of the Plan. The individuals that assisted with the plan at AMEC were Courtney Black, Hanna Sloan, and Lee Rozaklis. Paul Zilis with Vranesh & Raisch acted as the Town's Water Attorney. Town Staff included Russell Pennington, Gary Behlen, Jon Mays, Bruce Chameroy, and Paul Reed.

The Plan was developed in accordance with §37-60-126 C.R.S. and references many of the recommendations provided in CWCB's Water Conservation Plan Development Guidance Document. This guidance document served as a framework for the Plan's organization and content.

The Town of Erie's population in 2014 is approximately 22,000. The Town's retail water delivery for each of the past five years is as follows:

2009 – 721 MG 2010 – 879 MG 2011 – 939 MG 2012 – 1,009 MG 2013 – 870 MG

The Town will have a Public Hearing on the Conservation Plan at the Town's Board of Trustee's Meeting on January 13, 2015. The Town will advertise and have a 30 day review period for the public beginning December 3, 2014 in which a copy of the plan will be kept in the Public Works' office.

We truly appreciate the financial assistance provided by CWCB for the development of this Plan. Please contact me or Lee Rozaklis at AMEC with any questions.

Very truly yours,



Gary W. Behlen, PE
Director of Public Works
Town of Erie

Cc: Paul Zilis
Lee Rozaklis

Water Conservation Plan

Town of Erie

December 2014

Prepared for:

Town of Erie
645 Holbrook Street
Erie, CO 80516

Prepared by:



AMEC Environment and Infrastructure
1002 Walnut Street, Suite 200
Boulder, Colorado 80302

Executive Summary

Throughout Colorado, competition and costs for water supplies are increasing. One way to help reduce these costs is to conserve water, which can reduce the costs associated with water treatment and conveyance. Conservation also promotes stewardship of natural resources and the environment by reducing the amount of energy needed to pump and treat water. Conservation is an important component of Erie's water management strategy.

This Water Conservation Plan is an update to Erie's 2008 Water Conservation Plan. It provides an overview of Erie's water conservation activities implemented since 2008, Erie's water conservation goals specified in the 2008 Plan and how well Erie has accomplished those goals based on its historical water uses. Additionally, this update provides a set of new water conservation goals and conservation activities along with revised implementation and monitoring plans. Per State statute requirements, Erie intends to update this Plan by fall of 2021.

Town Profile

Erie is situated north of Denver in Weld and Boulder counties. The Town provides water and wastewater services to approximately 22,000 residential customers in addition to commercial and municipal users. Erie's population has more than doubled within the past ten years and it is anticipated that development will continue at a fast pace. Erie uses a combination of water sources to meet its potable and non-potable water needs including water from the Colorado Big Thompson (CBT) and Windy Gap projects, and local reservoir and ditch water. Erie's non-potable supply is primarily comprised of untreated ditch water and reclaimed water. This results in a variety of water "types". For purposes of this plan, the following types of water are defined:

- Ditch water – Erie's ditch water supplies that are untreated and used for irrigation of parks and other non-potable purposes.
- Treated water – Water that has been treated at the Lynn Morgan Water Treatment Facility and used for potable and non-potable purposes.
- Reuse water – Reclaimed water that has been treated at Erie's water reclamation facilities and used for non-potable purposes. This water may be reused to extinction and is currently limited to reclaimed water derived from Erie's Windy Gap shares discussed in further detail below.
- Raw water – Erie's potable water supplies prior to treatment at the Lynn Morgan Water Treatment Facility.
- First-use water – Erie's treated water and untreated ditch and reservoir water that are used for potable and non-potable purposes for the first time. This includes all of Erie's water supply sources with exception to reuse water.

Historical Water Use and the Former 2008 Water Conservation Goals

Although Erie has experienced consistent population growth, particularly in the early 2000s, Erie's per capita water use has decreased, indicating that its customers are using less water. This decrease in per capita water use is a common trend evident throughout the Front Range, attributed to a combination of behavioral changes resulting from the 2002 drought that have persisted long after the event occurred, and more prevalent use of water efficient fixtures, appliances and irrigation

systems. Further discussion of historical water uses, including per capita water use, indoor and outdoor water use and water use by customer type is included in Section 3.1.1.

Since the 2008 Water Conservation Plan, Erie has implemented a number of activities to achieve its conservation goals. As presented in Table ES-1, Erie has accomplished all but one of its goals. The decrease in housing construction due to the economic downturn is a main reason that goal number two was not attained. The development of Vista Ridge did not continue at the rate expected in 2008, thus the volume of reuse water used for non-potable purposes, e.g., outdoor irrigation, is currently less than projected.

Table ES-1 Goals of 2008 Water Conservation Plan

Goal No.	Summary	Goal Accomplished	Comments
1	Achieve an average annual per capita water use of 190 gpcd (first use) by 2014.	Yes	The average per capita first use of water from 2008 to 2013 was 150 gpcd, which is significantly less than the 190 gpcd goal.
2	Achieve 690 acre-feet of reuse water by 2014	No	This goal assumed that 350 acre-feet of reuse water would be developed at Vista Ridge. The rate of new development significantly declined from 2008 to 2013 and reuse was not developed at the rate anticipated in 2008.
3	Reduce water use by 15 percent on City parks	Yes	Erie has significantly reduced water use on Town Parks and continues to implement best management practices to maintain efficient irrigation.
4	Implement activities that are compatible with the community	Yes	Erie has received positive community feedback regarding its conservation activities and continues to experience reduction in annual water use.
5	Establish an effective monitoring system	Yes	Erie closely monitors its conservation activities and monitors water use on a more frequent basis than prior to the 2008 Conservation Plan.

2014 Conservation Goals

The development of attainable water conservation goals are a key component to the success of Erie's water conservation program. The goals listed below were developed with the objective of targeting a specific amount of water conservation savings, while also being compatible with the needs and expectations of the community. The expected time horizon for these goals is the year 2020, which corresponds with Erie's intent to update this water conservation plan in 2021.

- 1) Achieve a total first-use per capita water use of 146 gpcd by 2020.
- 2) Achieve a residential indoor per capita water use of 42 gpcd by 2020.
- 3) Achieve a 1% reduction in the percentage of non-revenue water by 2020 and consistently maintain an annual percentage of non-revenue water below 6%.
- 4) Continue to expand Erie's reuse system to utilize Erie's reusable Windy Gap return flows.
- 5) Implement conservation activities that are compatible with the community and are sustainable from an economic, social and environmental perspective.

- 6) Maintain a fair and equitable water rate structure that promotes efficient use while maintaining sufficient revenue.

Conservation Activities

A variety of water conservation activities were assessed to identify their compatibility with Erie's needs and ability to achieve the target water conservation saving goals. This included a review of the water conservation activities implemented since the 2008 Plan as well as potential activities currently not implemented by the Town. Table ES-2 provides a description for each of the water conservation activities selected for implementation.

Table ES-2 Water Conservation Activities

Conservation Activities	Customer Sectors							Description	Adopted in 2008 Plan	New Activity in the 2014 Plan
	Town Services	Parks	Golf Course	Construction	HOA	Residential	Commercial			
Foundational Activities										
Metering										
Metering of source water	X							Erie meters water treatment production, diversions of its ditch water, and deliveries of CBT and Windy Gap water. Since 2008, Erie has worked to improve monitoring of its reservoirs and conveyance of source water. Erie plans to continue improvements as metering technology improves and financial resources are available.	X	
Meter service connections and replacement of meters	X							Erie began to replace meters older than 10 to 12 years in 2005 and fully outfitted the service area with remote-read meters in 2007/2008. This improves metering reliability and helps to ensure that customers are accurately billed for the volume of water consumed.	X	
Water Use Data Collection and Billing Systems										
Volume billing	X	X	X	X	X	X	X	Volume billing coupled with Erie's tiered block rate structure has proven to be effective in making customers financially sensitive to the amount of water they use and consequently increased customers' awareness of water consumption. Erie plans to continue billing customers on a monthly basis based on the volume of water used.	X	

Conservation Activities	Customer Sectors							Description	Adopted in 2008 Plan	New Activity in the 2014 Plan
	Town Services	Parks	Golf Course	Construction	HOA	Residential	Commercial			
Improved water accounting	X	X	X	X	X	X	X	Erie's current billing system consists of residential, commercial, irrigation and construction enabling Erie to track water use by customer sector. Erie is updating its billing system software and plans to continue to improve its water accounting by individually accounting for multi-family, single-family and parks.	X	
Water Use Efficiency Oriented Rates and Tap Fees										
Tiered block rate structure						X		Erie uses a four tiered block rate structure for the residential sector and is currently conducting a water rate analysis to identify modifications that could be made to further incentivize efficient water use while also ensuring sufficient revenue for the Town.	X	
System Water Loss Management and Control										
Leakage detection program and leak repair	X							Erie's valve inspection and sonic leak detection program has been useful in detecting leaks. The program typically focuses on the older infrastructure within the Town. Residents may report water leaks by calling the following hotline: 303-591-2811.	X	
Analysis of non-account water	X							Erie annually accounts for non-revenue water. Erie began to calculate and report hydrant flushing flows in 2010. This reduces the amount of unaccounted for water and subsequently improves Erie's ability to estimate distribution system water losses.	X	
Reuse Program										
Reuse water	X							Erie plans to fully utilize its Windy Gap return flows; therefore reuse water will increasingly become an important source of water supply. As the Town continues to develop, more reuse will be brought online to irrigated parks and open spaces. Many new developers have expressed interest in using the reuse water and are currently tying into the system.	X	
Reuse water for flushing/cleaning of the wastewater treatment facilities	X							Erie began to use treated reclaimed water for flushing and cleaning at the SWRF in 2007. The SWRF was taken off line in 2011, shortly after the newly constructed NWRF came online. The NWRF currently uses reuse water for flushing and cleaning of the plant. Erie plans to eventually bring the SWRF back online and continue to use reuse water for the flushing and cleaning.	X	

Conservation Activities	Customer Sectors							Description	Adopted in 2008 Plan	New Activity in the 2014 Plan
	Town Services	Parks	Golf Course	Construction	HOA	Residential	Commercial			
Targeted Technical Assistance and Incentives										
Town Parks										
Drought resistant vegetation, low water use landscapes and soil preparation		X						Erie has established low water use landscapes and drought resistant vegetation on many of the parks. Low water use landscaping was installed on the Community Park in 2010 and recently installed for the NWRF landscaping and at other municipal buildings. Irrigation is scheduled to avoid high evaporation rates during the day.	X	
Evapotranspiration (ET) controllers		X						Erie installed a weather station and ET controllers at all Town parks. This avoids over-irrigating by monitoring the parks' irrigation requirement and keeping irrigation to the required level.		X
Moisture sensors		X						Erie installed moisture sensors at all Town parks. These sensors detect precipitation and shut off the irrigation system if it is raining.		X
Efficient irrigation practices and scheduling		X						Irrigation is scheduled to avoid high evaporation rates during the day and a cycle soak method is used to irrigate turf, improving irrigation effectiveness and efficiency.	X	
Fixtures and Rebates										
Washing machine rebate program							X	The replacement of an older washing machine with a front load machine can save approximately 20 gallons of water per load. Erie established a washer rebate program in 2008. This program has proven to be very popular among residents and provides both a means to educate the public and produce measureable indoor water savings.	X	
Pre-rinse spray valves							X	Erie established a pre-rinse spray valve give-away program to commercial businesses in 2008. This program has proven to not be very popular among customers. Erie plans to cease this program once the remaining pre-rinse spray valves in stock are given away.	X	

Conservation Activities	Customer Sectors							Description	Adopted in 2008 Plan	New Activity in the 2014 Plan
	Town Services	Parks	Golf Course	Construction	HOA	Residential	Commercial			
Economic development advisor recommendations							X	Erie is currently working with an economic development advisor on identifying the needs of Erie's business sector and how the Town can most effectively promote water conservation within the sector. The Town plans to follow up on specific recommendations of the economic development advisor.		X
Indoor and Outdoor Irrigation Audits										
Customer irrigation audits						X	X	Erie partners with the CRC to provide a free irrigation audits to residential and commercial customers. The audit program is designed to identify irrigation inefficiencies.	X	
Indoor water inspection program						X		Erie partners with the CRC to provide indoor water inspections that evaluate indoor water use and fixtures and offer the installation of two aerators and one low-flow showerhead.		X
Do-it-yourself irrigation audit kits						X		Erie offers free do-it-yourself irrigation audit kits that are available through the Public Work Department. These include catch cups to measure the sprinkler system's output and coverage, flags, a soil probe, a pressure gauge to measure water pressure, and instructions.		X
Ordinances and Regulations										
Water wasting ordinance	X	X	X	X	X	X	X	Erie has a water wasting ordinance that prohibits the waste of water. This measure has proven to be effective in clearly defining Erie's position against the wasting of water.	X	
Policy on landscape design		X						Erie Policy, Standards and Specifications for parks, medians, large irrigated HOA areas and recreation construction require irrigation efficiency, low water use landscaping, and good soil preparation as design goals.	X	
Policies on irrigation system design	X	X	X		X	X	X	Policy stating that all required landscaping should be irrigated as required for plant establishment and maintenance yet irrigation systems should be designed to achieve water efficiency as a major goal.	X	

Conservation Activities	Customer Sectors							Description	Adopted in 2008 Plan	New Activity in the 2014 Plan
	Town Services	Parks	Golf Course	Construction	HOA	Residential	Commercial			
Watering restrictions	X	X	X	X	X	X	X	Erie recently developed a Drought Management Program that defines voluntary water restrictions and three tiers of mandatory restrictions that correspond with the intensity of a drought.	X	
Education Activities										
Informative and understandable water bill	X	X	X	X	X	X	X	Erie's water bill provides each customer with information on how much water they used per monthly billing cycle and how much water was used the same month of the previous year. This information enables customers to compare and regulate their water use on a monthly basis.	X	
Distribution of information via bill inserts, Town website, and email distribution list	X	X	X	X	X	X	X	Erie uses its website, email distribution list, and bill inserts to convey water conservation information on a regular basis. These media provide an effective means to communicate to the majority of customers.	X	
Water conservation pamphlets					X			Erie plans to continue to distribute conservation and xeriscape pamphlets to HOAs.	X	
Xeriscape seminars	X	X				X	X	Since 2012, Erie has partnered with CRC to provide an annual public xeriscape seminar in the spring. This seminar is given by a local professional landscaper and provides information on how to replace high water-use grass with xeriscape.		X
Demonstration gardens						X		Erie installed xeriscape demonstration gardens at the Community Park in 2010. These demonstration gardens educate the public on wise-water use and how landscapes may be designed to conserve water.		X
School programs						X		Host field trips to the Town's water treatment facilities and educate school children on water management and conservation.	X	

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1.0 INTRODUCTION

Throughout Colorado, competition and costs for water supplies are increasing. One way to help reduce these costs is to conserve water, which can reduce the costs associated with water treatment and conveyance. Conservation also promotes stewardship of natural resources and the environment by reducing the amount of energy needed to pump and treat water. Conservation is an important component of Erie's water management strategy.

This Water Conservation Plan is an update to Erie's 2008 Water Conservation Plan. This Plan provides an overview of Erie's 2008 water conservation goals, conservation activities implemented by Erie since the 2008 plan and how well Erie has accomplished the goals. During the Plan development, Erie staff had an opportunity to review the effectiveness of Erie's existing conservation activities, discuss lessons learned and identify additional activities that Erie should implement to support efficient water use. Erie staff also developed a set of new water conservation goals and implementation and monitoring plans to help ensure that the selected conservation activities are compatible with the new goals. The public also had an opportunity to review the Plan during a 30-day public review process.

This Plan was also designed to be compatible with Erie's future development plans, its water supply planning efforts, drought management plan and community values. Additionally, this Plan was developed in accordance with Colorado statutes and Colorado Water Conservation Board (CWCB) guidelines. The CWCB officially approved the Plan as a "State approved Plan" in the fall of 2014.

2.0 PROFILE OF EXISTING WATER SUPPLY SYSTEM

2.1 Overview of Erie's Water Supply System

Erie is situated north of Denver in Weld and Boulder counties. Erie provides water and wastewater services to approximately 22,000 residential customers in addition to commercial users and other municipal needs. The planned service area is an irregular shape that consists of approximately 50 square miles bordered generally to the east by Interstate 25, to the west by Highway 287, to the north by Niwot Road, and to the south by Highway 7. Erie's population has more than doubled within the past ten years and it is anticipated that development will continue at a fast pace.

Transbasin and local water supplies are treated at the Lee Morgan Water Treatment Facility for potable use. Wastewater is currently treated at the North Water Reclamation Facility (NWRf) and is either stored for non-potable reuse or discharged into Coal Creek. When needed, Erie plans to bring the South Water Reclamation Facility (SWRF), which was the former water treatment facility, back online.

Erie's water supply is comprised of a variety of surface water sources. Erie's original and locally-derived water supplies consist of direct flow and storage rights diverted from South Boulder Creek and Coal Creek. Storage rights are diverted into Prince, Erie and Thomas reservoirs for potable and non-potable use. Erie receives the majority of its supply from the Colorado Big Thompson and Windy Gap projects, which divert from the Colorado River Basin. The CBT project consists of 11 reservoirs on the west and east slopes with a total reservoir storage capacity of approximately 1,000,000 acre-feet, 35 miles of tunnels, 95 miles of canals, 7 hydroelectric power plants and 700 miles of transmission facilities. This project delivers on average more than 200,000 acre-feet of supplemental water to Front Range municipal and agricultural contractors.

The Windy Gap Project includes a diversion dam on the Colorado River, a 445-acre-foot reservoir, a pumping plant, and a six-mile pipeline to Lake Granby. Windy Gap water supplies are pumped and stored in Lake Granby before delivery to municipal water users through CBT's East Slope distribution system.

Return flows derived from Erie's first use of its Windy Gap water are legally reusable and Erie reuses its Windy Gap return flows for outdoor irrigation purposes. First-use and reuse water is stored in the non-potable 1,000 acre-foot reservoir adjacent to the NWRf. Reuse and untreated ditch water may also be stored in a raw water pond adjacent to the Erie Commons development.

As a standard operational practice, Erie utilizes NCWCD's CBT carryover program, which allows Erie to store up to 20% of its annual CBT allotment in CBT project storage from one year to the next. This carryover storage serves as a drought reserve if drought conditions occur in the following year.

Erie also has emergency treated water interconnections with the Left Hand Water District and the City of Lafayette

2.2 Water Supply Reliability

Erie is located in the northern area of the South Platte Basin, which the Statewide Water Supply Initiative (SWSI) 2010 Report projects will need an additional 25,500 to 137,700 acre-feet per year (AFY) of water by 2050 to meet an additional 131,200 to 184,900 AFY of municipal and industrial (M&I) and self supplied industrial water demands.¹ There are several regional projects in which Erie is a participant that are currently undergoing environmental review to bring supplies to the area. These projects are discussed in further detail in Section 2.3.

Water supply reliability planning is necessary to ensure there are sufficient supplies to meet growing demands as well as during drought. Erie's water supply reliability depends on a variety of factors including the priority of its water rights, available storage capacity, rate of customer growth and ability to respond to emergencies. While the Town currently has sufficient water supplies to meet existing needs, additional supplies will be needed to meet future demands. Erie regularly monitors its projected future water needs and acquires additional supplies as necessary to meet its growing demands.

2.3 Supply-Side Limitations and Future Needs

While Erie has sufficient water supplies to meet its current needs, new supplies are necessary to meet growing demands. Erie's current policy requires new development within the Town's service area to provide either new water supplies or equivalent in-lieu cash payments. Erie plans to acquire more CBT units and is a participant in the Windy Gap Firming Project, which would increase the reliability of Windy Gap supplies such that Erie would be able to receive a substantial portion of its Windy Gap allotment during dry years. Erie is also a participant in the Northern Integrated Water Supply Plan (NISP) and has requested an annual 6,500 acre-feet of firm yield from that project. Erie also plans to purchase additional local ditch water rights and expand its non-potable reuse supplies.

Erie was recently awarded the Rocky Mountain AWWA Regional Best Tasting Water designation for Colorado, Wyoming and New Mexico and intends to continue to provide high quality water to its customers. Infrastructure improvements and treatment facility expansions will also be needed to meet growing demands and to continue to ensure high quality water. Erie is currently under contract to construct a pipeline to bypass its raw water deliveries around one of its reservoirs when the reservoir is experiencing high algae blooms. Recent planning efforts that address the Town's future needs ensuring a reliable high quality water supply include:

- 2005 Comprehensive Plan
- 2013 Wastewater Utility Master Plan
- 2013 Water Master Plan
- 2014 Non-Potable Master Plan
- 2014 Drought Management Plan
- 2014 Water Conservation Plan

¹ Source: CWCB. 2011. SWSI 2010 Report Appendix J – Technical Memorandum 2050 M&I Gap Analysis. These ranges were developed by assuming high and low water demand scenarios in addition to a 100% and 40% success rates for identified projects and processes.

Other factors that could impact Erie's long-term water supply reliability include climate change and the potential for a Colorado River compact call. These factors are being addressed in several regional and state-sponsored studies including the Colorado River Water Availability Study, the Joint Front Range Climate Change Vulnerability Study and the Boulder County Climate Change Preparedness Plan. Erie tracks the latest studies on these topics.

3.0 PROFILE OF WATER USE AND HISTORICAL DEMAND MANAGEMENT

3.1 Demographics and Key Characteristics of the Service Area

Erie was incorporated in 1874 as a coal mining town. The community remained a relatively small rural town until the 1990s when the first modern subdivisions were constructed. Erie's population has doubled within this decade with a current (2014) population of approximately 22,000 people. Erie's population is anticipated to increase as Erie continues to develop. Erie projects that it will serve approximately 40,680 people by 2025.² According to Erie's 2005 Comprehensive Master Plan, approximately two thirds of Erie's planning area could ultimately be developed for residential and commercial uses with the remainder of the planning area consisting of open space and other regional facilities.

3.1.1 Historical Water Use

Total Water Use

While Erie's total annual water use has increased in response to population growth, per capita water use has decreased since the 2002 drought, indicating that Erie's customers are reducing their individual water use. This downward trend in per capita water use since 2002 is common throughout municipal communities along the Front Range.

Figure 3-1 shows Erie's total annual water use, split into treated water, ditch water and reuse water, as well as average daily per capita water use from 2001 through 2013. Per capita use was estimated by dividing total system water use (sum of treated water, ditch water and reuse water) by the residential population. System-wide per capita water use spiked in 2002, in part because of the drought and because irrigation using reclaimed water and leased raw ditch water on Vista Ridge began that year. Since then per capita water use has decreased.

² Erie's 2005 Comprehensive Master Plan projected that the Town would grow at a rate of 6% annually from 2007 through 2017, and then at a rate of 4% annually to a projected population of 40,680 persons by 2025.

Figure 3-1 Total Annual and Per Capita Water Use

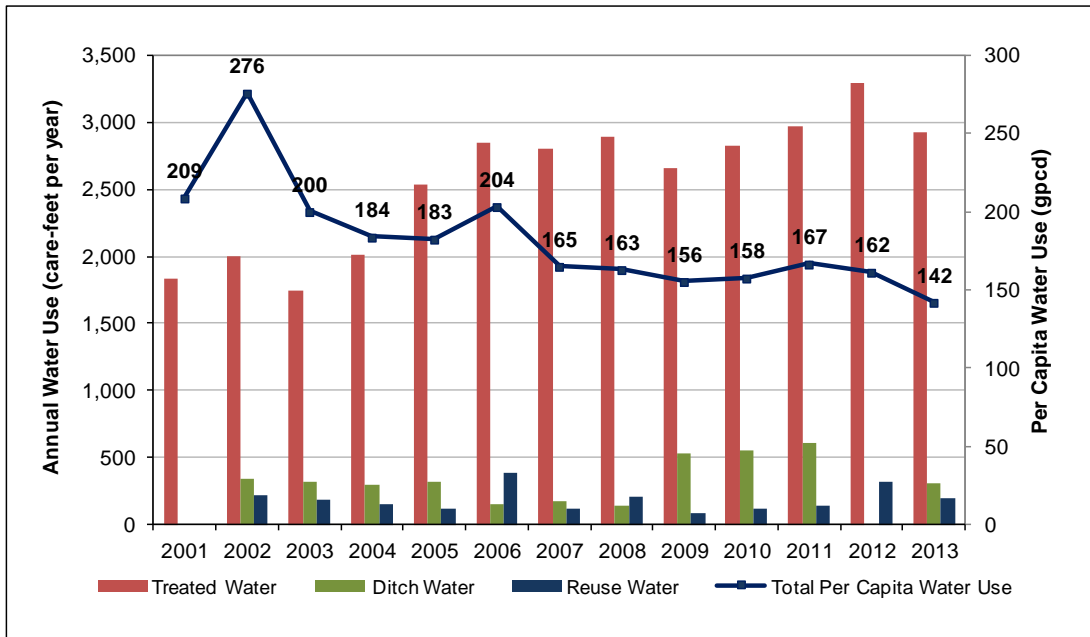
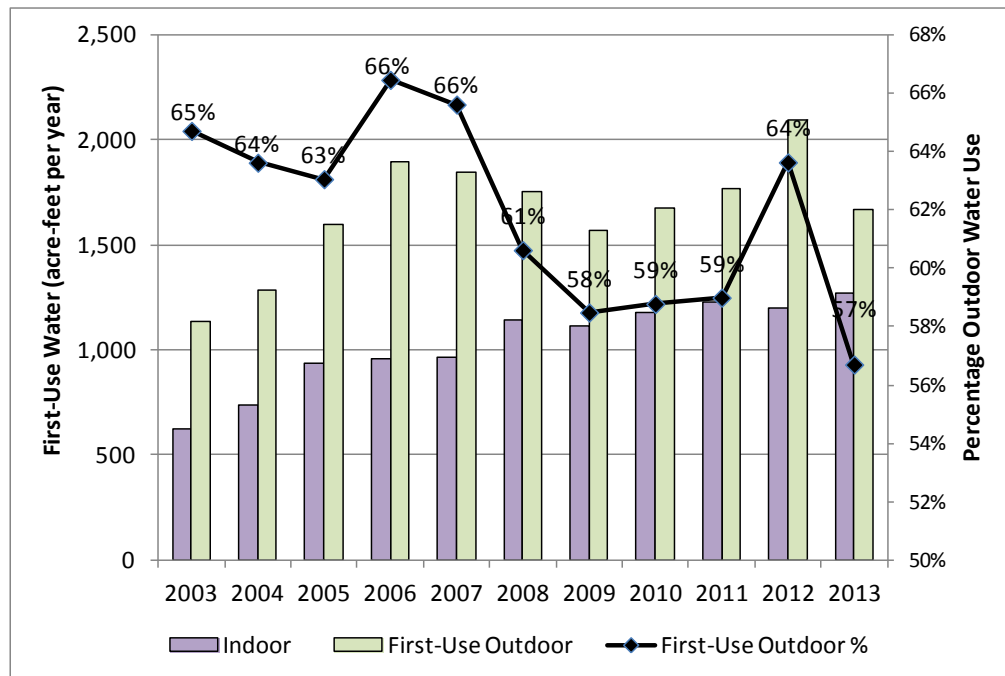


Figure 3-2 shows Erie's annual indoor and outdoor water use and the annual percentage of outdoor use from 2003 to 2013. On average, 62% of Erie's water use is for outdoor irrigation³.

Figure 3-2 Indoor and Outdoor First-Use Water



³ Indoor water use was estimated assuming that all water use during December through February was indoor, and that indoor use during March through October was equal to the average of the previous December through February use. Outdoor water use was calculated by subtracting estimated indoor use from total use.

3.1.2 Water Use by Customer Sector

Erie's treated water customer billing data is comprised of the following customer sectors: residential, commercial, irrigation and construction water. As shown in Figure 3-3, residential is the largest customer category followed by commercial. Each customer sector includes the following:

- Residential – Single-family and multi-family residential properties.
- Commercial - Commercial facilities, Home Owners Association (HOA) irrigated open space and other common uses, schools and municipal buildings.
- Irrigation – Outdoor irrigation accounts including Town parks and irrigation on Town property
- Construction – Construction accounts for new development within the Town.

Figure 3-3 Average Customer Water Use by Sector (2009 to 2013)

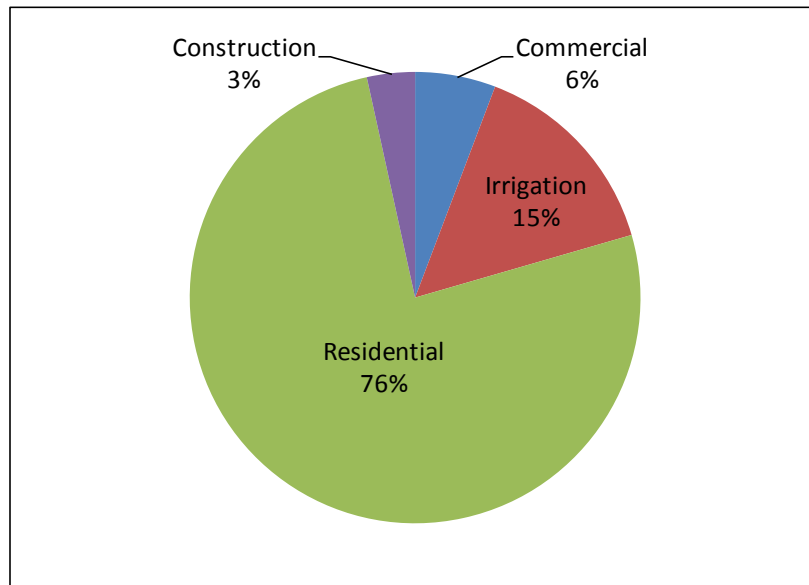


Table 3-1 shows the annual water use by customer sector. Prior to 2009, the commercial and irrigation sectors were grouped under the commercial category and therefore, data available on these individual sectors is limited to 2009 and after. The commercial water use in 2011 appears to be rather high when compared to other years of available data, and the irrigation water use appears low. It is possible that after the separation of these two sectors into separate billing types in 2009, data inconsistencies ensued for a couple of years. For example, some irrigation accounts may be included in commercial in 2011 thus causing the water use for these two categories to appear inconsistent as compared with other years.

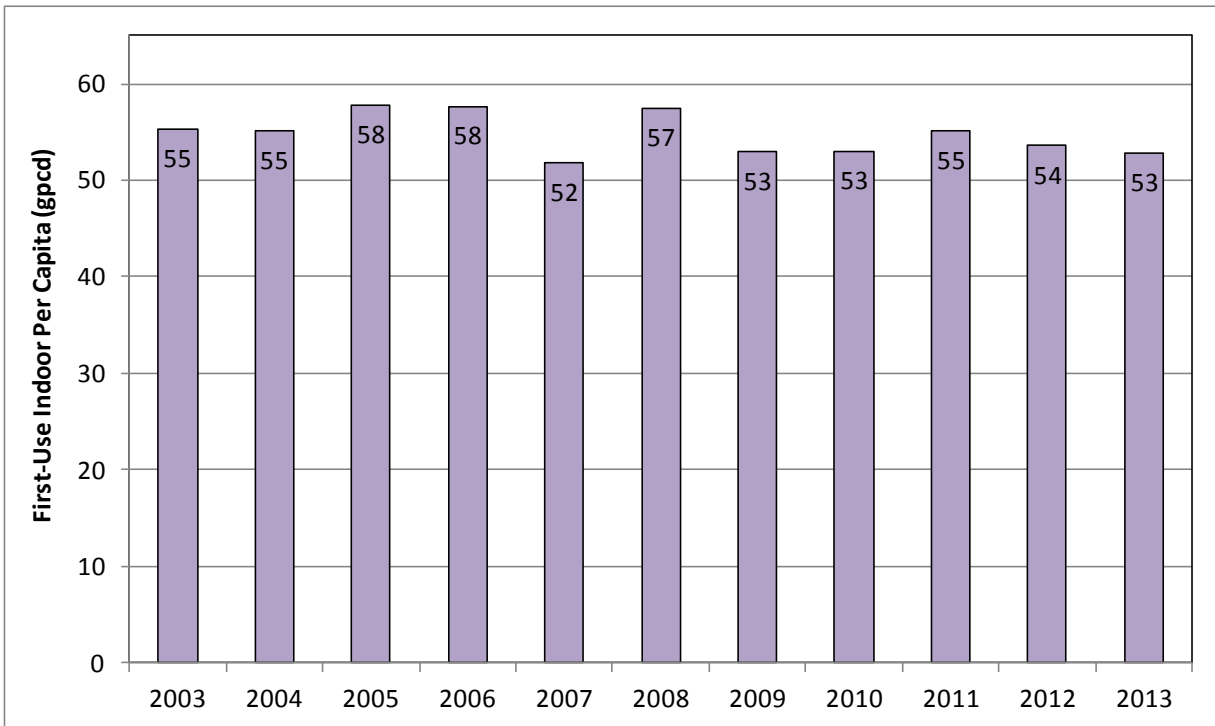
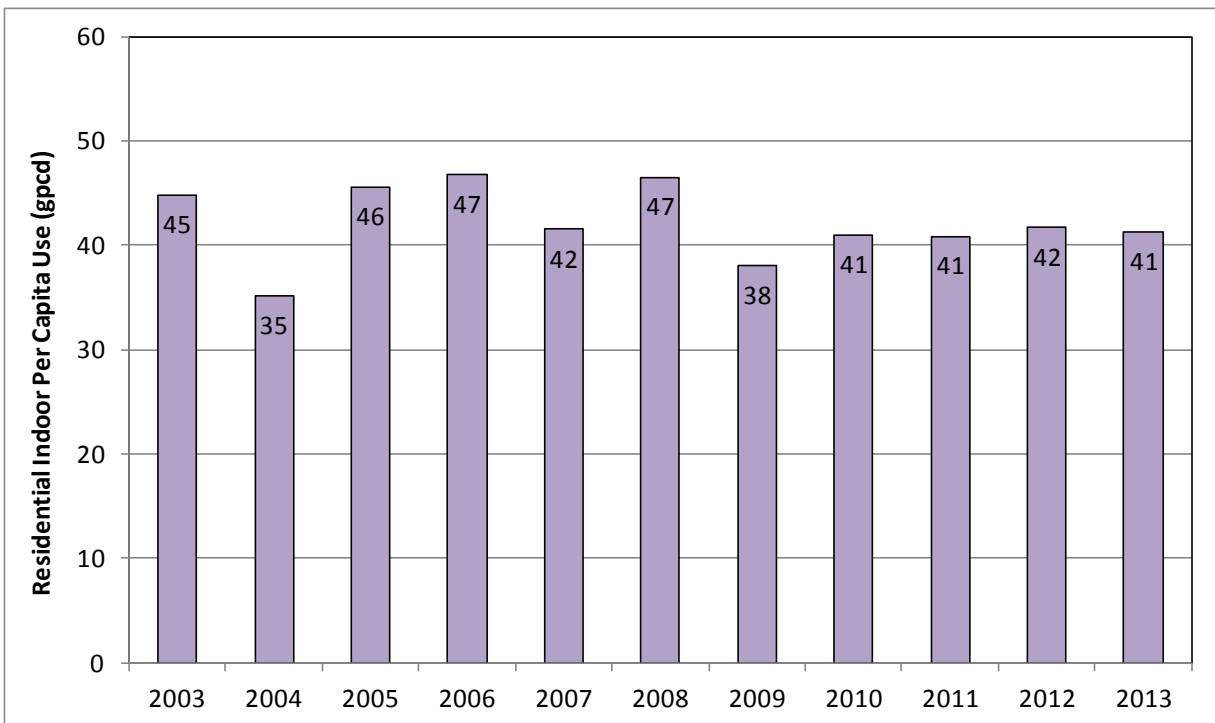
Table 3-1 Water Use by Customer Type (AFY) and Service Area Population

Year	Commercial	Irrigation	Residential	Construction	Total Metered End Use	Service Area Population
2001	112	*	1,266	56	1,434	7,810
2002	99	*	1,278	302	1,679	8,300
2003	229	*	1,209	56	1,494	10,020
2004	269	*	1,269	448	1,986	11,910
2005	401	*	1,788	76	2,265	14,500
2006	489	*	2,224	30	2,743	14,810
2007	458	*	2,167	80	2,705	16,642
2008	461	*	2,181	50	2,692	17,702
2009	113	372	1,589	139	2,213	18,761
2010	111	432	2,087	67	2,697	19,821
2011	342	293	2,139	109	2,883	19,881
2012	113	539	2,408	36	3,096	19,940
2013	102	364	2,089	114	2,669	21,500

Indoor Water Use and Passive Savings

Erie's indoor water use reflects the relatively recent age of its buildings and their water-using fixtures and appliances. Figures 3-4 and 3-5 show total and residential indoor per capita water use⁴, respectively. Total indoor per capita water use has fluctuated between 52 and 58 gpcd from 2003 to 2013, with an average of 55 gpcd, while residential indoor per capita water use has fluctuated between 35 and 47 gpcd, with an average of 42 gpcd over the same period. Residential indoor per capita water use is quite low even by modern standards. Nearly all of the homes in Erie were built after federal plumbing standards were in effect and many of them were built more recently; thus Erie's residential indoor per capita water use already largely reflects water savings from toilets using 1.6 gallons per flush or less, faucets using 2.2 gallons per minute (gpm) or less, and showerheads using 2.5 gpm or less. As new fixtures and appliances continue to become more water efficient, the Town's indoor water use will likely decrease over the long-term as customers eventually replace existing fixtures and appliances with more efficient ones. However, a significant reduction in indoor per capita use is unlikely to occur in the short-term, as the majority of buildings in Erie are relatively new and are already equipped with water efficient fixtures and appliances.

⁴ Total indoor per capita use was calculated from December-February treated water production data and estimated service area population. Residential indoor per capita use was estimated as total indoor per capita use multiplied by the ratio of residential billed use to total billed use.

Figure 3-4 Total Indoor Per Capita Water Use**Figure 3-5: Residential Indoor Per Capita Use**

Non-Revenue Water

Table 3-2 shows the Town's Lynn Morgan Water Treatment Facility production relative to the total metered end-use. The difference between treated water production and metered end-use is non-revenue water. Erie has made significant metering improvements to account for and reduce non-revenue water. Since 2013, the Town has improved the accuracy of its metering at the discharge from the water treatment facility and since 2010, metered the water used for the pipeline flushing maintenance. Erie also has a leak detection program inspecting valves and using sonic radar technology that focuses on the older components the Town's system. The majority of Erie's water supply system is relatively new and leaks of notable size are rarely found. Additional information on Erie's leak detection program is provided in Section 5.0.

Table 3-2 Non-Revenue Water (AFY)

Year	Water Treatment Plant Production	Total Metered End Use	Annual Non-Revenue Water	Percentage of Annual Non-Revenue Water
2001	1,829	1,434	395	21.6%
2002	2,005	1,679	326	16.3%
2003	1,746	1,494	252	14.4%
2004	2,011	1,986	25	1.2%
2005	2,533	2,265	268	10.6%
2006	2,843	2,743	100	3.5%
2007	2,801	2,705	96	3.4%
2008	2,888	2,692	196	6.8%
2009	2,653	2,213	440	16.6%
2010	2,829	2,697	132	4.7%
2011	2,965	2,883	82	2.8%
2012	3,291	3,096	195	5.9%
2013	2,924	2,669	255	8.7%

3.2 Past and Current Demand Management Activities and Effects upon Water Use

3.2.1 Past Water Conservation Activities

Table 3-3 lists the water conservation activities Erie has historically implemented. The conservation activities are grouped into the following categories per State guidelines:

- Foundational activities – Set of activities necessary for an effective water conservation program that are recommended by the State as highest priority. These activities include metering and water use data collection, water efficient water rates and tap fees and system water loss management.
- Targeted technical assistance and incentives – Collection of activities that rely on indoor water efficient technologies and water-wise outdoor practices.

- Ordinances and regulations – Series of ordinances, regulations and/or policies that promote or enforce water efficiency.
- Education activities - Variety of techniques and venues to convey water conservation information to the public

Additional information on each of the conservation activities summarized in Table 3-3 is provided in Section 5.1. This includes water saving estimates for each activity for which such savings can be estimated to a reasonable degree of accuracy.

Table 3-3 Past Water Conservation Activities

Conservation Activities	Customer Sector							Description and Activities Conducted Since 2008	Implementation		
	Town Services	Parks	Golf Course	Construction	HOA	Residential	Commercial		Initiated prior to 2008 Plan	Implemented as a component of the 2008 Plan	Initiated since 2008 Plan
Foundational Activities											
Metering											
Metering of source water	X							Erie meters water treatment production, ditch water diversions and CBT and Windy Gap water deliveries. Since 2008, Erie has improved monitoring of its reservoirs and conveyance of source water.	X	X	
Meter service connections and replacement of meters	X	X	X	X	X	X	X	Erie began to replace meters older than 10 to 12 years in 2005 and fully outfitted the service area with remote-read meters in 2007/2008. This improves metering reliability and helps to ensure that customers are accurately billed for the volume of water consumed. This also improves Erie's ability to evaluate distribution system water losses.	X	X	
Water Use Data Collection and Billing Systems											
Volume billing	X	X	X	X	X	X	X	Erie has metered and billed customers based on the amount of water used since 1972. This has increased customers' financial awareness of water consumption.	X	X	

Conservation Activities	Customer Sector							Description and Activities Conducted Since 2008	Implementation		
	Town Services	Parks	Golf Course	Construction	HOA	Residential	Commercial		Initiated prior to 2008 Plan	Implemented as a component of the 2008 Plan	Initiated since 2008 Plan
Improved water accounting	X			X	X	X	X	Erie further refined its billing categories in 2009 by separating outdoor irrigation accounts from commercial. Erie's current billing system consists of residential, commercial, irrigation and construction, which enables Erie to better track its water use among customer sectors.		X	
Water Use Efficiency Rates and Tap Fees											
Tiered block rate structure						X		Erie uses a four tiered block rate structure for the residential sector and is currently conducting a water rate analysis to identify beneficial adjustments.	X	X	
System Water Loss Management and Control											
Leakage detection program and leak repair	X	X	X	X	X	X	X	Erie's valve inspection and sonic leak detection program has been useful in detecting leaks. The program typically focuses on the older infrastructure within the Town. Residents may report water leaks by calling the following hotline: 303-591-2811.	X	X	
Analysis of non-account water	X	X	X	X	X	X	X	Since 2009, unmetered water use accounts for about 8% of Erie's total annual water use. Erie began to calculate and report hydrant flushing flows in 2010. This reduces the amount of unaccounted for water and subsequently improves Erie's ability to estimate distribution system water losses.	X	X	

Conservation Activities	Customer Sector							Description and Activities Conducted Since 2008	Implementation		
	Town Services	Parks	Golf Course	Construction	HOA	Residential	Commercial		Initiated prior to 2008 Plan	Implemented as a component of the 2008 Plan	Initiated since 2008 Plan
Reuse and Non-Potable Raw Water Program											
Non-potable raw water	X							Erie has historically used raw water to irrigate portions of Vista Ridge since the late 1990s and brought Erie Commons online in 2006. Erie recently updated its Non-Potable Water Master Plan to significantly expand reuse.	X	X	
Reuse water for flushing/cleaning of SWRF's system (wastewater treatment plant)	X							The SWRF has historically used potable water for flushing and cleaning of the plant. Erie began to use treated wastewater for the SWRF in 2007 and uses reclaimed water in the newly constructed NWRF.		X	
Targeted Technical Assistance and Incentives											
Town Parks											
Drought resistant vegetation Low water use landscapes Scheduling	X	X						Erie has established low water use landscapes and drought resistant vegetation on many of the parks. Low water use landscape was installed on the Community Park in 2010 and recently installed for the NWRF landscaping and at other municipal buildings. Irrigation is scheduled to avoid high evaporation rates during the day.	X	X	
Moisture sensors	X	X						Erie installed moisture sensors at all Town parks. These sensors detect precipitation and shut off the irrigation system if it is raining.		X	

Conservation Activities	Customer Sector							Description and Activities Conducted Since 2008	Implementation		
	Town Services	Parks	Golf Course	Construction	HOA	Residential	Commercial		Initiated prior to 2008 Plan	Implemented as a component of the 2008 Plan	Initiated since 2008 Plan
ET controllers	X	X						Erie installed and began using a weather station and ET controllers at all Town parks in 2011. This avoids over-irrigating by monitoring the parks' irrigation requirement and keeping irrigation to the required level.		X	
Fixtures and Rebates											
Washing machine rebate program						X		Rebate program offering a fixed number of rebates annually of \$50 for high water use efficiency washing machines. Erie has given out 414 rebates between 2008 and 2013.		X	
Pre-rinse spray valves							X	Erie gave away 6 pre-rinse spray valves to restaurants and commercial businesses between 2008 and 2013.		X	
Indoor and Outdoor Irrigation Audits											
Customer irrigation audits						X	X	Erie provides a free irrigation audit program for residential and commercial customers. The audit program is designed to identify irrigation inefficiencies. This program can result in the reduction of water use and associated costs and reduce runoff improving water quality. Approximately 595 irrigation audits were performed from 2008 to 2013. Erie has partnered with CRC for managing this program starting in 2004.	X	X	X
Indoor water inspection program						X		Erie has partnered with the CRC since 2012 to provide indoor water inspections that evaluate indoor water use and fixtures and offer the installation of two aerators and			X

Conservation Activities	Customer Sector							Description and Activities Conducted Since 2008	Implementation		
	Town Services	Parks	Golf Course	Construction	HOA	Residential	Commercial		Initiated prior to 2008 Plan	Implemented as a component of the 2008 Plan	Initiated since 2008 Plan
								one low-flow showerhead per home. The CRC performed 126 indoor audits in 2012 and 2013.			
Do-it-yourself irrigation audit kits						X		Erie offers free do-it-yourself irrigation audit kits that are available through the Public Works Department. The kit includes catch cups to measure sprinkler system's output and coverage, flags, a soil probe, a pressure gauge to measure water pressure, and instructions. The program started in 2009, and approximately 10 kits have been distributed since then.			X
Water consumption tracker						X		Erie offered in-home water consumption meters that allow residents to closely track indoor and outdoor water use for a cost of \$105 per meter. This program element has been discontinued because it was no longer supported by the meter manufacturer.			X
Ordinances and Regulations											
Water wasting ordinance	X	X	X	X	X	X	X	Erie has an ordinance that prohibits the waste of water. This measure has proven to be effective in clearly defining Erie's position on the negligent wasting of water.	X	X	
Policy on landscape design	X	X		X	X	X	X	Erie's Policy and Standards and Specifications for parks, medians, large irrigated HOA areas, and recreation construction require irrigation efficiency as a goal for the design of new parks, good soil preparation, and development of low water use landscaping designs.	X	X	

Conservation Activities	Customer Sector							Description and Activities Conducted Since 2008	Implementation		
	Town Services	Parks	Golf Course	Construction	HOA	Residential	Commercial		Initiated prior to 2008 Plan	Implemented as a component of the 2008 Plan	Initiated since 2008 Plan
Policies on irrigation system design	X	X	X		X	X	X	Policy stating that all required landscaping should be irrigated as required for plant establishment and maintenance yet irrigation systems should be designed to achieve water efficiency as a major goal.	X	X	
Watering restrictions	X	X	X	X	X	X	X	Erie has implemented a voluntary three-tiered water restriction program since 2002. Erie recently developed a Drought Management Program that includes voluntary water restrictions and three tiers of water restrictions.	X	X	
Education Activities											
Informative and understandable water bill	X	X		X	X	X	X	Erie's water bill provides each customer with information on how much water was used per monthly billing cycle and how much water was used the same month of the previous year. This information enables customers to compare and regulate the water use on a monthly basis.	X	X	
Distribution of information via bill inserts, town website, and local newspaper		X		X	X			Erie uses their website, email distribution list, bill inserts to convey water conservation information. Erie's website currently posts information on their water conservation program, a manual on WaterWise landscaping, irrigation system maintenance tips, irrigation best management practices and links to other conservation sources.	X	X	X
Water conservation pamphlets		X	X	X	X	X	X	Erie distributed water conservation and xeriscape pamphlets to all of its customers twice a year as billing inserts in 2013 and 2014.		X	

Conservation Activities	Customer Sector							Description and Activities Conducted Since 2008	Implementation		
	Town Services	Parks	Golf Course	Construction	HOA	Residential	Commercial		Initiated prior to 2008 Plan	Implemented as a component of the 2008 Plan	Initiated since 2008 Plan
Xeriscape seminars					X	X	X	Since 2012, Erie has partnered with CRC to provide public xeriscape seminars.			X
Demonstration gardens								Erie installed xeriscape demonstration gardens at the Community Park in 2010.			X
School programs		X						Erie has provided education programs to fourth and fifth graders since 2003. Topics have included: equipment safety, water treatment, stormwater, water conservation and field trips to the treatment facilities.	X	X	

Lessons Learned

Erie learned the following lessons through implementation of the 2008 Water Conservation Plan.

- Erie attempted to use pressure transducers to monitor storage in its reservoirs. The transducers did not provide accurate measurements. Erie is in the process of identifying new ways to improve monitoring its water source supplies.
- The majority of Erie's water distribution system is relatively new (less than 20-years old) and therefore few leaks have been detected through the sonic leakage detection program. However, a relatively substantial leak ranging from 5 to 10 gpm was recently found at the Vista Ridge treated water storage tank emphasizing the importance of routine monitoring.
- The expansion of Erie's reuse water is dependent on the rate of new development within the customer service area. The recent economic downtown slowed new development within the Town and with it the rate at which new reuse is brought online.
- The irrigation of Town parks on an acre-foot per acre basis has been reduced since the installation of the ET controllers. This indicates that the parks were over-irrigating prior to installation of the ET controllers and are currently irrigating more efficiently.
- The pre-rinse spray valve give-aways have not been under high demand. The Town is planning to work with a developer to better understand the needs of the commercial sector and how the Town can most effectively promote non-residential water conservation.
- The high efficiency washing machine rebates are in high demand and are considered an effective means in promoting water conservation from a public outreach perspective.

3.2.2 Former 2008 Water Conservation Goals

Erie's former 2008 water conservation plan included the five goals listed below. The first three goals target specific quantitative water savings while goals 4 and 5 address the implementation and monitoring of Erie's water conservation program.

- 1) Average annual per capita water usage of 190 gpcd by 2014. This goal also implied a first use water savings of 960 AFY by 2014, a reduction of 17% relative to the projected first use demands absent conservation and use of reclaimed water.^{5 6}
- 2) 690 AFY of reclaimed (reused treated effluent) water use by 2014 (assuming approximately 350 AFY of reclaimed water use at Vista Ridge to the extent that development occurs as anticipated and the reclaimed water system is constructed).
- 3) Reduce water use by 15 percent on all existing city irrigated parks and landscaping by 2014 and optimize irrigation efficiency on all new city irrigated parks and landscaping.
- 4) Implement conservation measures and program that are compatible with the community.

⁵ The per capita water use of 190 gpcd applies to first-use water. The 960 acre-feet per year savings target includes 690 acre-feet use of reuse and 270 acre-feet of demand reductions.

⁶ The former total targeted savings of 960 acre-feet was developed as the difference between the projected 2014 demand incorporating a per capita water use of 230 gpcd (which included treated water, reuse water and ditch water) relative to the 2014 projected demand incorporating the targeted 190 gpcd first-use goal. Figure 5-1 in the 2008 Water Conservation Plan illustrates this concept.

- 5) Establish a monitoring system that collects a sufficient amount of data to effectively measure the success of conservation programs and measures on an annual basis.

Table 3-4 summarizes how effectively Erie has met these goals.

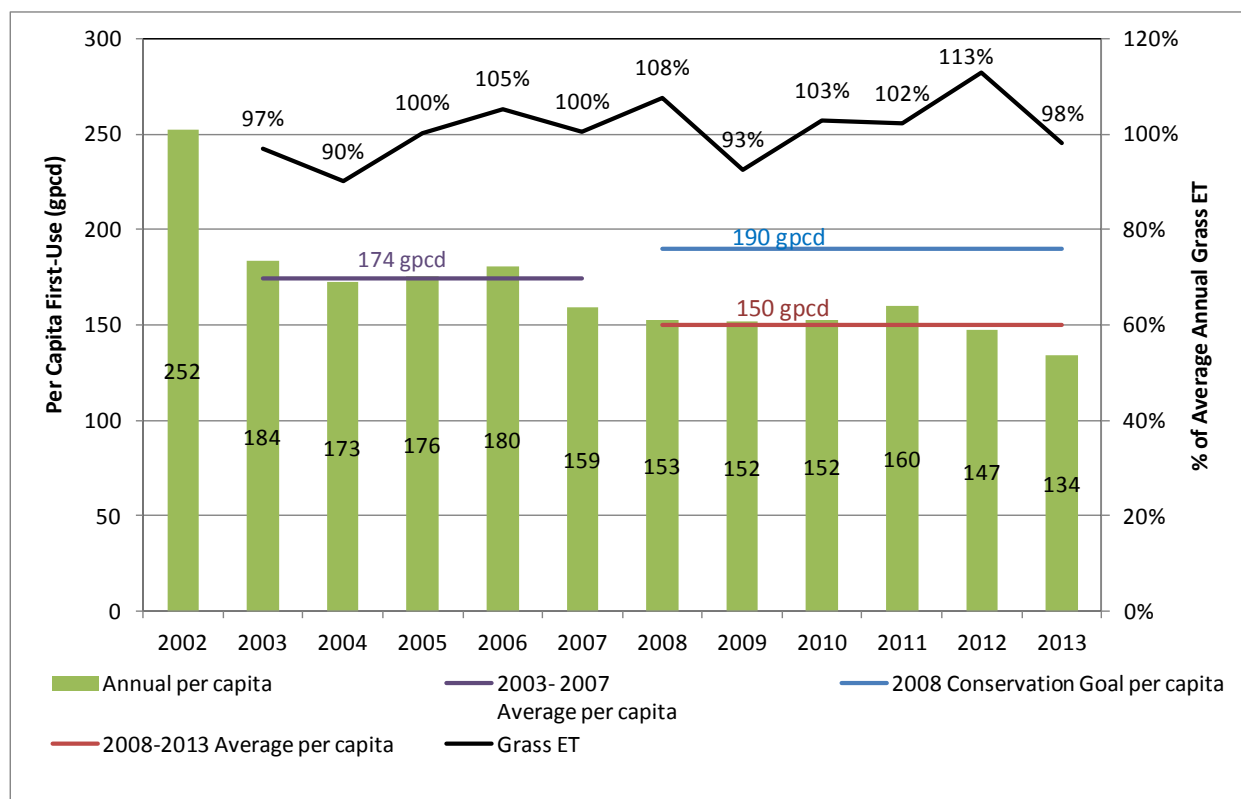
Table 3-4 Former 2008 Water Conservation Goals

Goal No.	Summary	Goal Accomplished	Comments
1	Achieve an average annual per capita water use of 190 gpcd by 2014.	Yes	The average per capita water use from 2008 to 2013 was 150 gpcd, which was significantly less than the 190 gpcd goal.
2	Achieve 690 acre-feet of reuse water by 2014	No	This goal assumed that 350 acre-feet of reuse water would be developed at Vista Ridge. The rate of new development significantly declined from 2008 to 2013 and reuse was not developed at the rate anticipated in 2008.
3	Reduce water use by 15 percent on City parks	Yes	Erie has significantly reduced water use on Town Parks and continues to implement best management practices to maintain efficient irrigation.
4	Implement activities that are compatible with the community	Yes	Erie has received positive community feedback regarding its conservation activities and continues to experience reduction in annual water use.
5	Establish an effective monitoring system	Yes	Erie closely monitors its conservation activities and monitors water use on a more frequent basis than prior to the 2008 Conservation Plan.

Reduction in Erie's Historical Water Use

Goal No. 1 of the 2008 water conservation plan targets a average per capita water use of 190 gpcd by 2014. Erie has successfully met this goal. Figure 3-5 shows that the average 2008 to 2013 first use per capita water use following implementation of the 2008 water conservation plan is 150 gpcd, which is significantly below the 190 gpcd target. Additionally, the average first use per capita water use has declined by 24 gpcd compared to the average per capita water use of 174 gpcd from 2003 to 2008.

Figure 3-5 also indicates that while there are annual variations in irrigation demand on a year-to-year basis, such variations do not explain the reduction in per capita water use. This is reflected in the annual variations in grass ET (annual ET as a percentage of average annual ET). The average ET percentage from 2003 to 2007 of 99% is lower than the average from 2008 to 2013 of 103%. Erie's per capita water use declined despite an average increase in outdoor irrigation demand.

Figure 3-5 Historical Per Capita Water Use and Water Conservation Goals

The reduction in per capita water use is likely attributed to the following factors:

- Sustained community response to regional drought awareness campaigns and Erie's mandatory water restrictions during the 2002 drought
- Larger proportion of new homes being constructed within the service area which tend to be more water efficient than older homes (e.g., homes within the Historic Downtown portion of Erie)
- Increased water efficiency among customers in response to Erie's water conservation outreach effort.

Goal No. 1 of the 2008 water conservation plan also calls for a first-use water use reduction of 270 acre-feet by 2014.⁷ Figure 3-6 shows a series of projected first-use demands from 2008 to 2013 relative to the actual historical first-use water use. The projected demands were calculated by multiplying Erie's population by the following per capita water demands listed below.

- Former 2008 water conservation goal of 190 gpcd (blue line) – Represents what the first-use water demand would have been if the historical per capita water demand was the former water conservation goal of 190 gpcd. This is significantly higher than the actual annual first-use shown by the green bars.

⁷ The 270 acre-feet demand reduction may be calculated by subtracting the reuse target of 690 acre-feet from the total targeted savings of 960 acre-feet.

- 2003 to 2007 average per capita use of 174 gpcd (purple line) – Represents what Erie’s first-use water demand would have been if the Town continued to use water at the average 2003 - 2007 per capita water use level prior to adoption of the 2008 water conservation plan. This projection results in a water demand of 4,198 in 2013.
- 2008 to 2013 average per capita use of 150 gpcd (green line) – Represents the average of Erie’s actual first-use, which was 3,030 acre-feet in 2008, grew to 3,740 acre-feet in 2011, and declined to 3,231 acre-feet in 2013. Erie’s first-use averaged 3,282 acre-feet per year over 2008-2013, equivalent to 150 gpcd.

Comparison of the 2003 to 2007 per capita demand of 174 gpcd (purple line) with actual use indicates significant water savings has been achieved as a result of reductions in per capita water use. In 2013, the difference between the projected demands based upon 174gpcd and the actual use is 967 acre-feet (4,198 – 3,231) showing that a savings of 967 acre-feet has been achieved.

Figure 3-6 Demand Reductions

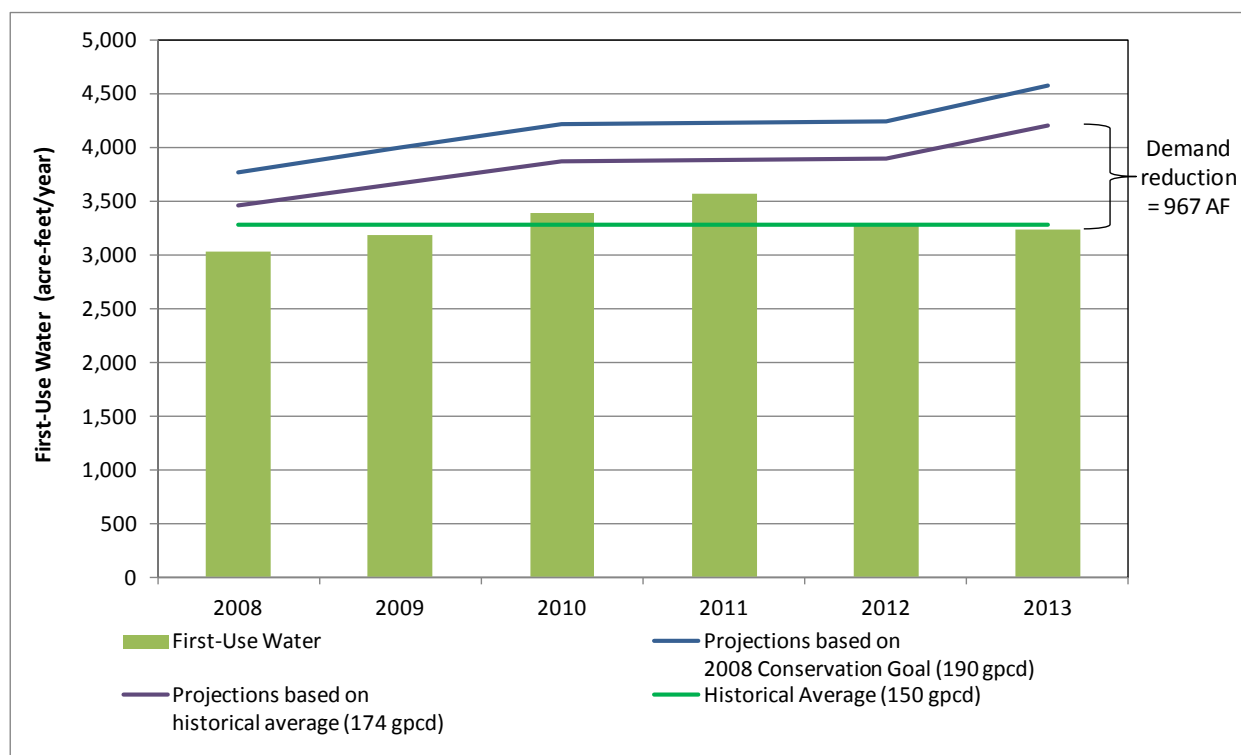
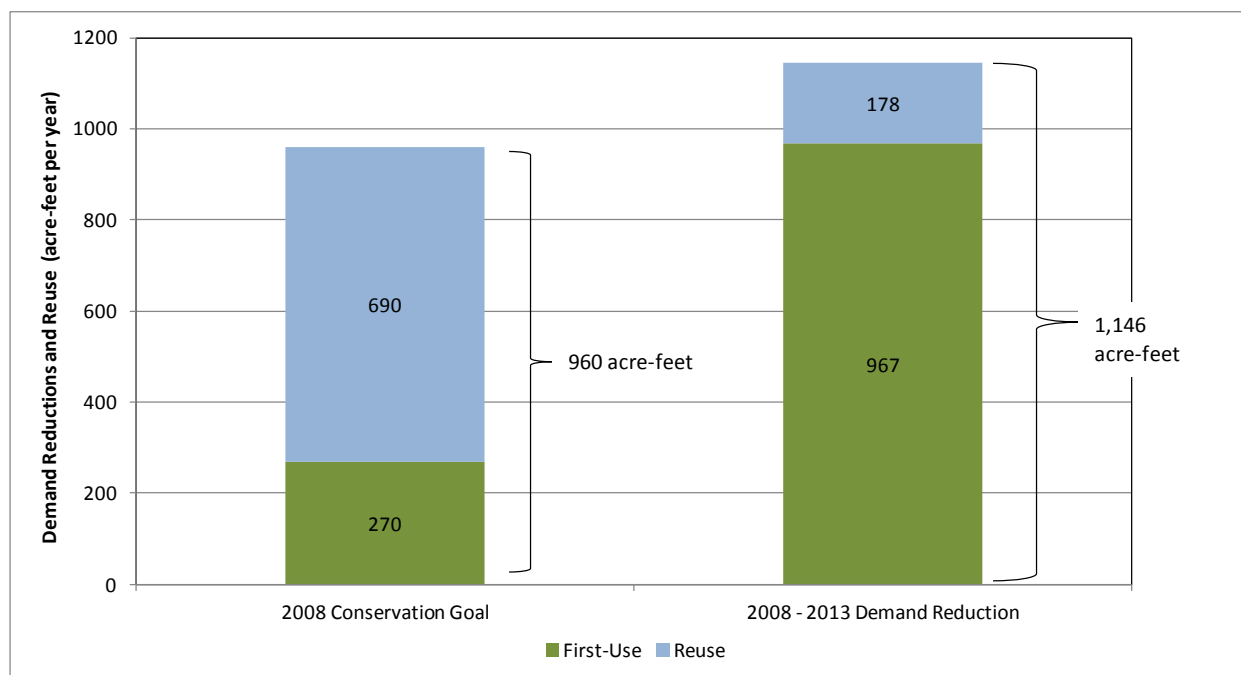


Figure 3-7 shows how well Erie met its 2008 demand reduction and reuse goals. Erie achieved a demand reduction of 967 acre-feet, which far exceeded the demand reduction goal (Goal No. 1) for 270 acre-feet. The reuse goal of 690 acre-feet (Goal No. 2) was not achieved; however, this goal was largely dependent on the rate of new development in Erie where new subdivisions adopt reuse for outdoor irrigation. The economic slowdown from 2010 to 2013 resulted in slower development where there was not a new demand for reuse.

Figure 3-7 Demands Reductions and Reuse Relative to 2008 Conservation Goals

Reduction in Irrigation on Erie Parks

Goal No. 2 of the 2008 water conservation plan targets a 15% reduction in park irrigation. Table 3-5 shows the annual irrigation water use on Erie's parks, including amount of the irrigation supply, the acreage irrigated, the annual irrigation application rate and the relative change in annual application rate compared to 2008 as a baseline. The table also shows the change in annual bluegrass ET relative to 2008 in order to provide a weather-based context to help assess whether Erie achieved Goal No. 2. Over 2009-2013, Erie reduced its irrigation application rate by an average of 22% compared to 2008. Over that same period, the average bluegrass ET was only 5% lower than 2008. Normalizing for ET, Erie reduced its irrigation application rate on its Parks by 17% compared to 2008, which indicates that Erie achieved its goal.

Table 3-5 Annual Irrigation on Erie Town Parks

Year	Acre-feet of Irrigation	Acres Irrigated	Application Rate (acre-feet per acre)	Percent Change in Application Rate Relative to 2008	Bluegrass ET, % of Average	Percent Change in Bluegrass ET Relative to 2008
2008	108	34.2	3.2		107.6%	
2009	84	34.2	2.5	-22%	92.5%	-14%
2010	131	48.4	2.7	-14%	102.9%	-4%
2011	135	60.4	2.2	-29%	102.3%	-5%
2012	181	60.4	3.0	-5%	112.9%	5%
2013	119	60.4	2.0	-38%	98.1%	-9%
09-13 Avg	130	52.8	2.5	-22%	101.7%	-5%

4.0 INTEGRATED PLANNING AND WATER EFFICIENCY BENEFITS AND GOALS

4.1 Water Conservation Goals

The development of attainable water conservation goals is important to the success of a conservation program. Goals provide a specific set of standards that can be used to gage the effectiveness of a program as well as clearly define the program's intention. The goals listed in Table 4-1 were developed by Erie Town staff to target a specific amount of water conservation savings while also implementing activities that are sustainable, equitable and compatible with community values.

Table 4-1 Water Conservation Goals

Goal No.	Goal	How to Measure Success ⁸
1	Achieve a per capita water use of 146 gpcd by 2020 for first-use water.	The 146 gpcd target will be calculated as the total annual first-use water (treated and ditch water) divided by the residential population.
2	Achieve an indoor residential per capita water use of 42 gpcd by 2020.	The 42 gpcd target will be calculated as the indoor water use for all residential uses (single-family, multi-family) divided by the residential population.
3	Achieve a 1% reduction in the percentage of non-revenue water by 2020 and consistently maintain an annual percentage of non-revenue water below 6%.	The 1% target will be calculated by comparing the average percentage of annual non-revenue for the previous five years to the average percentage of annual non-revenue water from 2009 to 2013.
4	Continue to expand Erie's reuse system to fully develop Erie's reusable Windy Gap units.	Monitor the annual amount of reuse water applied for each applicable subdivision.
5	Implement conservation activities that are compatible with the community and are sustainable from an economic, social and environmental perspective.	Conduct a public survey plan when the Water Conservation Plan is being updated in 2021 to assess community compatibility and sustainability.
6	Maintain a fair and equitable water rate structure that promotes efficient use while maintaining sufficient revenue.	Monitor per capita water use and revenue to determine whether per capita water use decreases while revenue remains sufficient.

Erie staff developed the water conservation targets specified in Goals Nos. 1 through 3 by reviewing Erie's historical per capita water use levels and non-revenue uses, and carefully considering the per capita water use levels that are reasonably attainable. Three factors are particularly relevant here. First, as Erie continues to grow, it is likely that it will become less of a bedroom community and a larger proportion of its future development will be nonresidential in nature (i.e. more restaurants, shops, offices, etc). This will tend to drive Erie's total per capita use upward. Second, as previously discussed, Erie's residential indoor per capita water use is already quite low even by modern standards. Nearly all of the homes in Erie are relatively new and their water use already reflects savings from water efficient fixtures and appliances. While retrofits

⁸ Because water use varies significantly from year to year due to factors unrelated to water conservation efforts, measurement of success in attaining the Goals 1 through 3 should be based upon the average of the previous five years of data.

with even more water-efficient fixtures and appliances may eventually occur over the long-term, a significant reduction in indoor per capita use is unlikely in the short-term, absent strong incentives or mandatory measures. Third, projected climate change is likely to increase future unit irrigation demands for a given type of landscaping or vegetation. This will also tend to drive Erie's total per capita use upward.

Attainment of Goal 1 by 2020 would require a 3% reduction in overall per capita first use, even as diversification of future development in Erie and climate change are likely to put upward pressure on overall per capita first use. A goal of 146 gpcd for total first use is attainable and reasonable considering Erie's plans to increase water reuse. Figure 4-1 shows the historical total per capita first use relative to Goal No. 1.

Attainment of Goal 2 by 2020 would require that Erie's indoor residential per capita use remain at currently low levels, which is reasonable considering that Erie's indoor residential per capita use is already low even by modern standards. Most of Erie's existing housing stock is relatively new, and it is expected that Erie's indoor residential per capita use will gradually decline beyond 2020 as Erie's housing stock ages and fixtures and appliances are replaced. Figure 4-2 shows the historical total per capita water use relative to Goal No. 2.

Table 4-2 compares Erie's Goals Nos. 1 and 2 to goals proposed by the northern South Platte municipal water providers for the year 2050⁹.

Table 4-2 Comparison of Erie's Goals to Northern South Platte Provider Group Goals

Use Category	Town of Erie 2020 Goals (gpcd)	South Platte Water Providers Proposed 2050 Goals (gpcd)
Residential indoor	42	40
Non-residential indoor	--	33.4
Outdoor	--	62.6
Water loss	--	10.2
Total	146	146

⁹ South Platte water providers' goals are detailed in a memo from Jim Hall discussing South Platte Roundtable conservation strategies (6/10/14).

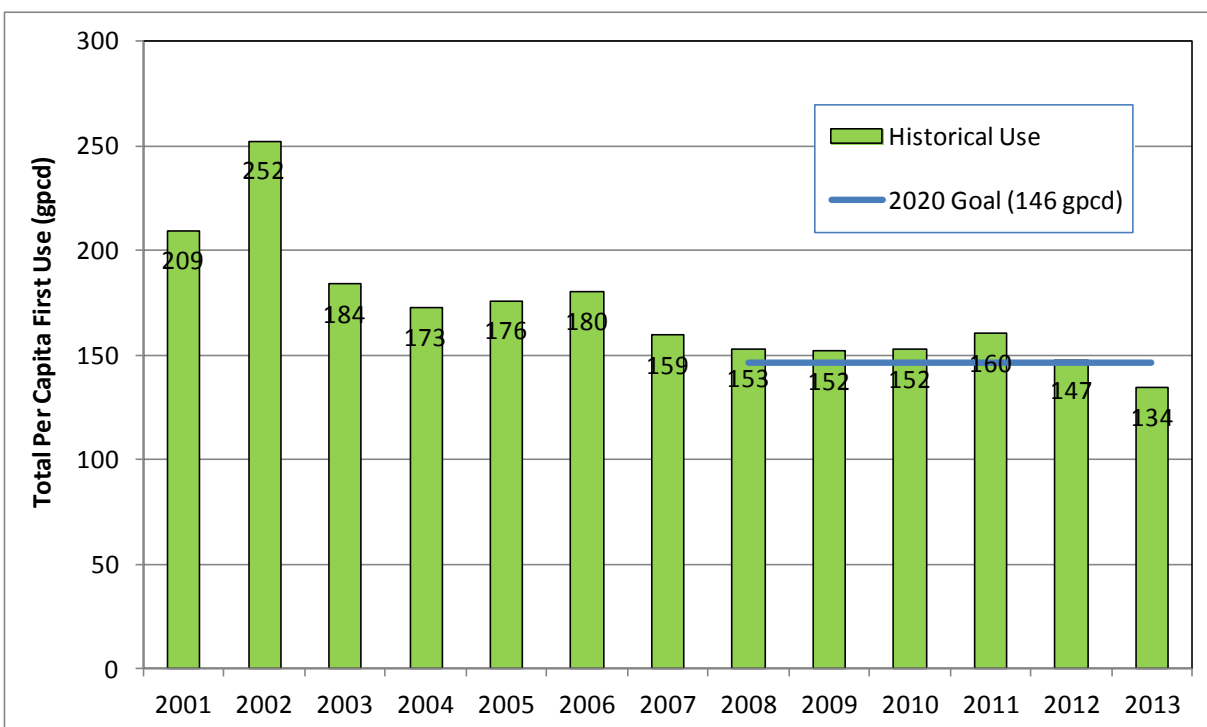
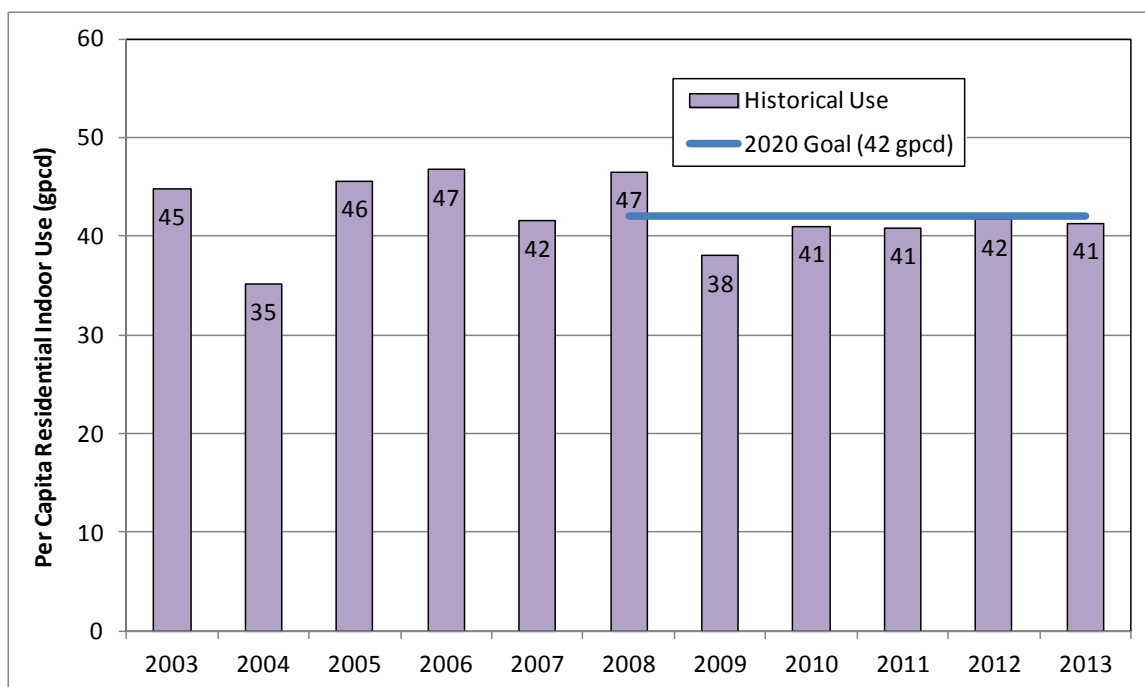
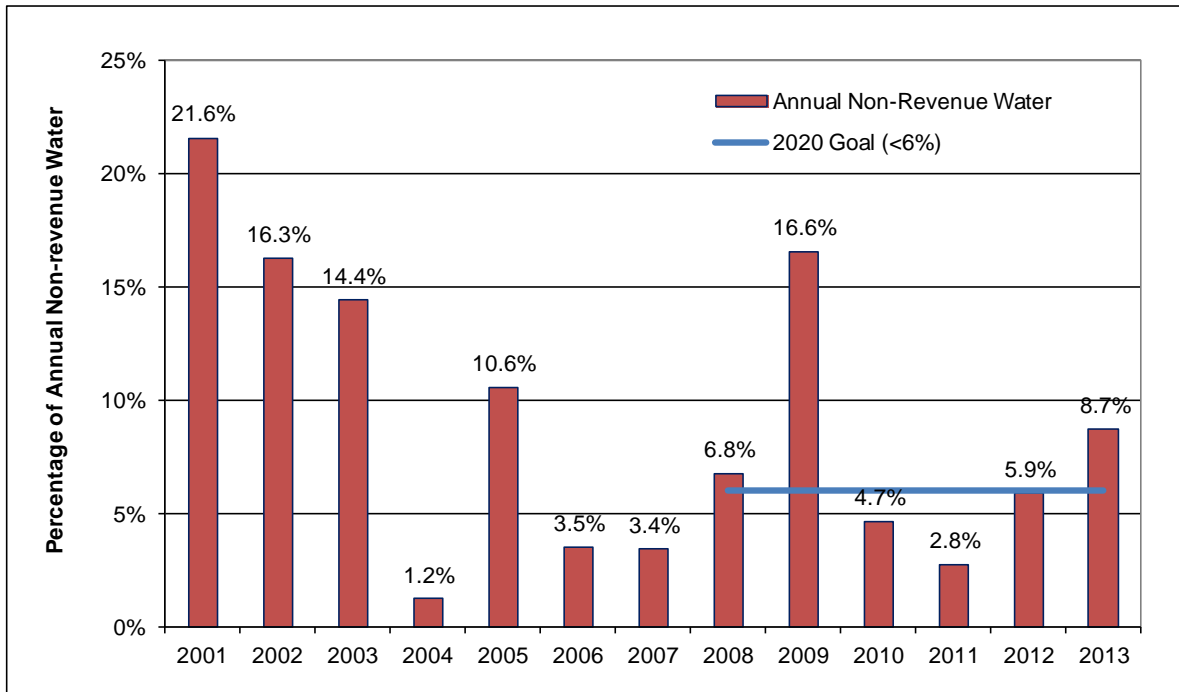
Figure 4-1 Historical Total Per Capita First Use and Goal No. 1**Figure 4-2 Historical Per Capita Water Residential Indoor Use and Goal No. 2**

Figure 4-3 shows that the average percentage of non-revenue water has generally decreased since 2001 although the percentage losses have significantly varied in some years. Erie has actively been

working on improving their metering and maintaining an annual sonic leak detection program. As will be discussed in Section 5.1.1, this is likely attributable to meter error rather than water loss. Erie plans to continue to improve their metering and overall accounting of non-revenue water. Goal No. 3 targets a 1% non-revenue water loss reduction and maintenance of all annual losses below 6%. Erie's Public Works Department feels this is achievable within the next 7-year time frame.

Figure 4-3 Annual Percentage of Non-Revenue Water



Water conservation Goals No. 4 through 6 were selected by Erie staff from an example collection of qualitative water conservation goals provided in the State's Municipal Water Efficiency Plan Guidance Document. These goals reflect Erie's ambitions to fully utilize its reusable Windy Gap shares while also maintaining positive community relations, promoting sustainability and incorporating responsible business practices.

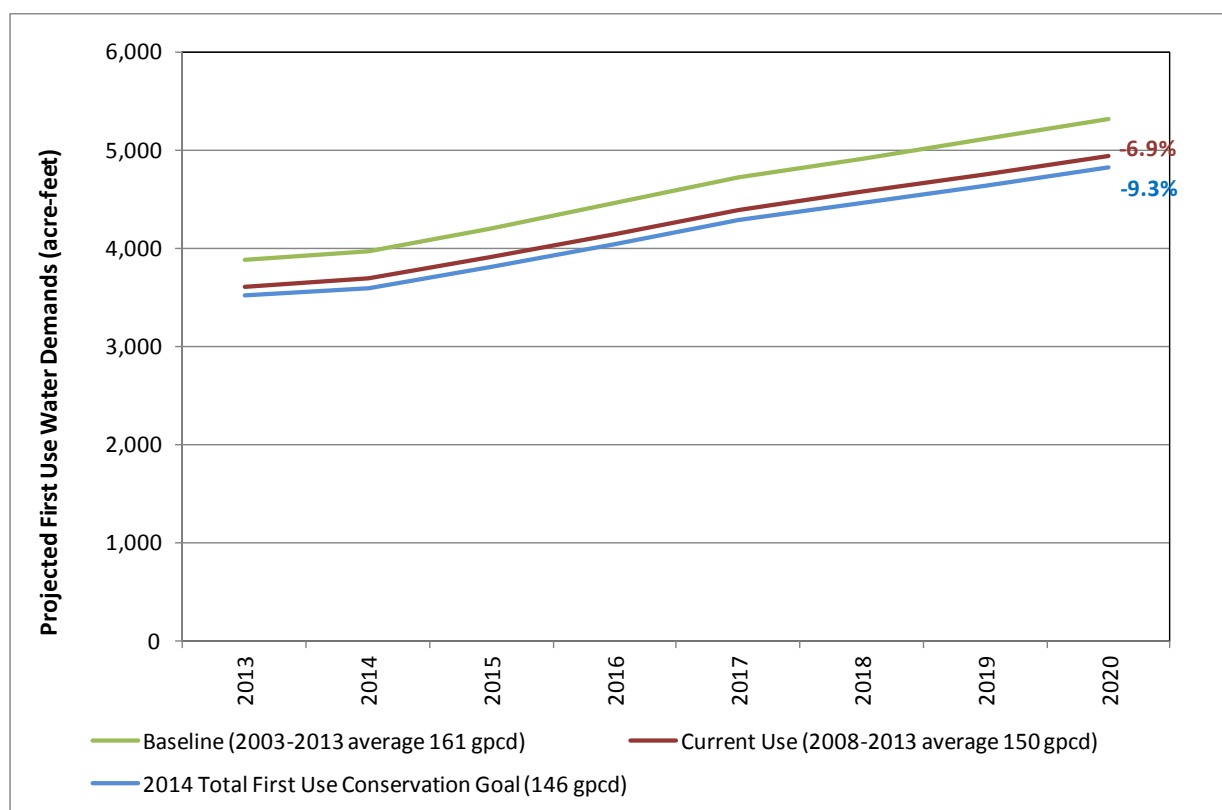
4.2 Water Conservation and Water Supply Planning

An important component to water conservation is obtaining long-term water savings that reduce water demands. Erie is a growing community and will need to acquire additional water supplies to meet its growing demands. Erie closely monitors its population and water use and uses this information along with projected population and water use trends to determine when additional water supplies should be acquired. Long-term reductions in annual demands can defer the timing under which new supplies are acquired.

A planning horizon of 2020 has been selected for purposes of this plan. This provides a reasonable period under which future population and associated future water demands may be projected and

corresponds with Erie's intent to update its Water Conservation Plan in 2021, consistent with State statutory requirements. Figure 4-4 shows Erie's projected water demands assuming annual population growth rates of 6% from 2014 to 2017 and 4% from 2018 to 2020, and per capita water use at the levels shown in the conservation goals. The baseline assumes the Town's historical average 2003-2013 per capita water use of 161 gpcd. Projecting this out through the planning period results in a demand of 5,313 AFY in 2020. The current per capita use is the average of 2008-2013, and is lower than baseline at 150 gpcd. Projecting this out through the planning period results in a demand of 4,945 AFY in 2020, which is a 6.9% reduction from the baseline projection. The proposed conservation goal of 146 gpcd total first use results in a 2020 demand of 4,820 AFY in 2020, which is a 9.3% reduction from the baseline projection and a 2.5% reduction from the current use projection.

Figure 4-4 Projected Water Demands



4.3 Water Conservation Benefits

Erie is situated in a semi-arid region and its population and water demands continue to grow. Efficient use of water supports responsible stewardship and sustainability. Erie's water conservation program is designed to provide the following benefits:

- Meet the community's expectations for sustainable water use by demonstrating leadership in using water responsibly and efficiently.

- Produce water savings which lowers operational pumping and water treatment costs while also potentially deferring the acquisition of additional water supplies to meet growing demands.
- Meet the political and regulatory requirements necessary to obtain permitting for NISP and Windy Gap firming projects.

5.0 SELECTION OF WATER CONSERVATION ACTIVITIES

5.1 Water Conservation Activities

Erie staff conducted a comprehensive screening process to review the effectiveness of the current (2014) conservation activities and identify new activities for implementation. The screening process consisted of a workshop with Erie staff to review its current activities, discuss accomplishments and lessons learned and identify new activities for consideration. Following this workshop, Erie staff further reviewed the considered activities and ultimately selected a set of activities that best meet the following criteria.

- Reflect the new water conservation goals
- Technically feasible
- Implementable from a staff resource and cost perspective
- Practical from a cost/benefit perspective
- High public acceptance
- Likely to be adopted at a regulatory level
- Activities are complementary to each other

Appendix A documents each of the activities that were considered, reasons why certain activities were not selected and the final activities selected for implementation.¹⁰ Table ES-2 in the Executive Summary highlights the water conservation activities selected for implementation. Additional information on each of the selected foundational, targeted technical assistance and incentives, ordinances and regulations and education activities is provided below.

5.1.1 Foundational Activities

Metering

Metering of source water - Erie meters its water treatment production and its ditch water diversions, and records its deliveries of CBT and Windy Gap water. Since 2008, Erie has made efforts in improving monitoring of its reservoirs and conveyance of source water. Erie plans to continue to make improvements as metering technology improves and financial resources are available.

Meter service connections and replacement of meters - Erie began to replace meters older than 10 to 12 years in 2005 and fully outfitted the service area with remote-read meters in 2007/2008. This has improved metering reliability, ensures that customers are billed on a consistent monthly basis, and has reduced the amount of time needed by Erie staff to read meters. Erie plans to continue to stay informed on the best available metering technologies, incorporate new technologies where feasible and maintain up-to-date working meters.

¹⁰ Colorado State statute requires that certain conservation activities are considered for implementation. Each of these activities was considered for implementation during the Plan development. Details of this process are described in Appendix A.

Water Use Data Collection and Billing Systems

Volume billing - Erie has metered and billed customers based on the amount of water they have used since 1972. This has proven to be effective in making customers financially sensitive to the amount of water they use and consequently increased customers' awareness of water consumption. Volume billing coupled with Erie's tiered block rate structure discourages using wasteful water used while also providing a financial incentive to use water efficiently. Erie plans to continue billing customers on a monthly basis based on the volume of water used.

Improved water accounting – Erie's billing categories consisted of residential and commercial prior to 2009. In 2009, Erie further refined its billing categories by metering construction water and separating outdoor irrigation accounts from the commercial sector. Erie's current billing system consists of residential, commercial, irrigation and construction, which enables Erie to better track its water use among customer sectors. Erie has updated its billing system software and plans to continue to improve its water accounting by accounting for residential indoor uses, non-residential indoor uses, outdoor uses (by City Parks and by non-city customers), and water loss, which will allow for direct comparison to the water use categories included in the Northern South Platte Provider Group Goals.

Efficiency Oriented Water Rates

Tiered block rate structure - Erie uses a four tiered block rate structure for the residential sector and is currently conducting a water rate analysis to identify modifications that could be made to further encourage efficient water use while also ensuring sufficient revenue for the Town. Table 5-1 Table 5-1 shows Erie's current residential water rates. The commercial sector is charged \$5.73 per 1,000 gallons and irrigation customers are charged \$6.03 per 1,000 gallons.

Table 5-1 2014 Residential Water Rates

Tier	Volume of Use	Rates
Tier 1	First 5,000 gallons	\$3.65
Tier 2	Next 10,000 gallons	\$4.56
Tier 3	Next 10,000 gallons	\$5.70
Tier 4	Over 25,000 gallons	\$8.55

System Water Loss Management and Control

Erie is responsible for the maintenance and repair of all pipelines within the distribution system that are not on private property. Erie began to replace older pipelines in the system in 1989. The original problem areas have been replaced and the majority of the distribution system is newer than 1989. Erie has an asset management plan for pipes, but because the distribution system is quite new they have not yet started a replacement program.

Leakage detection program and leak repair – Erie's leak detection program consists of both visual inspections of valve boxes as well as sonic leakage detection. The valve boxes are inspected every two years with portions of the water distribution system inspected annually. Any water observed

in the valve boxes is tested for chlorine, to determine whether the ponded water is the result of a leak. Erie uses sonic technology to inspect for leaks on all water distribution pipelines underlying roads that are scheduled for pavement overlay. In 2006, Erie expanded this program by sonically inspecting all of the water distribution losses in Northridge subdivision. No leaks were detected and this program proved to be relatively costly. Erie has subsequently decided to solely focus its sonic leakage detection efforts on pipelines underlying roads scheduled for pavement overlay. Residents may report water leaks by calling the following hotline: 303-591-2811. Erie also flushes hydrants and waterlines as routine maintenance procedures. In 2013, approximately 35% of Erie's pipes were inspected for leaks. The goal for 2014 is to inspect 25%.

Analysis of non-revenue water – Erie annually compares total water treatment production relative to the total metered end use to determine non-revenue water. Erie's unmetered water has historically consisted of water used for fire fighting, street cleaning, sewer cleaning, system losses and water line flushing. Erie began to calculate the volumes of water used for hydrant flushing in 2010. This reduces the amount of non-revenue water and subsequently improves Erie's ability to estimate distribution system water losses.

Reuse Program

Reuse water - Erie began reusing water to irrigate portions of Vista Ridge in 2002 and expanded its reuse program to Erie Commons in 2008. This is actually an exchange where Vista Ridge diverts water from Coal Creek and Erie replaces the diversion. The amount of historical reuse water is shown in Figure 3-1 in Section 3. As reflected in Erie's water conservation goals, Erie plans to utilize its reusable Windy Gap return flows and therefore reuse water will become an increasingly important water supply source for the Town. Erie is reconstructing a 1,000 acre-foot non-potable reservoir at the NWRf to store reuse water for irrigation and recently updated its Non-Potable Water Master Plan. As the Town continues to develop, more reuse will be used to irrigate parks and open spaces. Several developers have expressed interest in reuse water and are currently tying into the system. The amount of future additional reuse will be dependent upon the rate and types of future development within Erie's service area.

Reuse water for flushing/cleaning of wastewater treatment facilities - Erie began to use treated wastewater for flushing and cleaning at the SWRF in 2007. This saved approximately 17 acre-feet of first-use water per year. The SWRF was taken off line in 2011, shortly after the newly constructed Northern Water Reclamation Facility (NWRf) came online. The NWRf currently uses reuse water for flushing and cleaning of the plant, saving about 350 acre-feet of first-use water per year. Erie plans to eventually bring the SWRF back online and continue to use reuse water for the flushing and cleaning.

While not currently expressed as a formal water conservation goal, Erie has projected that it can increase its average annual volume of reuse by approximately 80 acre-feet per year by 2020, considering near-term reuse opportunities for irrigation and for flushing and cleaning at wastewater treatment facilities. While the potential for additional reuse may eventually exceed 200 acre-feet, the first use water-saving effect of additional reuse may be offset by increased unit irrigation demands due to climate change.

5.1.2 Targeted Technical Assistance and Incentives

Town Parks

Erie's parks are metered and charged by the Town for all water use. This provides a financial incentive to conserve water. In addition, since 2002, Erie's town parks have adopted a variety of practices that have improved irrigation efficiency. Section 3.2.2 addresses the 2008 through 2013 water savings achieved through the following efforts:

- Established low water use landscapes and drought resistant vegetation on many of the parks. Low water use landscape were installed on the Community Park in 2010 and recently installed for the NWRP landscaping and at other municipal building. Soil preparation for plantings and grass establishment has also been improved.
- Installed a weather station in 2008 and retrofitted the park irrigations systems with ET controllers to regulate irrigation based on measured ET in 2012. This avoids over irrigating by monitoring the parks' irrigation requirement and maintaining irrigation at the required level. Moisture sensors are also installed at all Town parks which detect precipitation and shut off the irrigation system if it is raining.
- Irrigation is scheduled to avoid high evaporation rates during the day and a cycle soak method is used to irrigate turf improving irrigation effectiveness and efficiency.

Fixtures and Rebates

Washing machine rebate program - The replacement of an older washing machine with a front load machine can save approximately 20 gallons of water per load. Erie established a washer rebate program in 2008. Rebates of \$100 were originally provided and were later reduced to \$50. Table 5-2 shows the number of rebates distributed since 2008 and the annual estimated savings. This program has proven to be very popular among residents and provides both a means to educate the public and produce measureable indoor water savings.

Table 5-2 Washing Machine Rebates

Year	Number of Rebates	Estimated Annual Savings (acre-feet)
2008	30	0.74
2009	60	2.21
2010	110	4.91
2011	79	6.85
2012	67	8.49
2013	68	10.16

The estimated annual savings in Table 5-2 assumes each high efficiency washing machine saves 20 gallons of water per load, and the average household does 400 loads of laundry per year¹¹. The

¹¹ U.S. EPA estimate, 2012.

savings are cumulative as the high efficiency machines are presumably used year after year after being installed.

Pre-rinse spray valves – Erie established a pre-rinse spray valve give-away program to commercial businesses in 2008. Businesses may contact Erie and request a free pre-rinse spray valve. Six pre-rinse spray valves have been provided to restaurants and commercial businesses between 2008 and 2013. Table 5-3 shows the number of spray valves provided annually and the associated water savings assuming a savings of 1.4 gal/min per spray valve. The demand for this program has been low to date because Erie does not have many commercial customers. Erie plans to continue this offer until the spray valves remaining in stock are given away, but is not currently planning to fund for purchase and give-away of additional spray valves.

Table 5-3 Pre-Rinse Spray Valves and Savings

Year	Number of Give-Aways	Annual Savings (acre-feet)
2008	6	1.04
2009	0	1.04
2010	0	1.04
2011	0	1.04
2012	0	1.04
2013	0	1.04

Evaluate water efficiency needs of the commercial sector – Erie is currently working with an economic development advisor on identifying the needs of Erie’s commercial sector and how the Town can most effectively promote/support efficiency water use within the sector. The Town plans to implement the recommendations of the economic advisor.

Indoor and Irrigation Audits

Customer irrigation audits – Since 2004, Erie has partnered with a Colorado nonprofit organization, the Center for Resource Conservation, to provide free irrigation audits to residential and commercial customers from June to August. The auditor checks soil type, root depth and sprinkler lines and heads, adjusts head types and spacing, and determines suitable pressures for the irrigation system. Customers also receive a customized watering schedule, learn do-it yourself sprinkler maintenance and tips on how to improve efficiency to save water and money. Table 5-4 shows the number audits conducted from 2008 to 2013 and estimated annual water savings. The program is offered on a first come/first service basis for a budgeted number of customers.

Table 5-4 CRC Irrigation Audits

Year	Number of Audits	Estimated Annual Savings (acre-feet)
2008	142	1.07
2009	140	1.69
2010	0	1.27
2011	127	2.22
2012	99	2.59
2013	87	2.94

The savings shown in Table 5-4 are ballpark estimates. The CRC is in the process of estimating the annual water savings as a result of the irrigation audits. Their initial results show that the average annual savings is 5,000 gallons per year per audited lawn where the recommendations of the CRC are implemented, and that water savings tend to drop to an average of 3,000 gallons per audited lawn going into the future, providing the customers continue to implement the recommendations of the audit. The CRC estimates that 53% of all participants decrease their water use following an audit. The CRC notes that there are large differences in water savings among participants, which can be attributed to how many suggestions the customer chooses to follow, location within the state, size of irrigated area, etc.

Indoor water inspection program – Erie also partners with the CRC to provide indoor water inspections that evaluates indoor water use and fixtures and offers the installation of two aerators and one low-flow showerhead. This program began in 2012 year and has provided an average of 63 audits per year. Table 5-5 shows the number audits conducted in 2012 and 2013 and estimated annual water savings. The program is offered on a first come/first service basis for a budgeted number of customers.

Table 5-5 CRC Indoor Audits

Year	Number of Indoor Audits	Estimated Annual Savings (acre-feet)
2012	60	0.52
2013	66	1.09

The values in Table 5-5 are calculated using the CRC's estimate that each indoor audit produces a direct savings of 3,053 gallons of water per household, and assume that the savings achieved in 2012 continue into 2013.

Do-it-yourself irrigation audits – Since 2009, Erie has offered free do-it-yourself irrigation audit kits that are available through the Public Works Department. The audits include catch cups to measure sprinkler system's output and coverage, flags, soil probe, pressure gauge to measure water pressure and instructions. Table 5-6 shows the number of irrigation audits provided on an annual basis.

Table 5-6 Do-it-yourself Irrigation Audits

Year	Number of Audits	Estimated Annual Water Savings (acre-feet)
2009	Unknown	N/A
2010	Unknown	N/A
2011	5	0.07
2012	3	0.09
2013	1	0.08

There are no data on the water savings that the do-it-yourself irrigation audit produces. Using the CRC average of 5,000 gallons the first year and 3,000 gallons for subsequent years, and assuming 100% of the participants modify their irrigation patterns, an estimate of less than one-tenth of one acre foot per year was calculated.

Water consumption tracker –While Erie has previously offered in-home water consumption meters that allow residents to closely track indoor and outdoor water use, this program element has been discontinued because it is no longer supported by the meter manufacturer. Reportedly the manufacturer is exploring the possibility of providing this capability via smartphone applications. Erie will monitor the status of this possibility.

5.1.3 Ordinances and Regulations

Water Wasting Ordinance

In 2002, Erie adopted an ordinance prohibiting the wasting of water, which is defined as "any use of water that is not applied to a beneficial use." This includes allowing water intended for irrigation or other purposes to pool in an area and/ or run onto streets and sidewalks or into a drainage facility. The ordinance further specifies that all leaks should be repaired within 10 days of discovery. All water that is lost through the leak (on the user side) will be charged to the user. Written notice of an infraction shall be delivered to the water user. If the water user does not appropriately address the water wasting, the user may be subject to a fine of up to \$300 in any given month or their water services may be terminated.

Policy on Landscape Design

Erie's policy requires low water use landscaping designs on parks, large HOA landscapes, and medians. Landscape improvements are to be designed with water efficiency as a major goal. Erie policy requires that the following items be incorporated into landscape designs to facilitate water conservation:

- Appropriate turf selection to minimize the use of bluegrass
- Use of organic matter for newly developed turf and native seeded areas and improvement of organic material as needed
- Use of mulch to maintain soil moisture and reduce evaporation

- Zoning of plant materials according to their microclimate needs and water requirements
- Efficient irrigation systems
- Proper maintenance and irrigation schedules
- Recirculation of water for decorative water features

This policy is a proactive approach to incorporating water savings into new development. Erie plans to continue to maintain this policy, promoting efficient water use design in all new development.

Policies on Irrigation System Design

Erie policy requires water efficiency for irrigation design, stating the following:

All required landscaping shall be irrigated as required for plant establishment and maintenance. Irrigation systems shall be designed to achieve water efficiency as a major goal and shall generally conform to the irrigation design guidelines set forth in Section 4.A.4 of the publication "Water-Efficient Landscape Design: A Model Ordinance for Colorado Communities" published by the Colorado Department of Local Affairs (2004 and as amended) (UDC 2006)

Erie's Standards and Specifications for Parks and Recreation Construction further requires that all installed irrigation systems be designed to provide head to head coverage and the spray radius of the head should be limited to areas only intended to be watered. Irrigation heads should not overspray walkways, pavements, or other hard surfaces. Design plans and specifications for all new irrigation systems on parks/recreational facilities must be submitted to Erie for review and approval.

Watering Restrictions

Erie has implemented a voluntary three -tiered water restrictions program since 2002. Erie recently developed a Drought Mitigation Plan which entails voluntary water restriction and three tiers of mandatory restrictions that correspond with the intensity of a drought. This program provides flexibility to customers recommending an irrigation schedule on a volunteer basis, yet when the water supply is stressed during a drought; it provides the Public Works Department the ability to regulate irrigation.

5.1.4 Education Activities

Erie initiated a program to educate customers on water supply, water rates, and the importance of water conservation in 2002. A variety of media/venues have been used to distribute information to customers.

Informative and understandable water bill - Erie bills its customers based on the volume of water used. The water bill shows customers the amount of water used per month and also the amount of water used the previous year for the same month. This enables customers to compare their water use on a monthly basis. The water bill also provides a phone number for customers to call for questions concerning their bill.

Bill inserts – Erie routinely provides information on water conservation in bill inserts. This has proven to be an effective means in educating customers on Erie’s water conservation program and promoting efficient water use.

Website - Erie’s website provides information on Erie’s current water conservation activities and also additional resources that customers may use to obtain additional information on water conservation.

Email Distribution List - Customers may sign up to receive regularly distributed e-mails summarizing Board meetings as well as other pertinent news. Information concerning water conservation and water restrictions has been conveyed to the public through this system.

Water conservation pamphlets – Beginning two years ago, Erie has mailed out educational pamphlets included with its water bills to all of its water customers twice each year: providing water conservation information oriented toward outdoor use in the spring and oriented toward indoor water use in the fall. This program is continuing in partnership with CRC.

Xeriscape seminars—Since 2012, Erie has partnered with CRC to provide an annual public xeriscape seminar in the spring. This seminar is given by a local professional landscaper that provides information on how to replace high water-use grass with enjoyable xeriscape. The seminars introduce the seven principles to xeriscape design and how to install xeriscape from the design to completion phase

Demonstration gardens – Erie installed a xeriscape demonstration garden at the Community Park in 2010. This demonstration garden educates the public on wise-water use and how landscapes may be designed to conserve water.

School programs – Historically Erie has provided a 3-day water education program to fourth and fifth graders. Topics included: equipment safety, water treatment, storm water, and water conservation. Erie plans to continue the program by hosting field trips to the Town’s water treatment facilities and educating the school children on water management and conservation.

5.2 Summary of Historical Water Savings

The historical water savings associated with many of Erie’s water conservation activities cannot be quantified with a sufficient degree of accuracy. There are a variety of factors that influence customer water use, including customer behavior, weather and economics. It is difficult to quantify specific demand reductions attributed to individual conservation activities. Given these limitations, water savings can be estimated for certain activities. Table 5-7 summarizes the water saving estimates for water conservation program elements for which savings can be attributed with reasonable accuracy, and the remainder of water savings that cannot be so attributed. Assumptions behind the savings estimates in Table 5-7 were described in prior sections.

Table 5-7 Estimated Savings from Existing Water Conservation Activities (acre-feet)

Year	Reuse Water	Washing Machine Rebates	Pre-rinse Spray Valves	Customer Irrigation Audits	Indoor Water Inspection Program	Do-it-yourself Irrigation Kits	Total Attributed Savings	Unattributed Savings	Total Savings
2008	207	0.74	1.04	1.07	0	0	209.85	216.45	426
2009	83	2.21	1.04	1.69	0	0	87.94	387.67	476
2010	120.9	4.91	1.04	1.27	0	0	128.12	358.40	487
2011	144.6	6.85	1.04	2.22	0	0.07	154.79	157.49	312
2012	317.8	8.49	1.04	2.59	0.52	0.09	330.53	272.10	603
2013	196.6	10.16	1.04	2.94	1.09	0.08	211.92	755.35	967
Average Annual Savings	178	5.56	1.04	1.96	0.27	0.040	187.19	357.91	545

Compared to the demand reductions shown in Figures 3-6 and 3-7 the estimated savings from existing and reasonably quantifiable water conservation activities, most of which are attributed to reuse, account for approximately 34% of the observed water demand reductions. The remainder of demand reductions may be attributed to increased customer awareness of the need to conserve water combined with the availability and effectiveness of water saving fixtures, appliances and irrigation systems. Erie's hard-to-quantify water conservation program elements certainly played a significant role in helping to achieve this overall demand reduction.

5.3 Projected Water Conservation Savings

As shown in the previous table, Erie's quantifiable water conservation activities produced an average annual savings of 187 AFY. Table 5-8 summarizes the projected future water savings from Erie's selected water conservation activities that can be reasonably quantified.

Table 5-8 Projected Water Savings of Conservation Activities (acre-feet)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
Year	Reuse Water	Park Savings	Washing Machine Rebates	CRC Customer Irrigation Audits	CRC Indoor Water Inspection Program	Do-it-yourself irrigation kits	Savings in Non-Revenue Water	Total Savings
2014	12	1.3	1.7	0.7	0.6	0.0	1.0	17
2015	24	2.6	3.4	1.2	1.2	0.1	2.0	34
2016	35	3.9	5.1	1.6	1.9	0.1	3.0	51
2017	47	5.2	6.8	2.0	2.5	0.1	4.0	68
2018	59	6.5	8.5	2.5	3.1	0.2	5.0	85
2019	71	7.8	10.2	2.9	3.7	0.2	6.0	101
2020	82	9.1	11.5	3.4	4.3	0.2	7.0	118

1. Assumes a 200 AF increase in reuse by 2030, pro-rated through 2020.
2. Assumes an additional 10% reduction in parks irrigation use by 2023, pro-rated through 2020.
3. Assumes 69 rebates per year through 2019, decreasing to 6 rebates per year by 2030.
4. Assumes 90 irrigation audits per year.
5. Assumes 66 indoor inspections per year.
6. Assumes 3 DIY irrigation kits per year.
7. Assumes a gradual 1% reduction in non-revenue water by 2030, pro-rated through 2020.

6.0 IMPLEMENTATION AND MONITORING PLAN

6.1 Implementation Plan

The implementation plan for each of the selected conservation activities is provided in Table 6-1. This table highlights the period of implementation, required actions and estimated annual costs for implementation. For rows where no costs are shown, the costs are embedded in Erie's existing Utilities budget and are not separately budgeted for as a conservation item.

2014 Budget

- Education material for utility billing - \$3,500
- Outdoor audits - \$18,750
- Indoor audits - \$18,750
- High efficiency washer rebates - \$6,000
- Seminars - \$2,000

Table 6-1 Implementation Plan 2014 Budget

Conservation Activities	Action and Milestone Activities	Period of Implementation	Costs
Foundational Activities			
Metering			
Metering of source water	Continue to monitor metering technologies and implementing new technologies that are feasible. Continue to monitor existing metering to ensure accuracy.	Existing ongoing activity	
Meter service connections and replacement of meters	Continue to stay informed on the best available metering technologies, incorporate new technologies where feasible and maintain up-to-date working meters.	Existing ongoing activity	
Water Use Data Collection and Billing Systems			
Volume billing	Continue billing customers on a monthly basis based on the volume of water used.	Existing ongoing activity	
Improved water accounting	Continue billing customers by a specific billing category. Refine the billing categories to include multi-family, single-family and parks during the 2014 software billing system update.	Existing ongoing activity Refinements to be made in 2014/2015	

Conservation Activities	Action and Milestone Activities	Period of Implementation	Costs
Water Use Efficiency Oriented Rates			
Tiered block rate structure	Update Erie's water rates per results of the current water rate study.	Existing ongoing activity Updates to water rates structure to be made in 2014/2015	
System Water Loss Management and Control			
Leakage detection program and leak repair	Continue leak detection and repair program.	Existing ongoing activity	
Analysis of non-revenue water	Continue to monitor and account for non-revenue water.	Existing ongoing activity	
Reuse Program			
Reuse water	Continue to promote and bring reuse water online in new developments consistent with the 2013 Non-potable Water Master Plan.	Existing ongoing activity	
Reuse water for flushing/cleaning of the wastewater treatment facilities	Continue to use reuse water for flushing/cleaning of the NWRf. Incorporate reuse into the flushing/cleaning of the SWRF when brought back online.	Existing ongoing activity	
Targeted Technical Assistance and Incentives			
Town Parks			
Drought resistant vegetation, low water use landscapes and soil preparation	Continue to implement best management practices to ensure efficiency irrigation on parks and incorporate low water use landscapes where beneficial.	Existing ongoing activity	
Evapotranspiration (ET) controllers	Continue to use the weather station and ET controllers to maintain irrigation at levels needed by the landscape on Town parks. Irrigation may be reduced during periods of drought.	Existing ongoing activity	
Moisture sensors	Continue to use moisture sensors on all Town parks.	Existing ongoing activity	
Efficient irrigation practices and scheduling	Continue to implement best management practices to ensure efficiency irrigation on parks.	Existing ongoing activity	
Fixtures and Rebates			
Washing machine rebate program	Continue the washing machine rebate program.	Existing ongoing activity	\$6,000
Pre-rinse spray valves	Continue the pre-rinse spray valve give-away until all of the pre-rinse spray valves are given out.	Existing activity Activity is to terminate once all pre-rinse spray valves are given out.	\$0

Conservation Activities	Action and Milestone Activities	Period of Implementation	Costs
Economic development advisor recommendations	Follow up on recommendations from the economic development advisor specific to water savings.	2014/2015	
Indoor and Outdoor Irrigation Audits			
Customer irrigation audits + do-it-yourself irrigation audit kits	Continue to partner with CRC in providing free irrigation audits. Continue to provide free do-it-yourself audit kits.	Existing ongoing activity	\$18,750
Indoor water inspection program	Continue to partner with CRC to provide indoor water inspections.	Existing ongoing activity	\$18,750
Ordinances and Regulations			
Water wasting ordinance	Continue to enforce water wasting ordinance.	Existing ongoing activity	
Policy on landscape design	Continue to adhere to the policy on landscape design.	Existing ongoing activity	
Policies on irrigation system design	Continue to adhere to the policies on irrigation system design.	Existing ongoing activity	
Watering restrictions	Continue to implement watering restrictions as defined in the Drought Management Plan.	Existing ongoing activity	
Education Activities			
Informative and understandable water bill	Continue to provide informative and understandable monthly water bills.	Existing ongoing activity	
Distribution of information via bill inserts, Town website, and email distribution list	Continue to provide public outreach on water conservation through bill inserts, the Town website and email distribution list. Routinely assess the website and update accordingly.	Existing ongoing activity	\$3,500
Water conservation pamphlets	Continue to distribute conservation and xeriscape pamphlets to the HOAs.	Existing ongoing activity	
Xeriscape seminars	Continue to work with CRC in hosting annual public seminars for xeriscape.	Existing ongoing activity	\$2,000
Demonstration gardens	Maintain the existing demonstration gardens and consider developing additional gardens if beneficial and feasible.	Existing ongoing activity	
School programs	Host annual field trips for school children at the Town's water treatment facilities.	Existing ongoing activity	

Water Conservation and Potential Revenue Effects

Like most water providers, Erie's revenues are largely driven by the amount of water used by its customers and Erie has significant fixed costs that are unaffected by water use. While water conservation has the potential to affect water utility revenues, it is not expected that the attainment of Erie's 2020 water conservation goals will significantly affect Erie's costs or revenues. More than 75% of Erie's projected water savings are expected to come from increased water reuse and reduction in non-revenue water. While increased reuse would reduce revenues from sale of first-use water, it would also generate revenues from sale of reuse water. Reduction in non-revenue

water would either be revenue-neutral (by reducing real water losses) or would increase revenues (by eliminating non-metered uses and reducing meter underreporting).

Erie plans to monitor cost expenditures for conservation activities. If an activity does not appear to be cost-effective in the long-term and could potentially contribute to a need to increase water rates, this activity may be considered for elimination. Erie annually reviews capital and operation expenditures as well as projected revenues. Water rates would only be raised if it is necessary to meet future expense.

6.2 Monitoring Plan

Water conservation planning is most effective when it is managed as an adaptive continuous process where routine monitoring and adjustments can be made to the implementation. Monitoring provides the necessary information decision-makers need to make adjustments that improve the water conservation program under continuously evolving conditions.

The collection and organization of data is instrumental in the success of this monitoring plan. The following data will be collected on an annual basis.

- Daily, monthly and annual totals of measured flows at Erie's two CBT/Windy Gap raw water intakes and raw water reservoirs.
- Daily, monthly and annual totals of wastewater and water treatment production at each facility.
- Monthly and annual total treated metered water uses for the new customer billing categories
- Monthly and annual deliveries used for raw water irrigation
- Monthly and annual reuse water applied for irrigation. The amount of annual water applied to each location (i.e. park facility) will be tracked.
- Monthly calculation of non-revenue water
- Annual costs, avoided costs and if applicable, lessons learned for each conservation activity
- Annual estimates of water savings for conservation activities where savings can reasonably be measures and/or estimated
- Water conservation activity tracking data (i.e. number of annual rebates, number of infractions, etc)
- Weather data the Erie's new weather station coupled with other local established weather stations that can be used to compare outdoor water use relative to ET on an annual basis
- Development within the service area. This may include the annual change in service area residential population, number of new homes built, commercial properties developed, and acres of new irrigated lands in Town parks and other open spaces.
- Efforts by the Public Works Department to conserve water in Town parks. This may include changes to the irrigation practices, acreage of new xeriscaping, acreage of new irrigated landscaping, etc.
- Feedback from the public. These may include comments at open houses concerning conservation, e-mail/ mail correspondence, etc. that provides valuable information on the public's perception of the conservation measures/programs.

Erie staff will analyze these data on an annual basis to assess the effectiveness of the conservation program. Results and any recommended improvements will be presented to the Town board.

6.3 Adoption of New Policy, Public Review and Formal Approval

Specific components of this section are required per C.R.S. 37-60-126 (5) for State approved plans. This section provides information on the adoption of relevant new policy, the public review process, formal approval, and future plan updates.

6.4 Public Review Process

Erie created a resolution for a 30-day public comment period on its water conservation plan during the last water conservation planning process. The public had the opportunity to provide feedback on Erie's Water Conservation Plan through a 30-day public review process from December 3, 2014 through January 2, 2015. A draft of this plan was advertised in local news media and posted on Erie's website where customers could download the report and provide comments via email to the Public Works Department. The public was also given the opportunity to comment on the Plan at Erie's Board meeting on January 13, 2015. No public comments were received during the public comments period or at Erie's Board meeting.

6.5 Periodic Review and Update

Colorado statute requires that State-approved water conservation plans are updated every seven years. Erie intends to update this Plan by the fall of 2021. The updated Plan will evaluate historical water use trends and how well Erie has met the conservation goals specified in Section 4.0. Monitoring results discussed in Section 6.0 will also be incorporated into the updated Plan. New water conservation goals will be considered in light of new findings and the new Plan will be updated to meet the current State requirements while also meeting the needs of Erie's community.

As discussed in Section 6.0, monitoring data will be collected and analyzed on an annual basis. If monitoring results and/or changes in the water supply system warrant a revised conservation plan prior to the seven year time period, Erie will modify the Plan accordingly.

6.6 Local Adoption and State Approval Processes

Erie's Water Conservation Plan was adopted by the Erie Town Board on January 13, 2015. Appendix C provides the formal documentation approving the Plan. The Plan was conditionally approved by the Colorado Water Conservation Board on December 16, 2014, with completion of the public comment period and adoption by Erie as the only remaining issues.

Appendix A Screening of Water Conservation Activities

Tables A-1 through A-4 show the water conservation activities considered in the Plan and denote those activities selected for final implementation and those activities that were eliminated. All activities required for consideration by Colorado state statute were considered. The reason(s) associated with the elimination of certain activities are denoted in the table.

Table A-1 Foundational Activities Considered for Implementation

Conservation Activities for Screening [1]	Potential Activities for Consideration [2]			Select Activities for Implementation [3]			Customer Sectors						
	Required by Law for Consideration	Current Activity	New Activity	Select for Implementation	Eliminate	Reason for Elimination	Town Services	Parks	Golf Course	Construction	HOA	Residential	Commercial
Metering													
Metering of Source Water		X		X			X						
Meter Service Connections and Replacement of Meters		X		X			X						
Automatic Meter Reading Installation and Operations		X		X			X						
Submetering for Large Users (Indoor and Outdoor)													
Meter Testing and Replacement													
Meter Upgrades													
Identify Unmetered/Unbilled Treated Water Uses		X		X			X						
Water Use Data Collection and Billing Systems													
Volume Billing		X		X			X						
Improved Water Accounting		X		X			X						
Increase Frequency of Meter Reading													
Tracking Water Use for Large Customers		X		X					X	X			
Tracking Area of Irrigated Lands in Parks (e.g. acres)		X		X				X					
Tracking Water Use by Customer Type		X		X			X						
Water Use Efficiency Oriented Rates and Tap Fees (Must be considered per Statute)													
Tiered Block Rate Structure		X		X			X						
Change frequency of Billing													
Changes to Inclining/Tiered Rates		X		X			X						
Water Budgets													
Tap Fees with Water Use Efficiency Incentives													
System Water Loss Management and Control													
Leakage Detection Program and Leak Repair	X	X		X			X						

Conservation Activities for Screening [1]	Potential Activities for Consideration [2]			Select Activities for Implementation [3]			Customer Sectors						
	Required by Law for Consideration	Current Activity	New Activity	Select for Implementation	Eliminate	Reason for Elimination	Town Services	Parks	Golf Course	Construction	HOA	Residential	Commercial
Analysis of Non-account Water		X		X			X						
System Wide Water Audits													
Control of Apparent Losses (with Metering)		X		X			X						
Water Line Replacement Program													
Staff													
Water Conservation Coordinator													

Table A-2 Targeted Technical Assistance and Incentives Activities Considered for Implementation

Conservation Activities for Screening [1]	Potential Activities for Consideration [2]			Select Activities for Implementation [3]			Customer Sectors						
	Required by Law for Consideration	Current Activity	New Activity	Select for Implementation	Eliminate	Reason for Elimination	Town Services	Parks	Golf Course	Construction	HOA	Residential	Commercial
Rebates & Installation of Water Efficient Fixtures and Appliances (Incentives/rebates must be considered by Statute)													
Indoor Audits		X		X									
Toilet Retrofits	X		X		X	Many of homes in Erie are new and have toilets are a relatively water efficient							
Urinal Retrofits	X		X		X	Commercial sector is not large enough to make this cost effective at this point in time. There are flushless urinals at the recreation center.							
Showerhead Retrofits (via CRC program)	X	X		X									
Faucet Retrofits (aerator installation via CRC program)	X	X		X									
Water Efficient Washing Machines		X		X									
Water Efficient Dishwashers													
Efficient Swamp Cooler and Air Conditioning Use													
Turf Replacement Programs/Xeriscape Incentives													
Low Water Use Landscapes													
Drought Resistant Vegetation	X	X		X				X					
Low Water Use Landscapes	X	X		X				X					

Conservation Activities for Screening [1]	Potential Activities for Consideration [2]			Select Activities for Implementation [3]			Customer Sectors						
	Required by Law for Consideration	Current Activity	New Activity	Select for Implementation	Eliminate	Reason for Elimination	Town Services	Parks	Golf Course	Construction	HOA	Residential	Commercial
Scheduling		X		X				X					
Efficient Irrigation	X	X		X				X					
Moisture Sensors		X		X				X					
Pilot Evapotranspiration (ET) Controllers		X		X				X					
Customer Irrigation Audits	X	X		X							X	X	X
Removal of Phreatophytes	X												
Upgrades to Irrigation Systems			X	X				X					
Irrigation Efficiency Evaluations/Outdoor Water Audits													
Outdoor Irrigation Controllers		X		X									
Residential Outdoor Meter Installations													
Xeriscape		X					X	X				X	
Irrigation Equipment Retrofits													
Water- Efficient Industrial and Commercial Water-Using Processes (Must be considered by Statute)													
Pre-Rinse Spray Valves		X											X
Specialized Nonresidential Surveys, Audits and Equipment Efficiency Improvements (working with economic developer specialist to identify needs of commercial sector)			X	X									X
Commercial Indoor Fixture and Appliance Rebates/Retrofits													
Cooling Equipment Efficiency													
Promotion of Recycling and BMPs for Commercial Car Washes			X		X	All car washes currently use recycled water							X

Table A-3 Ordinances and Regulations Considered for Implementation

Conservation Activities for Screening [1]	Potential Activities for Consideration [2]			Select Activities for Implementation [3]			Customer Sectors						
	Required by Law for Consideration	Current Activity	New Activity	Select for Implementation	Eliminate	Reason for Elimination	Town Services	Parks	Golf Course	Construction	HOA	Residential	Commercial
General Water Use Regulations (Regulatory Measures must be considered per Statute)													
Water Wasting Ordinance		X		X			X	X	X	X	X	X	X
Watering Restrictions		X		X			X	X	X	X	X	X	X
Time of Day Watering Restrictions		X		X			X	X	X		X	X	X
Landscape Design/Installation Rules and Regulations													
Irrigation Efficiency		X		X				X	X		X		
Low Water Use Designs								X	X		X		
Soil Amendment Requirements (for Parks, medians and large HOAs)								X	X		X		
Soil Amendment Requirements (for residential homes)			X		X	Considered requiring soil amendments for all new residential development. Eliminated because of economic burden on developer.						X	
Landscape Training and Certification													
Irrigation System Installer Training and Certification													
Turf Restrictions													
Irrigation Equipment Requirements													
Outdoor Water Audits/Irrigation Efficiency Regulations													
Outdoor Green Building Construction													
Indoor and Commercial Regulations													

Conservation Activities for Screening [1]	Potential Activities for Consideration [2]			Select Activities for Implementation [3]			Customer Sectors						
	Required by Law for Consideration	Current Activity	New Activity	Select for Implementation	Eliminate	Reason for Elimination	Town Services	Parks	Golf Course	Construction	HOA	Residential	Commercial
High Efficiency Fixture and Appliance Replacement			X		X	Considered requiring installation of water efficient fixtures and appliances at point-of-sale. Eliminated because of economic burden on homeowner.						X	
Commercial Cooling and Process Water Requirements													
Green Building Construction													
Indoor Plumbing Requirements													
City Facility Requirements													
Required Indoor Residential Audits													
Required Indoor Commercial Audits													
Commercial Water Wise Use Regulations (Car Washes, Restaurants, etc.)													

Table A-4 Targeted Technical Assistance and Incentives Activities Considered for Implementation

Conservation Activities for Screening [1]	Potential Activities for Consideration [2]			Select Activities for Implementation [3]			Customer Sectors						
	Required by Law for Consideration	Current Activity	New Activity	Select for Implementation	Eliminate	Reason for Elimination	Town Services	Parks	Golf Course	Construction	HOA	Residential	Commercial
Customer Education (Must be considered by Statute)													
Informative and Understandable Water Bill		X		X			X	X	X	X	X	X	X
Distribution of Information via Bill Inserts, Town Website, and Local Newspaper		X		X					X	X	X	X	X
School Programs		X		X								X	
Water Conservation Pamphlets		X		X							X		
Newsletter													
Mass Mailings													
Water Fairs													
Message Development/Campaign													
Interactive Websites													
Social Networking (e.g. Facebook)													
Customer Surveys													
Focus Groups													
Citizen Advisory Boards													
Customer Water Use Workshops													
Landscape Design and Maintenance Workshops		X		X								X	
Xeriscape Demonstration Garden		X		X							X	X	X
Water Conservation Expert Available													

Appendix B Summary of Public Comments

No comments were received during the public comment period.

Appendix C Ordinance Adopting Water Conservation Plan