Draft Drought Management Plan

Town of Erie

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Prepared for:

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Executive Summary

The Town of Erie (Erie) is situated north of Denver in Weld and Boulder counties. Erie provides water and wastewater services to over 7,300 households and more than 130 commercial and municipal users. Erie's 2015 population of approximately 22,000 represents a 47% increase within the past ten years. The Town of Erie Comprehensive Plan, updated in 2005, includes a 2025 population forecast of 40,680. Erie has a water conservation program and implements a variety of mitigation practices to enhance the Town's ability to meet customer needs in periods of drought. The Town also historically implemented a three-tiered water restrictions program, which was initiated following the 2002 drought. This Drought Management Plan (Plan) better prepares Erie for drought by providing a more integrated and comprehensive approach to addressing drought as Erie continues to grow and the competition for water supplies on the Front Range increases.

Erie uses a combination of water sources to meet its potable and non-potable water needs including Colorado Big Thompson (CBT), Windy Gap, reservoirs 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 as follows:

- 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 Erie's water treatment plant 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 multiple times and is limited to Erie's Windy Gap shares discussed in further detail below.
- Raw water – Erie's potable water supplies prior to treatment at the water treatment plant.
- First-use water – Erie's treated water and untreated ditch and reservoir water that is 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.

Plan Objectives and Operating Principles

This Plan was developed through a stakeholder-driven process that included a Drought Committee comprised of representatives from Erie's Public Works Department and Administration. Two Drought Committee meetings were held during the Plan development and the public and Board of Trustees also had an opportunity to provide feedback prior to the Plan's formal adoption on X date.

The Plan objectives are:

- To enhance Erie's ability to plan for droughts before they occur
- To identify and properly determine the severity of a drought based on Erie's potential shortage of supply

The following operating principles were developed to assist with the development of the Plan and serve as a decision-making guidance tool when implementing the drought response program.

- Drought response actions should be implemented in a manner that reflects the water use priorities in Table ES-1, with the highest priority being health and safety.

- Economic development is important to Erie and providing adequate drought protection for current and future residents is needed to provide a healthy sustainable community for future generations.
- When possible, efforts should be taken to preserve the environmental and recreational value of the surrounding lands, which are important to the values and livelihood of Erie residents.
- Where possible, efforts should be made to allocate the costs and impacts associated with water use restrictions among all customers in an equitable manner.
- Effective coordination among Erie staff is vital to the success of this Plan. Exceptions to this Plan may be necessary but must be communicated clearly to all Erie staff.

Table ES-1 Water Use Priorities

Priority	Customer Use	Description
1	Health and safety	Indoor use for essential services (i.e. hospitals, schools, etc.); indoor residential, fire fighting
2	Indoor commercial and municipal buildings	Indoor commercial (businesses, schools) and indoor municipal buildings (Erie's recreation center)
3	Priority irrigation, municipal services and construction water	Mode 1 parks, outdoor commercial business, car washing, outdoor residential, construction water, hydrant flushing, outdoor municipal buildings
4	Less priority irrigation	Mode 2 and 3 parks; golf courses, Home Owners Association (HOA) open space (neighborhood tot lots), facilities

Mode 1 parks – Community parks (i.e. softball field) and parks irrigated with non-potable water
Mode 2 parks – Neighborhood parks
Mode 3 parks – Public facilities
Note: Colorado National Golf Course uses a combination of ditch water and reuse water which may be subject to water restrictions based on the availability of supplies.

Drought Mitigation

Erie currently implements the mitigation measures listed below. Erie also plans to evaluate the feasibility and benefits associated with a variety of additional measures described in Section 6.1.

- New supplies – Erie continues to acquire additional water supplies. These acquisitions are not only necessary to meet the growing demands of the community, but also to ensure that there are sufficient supplies during dry periods.
- Demand management (water conservation) – Erie implements a variety of water conservation activities that serve the dual purpose of conserving water in the long-term while also maintaining lower water demands in drought years.
- CBT carryover – Erie optimizes its annual 20% carryover of CBT water. This water may be used as a drought reserve in the following year.
- Reuse water – Erie plans to continue to expand its use of non-potable reuse water for irrigation, which increases the availability of Erie's first use water for other purposes.

Drought Stages and Declaration

Though the pace of development since the economic downturn (2008-2012) would suggest Erie will fall short of the 40,680 population forecasted in the Town's 2005 Comprehensive Plan, both residential and commercial development will continue. As a result, Erie will see an increase in customer water demand and consequently the Town is planning to acquire additional water supplies to meet its growing needs. Given this trend, a drought trigger index (drought index) was

developed to characterize the severity of a drought within the context of both projected water supplies and demands. The drought index represents the ratio of Erie's projected water supply to demand. A detailed description of this drought index is provided in Section 5.1.

Table ES-2 presents four stages of drought severity with the corresponding drought index and response target. These four stages in increasing order of drought intensity are: voluntary, watch, severe and emergency. The targeted water savings increase with each stage, with a targeted 5% water savings for the voluntary drought stage and a 60% water savings target under the emergency drought stage. In years when Erie is in a declared drought stage, the targeted amount of water savings to be achieved (in acre-feet or thousand gallons) should be determined by multiplying Erie's "baseline demand" by the designated percentage response target defined in Table 11. The baseline demand should be determined by multiplying Erie's current population by Erie's average per capita water use (gpcd) of first-use water for the previous five years.

Table ES-2 Drought Stages, Trigger Point Guidelines and Response Targets

Drought Stage	Drought Trigger Index	Response Target (Targeted Water Savings)
Voluntary	1.0 to 0.95	5%
Watch	0.94 to 0.8	20%
Severe	0.79 to 0.6	40%
Emergency	0.59 to 0.4	60%

It is important to note that the water saving targets focus primarily on first-use water. Erie's non-potable supply is based primarily on reuse water generated from indoor uses and ditch water. So long as indoor uses are not curtailed, the Town should have reuse water for irrigation of parks, golf courses and open space. However, reuse water will also be carefully monitored during droughts and if available, could be used to preserve key landscape features under more severe drought conditions. The Town will inform the public of irrigation using reuse water. This may be important under mandatory restrictions when the public is required to cease irrigation, yet reuse water may still be applied to key landscape features in Town parks.

Erie will monitor the Town's drought index on a regular basis. Monitoring will be most intense from late February until mid-May when the majority of mountain snowpack has accumulated and Northern Colorado Water Conservancy District (NCWCD) has made its final CBT quota announcement. However, during dry years monitoring will also extend into the irrigation season and, if conditions remain dry, will extend past the irrigation season to determine whether drought response is needed in the winter.

While the drought index will be one of the main drought indicators in determining the appropriate drought stage, Erie will also monitor the US Drought Monitor, precipitation and soil moisture in the service area, near-term projected customer water demands, long-term weather forecasts and actions that other water providers are taking in the regions. These drought indicators will provide additional insight into which specific drought stage and corresponding level of drought response is most appropriate for Erie.

Erie's Public Works Department is responsible for monitoring drought conditions and developing recommendations on whether a drought should be declared and at what stage. These recommendations will be presented to the Board of Trustees, which is responsible for making the final decision. The Board of Trustees will have an opportunity to discuss the recommendations, ask questions and ultimately decide whether the recommended drought stage should be officially declared. The Town Administrator's Office, through the Communications & Marketing Division is responsible for conveying the drought messages to Erie's customers.

Staged Drought Response Program

Erie's staged drought response program provides a list of measures to implement in accordance to each of the drought stages. The measures specifically focus on first-use supplies. The intensity of the response escalates with the increase in drought severity for each stage. The drought response program is summarized below.

- Volunteer drought stage – Drought index of 1.0 to 0.95. Occurs when the projected supplies are just sufficient to meet Erie's customer demands and to also store 20% of Erie's CBT allotment in the carryover program. A 5% water savings target is encouraged throughout Erie's service area to provide an additional buffer in case Erie's supplies are lower than projected or demands are higher than projected. This voluntary drought stage entails voluntary water use reductions and other actions to lower water demands.
- Watch drought stage – Drought index of 0.94 to 0.8. Requires mandatory water restrictions for first-use water and other actions to lower water use with a targeted water savings of 20% throughout Erie's service area. While customers will be required to lower outdoor water use and conserve, large-scale impacts to landscaping are not anticipated at this stage.
- Severe drought stage – Drought index of 0.79 to 0.6. Calls for a water savings goal of 40% and prohibits the irrigation of all turf irrigated with first-use water except for high priority community parks (i.e. sports fields) and golf course tees. This will result in some loss of turf and other landscaping; however, trees may be watered to ensure survival. Available reuse water may be used to support key landscape features.
- Emergency drought stage – Drought index of 0.59 to 0.4. Calls for a targeted water savings of 60%. All outdoor first-use water use is prohibited except for fire-fighting. If available, reuse water may be used to ensure the survival of trees in Town parks. The use of construction water will be reviewed by the Board of Trustees. All landscaping, including trees, will be negatively impacted. The main objective at this stage is to provide water for the essential indoor needs while indoor water conservation will be strongly encouraged.

The specific drought response measures for first-use water by each drought stage are outlined in Table ES-3.

Table ES-3 Summary of the Staged Drought Response Program

Response Measures	Voluntary Drought Index: 1 to 0.95 Water savings goal: 5%	Watch Drought Index: 0.94 to 0.8 Water savings goal: 20%	Severe Drought Index: 0.79 to 0.6 Water savings goal: 40%	Emergency Drought Index: 0.59 to 0.4 Water savings goal: 60%
Supply-Side Measures				
Technical and financial assistance		Identify technical and financial assistance opportunities	Identify technical and financial assistance opportunities	Identify technical and financial assistance opportunities
Acquire additional short-term water supplies during drought periods		Evaluate short-term water supply options	Lease water from farmers and/or other water providers	Lease water from farmers and/or other water providers
Additional supplies for the following year in preparation for a multi-year drought			Evaluate purchasing agricultural leasing options for the following year	Purchase agricultural leasing options for the following year
CBT carryover	Maximize 20% CBT carryover	Maximize 20% CBT carryover	Maximize 20% CBT carryover	Maximize 20% CBT carryover
Optimize local storage in preparation for a multi-year drought		Maximize storage in local reservoirs following the irrigation season. This may be accomplished through demand reductions.		
Reuse water			Consider using reuse water to preserve key landscape features	If available, consider using reuse water to preserve key landscape features
Demand-Side Measures				
TOWN: Mode 1 Parks*	Voluntary Target 5% savings	Mandatory Target 20% savings	Mandatory Target 50% savings	Watering prohibited Exception: may consider watering of trees to maintain survival with reuse water
TOWN: Modes 2 and 3 Parks*	Voluntary Target 10% savings	Mandatory Target 30% savings	Watering prohibited Exception: may consider watering of trees to maintain survival with reuse water	Watering prohibited Exception: may consider watering of trees to maintain survival with reuse water
TOWN: Hydrants			Reduce frequency of flushing	Prohibit flushing Only use for emergencies (i.e. put out fire)
TOWN: Washing of fleet vehicles	Voluntary Conservation encouraged	Mandatory Limit once per week	Prohibit washing of fleet vehicles	Prohibit washing of fleet vehicles

Response Measures	Voluntary Drought Index: 1 to 0.95 Water savings goal: 5%	Watch Drought Index: 0.94 to 0.8 Water savings goal: 20%	Severe Drought Index: 0.79 to 0.6 Water savings goal: 40%	Emergency Drought Index: 0.59 to 0.4 Water savings goal: 60%
TOWN: Ornamental fountains in parks and splash pad		Ornamental fountains in parks and splash pad are turned off between 10:00 am to 4:00 pm	Ornamental fountains in parks and splash pad are turned off	Ornamental fountains in parks and splash pad are turned off
TOWN: Street cleaning		Reduce frequency of street cleaning	Limit street cleaning to areas in severe need of cleaning	Eliminate street cleaning
TOWN & COMMERCIAL: Public pools & hot tubs	Voluntary Encourage use of covers & other best management practices	Mandatory Use of covers & other best management practices	Mandatory Use of covers & other best management practices	Filling of all public pools is prohibited
RESIDENTIAL & COMMERCIAL: Outdoor irrigation	Voluntary Conservation encouraged Limit twice per week	Mandatory Limit once per week	Watering prohibited Exception: trees may be hand watered to ensure survival	Watering prohibited All outdoor vegetation
RESIDENTIAL & COMMERCIAL: Street, sidewalk and driveway cleaning and misting devices	Voluntary Limit street & sidewalk cleaning, misting devices & driveway washing	Mandatory Street & sidewalk cleaning, misting devices & driveway washing are prohibited	Mandatory Street & sidewalk cleaning, misting devices & driveway washing are prohibited	Mandatory Street & sidewalk cleaning, misting devices & driveway washing are prohibited
RESIDENTIAL & COMMERCIAL: Rent AMR meters	Automatic Meter Reading (AMR) meters available at Town Hall for customer monitoring of water use	AMR meters available at Town Hall for customer monitoring of water use	AMR meters available at Town Hall for customer monitoring of water use	AMR meters available at Town Hall for customer monitoring of water use
RESIDENTIAL & COMMERCIAL: Increase number of free irrigation audits available	Voluntary Irrigation audits are strongly encouraged	Voluntary Irrigation audits are strongly encouraged	n/a	n/a
RESIDENTIAL: HOA open space	Voluntary Conservation encouraged Limit twice per week	Mandatory Limit once per week	Watering prohibited Exception: trees may be hand watered to ensure survival	Watering prohibited All outdoor vegetation
RESIDENTIAL: Private pools and hot tubs	Voluntary Encourage use of covers & other best management practices	Mandatory Use of covers & other best management practices	Filling of all private pools is prohibited	Filling of all private pools is prohibited

Response Measures	Voluntary Drought Index: 1 to 0.95 Water savings goal: 5%	Watch Drought Index: 0.94 to 0.8 Water savings goal: 20%	Severe Drought Index: 0.79 to 0.6 Water savings goal: 40%	Emergency Drought Index: 0.59 to 0.4 Water savings goal: 60%
COMMERCIAL: Golf courses	Voluntary Conservation encouraged Limit twice per week	Mandatory Limit once per week	Watering prohibited Exception: tees and greens. Trees may be hand watered	Watering prohibited All outdoor vegetation
COMMERCIAL: Car washes without recycling	Voluntary Best management practices encouraged to save water	Mandatory Must meet a standard of 40 gallons or less per vehicle	Mandatory Must meet a standard of 15 gallons or less per vehicle	Operations are prohibited
COMMERCIAL: Car washes with recycled water	Voluntary Best management practices encouraged to save water	Voluntary Best management practices encouraged to save water	Mandatory Town to review facilities to ensure water is being conserved at optimum levels. Modifications to operations may be required.	Operations are prohibited
CONSTRUCTION WATER			Conserve and prevent wasting of construction water	Prohibit/limit use of construction water
ALL CUSTOMERS: Drought surcharge			Consider drought surcharge	Implement drought surcharge
ALL INDOOR USE		Voluntary Public campaign encourages reductions	Voluntary Public campaign encourages reductions	Mandatory Fines/flow restrictors may be applied to abnormally high users

Note: The water saving targets for the Town Parks are higher than the community water savings goals shown in the heading of the table above. The Town of Erie plans to take a leadership role in conserving water during periods of drought, by achieving a higher degree of water savings in its Town Parks relative to the targeted community goal within Erie's service area. The targeted amount of first-use water savings to be achieved (i.e. thousand gallons) for Erie's Parks should be determined by multiplying the Parks' "baseline demand" by the specified targeted savings percentage. The Parks' baseline demand should be determined by multiplying the Parks' average application rate (gal/acre) for the previous five years by the current number of acres irrigated. This should only apply to first-use water for the voluntary, watch and severe drought stages. Reuse water for irrigation should be reduced and included in the Parks' water savings target in the emergency drought stage when reductions in residential indoor water use is required.

TABLE OF CONTENTS

1.0 STAKEHOLDERS, OBJECTIVES AND PRINCIPLES 5
1.1 DROUGHT PLANNING COMMITTEE AND PLAN DEVELOPMENT 5
1.2 OBJECTIVES AND OPERATING PRINCIPLES 5
2.0 HISTORIC DROUGHT AND IMPACT ASSESSMENT 8
2.1 AVAILABLE SUPPLIES AND DEMANDS DURING HISTORICAL DROUGHTS 8
2.2 HISTORICAL DROUGHT IMPACT, MITIGATION AND RESPONSE ASSESSMENT 10
3.0 DROUGHT VULNERABILITY ASSESSMENT 12
3.1 WATER SUPPLY RELIABILITY AND DROUGHT MANAGEMENT PLANNING 12
3.2 DROUGHT IMPACT ASSESSMENT 12
4.0 DROUGHT MITIGATION AND RESPONSE STRATEGIES 14
4.1 DROUGHT MITIGATION MEASURES 14
4.2 RESPONSE STRATEGIES 15
4.3 DROUGHT PUBLIC INFORMATION CAMPAIGN 16
5.0 DROUGHT STAGES, TRIGGER POINTS AND RESPONSE TARGETS 19
5.1 DROUGHT STAGES, TRIGGER POINTS AND RESPONSE TARGETS 19
5.2 DROUGHT DECLARATION AND PREDICTABILITY 20
6.0 STAGED DROUGHT RESPONSE PROGRAM 22
6.1 VOLUNTARY DROUGHT STAGE 22
Supply-Side Response Measures 22
Demand-Side Response Measures 22
6.2 WATCH DROUGHT STAGE 24
Supply-Side Response Measures 24
Demand-Side Response Measures 24
6.3 SEVERE DROUGHT STAGE 26
Supply-Side Response Measures 26
Demand-Side Response Measures 26
6.4 EMERGENCY DROUGHT STAGE 29
Supply-Side Response Measures 29
Demand-Side Response Measures 30
7.0 IMPLEMENTATION AND MONITORING 32
7.1 MITIGATION ACTION PLAN 32
7.2 MONITORING OF DROUGHT INDICATORS 33
7.3 DROUGHT DECLARATIONS 33

7.4 IMPLEMENTATION OF THE STAGED DROUGHT RESPONSE PROGRAM 34
7.5 ENFORCEMENT OF THE STAGED DROUGHT RESPONSE PROGRAM 34
7.6 REVENUE IMPLICATIONS AND A FINANCIAL BUDGETING PLAN 35
7.7 MONITORING OF PLAN EFFECTIVENESS 35
8.0 FORMAL PLAN APPROVAL AND UPDATES 37
8.1 PUBLIC REVIEW PROCESS 37
8.2 ADOPTION OF RESOLUTIONS AND OFFICIAL AGREEMENTS 37
8.3 DROUGHT MANAGEMENT PLAN APPROVAL 37
8.4 PERIODIC REVIEW AND UPDATE 37
REFERENCES 38

LIST OF TABLES

Table ES-1 Water Use Priorities ii
Table ES-2 Drought Stages, Trigger Point Guidelines and Response Targets iii
Table ES-3 Summary of the Staged Drought Response Program v
Table 1 Erie's Water Conservation Activities 4
Table 2 Drought Committee Members 5
Table 3 Water Use Priorities 6
Table 4 Historical Impacts During the 2011/2012 Drought 11
Table 5 Potential Future Drought Impacts 13
Table 6 Supply-Side Response Strategies 15
Table 7 Demand-Side Response Strategies 16
Table 8 Public Drought Campaign Messages When a Drought is Not Occurring 17
Table 9 Public Drought Campaign Messages During a Drought 17
Table 10 Public Drought Campaign Communication Tools 18
Table 11 Drought Stages, Trigger Point Guidelines and Response Targets 19
Table 12 Mitigation Action Plan 32

TABLE OF FIGURES

Figure 1 Virgin Annual Flow Volume at Hot Sulphur Springs 2
Figure 2 Storage and Quota of the CBT System 9
Figure 3 Total and Per Capita Water Use 10

Introduction

Overview of Erie's Water Supply System

The Town of Erie is situated north of Denver in Weld and Boulder counties. Erie provides water and wastewater services to over 7,300 households and more than 130 commercial and municipal users. The planned service area consists of 46 square miles bordered to the east by Interstate 25 and on the west by U.S. Highway 287. The service area extends north of Highway 52, with State Highway 7 serving as its southern boundary. Transbasin and local reservoir and ditch water supplies are treated at one Water Treatment Facility for potable use. Wastewater is treated at the North Water Reclamation Facility (NWRF) and is either stored for non-potable reuse or discharged into Boulder Creek.

Erie's 2015 population of approximately 22,000 represents a 47% increase within the past ten years. The Town of Erie Comprehensive Plan updated in 2005 includes a 2025 population forecast of 40,680. It is projected that Erie will serve over 49,600 people by 2030.[1] According to Erie's 2005 Comprehensive Master Plan,[2] approximately two thirds of Erie's planning area could ultimately be developed for residential and commercial uses with the remainder of the area consisting other regional facilities and open space.

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. Storage rights are diverted into 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 originate from the Colorado River Basin. The CBT project consists of 12 reservoirs on the west and east slopes with a total reservoir storage capacity of 720,000 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 a 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.

Erie also regularly utilizes NCWCD's CBT carryover program. As a standard operational practice, Erie stores the maximum allowable 20% of its annual CBT allotment in CBT project facilities.

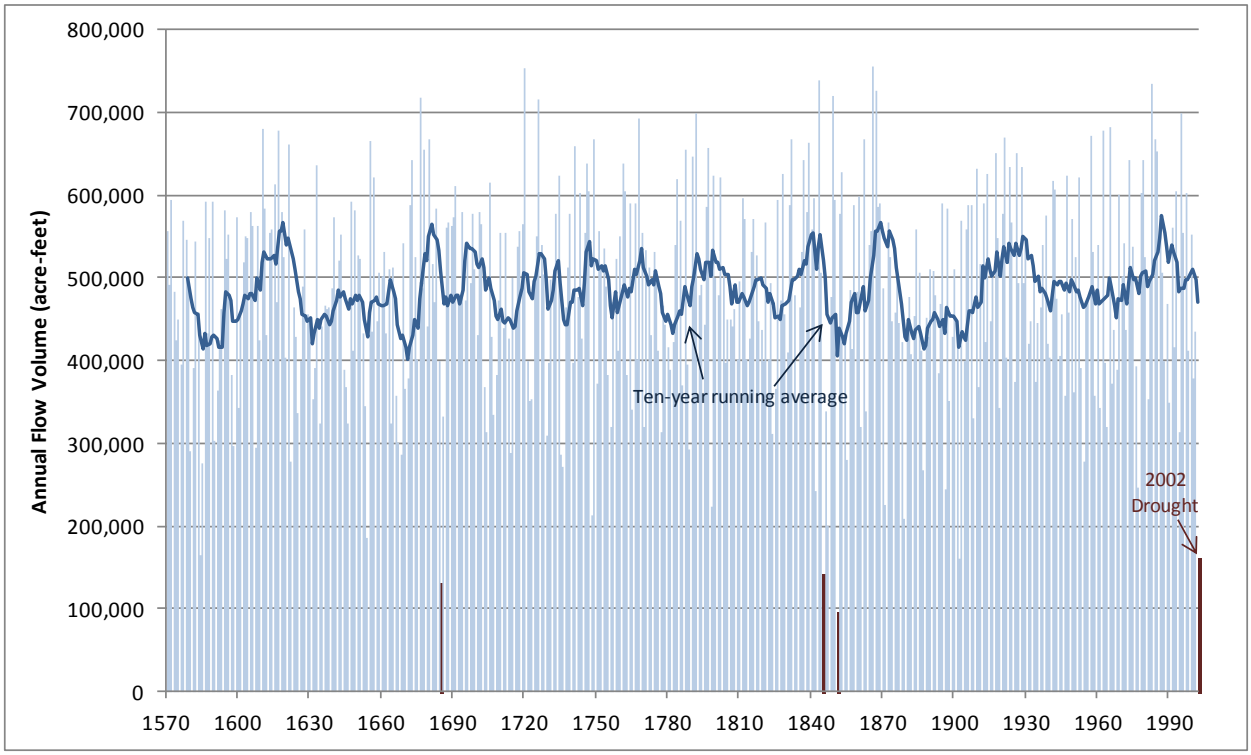
[1] Current and historical estimates are based on the number of Certificates of Occupancy issued by the Town of Erie while future population projections were recently developed in 2012 for Erie's 2013 Wastewater Utility Plan.
[2] The 2005 Comprehensive Master Plan provides goals, guiding principles and policies, and a proposed land use map addressing specific types of future land use development.

This carryover storage serves as a drought reserve if drought conditions occur in the following year.

Drought and Erie's Water Supplies

Drought is defined as "a period of abnormally dry weather sufficiently long enough to cause a serious hydrological imbalance."[3] This occurs when precipitation is below average based on historical weather records and there are not sufficient supplies to satisfy water demand. Drought is a natural phenomenon in Colorado. Figure 1 shows the paleo[4] and historical annual virgin flow volume of the Colorado River at Hot Sulphur Springs. These data indicate that there have been significant natural fluctuations in the Colorado River on an annual basis. Total annual flows have historically been lower than the 2002 drought levels, as denoted by the brown columns in Figure 1. This indicates within the past 440 years there have been droughts worse than the 2002 drought.

Figure 1 Virgin Annual Flow Volume at Hot Sulphur Springs



Erie defines drought within the context of its system as periods when there is a lack of precipitation and consequently there is an insufficiency in available water supplies to meet customer demand. The magnitude of water shortage depends on the severity and duration of the drought. Multi-year

[3] Source: Glossary of Meteorology, 2nd edition. 2000. American Meteorological Society

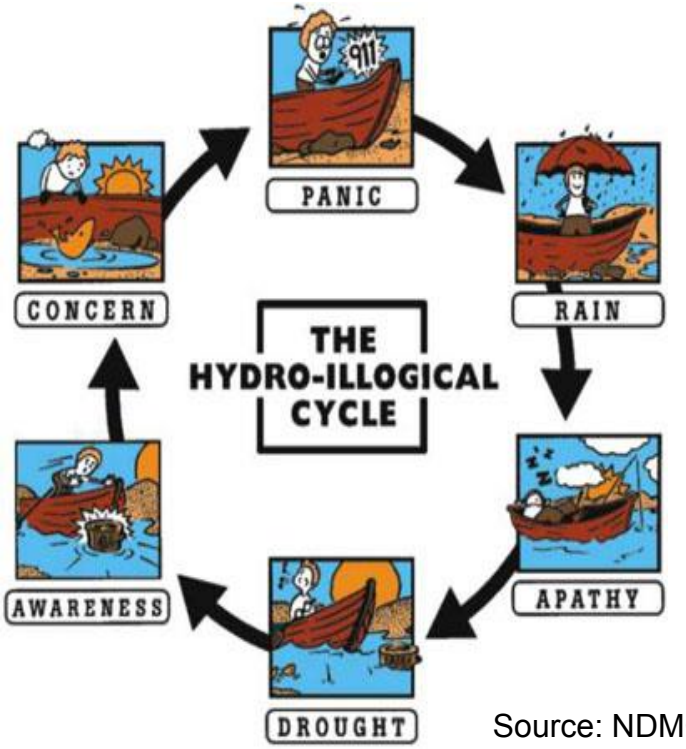
[4] Data prior to the historical records (prior to 1910), were developed by applying correlations of annual stream flow records with local tree rings width data. It has been found that the width of tree rings correlate with both annual precipitation and annual stream flow volumes: higher annual precipitation results in greater tree ring widths and higher stream flow volumes. The width of tree rings in prehistorical trees have been used to estimate annual stream flows prior to when stream flow data was collected.

droughts could have a significant impact on CBT storage and consequently impact the amount of project water available to Erie. Even single-year droughts could significantly reduce Erie's Windy Gap supplies, which would also reduce Erie's reuse supply.

In addition to CBT and Windy Gap supplies, drought can significantly reduce Erie's ditch and reservoir supplies which comprise 15% and 6%, respectively, of Erie's water supply portfolio in an average year.[5] In dry-years, the yield of Erie's junior storage rights are often significantly reduced or not available and the yield of Erie's ditch water rights yield can be reduced to 10% of its annual average yield.[6]

Mitigation and Response Planning

The main purpose of drought mitigation and response planning is to preserve essential public services and to minimize the adverse effects of drought on public health and safety, economic activity, environmental resources, and individual lifestyles during a drought event. Effective drought management plans remove the "crisis" from drought response efforts; reduce the hardship caused by water shortages, and raise public confidence in the actions taken to address the water supply shortage. Drought mitigation refers to actions taken in advance of a drought that reduce potential drought-related impacts when the event occurs, whereas drought response planning refers to the conditions under which a drought-induced water supply shortage occurs and specifies the actions that should be taken in response.[7]



Source: NDMC

Historically Erie's drought preparedness planning has consisted of a three-tiered water restrictions program and water supply management practices. Details of such practices are provided in Section 2.2. This Plan provides the Town a more integrated and comprehensive approach to addressing drought as Erie continues to grow and the competition for water supplies on the Front Range increases.

[5] These percentages assume Erie receives its full allotment of Windy Gap shares and a CBT quota of 70% in average years.
[6] This assumes Erie's ditch water rights yield 1,276 acre-feet and 124 acre-feet in average and dry years, respectively.
[7] This Plan includes both drought mitigation and response planning; however, it does not address emergency water shortages resulting from non-drought-related events such as an unexpected failure of a major raw water conveyance facility.

Drought Planning and Water Conservation

Water conservation and drought planning both entail a combination of strategies for reducing water demand. However, the main objective of a water conservation plan is to achieve continuing, long-term improvement in water use efficiency while reducing overall water demands. A drought management plan focuses on long-term drought mitigation and temporary response strategies that provide short-term responses to drought-related water supply shortages. Conservation activities that result in an ongoing reduction in water demand can provide long-term drought mitigation benefits and therefore can be considered a component of conservation as well as drought mitigation.

Erie's 2014 Water Conservation Plan targets a total per capita water use of 146 gpcd for first-use water and an indoor residential per capita water use of 42 gpcd by 2020. Table 1 provides a list of Erie's current water conservation activities that encourage long-term water savings while also providing drought mitigation benefits.

Table 1 Erie's Current Water Conservation Activities

Conservation Activities
Parks Activities - Implement best management practices to ensure efficient irrigation on parks, incorporate low water use landscapes where beneficial and continue to use the weather station, ET controllers and moisture sensors
Policy on water-wise landscape and efficient irrigation system design
Use of reuse water for non-potable irrigation
Use of treated reuse water for flushing/cleaning of NWRF's system
Volume billing and tiered block rate structure
Metering of source water, service connection and hydrant flushing
Leakage detection program and repair
Analysis of non-revenue water
Free Do-it-yourself Irrigation Audit Kits
Irrigation Audit Program (Partner with Center for Resource Conservation)
Remote readers available to residents to monitor water use
High efficiency washing machine rebate program and pre-rinse spray valve give-ways (until valves are gone)
Indoor water inspection program (Partner with Center for Resource Conservation)
Public education program on water conservation
Water wasting ordinance
Water conservation pamphlets, demonstration gardens, annual school fieldtrip to the NWRF
Annual xeriscape seminars (Partner with Center for Resource Conservation)
Garden-in-the-box (Partner with Center for Resource Conservation)

1.0 STAKEHOLDERS, OBJECTIVES AND PRINCIPLES

1.1 Drought Planning Committee and Plan Development

This Plan was developed through a stakeholder driven process that consisted of a Drought Committee and public outreach. The Drought Committee was comprised of representatives from a variety of Town services that could be impacted by drought. Members of the Committee are shown in Table 2. During the Plan development, two Committee workshops were held in October 2013 and December 2013. During these workshops, each committee member provided input on how drought could potentially affect Erie and how such impacts could be minimized through an effective mitigation and response program. The Committee members reviewed the Plan prior to a 60-day public review period in May and June of 2015 where Erie residents had the opportunity to provide input. This stakeholder process resulted in a robust plan representing a variety of perspectives and input.

Table 2 Drought Committee Members

Staff Member	Position
Gary Behlen	Public Works Director
Russell Pennington	Deputy Director of Public Works
Gary Hegner/Rob Crabb	Park Maintenance Division Manager
Jody Lambert	Operations & Maintenance Manager
Jon Mays	Water & Wastewater Operations Manager
Bruce Chameroy	Chief Water Plant Operator
Paul Reed	Park Crew Lead
Katie Jenkins	Communications and Marketing Coordinator

The first Drought Committee workshop focused on the plan objectives, operating principles and water use priorities; historical drought impacts and future vulnerability; drought mitigation and response strategies and introduced the concept of the drought trigger points and drought stages. The second workshop addressed the staged drought response program, public drought campaign and the drought declaration protocol.

In addition to these workshops, the Director and Deputy Director of Public Works met with NCWCD in November 2013 to discuss how the CBT and Windy Gap projects are managed during periods of drought. Information from this meeting was used to develop Erie's drought index discussed in Section 5.1.

1.2 Objectives and Operating Principles

This drought planning effort better prepares Erie for drought and provides an action-based guidance framework to respond to drought when it occurs. The objectives of this Plan are the following:

- Enhance Erie's ability to plan for droughts before they occur
- Identify and properly determine the severity of a drought based on Erie's potential shortage of supply
- Provide an effective drought response program

Erie manages its water supply system to ensure that its customer water needs are normally met throughout the year. However during droughts, Erie could experience a water shortage that requires customers to reduce their water use. Table 3 presents Erie's prioritization of customer use during periods of shortage. Customer uses of highest priority consist of services essential to public health and safety such as indoor residential use, hospitals, schools and firefighting. During periods of shortage, Erie will manage water service to ensure that all of these essential needs are met. Depending on the severity and duration of the water shortage, customer uses of lower priority may need to be reduced or in very severe situations, water use may be prohibited. Such low priority uses include Mode 2 and 3 parks (as defined in the table below), golf courses and HOA open space. However, irrigation of parks, golf courses and open space with reuse water will only be affected if there is an insufficient amount of reuse water for irrigation purposes and/or the reuse water is used to preserve key landscape features in severe and emergency droughts.

Table 3 Water Use Priorities

Priority	Customer Use	Description
1	Health and safety	Indoor use for essential services (i.e. hospitals, school, etc.); indoor residential, fire fighting
2	Indoor commercial and municipal buildings	Indoor commercial (businesses, schools) and indoor municipal buildings (Erie's recreation center)
3	Priority irrigation, municipal services and construction water	Mode 1 parks, outdoor commercial, car washing, outdoor residential, construction water, hydrant flushing, outdoor municipal buildings
4	Low-priority irrigation	Mode 2 and 3 parks; golf courses, HOA open space (includes neighborhood tot lots), facilities

Mode 1 parks – Community parks (i.e. softball field)
Mode 2 parks – Neighborhood parks
Mode 3 parks – Public facilities

The following operating principles were developed as means to assist with the development of this Plan and may also be used as a decision-making guidance tool when implementing the drought response program.

Drought response actions should be implemented in a manner that reflects the water use priorities in Table 3, with the highest priority being health and safety.

- Economic development is important to Erie and providing adequate drought protection for current and future residents is needed to provide a healthy sustainable community for future generations.
- When possible, efforts should be taken to preserve the environmental and recreational value of the surrounding lands which are important to the values and livelihood of Erie residents.
- Where possible, efforts should be made to allocate the costs and impacts associated with water use restrictions among all customers in an equitable manner.

- Effective coordination among Erie staff is vital to the success of this Plan. Exceptions to this Plan may be necessary but must be communicated clearly to all Erie staff.

2.0 HISTORIC DROUGHT AND IMPACT ASSESSMENT

2.1 Available Supplies and Demands during Historical Droughts

The majority of Erie's supplies consist of CBT water. The CBT project provides supplemental water supply to water users within the NCWCD boundaries. Erie owns 7,380 units out of a total of 310,000 units in the CBT system. The annual yield of each CBT unit is established by NCWCD's Board through an annual quota. The quota represents the annual water delivery volume per unit in acre-feet. The quota has historically ranged from 50% to 100% (i.e. a 100% quota delivers 1.0 acre-foot to each CBT unit). The NCWCD Board annually determines the quota through assessing snowpack, soil moisture conditions, the availability and amount of local native supplies and the amount of water stored in CBT reservoirs. The quota is initially set in November and is then normally revisited in April, after the majority of mountain snowpack has accumulated. Occasionally the NCWCD Board has increased the quota in the summer due to major unexpected reductions in supply or increases in demands.

Figure 2 shows the annual quota since the CBT project came online in the 1950s. Normally the quota is based upon the need for supplemental water: lower (as low as 50%) in wet years because the native supply is plentiful and higher (as high as 100%) in dry years, when the need for supplemental supply is greater. In an average hydrological year, the quota is typically set at 70%. Occasionally, the quota is based upon supply rather than demand.

Figure 2 also shows monthly recorded CBT storage and project reserves.[8] CBT storage was significantly impacted during drought in the 1960s and 1970s. The CBT storage was also significantly impacted during the 2000s drought. In 2002 (the lowest runoff year on record), the quota was set at only 70% as result of drought and low water storage. This was the first time in the project's history that a lower quota was set due to lack of storage in a drought.

[8] Project reserves consist of surplus unallocated CBT water in storage. These data did not start to be collected until the late 1980s.

Figure 2 Storage and Quota of the CBT System

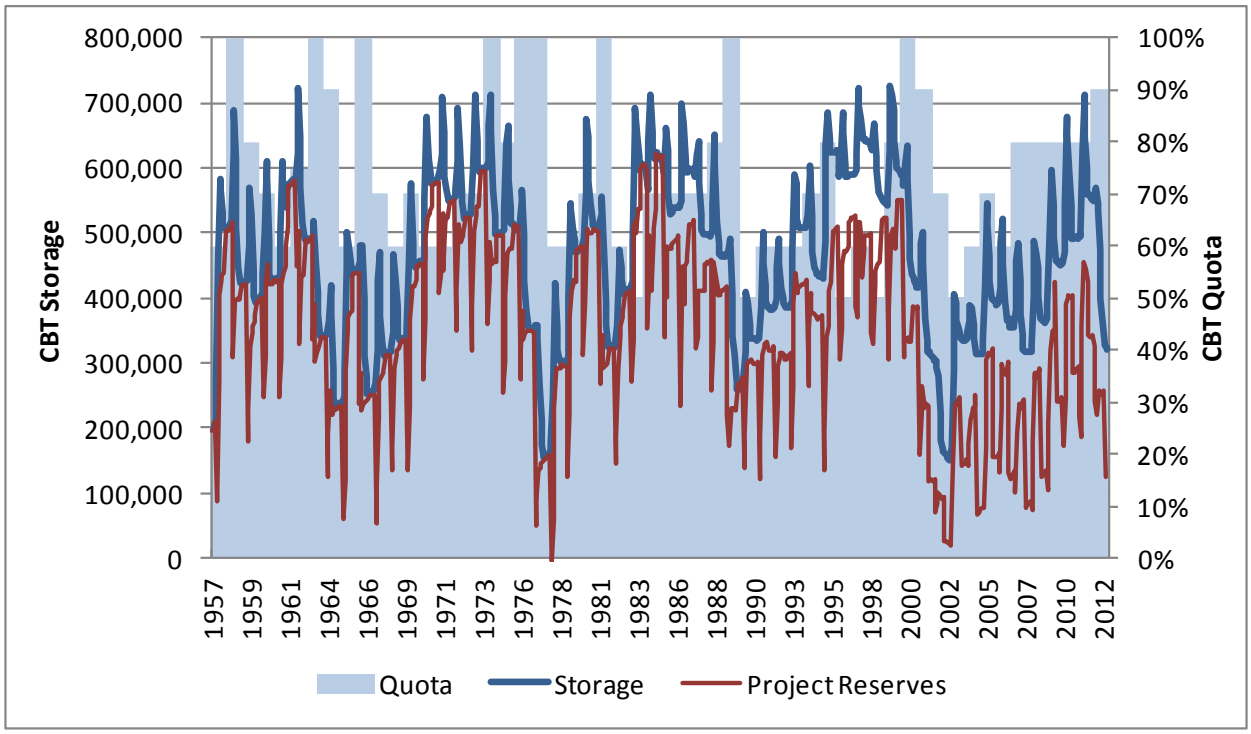
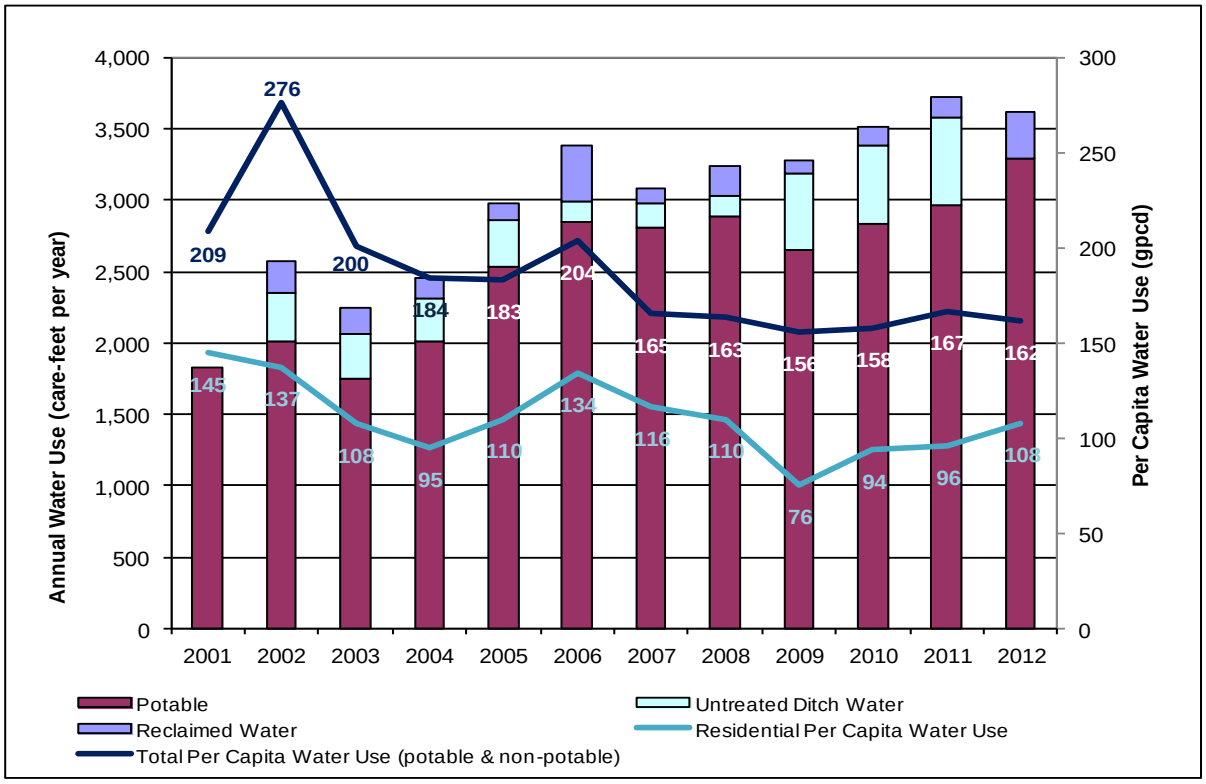


Figure 3 shows Erie's total annual and average daily per capita water use from 2001 through 2012. Per capita use for the service area was estimated by dividing total system water use by the residential population. Total system water use includes non-potable irrigation using reuse and raw ditch water (i.e. irrigation on the Vista Ridge Golf Course and on the community park in Erie Commons). Irrigation using reuse water and leased raw ditch water on Vista Ridge began in 2002, which coupled with the drought, significantly increased Erie's 2002 system-wide per capita water use, as shown in Figure 3.

Figure 3 Total and Per Capita Water Use



Note: Untreated ditch water was not available in 2012 due to dry conditions.

Erie's total annual water use has generally trended upward this decade reflecting the Town's increasing population. However, Erie's system-wide per capita water use and residential per capita water use has generally declined over the past eleven years and is lower than 2002 levels. Residential per capita water use during the 2012 drought was 37 gallons per capita per day (gpcd) less than the 2002. This is attributed to the following:

- Long-term 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 (i.e. homes within the Old Town portion of Erie)
- Increased water efficiency among customers in response to Erie's water conservation outreach efforts

2.2 Historical Drought Impact, Mitigation and Response Assessment

Prior to the onset of new development in the mid-1990s, Erie was a small rural town. Erie is now rapidly changing into a prosperous northern Colorado municipality. Since the 2002 drought, Erie has grown by 150% and has acquired additional water supplies to meet the needs of its growing population. Given this dramatic change, impacts Erie experienced during the 2002 drought are not relevant to Erie's current or future water supply and customer demand conditions.

Consequently, this Plan focuses on the historical drought impacts of the more recent drought of 2011/2012. These impacts and level of severity are outlined in Table 4. Taste and odor complaints

were of greatest significance, occupying the most amount of staff time to address. The remaining impacts were moderate to minor in severity requiring some to very little staff time. Impacts of moderate severity included loss of trees, increased costs to parks and an increase in public complaints while minor impacts included loss of revenues, recreational use and fish impacts.

Table 4 Historical Impacts During the 2011/2012 Drought

Impacts	Severity
Taste and odor complaints	Significant
Loss of trees	Moderate
Loss of revenues	Minor
Increased costs to parks	Moderate
Increase in public complaints	Moderate
Recreational use	Minor
Fish impacts	Minor

Minor –very little impact, did not require much staff time
Moderate – some impact, required more staff time to address
Significant – key impact, occupied staff time

Erie has historically implemented the following drought mitigation practices to ensure the Town has sufficient supplies during periods of drought.

- Acquisition of water supplies to meet its growing demand
- Maximum use of the CBT carryover program as a drought reserve
- Water conservation program

These mitigation activities help ensure a reliable water supply for Erie customers in dry years. In addition, Erie has implemented a three-tiered water restrictions program since 2002. Generally the water restrictions have been on a voluntary basis. This has provided flexibility to customers by simply recommending an irrigation schedule, yet when the water supply system is stressed, Erie has had the option to implement mandatory restrictions to better regulate irrigation.

3.0 DROUGHT VULNERABILITY ASSESSMENT

3.1 Water Supply Reliability and Drought Management Planning

Water supply reliability planning is necessary to ensure there are sufficient supplies to meet growing demands as well as during drought and, to some extent, overlaps with this drought management planning process. Erie's drought planning and water supply reliability planning efforts are closely coordinated. Erie's water supply reliability depends on a multitude of factors including the seniority of its water rights, storage, rate of customer growth and ability to respond to emergencies. While the Town's current water supplies provide a sufficient amount of water to meet existing needs, additional water supplies will be needed to meet future demands. Erie regularly monitors its projected future water needs and acquires additional supplies necessary to meet its growing demands.

Erie's current policy requires new development within the service area to provide either new water supplies or equivalent cash-in-lieu. Erie plans to acquire more CBT units and is a participant in the Windy Gap Firming Project. This project 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. Erie also plans to purchase additional ditch water rights and expand its non-potable reuse supplies. Additional planning efforts that support a reliable water supply system include:

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

Other factors that could impact Erie's water supply reliability in the long-term include climate change and the potential for Colorado River compact call. These factors are being addressed through a variety of 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.

Erie's water supply is also vulnerable to large-scale wildfires on the west slope that impact the water quality of CBT and Windy Gap supplies. In 2012 the CBT Headwater Partnership was formed between NCWCD, U.S. Bureau of Reclamation and the U.S. Forest Service to pursue and restore forest and watershed health before wildlife fires occur and to develop a plan to protect water supplies after fires occur. NCWCD is also working with a variety of other local and federal stakeholders to address algae blooms and other related concerns in Granby Reservoir, Shadow Mountain Reservoir and Grand Lake.

3.2 Drought Impact Assessment

Erie could experience a variety of future drought-related impacts. These impacts and corresponding level of severity are listed in Table 5. The potential severity of many of these

impacts could be significant depending on the magnitude and duration of the drought. Impacts with greatest anticipated severity include algae blooms (taste and odor complaints), loss of trees and increase in public complaints. Impacts of moderate severity include increased costs to parks, recreational use, changes to water supply operations and loss of vegetation including secondary effects (i.e. safety on ball parks). Impacts of less severity include loss of revenues and reduced firefighting capacity. Fish impacts may also be of concern depending on the severity of drought.

Table 5 Potential Future Drought Impacts

Impacts	Severity
Algae blooms - taste and odor complaints	Moderate/significant
Loss of trees	Moderate/significant
Loss of revenues	Minor/moderate
Increased costs to parks	Moderate
Increase in public complaints	Moderate/significant
Recreational use	Moderate
Fish impacts	Depend on drought severity
Reduced firefighting capacity	Minor/moderate
Changes in water supply operations	Moderate
Loss of vegetation and secondary effects (safety on ball parks)	Moderate

Notes:
Minor –very little impact, did not require much staff time
Moderate – some impact, required more staff time to address
Significant – key impact, occupied staff time

4.0 DROUGHT MITIGATION AND RESPONSE STRATEGIES

4.1 Drought Mitigation Measures

Erie is committed to drought preparedness by mitigating for drought before it occurs. The main components of this Plan are critical components of mitigation. The Plan provides a set of drought triggers and guidelines for declaring drought stages, addresses potential future impacts and includes a drought response plan. In addition to this Plan, Erie currently implements the following mitigation measures.[9]

- New supplies – Erie continues to acquire additional water supplies. These acquisitions are necessary to meet the growing demands of the community as well as to ensure that there are sufficient supplies during dry periods.
- Drought reserve - Erie maximizes its 20% CBT carryover as a standard water operations and drought mitigation practice. This practice will continue in periods of drought to ensure a drought storage reserve in the case the drought persists into the following year(s)
- Reuse water – Erie plans to continue to expand its use of non-potable reuse water. Depending on the yield of Windy Gap water, this reuse water may be available in dry years for irrigation, enabling Erie's first use water to be used for other purposes.
- Erie updated its Water Conservation Plan in 2014 which includes a variety of conservation activities that provide long-term water savings while also providing drought mitigation benefits. These activities are listed in Table 1.

In addition to the items above, Erie plans to evaluate the feasibility and benefits associated with the following infrastructure and operational improvements:

- Emergency interconnects – Erie has emergency interconnects with Lafayette and Left Hand Water District. Erie could work with these water providers in expanding the terms of use of these interconnects during dry periods.
- Bypass Erie Lake – Low reservoir levels during dry periods can result in algae blooms and taste and odor issues. Erie has installed a pipeline to bypass CBT and Windy Gap water around Erie Lake and thereby avoid water quality issues.
- Recycle backwash water at the Water Treatment Facility- Recycling backwash water at the Water Treatment Facility would provide long-term water savings and provide drought mitigation benefits.
- New local raw water storage for potable and non-potable use – Additional local storage would extend Erie's ability to provide reliable supplies during drought shortages. Erie is in the process of expanding its non-potable reuse which entails the need for additional water storage at strategic locations.
- Improve ditch efficiencies – Water savings may be achieved by lining ditches Erie uses to convey supplies within its service area.

[9] Worksheets B and C in CWCB's Municipal Drought Management Plan Guidance Document were used in selecting the drought mitigation measures.

4.2 Response Strategies

Tables 6 and 7 list the supply-side and demand-side response strategies, respectively. The supply-side strategies focus on actions Erie will take to extend water supplies during drought shortage periods. The demand-side response strategies provide activities that both Town staff and Erie customers will do during drought shortages. The response strategies were selected using the following criteria:

- Technical feasibility – Will the strategy work as intended in a timely manner? Is there staff available to implement the action?
- Perceived cost and benefits – Will the selected strategy provide an adequate amount of water savings/additional supplies relative to the cost?
- Enforceable – Is the strategy worth the cost/effort of enforcing it?
- Public acceptance – How will the public accept the selected strategy?

Table 6 Supply-Side Response Strategies

Category	Response Strategy
Seek technical and financial assistance	Identify state, federal, county and private financial assistance opportunities, which could include grant or loans for emergency drought related planning, drought relief, and/or water use efficiency improvements.
Develop short-term water supply options	Identify ways in which additional supplies may be acquired during the drought shortage including leasing arrangements from farmers, leasing excess CBT supplies (if available) and exchanging non-potable reuse for potable supplies.
	Purchase agricultural leasing options for the following year in preparation for a multi-year drought.
Maximize drought reserves	Ensure a 20% CBT carryover in storage during a drought in case of a multi-year drought
	Maintain maximum amount of storage in local reservoirs in preparation for a multi-year drought
Reuse water	Consider using reuse water to preserve key landscape features under severe and emergency droughts and/or be use reuse water to increase potable supplies through trade-arrangements with other water users.

Table 7 Demand-Side Response Strategies

Category	Response Strategy
Town operations (actions by Erie Town staff)	Prohibit use of splash pad
	Prevent washing of Town fleet vehicles
	Turn off ornamental fountains in building and parks
	Limit use of hydrants (except for public safety)
	Reduce Town's irrigation with first-use water via water restrictions (i.e. parks)
	Encourage staff to reduce indoor water use in municipal buildings
	Consider drought surcharge
	Prohibit/limit Town street cleaning
Residential, HOA, commercial and public services (i.e. schools)	Reduce outdoor use of first-use water via water restrictions
	Use of covers and other best management practices on hot tubs and pools
	Limit/prohibit outdoor misting devices
	Increase number of residential irrigation audits available for free
	Prohibit/limit street cleaning, sidewalk and driveway washing
	Rent AMR monitors
	Provide residences meters to monitor water use
	Car washing (limit or prohibit depending on whether use recycled water)
Golf courses	Reduce use of first-use water via water restrictions
	Limit/prohibit outdoor misting devices
	Prohibit/limit street cleaning, sidewalk and driveway washing
Construction water	Limit/prohibit construction water

4.3 Drought Public Information Campaign

The public drought campaign will be closely coordinated with Erie's water conservation education programs. While the water conservation education program focuses on long-term water savings, the public drought campaign focuses on information specific to drought and how to achieve additional short-term savings during a drought shortage. The objectives of the public drought campaign are:

- Provide concise effective drought information to Erie customers and the media.
- Adjust the intensity of the public outreach effort in accordance to the severity of the drought (drought stage).
- Coordinate campaign efforts with nearby entities when beneficial
- The public drought campaign will provide the basic foundational information shown in Table 8 during non-drought periods and continue with this messaging during droughts.

Table 8 Public Drought Campaign Messages When a Drought is Not Occurring

Actions and Messages
Status of current drought conditions and corresponding drought stages
How to access the Drought Management Plan
Actions that Erie is taking to mitigate drought and where customers may access the drought management plan
Actions Erie is taking to save water and acquire new water
Information on how to set up a water use plan for the home/business that tracks their water use
Convey messages through the public education program that promote conservation of water

Table 9 lists the actions and general message the drought public campaign will convey during a drought. The specific messages as well as the means and frequency in which the information is conveyed to the public will be customized to the drought and needs of the public.

Table 9 Public Drought Campaign Messages During a Drought

Actions and Messages
Status of current drought conditions and corresponding drought stages
How to access the Drought Management Plan
Actions that Erie is taking to mitigate drought and where customers may access the drought management plan
Convey messages through the public education program that promote conservation of water
Actions Erie is taking to save water and acquire new water
Information on how to set up a water use plan for the home/business that tracks their water use
Develop a communications plan in the spring (i.e. key messages, media for communication, etc.)
Increase public's awareness on drought, status of current drought stage & future restrictions/impacts if drought conditions continue
Elevate water conservation education program messages
Generate more public discussion & media involvement about ways to cut water use
Contact key customers (i.e. large water users) and inform them of drought conditions
Implement a drought response hotline for customers to file complaints and ask questions
Publicize efforts of individuals and businesses as examples of how to reduce water use
Hold public outreach meetings
Landscaping tips during a drought (i.e. which plants to convert to drip, which to save, which to let die)
Education on enforcement activities if applicable
Key messages related to the drought surcharge if applicable
Develop messages on how customers should respond to the drought if the drought is anticipated to persist through the winter
Provide customers post-drought landscape revival information

Coordination with other entities will also be an important component of the public drought campaign. Efforts will be made to take advantage of synergies associated with consistent drought-related messages shared among neighboring providers and collectively contributing to a regional drought outreach effort. During this period, Erie will also track other local water providers'

drought-related response activities, water use restrictions, and means of enforcement. This will enable Erie to explain to its customers any differences between Erie's drought response activities and its neighboring municipalities.

The Town Administrator's Office through the Communications and Marketing Division will work closely with the Public Works Department to ensure that the message delivered to the public is accurate. Table 10 lists the communication tools that will be used to convey the drought messages to specific targeted audiences. The drought campaign will mainly consist of website communications, social networking media, and informational emails during non-drought periods. During droughts, communication tools will likely be expanded to newspaper articles, bill inserts, emails targeted to specific water users, booths at special events, and school programs.

Table 10 Public Drought Campaign Communication Tools

Targeted Audience	Communications Tools
Town staff and Board of Trustees	Email Meetings
All water customers	Website Newsflash/email distribution list Social networking media Local newspaper/television Media articles/television Poster in public places (i.e. post office) Special events Public meetings
Large water users (i.e. HOAs, golf course, construction sites)	Items listed above in addition to direct phone calls
School children	Booths at special events for children School programs (if possible)

5.0 DROUGHT STAGES, TRIGGER POINTS AND RESPONSE TARGETS

5.1 Drought Stages, Trigger Points and Response Targets

Though the pace of development since the economic downturn (2008-2012) would suggest Erie will fall short of the 40,680 population forecasted in the Town's 2005 Comprehensive Plan, both residential and commercial development will continue. This new development will result in an increase in customer water demand and consequently the Town is planning to acquire additional water supplies to meet the growing needs. Given this trend, a drought trigger index was developed to characterize the severity of a drought within the context of both Erie's projected water supplies and demands. The drought index represents the ratio of Erie's projected water supply to demand.

Table 11 presents four stages of drought severity with the corresponding drought index and response target. These four stages in an increasing order of drought intensity are voluntary, watch, severe and emergency. The targeted water savings increases with each stage, with a targeted 5% water savings for the voluntary drought stage and a 60% water savings target under the emergency drought stage.

Table 11 Drought Stages, Trigger Point Guidelines and Response Targets

Drought Stage	Drought Trigger Index	Response Target (Targeted Water Savings)
Voluntary	1.0 to 0.95	5%
Watch	0.94 to 0.8	20%
Severe	0.79 to 0.6	40%
Emergency	0.59 to 0.4	60%

The drought index should be calculated and applied during the spring, normally in April after the spring update to the CBT quota has been announced, to project Erie's annual water supply for the upcoming irrigation season. The drought index includes all of Erie's first-use supplies (CBT, Windy Gap, ditch water rights and reservoir rights). The projected demands entails last year's per capita demand of Erie's first-use water (this does not include reuse water) multiplied by this year's population and safety factor of 10% plus an allowance for a maximum carry-over of Erie's CBT supplies (number of CBT units owned by Erie x 0.2 acre-feet) into the following year.

1)

$$\text{Index} = \frac{\text{Projected Supply}}{\text{Projected Demand}}$$

2)

$$\text{Index} = \frac{\text{CBT quota supply} + \text{CBT carryover from last year} + \text{Projected Windy Gap delivery} + \text{Projected yield of ditch rights} + \text{Projected yield of reservoir rights}}{\text{Last year's first use per capita demand} \times \text{This year's projected population} \times \text{10\% safety factor} + \text{Allowance for full CBT carryover}}$$

Details of the drought index terms and input data are provided below.

- CTB quota supply: this year's CBT quota times Erie's CBT units (acre-feet)
- CBT carryover from last : storage in CBT carryover program minus a 10% shrinkage (acre-feet)
- Projected Windy Gap delivery: estimated yield of Windy Gap water (acre-feet)
- Projected yield of ditch rights: estimated yield of ditch water rights (acre-feet)
- Projected yield of reservoir right: estimated yield of storage water rights minus 10% evaporation (acre-feet)
- Last year's first-use per capita demand: last year's annual water treatment plant production (acre-feet) plus raw water ditch deliveries for non-potable use divided by last's years population (acre-feet)
- This year's projected population
- Allowance for full CBT carryover (acre-feet): CBT units owned by Erie times 20%

In years when Erie is in a declared drought stage, the targeted amount of water savings to be achieved (in acre-feet or thousand gallons) should be determined by multiplying Erie's "baseline demand" by the designated percentage response target defined in Table 11. The baseline demand should be determined by multiplying Erie's current population by Erie's average per capita water use (gpcd) of first-use water for the previous five years.

It is important to note that the drought index reflects the level of shortage Erie may experience in times of drought as well as in wet years when NCWCD sets a lower quota. Erie could potentially experience shortages in wet years if NCWCD sets a lower quota (i.e. 50%). Historically this has happened in wet periods when the amount of supplemental supply needed for agricultural irrigation is low. If the drought index indicates a potential shortage in wet years, Erie may want to investigate options to acquire additional temporary supplies such as purchasing short-term agricultural leases and assessing whether demand reductions are necessary.

5.2 Drought Declaration and Predictability

Droughts in Colorado can appear quickly or slowly, last for a season or many years, and can occur locally, regionally, or statewide. Furthermore, a drought does not have a clearly defined beginning or end and is difficult to predict. For example, following the 2002 drought, snowpack accumulation in early 2003 was abnormally low and, if not for a large single snow storm event in late March 2003, many providers throughout Colorado would have been seriously stressed. Even though South Platte supplies in 2003 were slightly above average, water demands (including demands to fill empty reservoirs) were well above average, resulting in a drought condition even with above-average supplies.

Erie will monitor the Town's drought index on a regular basis. Monitoring will be most intense from late March until early May when the nearly all of the spring mountain snowpack has accumulated and NCWCD has made its final CBT quota announcement. However in dry years (or in wet years when the CBT quota is low), monitoring will extend into the irrigation season. If the summer continues to remain dry, monitoring will extend past the irrigation season in order to determine whether drought response is needed in the winter.

While the drought index will be one of the main drought indicators in determining the appropriate drought stage, Erie will also monitor the US Drought Monitor, precipitation and soil moisture in the service area, near-term projected customer water demands, long-term weather forecasts and actions that other water providers are taking in the regions. These drought indicators will provide additional insight into which specific drought stage and corresponding level of drought response is most appropriate for Erie. For example, if in early May Erie's drought index is 0.6 and the following conditions persist: the majority of water providers in the region are declaring severe drought stages, early spring precipitation is low with dry soil moisture conditions, and long-term weather forecasts predict very little relief; these data may collectively support the declaration of a severe drought stage.

The official drought declaration and corresponding drought stage designation should occur in a timely manner. If a drought is declared too late or actions are not taken early enough to reduce water use, supplies can be severely depleted and strict water restrictions and economic impacts may be required that could have been avoided. Conversely, premature drought declarations can result in unnecessary mandatory water restrictions and associated impacts, while customers can lose confidence in the declaration. The timing of such a declaration will be an important consideration by both Erie staff and Erie's Board of Trustees.

6.0 STAGED DROUGHT RESPONSE PROGRAM

This section outlines supply and demand-side response measures specific to each drought stage. These measures apply to first-use water unless otherwise noted.

6.1 Voluntary Drought Stage

Drought Trigger: Drought Index of 1.0 to 0.95

Drought Stage and Trigger Summary: This stage is triggered when the there is a drought index of 1 to 0.95. The projected supplies are just sufficient to meet Erie's customer demands and to also store 20% of Erie's CBT allotment in the carryover program. A 5% water savings target is encouraged throughout the Town's service area to provide an additional buffer in case Erie's actual supplies are lower than projected or demands are higher than projected. This voluntary drought stage entails voluntary water reductions and other actions to lower water demands.

Supply-Side Response Measures

Drought reserve - Erie maximizes its 20% CBT carryover as a standard water operations and drought mitigation practice. This practice will continue in periods of drought to ensure a drought storage reserve in the case the drought persists into the following year(s).

Demand-Side Response Measures

Town

- Mode 1 Parks – Voluntary best management practices are encouraged with a targeted savings of 5%.[10]
- Modes 2 and 3 Parks - Voluntary best management practices are encouraged with a targeted savings of 10%.[10]
- Washing of fleet vehicles – Voluntary conservation practices are encouraged when washing fleet vehicles.
- Public pools and hot tubs– Encourage use of covers and other best management practices to conserve water.

Residential

- Private pools and hot tubs – Encourage use of covers and other best management practices to conserve water.

[10] The targeted amount of first-use water savings to be achieved (i.e. thousand gallons) for Erie's Parks should be determined by multiplying the Parks' "baseline demand" by the specified targeted savings percentage. The Parks' baseline demand should be determined by multiplying the Parks' average application rate (gal/acre) for the previous five years by the current number of acres irrigated. This should only apply to first-use water for the voluntary, watch and severe drought stages. Reuse water for irrigation should be reduced and included in the Parks' water savings target in the emergency drought stage when reductions in residential indoor water use is required.

- Outdoor resident irrigation – Voluntary water restrictions limit outdoor irrigation to twice a week and encourage conservation.
- Street, sidewalk and driveway cleaning and misting devices – Discourage use of misting devices and use of water to clean the street, sidewalk and driveway (voluntary restrictions)
- Rent AMR monitors – AMR meters are available at Town Hall for customers to rent and monitor their water use.
- Irrigation audits – Erie's water conservation program includes outdoor irrigation audits. Additional audits are made available and encouraged through the public drought campaign.
- HOA open space - Voluntary water restrictions limit outdoor irrigation to twice a week and encourage conservation.

Commercial

- Public pools and hot tubs – Encourage use of covers and other best management practices to conserve water.
- Outdoor irrigation – Voluntary water restrictions limit outdoor irrigation to twice a week and encourage conservation.
- Street, sidewalk and driveway cleaning and misting devices – Discourage use of misting devices and use of water to clean the street, sidewalk and driveway (voluntary restrictions)
- Rent AMR monitors – AMR meters are available at Town Hall for customers to rent and monitor their water use.
- Irrigation audits – Erie's water conservation program includes outdoor irrigation audits. Additional audits are made available and encouraged through the public drought campaign.
- Golf courses - Voluntary water restrictions limit outdoor irrigation to twice a week and encourage conservation.
- Commercial car washes – Encourage voluntary best management practices to conserve water for both car washes that use recycled water and ones that do not use recycled water. (i.e. limit duration in which individual automobiles may be washed).

6.2 Watch Drought Stage

Drought Trigger: Drought Index of 0.94 to 0.8

Drought Stage and Trigger Summary: This stage is triggered when the drought index is 0.94 to 0.8. This stage requires mandatory water restrictions and other actions to lower water use with a targeted water savings of 20% throughout the Town's service area. While customers will be required to lower outdoor first-use water use through mandatory water restrictions, large-scale impacts to landscaping are not anticipated.

Supply-Side Response Measures

Drought reserve - Erie maximizes its 20% CBT carryover as a standard water operations and drought mitigation practice. This practice will continue in periods of drought to ensure a drought storage reserve in the case the drought persists into the following year(s).

- Seek technical and financial assistance opportunities – This may include assistance from the public sector at the federal, state, or county level or include assistance from private entities such as non-profit organizations promoting water conservation and drought awareness.
- Evaluate short-term water supply options – Erie will investigate potential short-term water supply options such as temporary agricultural leasing arrangements and consider whether it is beneficial to purchase such temporary supplies.
- Maximize storage in local reservoirs – Erie will manage water supplies in such a manner to maximize the amount of storage in Erie's local reservoirs at the end of the irrigation season for carrying into the following irrigation season if the winter continues to be dry.

Demand-Side Response Measures

Town

- Mode 1 Parks – Mandatory best management practices for first-use water use with a targeted savings of 20%.[11]
- Modes 2 and 3 Parks - Mandatory best management practices for first-use water use with a targeted savings of 30%.[11]
- Washing of fleet vehicles –Washing fleet vehicles is limited to once per week.
- Ornamental fountains and splash pad – Ornamental fountains in the parks and splash pad are turned off between 10:00 am to 4:00 pm.
- Street cleaning - Reduce frequency of Town street cleaning.
- Public pools and hot tubs – Require use of covers and other best management practices to conserve water.

[11] The targeted amount of first-use water savings to be achieved (i.e. thousand gallons) for Erie's Parks should be determined by multiplying the Parks' "baseline demand" by the specified targeted savings percentage. The Parks' baseline demand should be determined by multiplying the Parks' average application rate (gal/acre) for the previous five years by the current number of acres irrigated. This should only apply to first-use water for the voluntary, watch and severe drought stages. Reuse water for irrigation should be reduced and included in the Parks' water savings target in the emergency drought stage when reductions in residential indoor water use is required

Residential

- Private pools and hot tubs – Require use of covers and other best management practices to conserve water.
- Outdoor resident irrigation – Mandatory water restrictions limit outdoor irrigation to once a week and encourage conservation.
- Street, sidewalk and driveway cleaning and misting devices – Prohibit use misting devices and use of water to clean the street, sidewalk and driveway.
- Rent AMR monitors – AMR meters are available at Town Hall for customers to rent and monitor their water use.
- Irrigation audits – Erie's water conservation program includes outdoor irrigation audits. Additional audits are made available and encouraged through the public drought campaign.
- HOA open space - Mandatory water restrictions limit outdoor irrigation with first-use water to once a week and encourage conservation.

Commercial

- Public pools and hot tubs – Require use of covers and other best management practices to conserve water.
- Outdoor resident irrigation – Mandatory water restrictions limit outdoor irrigation with first-use water to once a week and encourage conservation.
- Street, sidewalk and driveway cleaning and misting devices – Prohibit use of water to clean the street, sidewalk and driveway as well as using misting devices.
- Rent AMR monitors – AMR meters are available at Town Hall for customers to rent and monitor their water use.
- Irrigation audits – Erie's water conservation program includes outdoor irrigation audits. Additional audits are made available and encouraged through the public drought campaign.
- Golf courses - Mandatory water restrictions limit outdoor irrigation with first-use water to once a week and encourage conservation.
- Commercial car washes without recycling – Must meet a standard of 40 gallons or less per vehicle washing.
- Commercial car washes with recycling – Encourage voluntary best management practices to conserve water (i.e. limit duration in which individual automobiles may be washed).

Indoor Water Use

- Public drought campaign encourages reductions in water use.

6.3 Severe Drought Stage

Drought Trigger: Drought Index of 0.79 to 0.6

Drought Stage and Trigger Summary: This stage is triggered when the drought index is 0.79 to 0.6. The stage calls for a water savings goal of 40% throughout the Town's service area and prohibits the irrigation of all turf using first-use water except for high priority community parks (i.e. baseball fields) and golf course tees and greens. This will result in some loss of turf and other landscaping; however, trees may be watered to ensure survival.

Supply-Side Response Measures

Drought reserve - Erie maximizes its 20% CBT carryover as a standard water operations and drought mitigation practice. This practice will continue in periods of drought to ensure a drought storage reserve in the case the drought persists into the following year(s).

- Seek technical and financial assistance opportunities – This may include assistance from the public sector at the federal, state, or county level or include assistance from private entities such as non-profit organizations promoting water conservation and drought awareness.
- Evaluate short-term water supply options – Erie will investigate and purchase available short-term water supply options such as temporary agricultural leasing arrangements if proven beneficial.
- Maximize storage in local reservoirs – Erie will manage water supplies in such a manner to maximize the amount of storage in Erie's local reservoirs at the end of the irrigation season for carrying into the following irrigation season if the winter continues to be dry.
- Evaluate purchasing available agricultural leasing options for the following year – Erie will consider purchasing agricultural leasing options that would provide the Town additional supplies in the following year.
- Reuse water – Erie will consider using reuse water to preserve key landscape features that are no longer irrigated with first-use water.

Demand-Side Response Measures

Town

- Mode 1 Parks – Mandatory irrigation restrictions reduce first-use water use by a targeted 50%.[12]
- Modes 2 and 3 Parks – Irrigation with first-use water is prohibited on all turf. Trees may be hand watered with reuse water to maintain survival.[12]
- Hydrants – The frequency of hydrant flushing is reduced.
- Washing of fleet vehicles – Washing of fleet vehicles is prohibited.

[12] The targeted amount of first-use water savings to be achieved (i.e. thousand gallons) for Erie's Parks should be determined by multiplying the Parks' "baseline demand" by the specified targeted savings percentage. The Parks' baseline demand should be determined by multiplying the Parks' average application rate (gal/acre) for the previous five years by the current number of acres irrigated. This should only apply to first-use water for the voluntary, watch and severe drought stages. Reuse water for irrigation should be reduced and included in the Parks' water savings target in the emergency drought stage when reductions in residential indoor water use is required

- Ornamental fountains and splash pad – Ornamental fountains in the parks and splash pad are turned off.
- Street cleaning - Limit Town street cleaning to priority streets in need of washing.
- Public pools and hot tubs – Use of covers and other best management practices to conserve water.

Residential

- Private pools and hot tubs – Filling of all private pools and hot tubs is prohibited.
- Outdoor resident irrigation – Irrigation with first-use water is prohibited on all turf. Trees may be hand watered to maintain survival.
- Street, sidewalk and driveway cleaning and misting devices – Prohibit use of misting devices and use of water to clean the street, sidewalk and driveway.
- Rent AMR monitors – AMR meters are made available at Town Hall for customers to rent and monitor their water use.
- HOA open space – Irrigation with first-use water is prohibited on all turf. Trees may be hand watered to maintain survival.

Commercial

- Public pools and hot tubs – Require use of pool covers and other best management practices to conserve water.
- Outdoor resident irrigation – Irrigation with first-use water is prohibited on all turf. Trees may be hand watered to maintain survival.
- Street, sidewalk and driveway cleaning and misting devices – Prohibit use of water to clean the street, sidewalk and driveway as well as using misting devices.
- Rent AMR monitors – AMR meters are available at Town Hall for customers to rent and monitor their water use.
- Golf courses – Irrigation with first-use e water is prohibited on all turf with exception to the tees and greens. Trees may be hand watered to maintain survival.
- Commercial car washes without recycling – Must meet a standard of 15 gallons or less per vehicle washing.
- Commercial car washes with recycling – Mandatory best management practices are required (i.e. limit duration in which individual automobiles may be washed). The Town will review facilities to ensure water is being conserved at optimum levels. Modifications to operations may be required.

Construction Water

- Conservation and best management practices of construction water are strongly encouraged to prevent wasting of construction water.

Drought Surcharge

- A drought surcharge on first-use water is considered that supports water use restrictions and helps customers reduce water use.

Indoor Water Use

- Public drought campaign encourages reductions in water use.

6.4 Emergency Drought Stage

Drought Trigger: Drought Index of 0.59 to 0.4

Drought Stage and Trigger Summary: This stage is triggered when the drought index is 0.59 to 0.4 and calls for a targeted water savings of 60% throughout the Town's service area. All outdoor use of first-use water is prohibited except for firefighting and if available, reuse water may be used to ensure the survival of trees in Town parks. The use of construction water will be reviewed by the Board. All landscaping, including trees will be negatively impacted. The main objective at this stage is to provide water for the essential indoor needs. Indoor water conservation will be strongly encouraged. Customers with abnormally high indoor water use may receive warnings and if necessary, other measures may be enforced to reduce indoor water use (i.e. fines and flow restrictors).

Supply-Side Response Measures

Drought reserve - Erie maximizes its 20% CBT carryover as a standard water operations and drought mitigation practice. This practice will continue in periods of drought to ensure a drought storage reserve in the case the drought persists into the following year(s).

- Seek technical and financial assistance opportunities – This may include assistance from the public sector at the federal, state, or county level or include assistance from private entities such as non-profit organizations promoting water conservation and drought awareness.
- Evaluate short-term water supply options – Erie will investigate and purchase available short-term water supply options such as temporary agricultural leasing arrangements if proven beneficial.
- Maximize storage in local reservoirs – Erie will manage water supplies in such a manner to maximize the amount of storage in Erie's local reservoirs at the end of the irrigation season for carrying into the following irrigation season if the winter continues to be dry.
- Purchase available agricultural leasing options for the following year – If available, Erie will purchase agricultural leasing options that provide the Town with additional supplies in the following year.
- Reuse water – Erie will consider using reuse water, if available, to preserve key landscape features that are no longer irrigated with first-use water and/or use reuse water to increase its potable supplies through trade-arrangements with other water users.

Demand-Side Response Measures

Town

- Mode 1 Parks – Irrigation with first-use water is prohibited on all turf. The hand watering of trees with reuse water may be considered to maintain survival.[13]
- Modes 2 and 3 Parks – Irrigation with first-use water is prohibited. Irrigation with first-use water is prohibited on all turf. The hand watering of trees with reuse water may be considered to maintain survival.[13]
- Hydrants – All hydrant flushing is prohibited unless necessary for public safety. Emergency use of hydrants is allowed.
- Washing of fleet vehicles – Washing of fleet vehicles is prohibited.
- Ornamental fountains and splash pad – Ornamental fountains in the parks and splash pad are turned off.
- Street cleaning - Eliminate Town street cleaning.
- Public pools and hot tubs – Filling of all public pools and hot tubs are prohibited.

Residential

- Private pools and hot tubs – Filling of all private pools and hot tubs are prohibited.
- Outdoor resident irrigation – Irrigation is prohibited on all landscaping.
- Street, sidewalk and driveway cleaning and misting devices – Use of misting devices and use of water to clean the street, sidewalk and driveway are prohibited.
- Rent AMR monitors – AMR meters are available at Town Hall for customers to rent and monitor their water use.
- HOA open space - Irrigation with first-use water is prohibited on all landscaping.

Commercial

- Public pools and hot tubs – Filling of all public pools and hot tubs is prohibited.
- Outdoor resident irrigation – Irrigation with first-use water is prohibited on all landscaping.
- Street, sidewalk and driveway cleaning and misting devices – Use of misting devices and use of water to clean the street, sidewalk and driveway are prohibited
- Rent AMR monitors – AMR meters are available at Town Hall for customers to rent and monitor their water use.
- Golf courses - Irrigation with first-use water is prohibited.
- Commercial car washes without recycling – Operations are prohibited.
- Commercial car washes with recycling – Operations are prohibited.

[13] The targeted amount of first-use water savings to be achieved (i.e. thousand gallons) for Erie's Parks should be determined by multiplying the Parks' "baseline demand" by the specified targeted savings percentage. The Parks' baseline demand should be determined by multiplying the Parks' average application rate (gal/acre) for the previous five years by the current number of acres irrigated. This should only apply to first-use water for the voluntary, watch and severe drought stages. Reuse water for irrigation should be reduced and included in the Parks' water savings target in the emergency drought stage when reductions in residential indoor water use is required

Construction Water

- Use of construction water is either limited or prohibited depending on the severity of drought conditions. The use of construction water will be reviewed by the Board of Trustees.

Drought Surcharge

- A drought surcharge on first-use water is implemented that supports water use restrictions and helps customers reduce water use.

Indoor Water Use

- Public drought campaign encourages reductions in water use. Customers with abnormally high indoor water use may receive warnings and if necessary, other measures may be enforced to reduce indoor water use (i.e. fines and flow restrictors).

7.0 IMPLEMENTATION AND MONITORING

7.1 Mitigation Action Plan

The mitigation action plan provided in Table 12 outlines the action items, milestone deadlines and Town's departments leading the implementation of mitigation measures discussed in Section 4.1. These measures include existing ongoing measures in addition to new measures that will be further evaluated.

Table 12 Mitigation Action Plan

Category	Mitigation Measures	Action Items	Milestones	Lead Department
Existing Ongoing Mitigation Measures				
Drought Planning	Drought Management Plan	Implement the Drought Management Plan	Ongoing	Public Works
New Supplies	Development of new water supplies	1) Continue to acquire new supplies 2) Continue to participate in NISP and the Windy Gap Firming projects	Ongoing	Public Works
Demand Management (water conservation)	Existing water conservation program	Update the Water Conservation Plan every 7 years	Ongoing	Public Works
Operations and Infrastructure	Existing operation and maintenance activities that improve water distribution efficiency	Ongoing	Ongoing	Public Works
	Expansion of non-potable reuse	Ongoing	Recently updated Non-potable Master Plan	Public Works
	Maximize CBT carryover on an annual basis	Ongoing	Ongoing	Public Works
Policy	Policy requires new developers to provide water supplies or comparable payment	Ongoing	Ongoing	Public Works
	Policy requires soil amendments for all new common areas	Ongoing	Ongoing	Public Works
Potential New Mitigation Measures For Further Evaluation				
Demand Management (water conservation)	Erie updated its Water Conservation Plan in 2014 which includes a variety of conservation activities that provide long-term water savings while also providing drought mitigation benefits. These activities are listed in Table 1.	n/a	Plan update was completed in December of 2014	Public Works

Category	Mitigation Measures	Action Items	Milestones	Lead Department
Operations and Infrastructure Changes	Emergency interconnects	Discuss potential of using interconnects with nearby water providers for drought related shortages	2016	Public Works
	Bypass local reservoirs	Conduct feasibility study	Start summer 2015	Public Works
	Recycle backwash water at the Water Treatment Facility	Test via adjusting operations	Summer 2014	Public Works
	New local raw water storage for potable and non-potable purposes	Incorporated in ongoing planning efforts	Summer 2014	Public Works

7.2 Monitoring of Drought Indicators

Erie's Public Works Department is responsible for calculating the Erie drought index and collecting the other drought indicator data including the US Drought Monitor, precipitation and soil moisture in the service area, near-term projected customer water demands, long-term weather forecasts and actions that other water providers are taking in the regions. The intensity of monitoring increases from February to early May when the majority of mountain snowpack has accumulated. The drought index coupled with the other drought indicator data is used by the Public Works Department to determine whether there is a drought related shortage for the Town and if so, to develop a recommendation to the Erie Board of Trustees on the specific drought stage for declaration. This recommendation may be modified conditions change that either intensify or reduce drought conditions.

During the irrigation season of a drought, Erie's Public Works Department will continue to monitor local storage, yield from their ditch water rights, precipitation/soil moisture and water demands within their service area. Erie may either increase of decrease the drought stage depending on the magnitude of drought shortage and regional drought conditions.

Erie will also monitor the drought-related actions of other water providers in the region and consider whether these actions are relevant to Erie's water supply situation. This enhances Erie's ability to provide a consistent message to their customer base on why the Town's level of drought response (i.e. water restrictions) either corresponds to or is different from other neighboring cities. In drought years following the irrigation season, Erie will continue to closely monitor their drought indicators to determine the level of drought most appropriate for the fall and winter.

7.3 Drought Declarations

Erie recognizes the importance of declaring a drought and corresponding drought stage in a timely manner. If a drought is declared too late and actions are not taken early enough to reduce water use, supplies can be severely depleted and strict water restrictions may be required, leading to economic impacts that could have been avoided. Conversely, premature drought declarations can result in unnecessary mandatory water restrictions and associated impacts while customers can lose confidence in the declaration.

As discussed in Section 7.2, Erie's Public Works Department is responsible for monitoring drought conditions and developing recommendations on whether a drought should be declared and at what stage. These recommendations are to be presented to the Board of Trustees whom is responsible for making the final decision considering the Public Works Department's recommendations. The Board of Trustees will have an opportunity to discuss the recommendations, ask questions and ultimately decide whether the drought stage should be officially declared. The Town Administrator's Office through the Communication and Marketing Division is responsible for conveying the drought messages to Erie's customers.

7.4 Implementation of the Staged Drought Response Program

The roles and responsibilities for administering the drought response plan include the following.

- Public Works Department – Calculate index, monitor drought indicators and provide recommendations to the Board of Trustees on whether to declare drought and at what stage. Administer, implement and enforce the staged drought response program.
- Administration/Communications and Marketing – Administer the public drought campaign and convey the drought declaration and key messages to the public. This includes consistent information on how drought restrictions will be enforced and the appropriate level of penalties for infractions.
- Finance Department – Monitor revenue changes and additional drought-related expenses and coordinate with the Public Works Department in developing a drought surcharge and issuing customer citation fines if necessary.
- All departments – Follow water use restrictions imposed by staged drought response program.

Weekly or bi-weekly staff meetings will be initiated by the Public Works Director at the onset of a drought among key departments and Town staff to ensure that the program is properly carried out. The initial staff meetings will focus on the staged drought response program and public drought campaign and will include:

- Review of funds available for implementation of the Plan.
- Actions necessary to initiate the designated staged drought response measures to achieve the appropriate response target.
- Specific drought messages to convey to the public and methods used for education using the framework provided in this Plan
- Actions necessary for enforcement (if applicable)
- Roles and responsibilities of each staff member.

7.5 Enforcement of the Staged Drought Response Program

The level of enforcement needed to implement the staged drought response program will be customized to the drought stage as well as to how responsive the public is to the mandatory drought response measures. During the volunteer drought stage, no enforcement will be necessary given that the majority of drought response is voluntary. However, for the remaining drought stages, enforcement will consist of a call-in service (hotline) where customers will have an opportunity to report infractions.

Enforcement will be managed by Erie's Public Works Department. This will include patrol of neighborhood and business districts to identify owners/residents that are in violation of mandatory restrictions/requirements and issuing citations and appropriate penalties based on the drought stage and number of violations.

At the onset of a drought, the Public Works Department will determine the level of enforcement necessary and penalties assigned to infractions. The severity of penalty will depend upon the drought stage and number of infractions incurred by a customer. Penalties could range from warning citations and monetary fines to the temporary shut-off of water services in severe cases.

Customers will have an opportunity to appeal citations. Written appeals may be mailed/emailed to the Town Clerk's office at Town Hall (PO Box 750, Erie CO 80516 or 645 Holbrook Street Erie, CO 80516) providing justification for why the citation should be appealed. Reasons for appeal may include:

- The citation mistakenly included the wrong address.
- A new resident has moved into a house that had received multiple previous citations through no fault of the new resident.
- Irrigation with independent well water.

7.6 Revenue Implications and a Financial Budgeting Plan

A reduction in customer water use during periods of drought reduces water sales and consequently could result in a revenue shortfall. Increased costs associated with implementation of the staged drought response program, public drought campaign, and enforcement could further intensify the shortfall. At the onset of a drought declaration, the Public Works Department will estimate the costs necessary to implement drought response and also work with the Finance Department to project potential revenue shortfalls. If necessary, the Public Works Department will request supplemental appropriations from the Board of Trustees for additional funding.

In addition, Erie plans to seek available financial drought-related assistance (i.e. public drought-related loans, grants, etc.) and in a severe or emergency drought stage, the drought response plan also calls for the consideration of a temporary drought surcharge that would be approved by the Board of Trustees. The main objective of the surcharge is to provide additional financial incentive to conserve water; however, as a secondary benefit, the drought surcharge could also be used to help compensate for reduced water sales and increased drought response costs. If drought conditions and corresponding water sale reductions are severe enough to warrant the increase of water rates, an intensive public outreach campaign would be implemented to convey the reasoning behind why the water rates are being raised and the status of the Town's financial condition.

7.7 Monitoring of Plan Effectiveness

The monitoring of Erie's drought mitigation and response actions is important to ensuring Erie's success in preparing and responding to drought. The following data will be collected by the Public Works Department and included in an annual report.

- Drought index and drought indicators – The drought index will be recorded on an annual basis (i.e. drought index calculated in November, March, April and May) and will include the

specific information needed to develop the drought index (i.e.: CBT quota). Information on the other drought indicators will also be recorded in addition to changes in CBT policy/operations, infrastructure repairs or modifications that affect supply delivery, etc.

- Customer water demands – These demands will include total annual and monthly water demands for the Town and by customer type, system-wide per capita water use, residential per capita water use and first-use and reuse irrigation on Town Parks. During drought periods, information will also be provided on whether demand reductions corresponded to the drought response and how the present year's demands compare to previous non-drought years.
- Drought mitigation measures – Status of the mitigation activities and other relevant factors (i.e. budget and staff time).
- Public perceptions and response to the drought (in drought years) – Documentation of public comments on the drought response and mitigation given at public/Town meetings and through phone calls and electronic correspondence. Formal public surveys may also be used to gather public input depending on the magnitude of the drought and Town budget available for the survey.
- Administrative data on the drought response – This includes citations delivered to customers, summary of drought-related calls received, specific response measures that were enacted and enforced, etc.
- Lessons learned – Any issues, challenges, and concerns that arose during implementation of the staged drought response program (if applicable), drought monitoring, mitigation activities, enforcement and the public drought campaign.

These monitoring data provide a means to assess the effectiveness of the Plan make necessary adjustments. During drought years, these monitoring data may be collected on a more frequent basis in order to more effectively respond to drought and customer needs.

8.0 Formal Plan Approval And Updates

8.1 Public Review Process

Erie conducted a 60–day public review period from June 3 to August 2 in order to obtain feedback from the public on the Plan. During this period, the Plan and a Fact Sheet summarizing the Plan was posted on Erie's Town website. Members of the public were able provide comments via email and by delivering hard copies of comments to the Town Clerk at Town Hall.

8.2 Adoption of Resolutions and Official Agreements

Resolution X was passed on X adopting the Town of Erie's Drought Management Plan. Town code was also modified giving the Town authority to enforce the Drought Plan.

Erie currently does not have any official agreements with other entities related to drought mitigation or response. Erie will consider entering future agreements if such agreement provide Erie with drought mitigation and/or response benefits.

8.3 Drought Management Plan Approval

Erie's Drought Management Plan was approved by the Board of Trustees on enter date. Each Board member had the opportunity to review the Plan and comment prior to finalization of the Plan and formal approval.

8.4 Periodic Review and Update

Erie's Drought Management Plan will be updated every five years. The next update is scheduled for 2020. The new plan will incorporate information from the annual monitoring reports discussed in Section 7.7.

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