

PUBLIC WORKS DEPARTMENT MEMORANDUM
#13-2020

DATE: April 13, 2020

TO: Honorable Mayor Meredith Leighty and City Council Members

THROUGH: Heather Geyer, City Manager *hmg*

FROM: Kent Kisselman, PE, Director of Public Works *KK*
Tamara Moon, Environmental Manager

SUBJECT: 2020 Water Efficiency Plan

PURPOSE

This memorandum provides information to City Council on the draft Water Efficiency Plan for the City, as developed by ELEMENT Water Consultants.

BACKGROUND

In 2007, the City developed and approved a Water Conservation Plan that was submitted to the Colorado Water Conservation Board. This plan documented steps the City was going to implement to encourage reduced water use by residents and businesses. Since that time, many aspects of the 2007 plan have been accomplished, and some aspects of the City's water supply have changed. These changes made the 2007 Conservation Plan no longer a useful document, and prompted an update of the City's Water Conservation Plan.

In 2019, the City hired ELEMENT Water Consultants to assist with an update of the City's Integrated Water Resource Plan (IWRP). In their proposal, ELEMENT included an update of the City's conservation plan, now called a water efficiency plan (WEP), in conjunction with the IWRP update. Work on both of these projects began in May of 2019. Additionally, the City applied for and received a grant from the Colorado Water Conservation Board to fund the costs of the work necessary to update the City's water efficiency plan.

The Water Efficiency Plan is designed to take a close look at the programs and actions the City can take to further reduce water use and improve use efficiency within the City. These actions apply to residential, commercial, government and school facilities within the City.

During the process, ELEMENT evaluated the current system supply and demands, and compared these to the supply and demand presented in the 2007 WEP. Since 2007, the City has been able to reduce its gallons per capita daily demand from 126 gpcd to 111 gpcd. The reduction goal projected in the 2007 WEP was a reduction to 116 gpcd by the year 2020. By 2018, this goal had been exceeded, thanks to the demand management programs the City has implemented.

However, despite the best effort of the City to reduce demands through conservation programs, modeling of the City's current supply indicates there is supply gap of more than 700 acre-feet that still need to be filled in order to provide a reliable and sustainable source of water for Northglenn's residents during drought conditions.

In the recent IWRP/WEP planning process, City staff and ELEMENT Water determined the most reasonable goal for the next 30 years is for the City to further reduce its daily gallons per capita

from 111 gpcd to 102 gpcd. Some of the factors that were considered in making this proposal included: a slight increase in population; increasing seasonal water demands due to climate changes, and an assumption about continued decreases in indoor water demands.

In order to meet the goal of 102 gpcd by 2050, the City will begin using advanced conservation programs. Some of these programs will be new (Water Loss Audits), and some will be modifications to current conservation programs already being used by the City (rebate programs, public education and landscape transformation programs).

The WEP proposes an implementation and funding plan for achieving the further reduction in water demands over the next 30 years. The plan recommends a total program cost of approximately \$230,000.00 per year on average, to implement advanced conservation programs.

The draft WEP will be posted on the City's website following the April 13, 2020 Council meeting for a 60-day public comment period. This is required for the approval of the WEP by the Colorado Water Conservation Board. At the conclusion of the public comment period, the WEP will be revised as necessary, based on comments received, and presented to City Council for approval by resolution.

STAFF RECOMMENDATION

No actions are necessary at this time. A resolution for approval will be submitted following the public comment period.

BUDGET/TIME IMPLICATIONS

A public comment period will open for 60 days following this meeting. Approval by City Council and the Colorado Water Conservation Board will follow the public comment period.

STAFF REFERENCE

If Council members have any comments or questions they may contact Kent Kisselman, Director of Public Works, at 303.450.4005 or kkisselman@northglenn.org.

ATTACHMENTS

1. WEP Presentation
2. Draft WEP Document



MUNICIPAL WATER EFFICIENCY PLAN UPDATE

April 13, 2020



PROJECT TEAM

Northglenn Staff

- Tamara Moon, Environmental Manager
- Sophie Porcelli, Water Resources Administrator



Consultant Team

- Beorn Courtney, President-Water Resources Engineer
- Logan Burba, Water Resources Engineer
- Peter Mayer, Special Advisor (WaterDM)



Colorado Water Conservation Board

A special thanks to the CWCB for funding the Water Efficiency Plan (WEP) update through a Water Efficiency Planning Grant.



COLORADO

Colorado Water
Conservation Board

Department of Natural Resources

INTRODUCTION

Statutory Requirement:

Colorado's Water Conservation Act of 2004 requires that water providers in the State of Colorado who annually supply over 2,000 acre-feet of water to retail customers submit a water conservation plan for review and approval to the Colorado Water Conservation Board.



HOUSE BILL 04-1365
BY REPRESENTATIVE(S) Harvey, Frangas, May M., McFadyen, Plant,
Rippy, Weissman, and Wiens,
also SENATOR(S) Keator, Groff, Grossman, Hillman, and Tapia.

CONCERNING WATER PLANNING BY RETAIL WATER PROVIDERS.

Be it enacted by the General Assembly of the State of Colorado:

SECTION 1. Legislative declaration. (1) The general assembly hereby finds and declares that:

- (a) Colorado was the first western state to enact statewide water conservation legislation;
- (b) Water conservation and drought mitigation planning will benefit all citizens of the state of Colorado;
- (c) The "Water Conservation Act of 1991", which fostered a statewide policy of improved urban water use efficiency and conservation, provides the foundation that can now be enhanced to provide new technical and financial opportunities for Colorado's communities regarding water conservation and drought mitigation planning.

Relationship with Other Planning Efforts:

1. *Integrated Water Resources Plan:* Works hand-in-hand with the WEP to evaluate future water solutions.
2. *Strategic Plan:* Identifies WEP update and implementation as performance measures to support water conservation.
3. *Sustainability Plan:* Identifies water use reduction goals to support resource conservation initiatives.

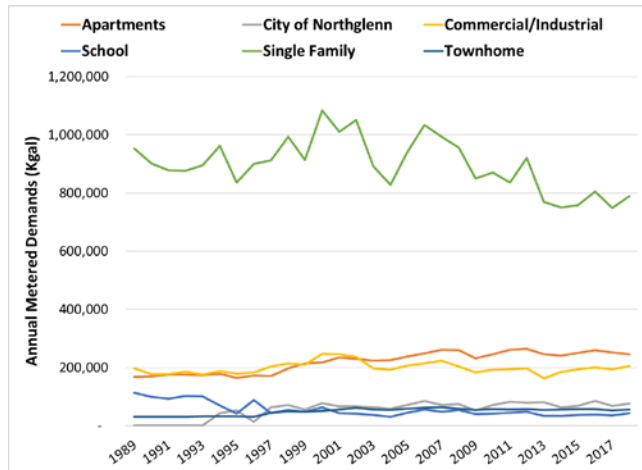
PURPOSE

- The purpose of the 2020 WEP is to re-evaluate water conservation goals and select water conservation programs and measures, both ongoing and new, which will enable the City to meet these goals.
- The 2020 WEP builds upon and replaces the 2007 WEP and was prepared in conjunction with the 2020 IWRP.



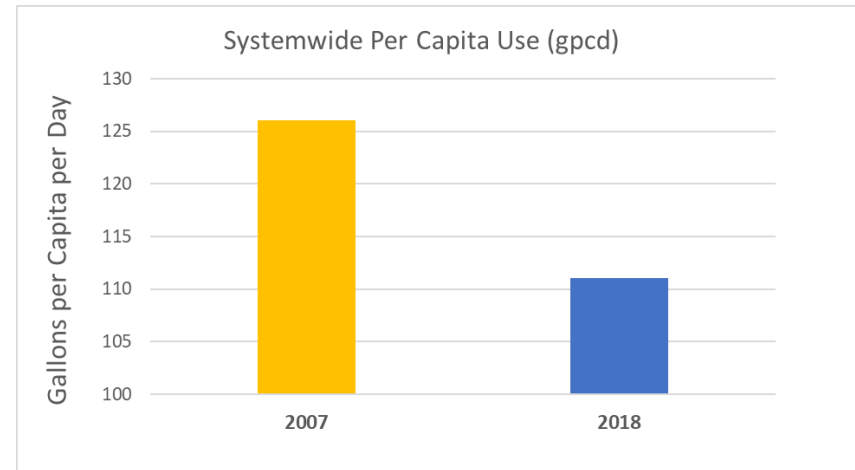
HISTORICAL DEMANDS

Customer Categories:



- Single-family residential water use remains the largest customer category and has been declining over time.

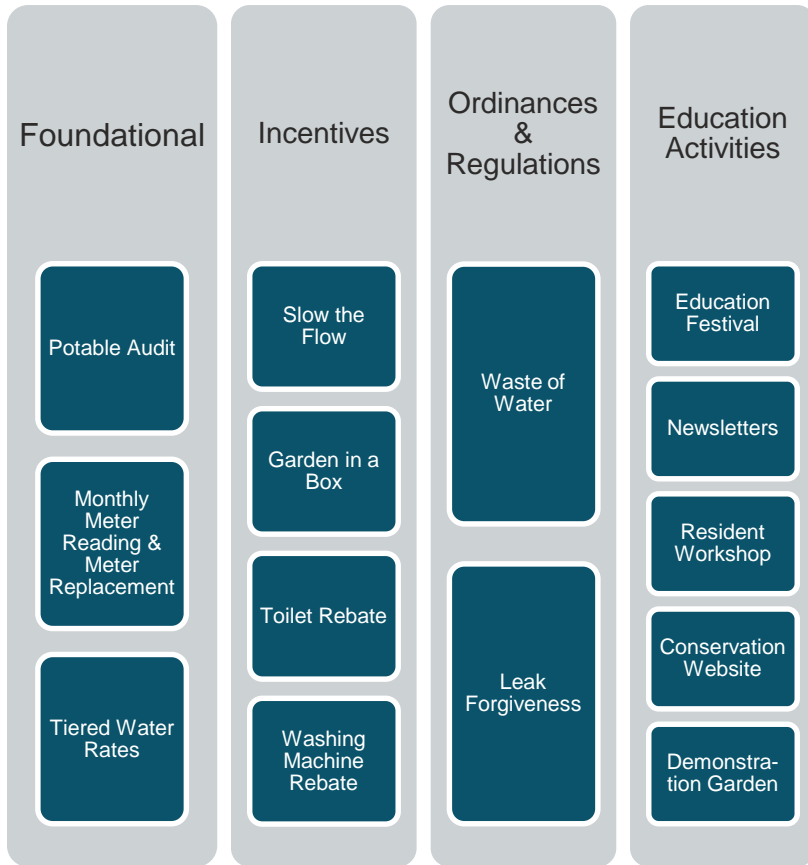
Systemwide Use:



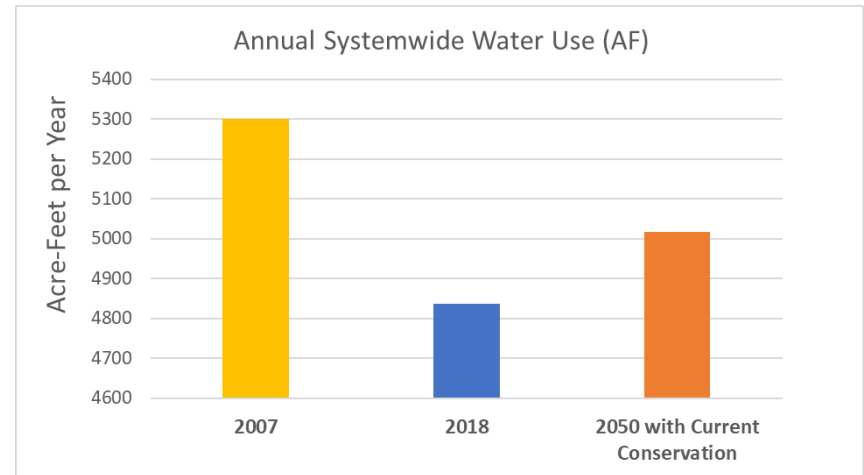
- 2007 systemwide use was around 5,300 acre-feet per year (AFY) and **126 gpcd**.
- 2007 WEP Goal: reduce systemwide use to 116 gpcd by the year 2020.
- 2018 systemwide use was 4,837 AFY and **111 gpcd**.
- **We met and exceeded our previous goal!**

CURRENT CONSERVATION PROGRAMS

Current Program:



2050 Demand Projection:



- 2050 demand projection: **5,016 AFY = 105 gpcd**
- Population **increases**.
 - Per capita indoor use **decreases** with ongoing program.
 - Per capita outdoor use **increases** due to climate.
 - Net effect is a **decrease** in per capita demand but an **increase** in total water use.



ADVANCED CONSERVATION PROGRAM

Advanced Program:

Annual AWWA M36 Audit

- Advance annual water loss and non-revenue water evaluation.

Commercial Valve Toilet & Urinal Rebate

- New rebate program targeting non-residential customers.

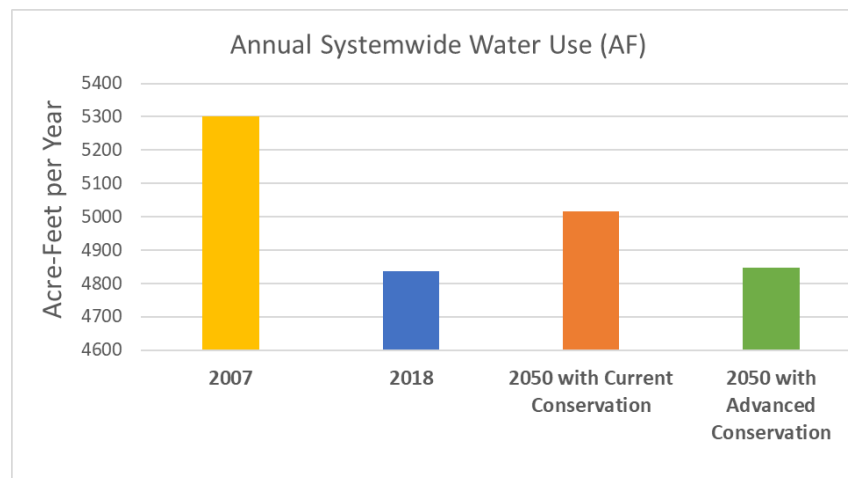
Modify Tank Toilet Rebate

- Modify program to require higher-level of efficiency.

Landscape Transformation Program

- Incentivized turf replacement.
- Landscape water budgets.
- Landscape ordinances.

2050 Demand Projection:



2050 demand projection: **4,846 AFY = 102 gpcd**

- Population **increases**.
- Per capita indoor use **decreases even more**.
- Per capita outdoor use **increases** due to climate but **decreases** with advanced program.
- Net effect is a **further decrease** in per capita demand and total water use **similar to 2018**.

NEXT STEPS

Local Approval

- Council review draft plan prior to public.
- Council approve and adopt final plan after public and CWCB input.

Public Comment

- 60-day public comment period.

CWCB Approval

- Review concurrent to public comment.
- Approve final plan.
- Close out grant.

Fund & Implement

- WEP includes implementation plan.
- Average annual program cost ~\$230K through 2050.



Municipal Water Efficiency Plan

City of Northglenn, Colorado



CITY OF NORTHGLENN 2020 MUNICIPAL WATER EFFICIENCY PLAN

PREPARED FOR
THE CITY OF NORTHGLENN

MARCH 24, 2020



ELEMENT
Water Consulting

P.O. BOX 140785
DENVER, CO 80214
(303) 481-2365

DRAFT

Table of Contents

1. INTRODUCTION	1
1.1 PURPOSE	1
1.1.1 RELATIONSHIP WITH OTHER PLANNING EFFORTS	1
2. PROFILE OF EXISTING WATER SUPPLY SYSTEM	3
2.1 SYSTEM PROFILE	3
2.2 WATER SUPPLY	4
2.2.1 WATER SUPPLY SOURCES	4
2.2.2 POTABLE WATER TREATMENT AND STORAGE	4
2.2.3 WASTEWATER TREATMENT AND STORAGE	4
2.3 WATER SUPPLY RELIABILITY	5
2.4 SYSTEM LIMITATIONS AND CHALLENGES	5
3. HISTORICAL AND PROJECTED FUTURE WATER DEMANDS	5
3.1 SERVICE AREA CHARACTERISTICS	5
3.2 HISTORICAL WATER DEMANDS	6
3.2.1 SEASONAL AND PEAK DAY DEMANDS	11
3.3 WATER COSTS AND PRICING	16
3.3.1 CONSERVATION-ORIENTED RATES	17
3.3.2 SEWER SERVICES AND STORMWATER IMPACT FEES	17
3.3.3 METERING AND BILLING	18
3.3.4 LEAK FORGIVENESS POLICY	18
3.4 PAST AND CURRENT CONSERVATION ACTIVITIES AND IMPACT TO DEMANDS	18
3.5 PAST AND CURRENT LAND USE ACTIVITIES	21
3.6 WATER DEMAND PROJECTIONS	22
3.6.1 PROJECTION APPROACH	22
3.6.2 POPULATION PROJECTION	22
3.6.3 CLIMATE CHANGE EFFECT ON WATER DEMAND	23
3.6.4 WATER DEMAND PROJECTION	23
4. INTEGRATED PLANNING AND WATER EFFICIENCY BENEFITS AND GOALS	25
4.1 WATER EFFICIENCY AND WATER SUPPLY PLANNING	25
4.2 WATER EFFICIENCY GOALS	26
5. SELECTION OF WATER EFFICIENCY ACTIVITIES	27
5.1 SUMMARY OF SELECTION PROCESS	27
5.2 WATER EFFICIENCY ACTIVITIES	27
5.2.1 FOUNDATIONAL ACTIVITIES	30
5.2.2 TARGETED TECHNICAL ASSISTANCE AND INCENTIVES	31
5.2.3 ORDINANCES AND REGULATIONS	33

5.2.4	EDUCATION ACTIVITIES.....	34
5.2.5	INTEGRATION OF LAND USE EFFORTS.....	35
6.	IMPLEMENTATION AND MONITORING PLAN	35
6.1	IMPLEMENTATION PLAN	35
6.2	MONITORING PLAN.....	37
6.3	REVENUE IMPACTS	40
7.	ADOPTION OF NEW POLICY, PUBLIC REVIEW AND FORMAL APPROVAL	40
7.1	PUBLIC REVIEW	40
7.2	LOCAL ADOPTION AND CWCB APPROVAL	40
7.3	PERIODIC REVIEW AND UPDATE	40
8.	COMPLIANCE WITH STATE PLANNING REQUIREMENTS.....	41
8.1	STATUTORY REQUIREMENTS	41
8.2	NORTHGLENN WATER EFFICIENCY PLAN COMPLIANCE	41
9.	REFERENCES & RESOURCES	44

List of Figures

Figure 1:	City of Northglenn General Location Map.....	4
Figure 2:	Annual Summary of Northglenn Water Production and Metered Water Use, (1989 – 2018).....	7
Figure 3:	Northglenn Metered Customer Water Use, (1989 – 2018).....	9
Figure 4:	Northglenn 2018 Metered Customer Category Water Use Distribution.....	9
Figure 5:	Northglenn Non-Seasonal and Seasonal Water Use, (1989 – 2018).	13
Figure 6:	Northglenn Average Monthly Non-Seasonal and Seasonal Use.....	14
Figure 7:	Average Monthly Billed Water Use by Customer Class, (2014 – 2018).....	15
Figure 8:	Northglenn Peak Day Treated Water Production, (2014 – 2018).....	16
Figure 9:	Northglenn Straight-Line Water Demand Projections for the Year 2050.....	25

List of Tables

Table 1:	Northglenn Metered Water Use, (2014 – 2018).....	8
Table 2:	Comparison of Annual Treated Production and Total Metered Water Use, (1999 – 2018).....	10
Table 3:	Northglenn Residential and Systemwide Annual Per Capita Water Use, (2014 – 2018).....	11
Table 4:	Treated Non-Seasonal and Seasonal Billed Water Use (2014 – 2018).	11
Table 5:	Treated Non-Seasonal and Seasonal Percentages by Customer Class.	12
Table 6:	Single-Family Residential Water Volume Rates.	17
Table 7:	Monthly Service Charges for Commercial Accounts	17

Table 8: Commercial Mixed-Use Water Volume Rates..... 17
 Table 9: Historical and Current Water Efficiency Activities (CWCB Worksheet B)..... 20
 Table 10: Northglenn Approved Water Conservation Rebates (2019)..... 21
 Table 11: New and Ongoing/Updated Water Efficiency Activities and Water Savings Estimates..... 29
 Table 12: Estimated Future Savings from Rebate Programs. 31
 Table 13: Advanced Water Conservation Program Monitoring. 39

List of Appendices

- A. Turf Rebate Packet
- B. **Public Review Process**

List of Abbreviations

AF	acre-feet
AFY	acre-feet per year
AWC	average winter consumption
cfs	cubic feet per second
CWCB	Colorado Water Conservation Board
gpcd	gallons per capita per day
gpf	gallons per flush
gpm	gallons per minute
IWRP	Integrated Water Resources Plan
kgal	1,000 gallons
MGD	million gallons per day
sq-ft	square feet
WEP	Water Efficiency Plan
WTP	water treatment plant
WWTP	wastewater treatment plant

Acknowledgements¹

The City of Northglenn and consultant team would like to express its gratitude to the Colorado Water Conservation Board (CWCB) for its funding and technical assistance in preparing this Water Efficiency Plan (WEP) update. The consultant team would also like to thank the following City of Northglenn staff who were instrumental in development of the WEP plan update:

- Tamara Moon, Environmental Manager
- Sophie Porcelli, Water Resources Administrator

¹ Report cover photo from City of Northglenn.

City staff and the consultant team would like to thank Northglenn City Council for its review and support of the WEP development and implementation. It is with your support that the City of Northglenn will continue to thrive and provide a safe and reliable drinking water supply to residents into the future.

- Mayor Meredith Leighty
- Randall Peterson
- Ashley Witkovich
- Becky Brown
- Joyce Downing
- Julie Duran Mullica
- Katherine E. Goff
- Antonio B. Esquibel
- Jenny Willford

DRAFT

1. INTRODUCTION

The City of Northglenn (Northglenn or City herein) is located in western Adams County, Colorado, approximately 10 miles north of Denver, as further described in Section 2 below.

1.1 PURPOSE

The City recognizes the value of its water and the need to use this resource as wisely as possible. Conserving water can help support adequate water supplies for future generations and reduce the risk of water shortages. It is the City's policy to manage its water supply and distribution systems to minimize waste and encourage the efficient use of its water supply. The 2020 Municipal Water Efficiency Plan (WEP) builds upon and replaces the City of Northglenn 2007 Municipal Water Conservation Plan (referred to hereafter as Water Efficiency Plan or WEP). The purpose of the 2020 WEP² is to re-evaluate water conservation goals and select water conservation programs and measures, both ongoing and planned, which will enable the City to meet these goals. Furthermore, Colorado's Water Conservation Act of 2004 requires that water providers in the State of Colorado who annually supply over 2,000 acre-feet (AF) of water to retail customers (covered entities) are required to submit a water conservation plan for review and approval to the Colorado Water Conservation Board (CWCB). This 2020 WEP was developed under the direction of the City of Northglenn's water resources staff. Input was solicited from City Council and Northglenn residents and integrated into this plan. It has been approved by the CWCB, meeting Colorado's statutory requirements.

1.1.1 RELATIONSHIP WITH OTHER PLANNING EFFORTS

Northglenn is actively evaluating its water supply portfolio, delivery system, and demand management³ through parallel planning efforts. In addition to the 2020 WEP, Northglenn concurrently updated its Integrated Water Resources Plan (2020 IWRP). The 2020 IWRP works hand-in-hand with the 2020 WEP to evaluate a variety of water demand-side and supply-side solutions, identifying a clear path forward to meet the City's future water resources needs. Some planning components that are typically included in the preparation of a WEP were developed through the 2020 IWRP process, allowing the 2020 WEP to focus on evaluating, selecting, and planning implementation for targeted conservation and efficiency programs. Where pertinent, information developed for the 2020 IWRP is referenced in the 2020 WEP but generally is not repeated in detail.

Through preparation of the 2020 IWRP, water conservation and efficiency programs to reduce demands⁴ were evaluated as an alternative project at the same level of consideration as adding or expanding infrastructure, new water supply projects, making operational changes, and creating opportunities through partnerships. Ultimately, advanced conservation was selected as part of the portfolio of future water solutions under the 2020 IWRP, leading to a more aggressive conservation program with higher water savings being defined in the 2020 WEP. The 2020 WEP provides the implementation plan for the advanced conservation portion of the 2020 IWRP. This demonstrates the connection and influence the

² The 2020 WEP addresses potable water use and savings only. The City is currently evaluating opportunities to develop non-potable water use projects, but these are not included under this plan or the 2020 IWRP.

³ The terms "water conservation", "water efficiency", and "demand management" are generally interchangeable throughout this report.

⁴ The terms "water demand", "water use", and "consumption" are generally interchangeable throughout this report.

preparation of the 2020 IWRP and 2020 WEP had on each other. The following list of key assumptions further demonstrates how the two planning efforts were integrated:

- Planning timelines:
 - The IWRP is a long-range planning document, integrating supply, storage, and water conservation solutions to meet long-term needs. The 2020 IWRP uses a planning projection period of 2050.
 - WEPs often reflect a nearer-term evaluation of conservation and efficiency programs to achieve demand reductions. However, for consistency between the planning documents, the 2020 WEP uses a planning projection period of 2050 and provides recommendations for short-term monitoring of savings and demand reductions. This will help Northglenn evaluate the 2020 WEP program implementation and to determine how this and other programs being implemented under the 2020 IWRP should be adjusted in the future.
- Representation of future baseline demands to estimate water savings:
 - Demand projections were developed to support using consistent methodology, historical data, and assumptions in the IWRP and WEP.
 - The 2020 IWRP includes a future water supply-demand gap analysis, the basis of which is a demand projection that reflects a practical level of future demand anticipated through the City's existing and ongoing conservation program. This projection was prepared to avoid over-representing the calculated gap and to recognize that Northglenn will continue to invest in conservation and efficiency programs into the future, even if an advanced conservation program had not been selected through the IWRP evaluation process.
 - For the 2020 WEP, the projected water savings calculations reflect the full conservation program, including ongoing savings from the City's existing program as well as additional savings through the advanced conservation program that has been prioritized through the IWRP planning process. Basing the water savings calculations off of recent per-capita demand levels for the WEP helps to facilitate ongoing water savings tracking, program monitoring, and evaluation of program effectiveness.
- Climate change impacts:
 - Through the 2020 IWRP development, Northglenn staff supported a planning projection that includes a warmer and drier climate future. This climate change scenario influences higher outdoor demands in response to warmer and drier future conditions and is included in the IWRP future baseline demand projection as well as the projection for the advanced conservation program.
 - For consistency, the 2020 WEP demand projections also include impacts from a warmer and drier future climate. Estimated water savings goals are based on these projections and are represented by a demand reduction from recent per-capita levels.
- Conservation and efficiency program detail:
 - The 2020 IWRP future baseline demand projection reflects a level of conservation anticipated through the City's existing and ongoing conservation program, but the IWRP does not provide details regarding the programs required to maintain this level of savings. New conservation programs to support additional levels of savings were explored through the advanced conservation alternative.
 - The 2020 WEP represents Northglenn's comprehensive suite of conservation and efficiency programs and provides further detail for each of the ongoing and new programs.

Completion of this WEP is identified in Northglenn City Council's 2019—2023 Strategic Plan⁵ to increase environmental sustainability and allow the City to be eligible for future grant funding opportunities. The plan identifies this update to the WEP and implementation of the plan activities as performance measures to support water conservation. The Strategic Plan focuses on sustainability and fiscal responsibility and provides guidance for daily operations, the annual budget process, and multi-year capital improvement planning. The plan sets eight five-year strategic goals and focuses on the efficient use of water under the environmental sustainability and infrastructure goals.

Northglenn also recently completed a Sustainability Plan⁶ which includes a focus on resource conservation, including water use, energy use, petroleum use, paper use, and sustainably sourced goods. These initiatives were considered in the development of demand-side alternatives and demand projections for the 2020 IWRP and 2020 WEP.

Northglenn is also updating its Water Treatment Plant Master Plan and anticipates updating its Comprehensive Plan. Information from the 2020 WEP and 2020 IWRP was used for the Water Treatment Plant Master Plan update. In the future, information from the Water Treatment Plan Master Plan should be referenced upon completion for details regarding facility capacities and potential system upgrades and information from the Comprehensive Plan should be referenced with respect to future population and development patterns that influence demand projections.

2. PROFILE OF EXISTING WATER SUPPLY SYSTEM

The City of Northglenn is committed to developing and operating a resilient system to continue to provide a reliable and safe drinking water supply to its customers into the future. The following information is abbreviated from the 2020 IWRP, which provides additional information.

2.1 SYSTEM PROFILE

Northglenn is located in western Adams County, Colorado, approximately 10 miles north of Denver, as shown on Figure 1. Construction of the first housing development began in 1959 followed by Northglenn's incorporation in 1969. Northglenn's municipal water system was established in 1980 and in 2018 served a population of nearly 39,000 people⁷ occupying 7.5 square miles. The service area is a multi-use community consisting of open space, residential, industrial, schools, and commercial. In addition to Northglenn proper, City boundaries include a parcel of land referred to as "Section 36" that is located north of the City in Weld County upon which Northglenn's wastewater treatment plant (WWTP) is located. Water demands in Section 36 are not currently met through the City's potable system and these demands have not been included under this WEP.

⁵ https://www.northglenn.org/Government/City%20Council/Performance_Measures_102519_FINAL_FULL_PERIOD.pdf

⁶ https://www.northglenn.org/Departments/Planning%20&%20Development/Planning/Sustainability/City%20of%20Northglenn%20Sustainability%20Plan_r4_for_web.pdf

⁷ As produced by the Colorado State Demography Office.

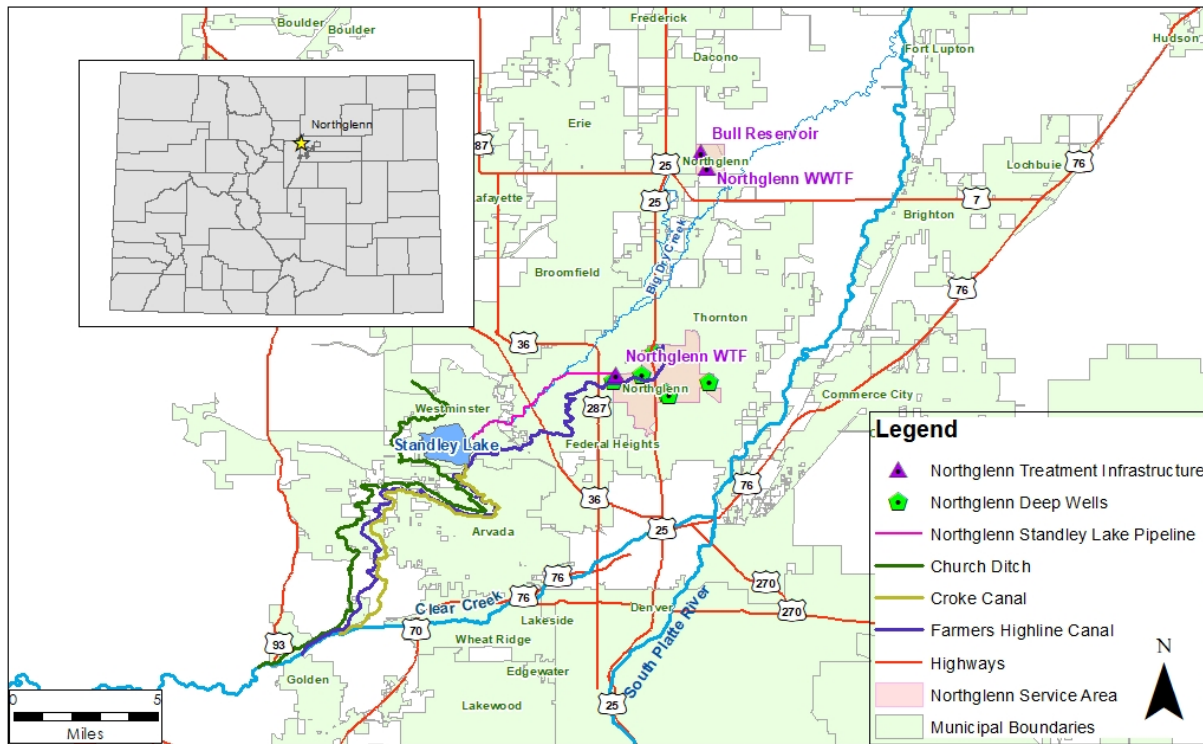


Figure 1: City of Northglenn General Location Map.

2.2 WATER SUPPLY

2.2.1 WATER SUPPLY SOURCES

Northglenn diverts its primary water supply sources from Clear Creek and stores water in Standley Lake when it is not immediately needed to meet municipal demands. More information regarding Northglenn’s water supplies and yields is provided in the 2020 IWRP.

2.2.2 POTABLE WATER TREATMENT AND STORAGE

The City’s raw water supply is stored in Standley Lake. Water from Standley Lake flows by gravity through a 48-inch pipe to a terminal reservoir with a storage capacity of 40 million gallons. The terminal reservoir is located at the Northglenn Water Treatment Plant (WTP) at 2350 West 112th Avenue. The WTP has a 14 million gallons per day (MGD) capacity. In 2002, the City built a new finished water storage tank with a capacity of 3 million gallons. Combined with three existing storage tanks, the City has 7.75 million gallons of finished water storage. The City’s potable water supply system includes 120 miles of pipe which delivers water throughout the main service area.

2.2.3 WASTEWATER TREATMENT AND STORAGE

The Northglenn WWTP is located on 320 acres of City-owned land in the West ½ of Section 36, T1N, R68W in Weld County at the intersection of Weld County Roads 2 and 11. The City’s sewer system includes 112 miles of sewer main that collect wastewater and deliver it to the WWTP. The WWTP treats an average of 3.7 MGD and has a permitted capacity of 4.3 MGD. Water demand projections described in Section 3.6 of

this report indicate that future indoor demands may decrease slightly over time, which could help delay future needs to increase capacity at the WWTF. This should be monitored into the future.

2.3 WATER SUPPLY RELIABILITY

Northglenn is nearing build-out conditions, has little undeveloped land, is bordered on all sides by other municipalities, and has no plans to expand water service outside of its current service area boundary. Based on current information and projected climate change impacts on supplies and demands, the City anticipates challenges in meeting future demands during extreme drought conditions. The City will continue to evaluate its water supply reliability and, as further described in the 2020 IWRP, intends to continue purchasing water supplies and making system infrastructure improvements to meet its future water supply needs.

2.4 SYSTEM LIMITATIONS AND CHALLENGES

Northglenn is updating its Water Treatment Plant Master Plan concurrently⁸ with this 2020 WEP update, which will further explore system capacities, limitations, and provide recommendations for facility upgrades. Based on available historical information, it is not anticipated that Northglenn will experience capacity limitations with the existing treatment system. As discussed below, current peak day demands are well below the maximum rated WTP capacity and the instantaneous daily rate. Projected future demands are not significantly higher than current demands. System upgrades will likely be influenced more by aging infrastructure than designed capacity with current operations.

3. HISTORICAL AND PROJECTED FUTURE WATER DEMANDS

This section provides an overview of Northglenn's historical water demand trends and an evaluation of the City's prior water conservation program. Multiple treated water demand projections were prepared to provide a range of reasonable planning estimates that reflect the anticipated growth in Northglenn's service area with varying levels of water efficiency. These projections are described in more detail below.

3.1 SERVICE AREA CHARACTERISTICS

Northglenn began operating a municipal water system in 1980. As of December 2018, the City had approximately 10,263 customer accounts: 8,760 single family residences, 880 townhomes, 152 apartments, 378 commercial and industrial, 24 schools, and 69 municipal connections. Northglenn does not provide water service outside of its City limits. Northglenn is close to its projected build-out population and growth in the service area has been minimal over the past 5 years. The City's current long-term planning period extends through the year 2050, at which time the City expects to reach full build-out.

The City defines an Equivalent Residential Unit (EQR) as the average annual volume of treated water supplied to a detached, single family, residential unit account within the City. EQRs are updated annually and are calculated as the five-year rolling average of annual water used by single-family accounts divided by the number of single-family homes. For other customer classes, the number of EQRs is calculated by dividing the total water use by the five-year rolling average of single-family home water use. Using EQRs

⁸ Findings and recommendations developed to support the Water Treatment Plant Master Plan were not available at the time of this 2020 WEP.

is one way in which the City can compare water use between customer classes. During the 2014 to 2018 period, the total number of all accounts increased by 20 (or by 0.2%) and EQRs increased by 3.4% during the same period.

Within the City's billing system, the following customer categories are assigned to potable water customers:

- Apartments
- City of Northglenn
- Commercial/Industrial
- School
- Single Family
- Townhomes

All connections are metered⁹, enabling the water utility to charge customers based on their actual water use.

3.2 HISTORICAL WATER DEMANDS

Monthly water production and metered water uses, categorized by customer class, were available for the period of 1989 through 2018. Figure 2 below shows an annual summary of the total production and metered water uses, i.e. demands or consumption. Water production peaked in the early 2000s and has generally declined since 2006. Metered water demand tracks closely with production and the difference between production and metered demand is referred to as non-revenue water. Northglenn's non-revenue water has averaged about 8% over the long-term from 1999 – 2018. Over the most recent 10 years, the average has been closer to 6%. Non-revenue water was calculated as the total annual production less the total metered water demands.

⁹ With all connections metered, the terms "metered" and "billed" are generally interchangeable throughout this report.

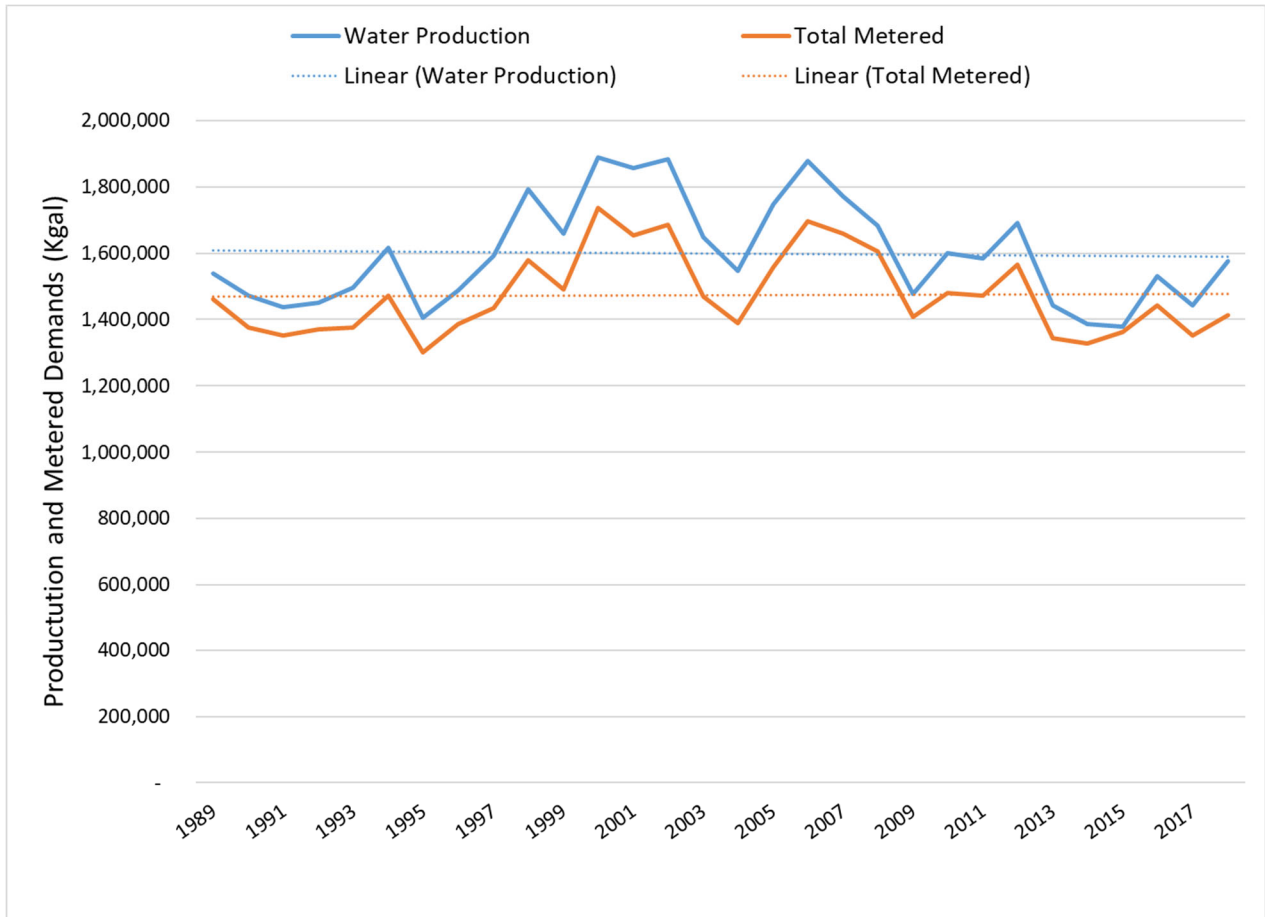


Figure 2: Annual Summary of Northglenn Water Production and Metered Water Use, (1989 – 2018).

Table 1 below shows population, metered water use by customer category, and total potable metered use for the period 2014 – 2018. Total metered use has increased slightly over the period, peaking in 2016. Single-family residential represents the highest-use customer class, with an average annual water use of about 770,000 kgal/year.

Table 1: Northglenn Metered Water Use, (2014 – 2018).

Year	Population	Metered Water Use (kgal)						
		Apartments	City of Northglenn	Commercial/Industrial	School	Single Family	Townhome	Total Metered
2014	38,407	240,461	63,420	184,033	34,227	750,607	55,767	1,328,515
2015	38,661	249,883	67,427	193,582	35,961	758,150	57,026	1,362,029
2016	38,855	259,704	85,202	200,250	38,221	804,222	56,125	1,443,724
2017	38,694	251,460	68,183	194,186	34,466	749,337	52,796	1,350,428
2018	38,811	246,125	75,822	204,235	42,337	789,073	54,973	1,412,565
5-Year Average (kgal)	38,686	249,527	72,011	195,257	37,042	770,278	55,337	1,379,452
5-Year Average (AF)		766	221	599	114	2,364	170	4,233

Figure 3 shows Northglenn’s metered customer use, summarized by customer category from 1989 through 2018. In 2018, single-family residential water use accounted for almost 56% of Northglenn’s total annual treated water use (Figure 4). Apartment customers accounted for approximately 17% of the treated use and commercial/industrial customers accounted for approximately 15% of the treated use. The remaining categories (City of Northglenn, school, and townhomes) accounted for the remaining 12%. Figure 3 also shows that the distribution of Northglenn’s sectoral demands is very consistent between years.

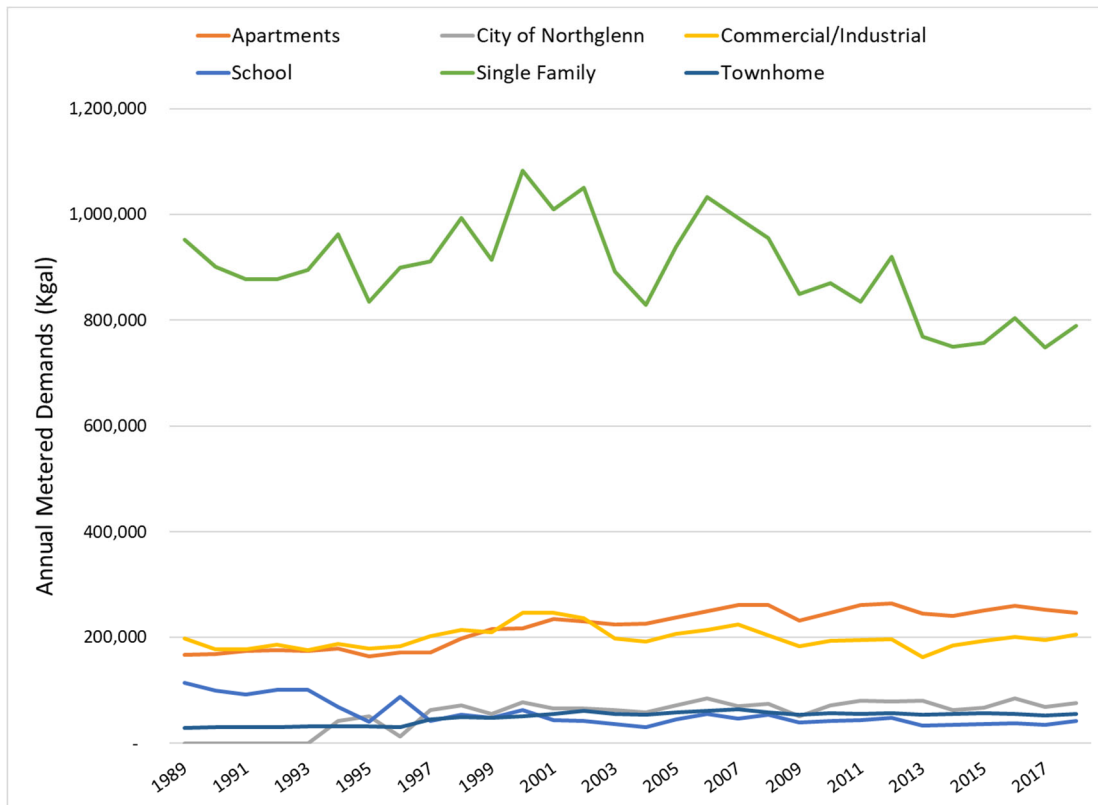


Figure 3: Northglenn Metered Customer Water Use, (1989 – 2018).

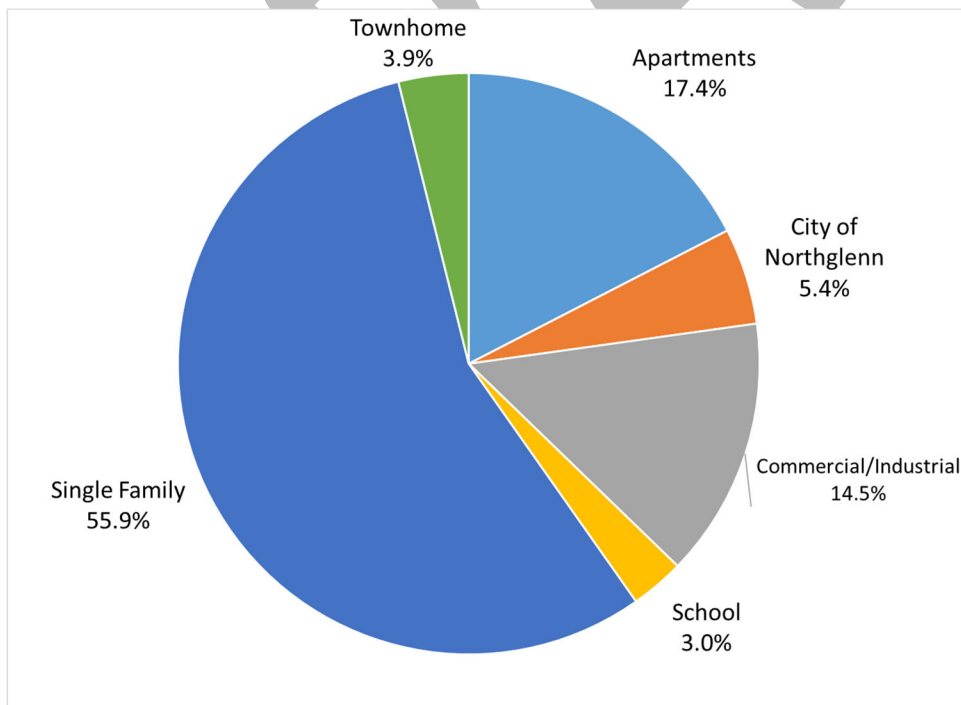


Figure 4: Northglenn 2018 Metered Customer Category Water Use Distribution.

Water loss, also referred to as non-revenue water, accounts for about 8% of total produced water on average for the past 20 years in Northglenn (see Table 2) and just over 10% of the total produced water in 2018. Until 2018, recent water loss in Northglenn had been below the long-term average, but then increased in 2018. The 20-year historic period is shown here to illustrate the variability in Northglenn’s annual water loss, both as a volume and as a percent of production. The Colorado Water Plan Technical Update (CWP Technical Update) reports an average non-revenue value of 8% for municipalities in the Metro Region, which is the lowest in the state, and 14% for the South Platte Basin. Northglenn’s water loss is near the average for the Metro Region. The variability and recent increase in annual water loss indicates that some savings through water loss management is reasonable for Northglenn and should be further explored and supported through the water efficiency program.

Table 2: Comparison of Annual Treated Production and Total Metered Water Use, (1999 – 2018).

Year	Total Production (kgal)	Total Metered (kgal)	Water Loss (kgal)	Water Loss (%)
1999	1,659,111	1,489,513	169,598	10%
2000	1,888,575	1,737,478	151,097	8%
2001	1,855,733	1,654,405	201,328	11%
2002	1,884,423	1,687,004	197,419	10%
2003	1,649,448	1,468,020	181,428	11%
2004	1,546,469	1,388,375	158,094	10%
2005	1,746,739	1,558,344	188,395	11%
2006	1,877,039	1,697,618	179,421	10%
2007	1,771,816	1,658,894	112,922	6%
2008	1,683,839	1,606,112	77,727	5%
2009	1,477,080	1,408,577	68,503	5%
2010	1,600,659	1,478,695	121,964	8%
2011	1,584,451	1,471,181	113,270	7%
2012	1,691,410	1,564,411	126,999	8%
2013	1,443,149	1,344,096	99,053	7%
2014	1,385,225	1,328,515	56,710	4%
2015	1,417,039	1,362,029	55,010	4%
2016	1,532,026	1,443,724	88,302	6%
2017	1,442,127	1,350,428	91,699	6%
2018	1,576,044	1,412,565	163,479	10%
Average	1,635,620	1,505,499	130,121	8%

From 2008 forward, the normalized average daily use per person, expressed as gallons per capita per day (gpcd), has been generally declining. These trends are consistent with other municipalities throughout Colorado and beyond, and indicates that Northglenn’s water efficiency programs, national plumbing codes and standards, and programs like EPA WaterSense are contributing to an overall decrease in per capita water use. From 2014 through 2018, the average annual residential per capita water use was about 76 gpcd while the system-wide (including non-revenue values) was about 104 gpcd. The CWP Technical Update reported that the Metro Region average baseline per capita system-wide water use was about

141 gpcd, the lowest basin-wide per capita use in the state. Based on the past five years of water use data, this shows that Northglenn has reduced per capita water demands beyond the average of utilities within the Denver-Metro area. Annual residential and system-wide per capita demands are shown below in Table 3.

Table 3: Northglenn Residential and Systemwide Annual Per Capita Water Use, (2014 – 2018).

Year	Residential Per Capita (gpcd)	Systemwide Per Capita (gpcd)
2014	74.7	98.8
2015	75.5	100.4
2016	79.0	108.0
2017	74.6	102.1
2018	77.0	111.3
5-Year Average	76.1	104.1

3.2.1 SEASONAL AND PEAK DAY DEMANDS

Annual non-seasonal (largely indoor) water use was estimated using a standard average winter consumption (AWC) approach that relies on monthly data from November, December, and January when there is generally no outdoor use. Annual seasonal (largely outdoor) water use was then calculated as the difference between total billed consumption, i.e. water use, and the estimated non-seasonal use. The results of this analysis indicate that, on average, treated non-seasonal use in Northglenn’s service area accounts for around 60% of the potable water use (Table 4). Non-seasonal water use has trended downward over the past 5 years, indicating that indoor water use has become more efficient and seasonal use may be increasing. This correlates with slightly increasing average annual temperatures over the same period. The year with the lowest seasonal use, 2014, is the year with the lowest average annual temperature and the 2020 IWRP provides additional information explaining the trend between Northglenn’s seasonal water use and temperature.

Table 4: Treated Non-Seasonal and Seasonal Billed Water Use (2014 – 2018).

Year	Non-Seasonal Indoor (AFY)	Seasonal (AFY)	Non-Seasonal (%)	Seasonal (%)	Annual Precip (inches)	Avg. Annual Temp (deg-F)
2014	2,721	1,356	67%	33%	18.3	51.3
2015	2,583	1,597	62%	38%	23.1	52.5
2016	2,570	1,861	58%	42%	12.1	54.0
2017	2,436	1,709	59%	41%	14.1	54.0
2018	2,508	1,827	58%	42%	12.1	53.2
5-Year Average	2,563	1,670	61%	39%		

Northglenn’s billed water use data were further disaggregated by customer class for the evaluation of potential water conservation programs (Table 5). The results indicate that seasonal use by apartment and townhome customers is typically only 17% and 14%, respectively. The highest potable seasonal use is

attributed to City of Northglenn connections, although on average, the City of Northglenn accounts for only about 5% of the total annual treated water use. With outdoor use being such a large portion of the City of Northglenn account usage, there is opportunity for exploring potential savings through landscape transformation of non-active recreational areas of public spaces and parks. This was also identified in the Sustainability Plan as a goal for open space and land use.

Table 5: Treated Non-Seasonal and Seasonal Percentages by Customer Class.

Customer Category	Non-Seasonal (%)	Seasonal (%)
Apartments	83%	17%
City of Northglenn	2%	98%
Commercial/Industrial	56%	44%
School	25%	75%
Single Family	61%	39%
Townhome	86%	14%

Non-seasonal (largely indoor) and seasonal (largely outdoor) water uses were estimated by averaging the minimum monthly wintertime metered water use for each customer. Seasonal and non-seasonal water use trends from 1989 through 2018 are presented in Figure 5. Non-seasonal use peaked in 2006 and has declined over the past 10 years. Seasonal use is more variable but also shows a declining trend over the past twenty years.

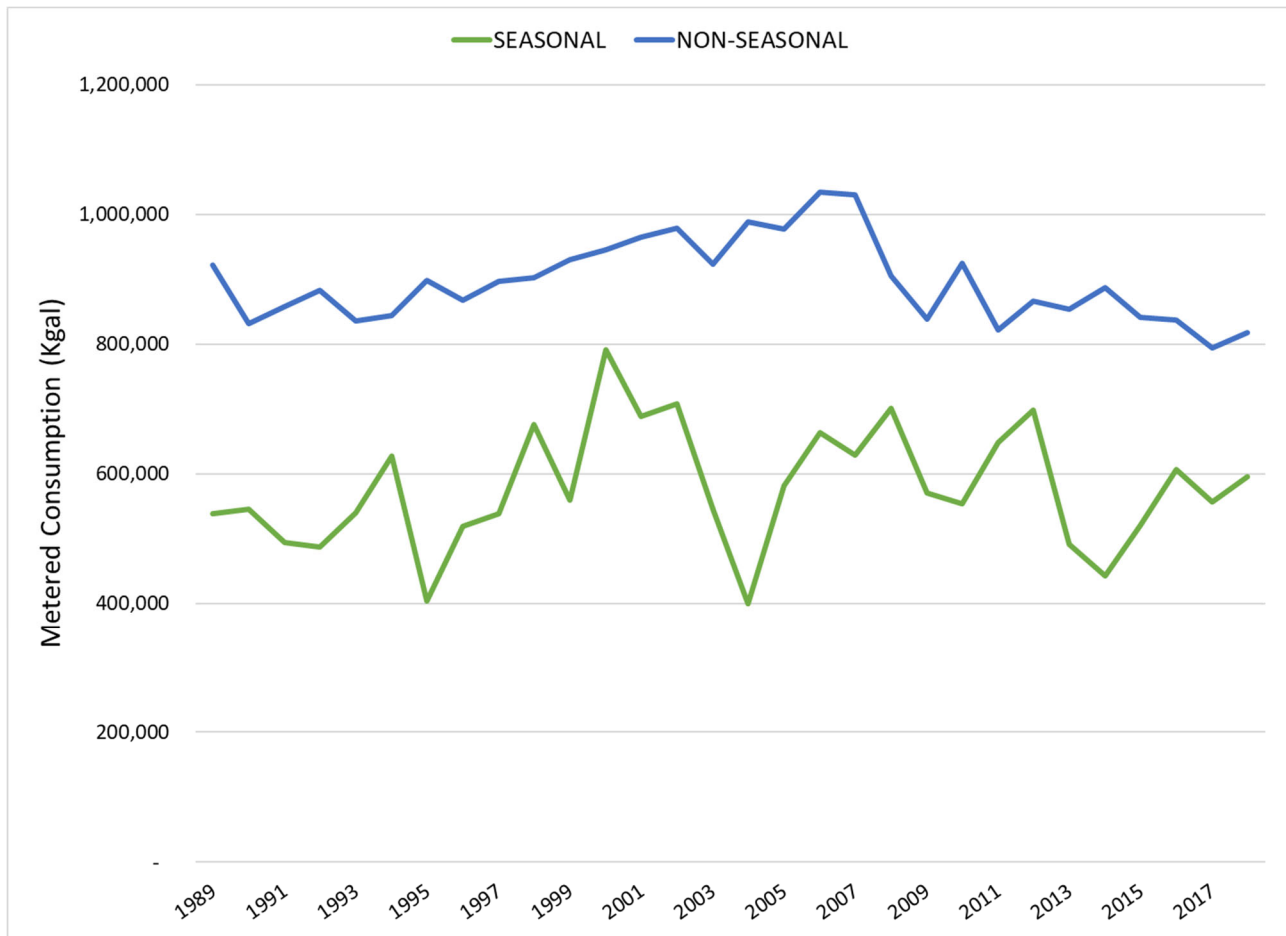


Figure 5: Northglenn Non-Seasonal and Seasonal Water Use, (1989 – 2018).

Figure 6 shows the monthly seasonal and non-seasonal use in Northglenn averaged from 1989 through 2018. As with most municipalities in Colorado, Northglenn’s demands are higher during summer months due to landscape irrigation and other seasonal water uses.

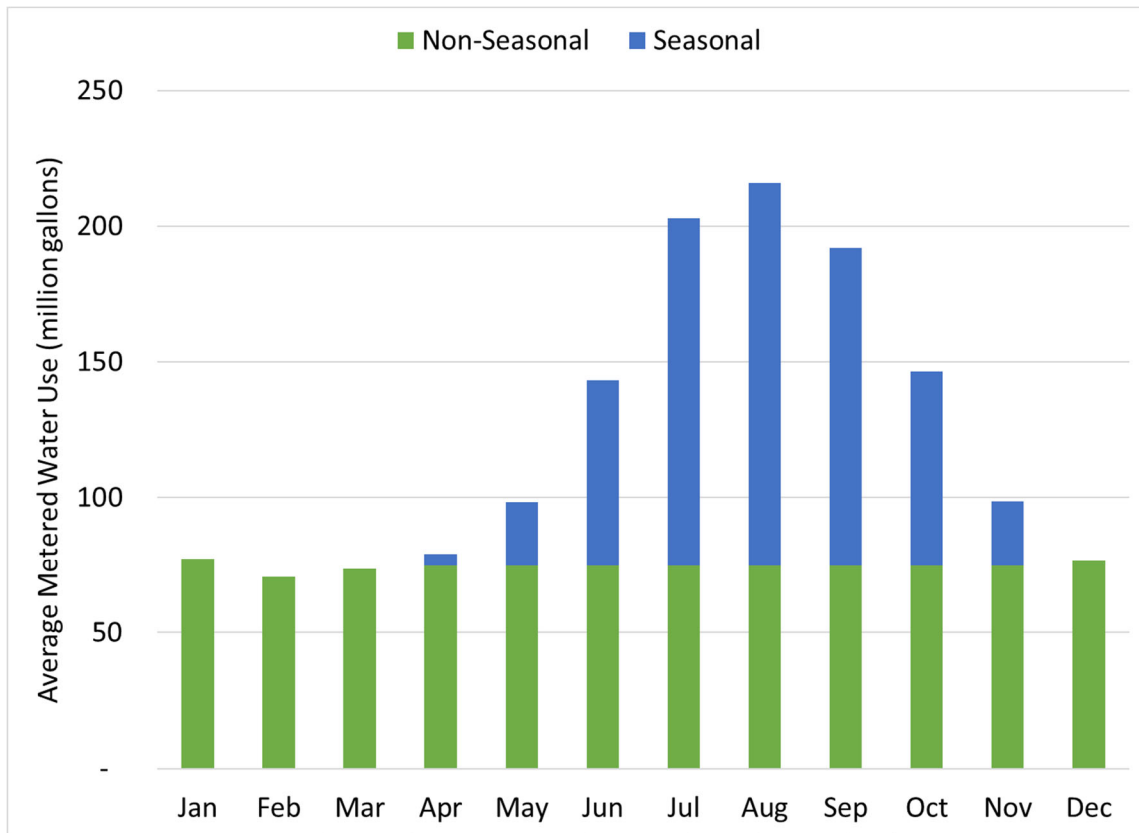


Figure 6: Northglenn Average Monthly Non-Seasonal and Seasonal Use.

Figure 7 shows the average monthly billed water use over the past 5 years from 2014 through 2018 by water use sector compared with the mean monthly temperature (NOAA Northglenn Climate Station USC00055984). As a result of seasonal water use, all water use sector demands increase during summer months from June through October when temperatures are higher. Single-family residential customers have the largest volumetric demands (Figure 7) and the highest peak month factor, which indicates that this customer class is the key driver with respect to the City’s water supply and treatment capacity requirements.

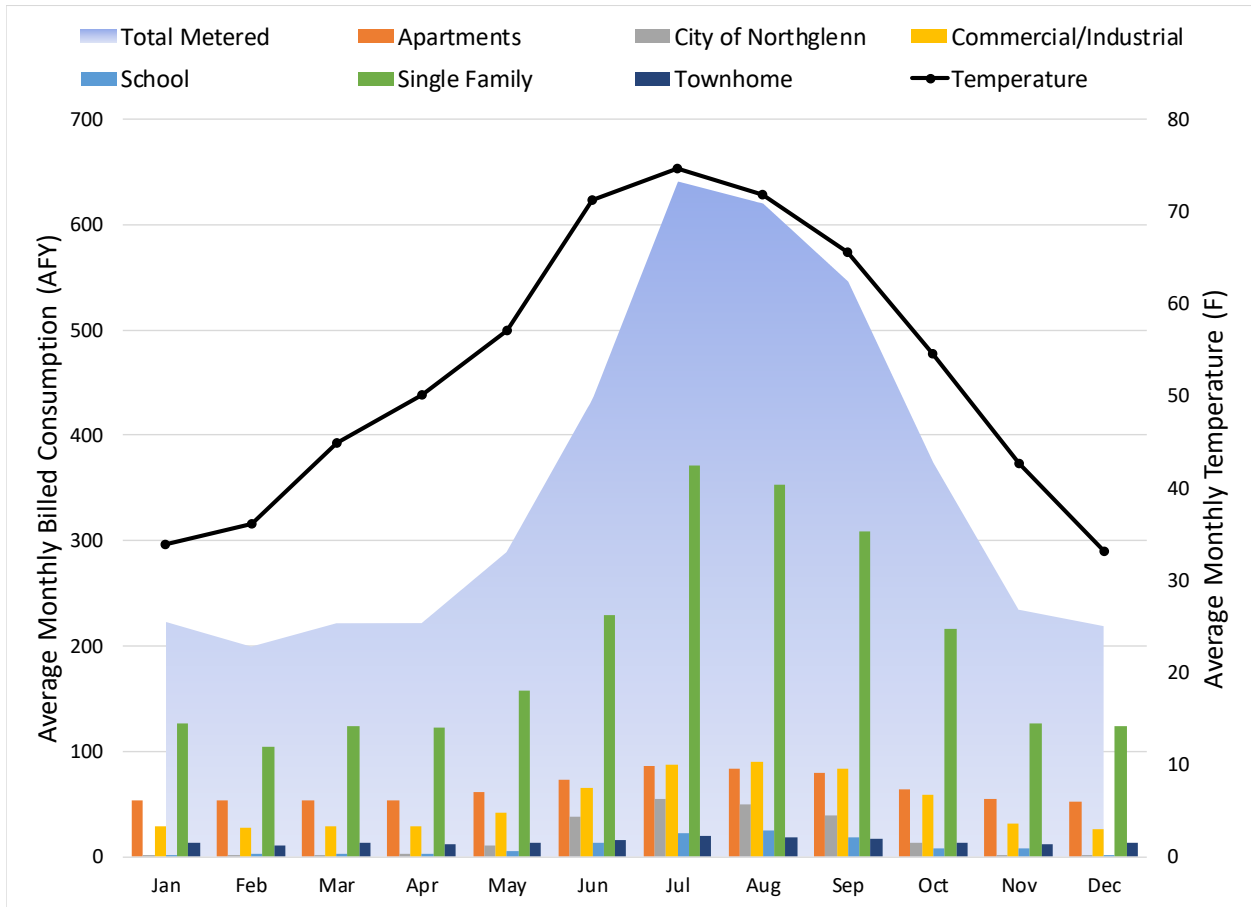


Figure 7: Average Monthly Billed Water Use by Customer Class, (2014 – 2018).

Northglenn’s peak day water demand data for the past 5 years from 2014 – 2018 is shown in Figure 8. These peak demands are determined as the day of maximum production during each year at Northglenn’s WTP. Peak day demand ranged from 8.39 MGD to 8.81 MGD over this period and the peak days occurred in June, July or August, depending upon the year. Daily peak demand under the highest demand scenario, which is described in the following section, is projected to be about 10 MGD. These peak demands are well within the rated treatment capacity of Northglenn’s WTP, which is 14 MGD.

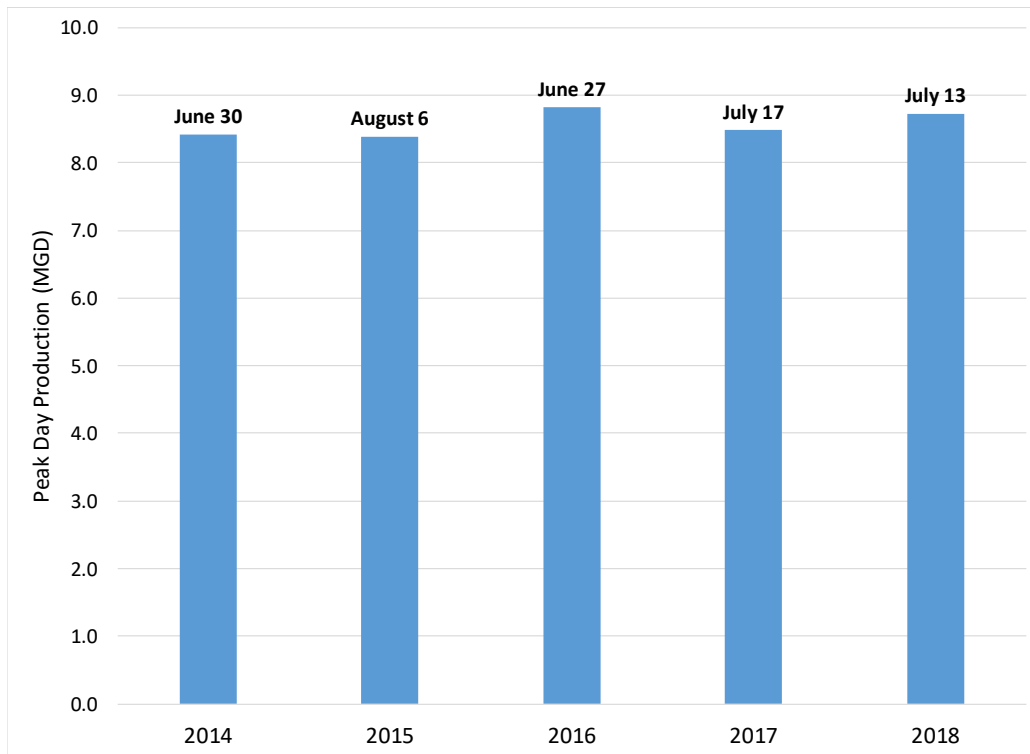


Figure 8: Northglenn Peak Day Treated Water Production, (2014 – 2018).

3.3 WATER COSTS AND PRICING

Water efficiency-oriented water rates have been one of the most effective methods in influencing customer behavior and reducing water use (CWCB 2012). Northglenn’s billing structure is intended to influence efficient water use through the use of tiered water rates. This means that customers pay different prices per unit of water depending on the amount used, with a higher price charged for larger water demands. Northglenn has been operating under a tiered water rate structure for over 15 years, adjusting the tier rates as appropriate. The City increased water and wastewater rates to support the ongoing operations and maintenance of the City’s WTP and WWTP and infrastructure in 2009, 2010, 2011, 2014, 2015; in 2017 the City Council approved rate increases for the next five-years, beginning in 2018.

In 2018, the City billed \$7.525 million in water charges and \$4.020 million in sewer charges. Water utility programs and projects are funded through service and water use charges and through the City’s “Water and Rates Fund”, from a one-half percent sales tax that is in effect through the end of 2025. This tax provides the City with funds to be used exclusively for the purchase or lease of water or water rights for use in, and/or augmentation of, the municipal water system. This tax enables the City to develop the water supplies and infrastructure it needs while at the same time encouraging a water conservation ethic without the impacts of decreases in revenue that may result from lower water demands. The City’s review of its recent water sales and revenue revealed no significant billing or revenue issues. If the Water and Rates Fund tax were to expire without renewal, the City’s rate structure would likely need review and modification to sufficiently fund ongoing water programs and projects.

3.3.1 CONSERVATION-ORIENTED RATES

Customer water accounts are charged based on the following classes: single-family residential, commercial/mixed use (including businesses, schools, churches, etc.), commercial irrigation (outside use only), and commercial domestic (indoor use only).

Residential accounts currently pay a fixed service charge of \$11.41 per month as well as an additional amount based on the volume of water use. Water volume rates are charged at an increasing tiered rate that is designed to encourage water conservation and prevent the excessive use of water (see Table 6).

Table 6: Single-Family Residential Water Volume Rates.

Tier	Monthly Consumption in Gallons	Rate per 1,000 Gallons
Tier 1	1,000 to 3,000	\$3.76
Tier 2	4,000 to 10,000	\$4.70
Tier 3	11,000 to 20,000	\$5.88
Tier 4	Greater than 20,000	\$8.80

Commercial accounts pay a fixed monthly service charge based on meter size (see Table 7) as well as an additional amount based on the volume of water used. Water volume rates are charged at an increasing tiered rate (see Table 8). The designation of use between tiers is based on the calculated EQR (five-year rolling average of water use compared to the residential five-year rolling average of water use).

Table 7: Monthly Service Charges for Commercial Accounts.

Meter Size	Monthly Service Charge
5/8"	\$11.41
¾"	\$14.15
1"	\$19.51
1 ½"	\$33.09
2"	\$49.30
3"	\$92.55
4"	\$141.50
6"	\$276.16

Table 8: Commercial Mixed-Use Water Volume Rates.

Tier	Monthly Water Use in Gallons	Rate per 1,000 Gallons
Tier 1	100% EQR	\$3.71
Tier 2	Over 100% EQR	\$6.46

Commercial irrigation accounts are charged a flat volume rate of \$6.46 per 1,000 gallons of water used. Commercial domestic use accounts are charged a flat volume rate of \$3.71 per 1,000 gallons of water used.

3.3.2 SEWER SERVICES AND STORMWATER IMPACT FEES

In addition to charges for water use, accounts are also charged monthly for sewer service. Because sewer lines are not metered, annual sewer charges are based on the AWC billed to each account and updated annual sewer rates are posted to each account in April. This AWC is considered equivalent to total indoor water use and the quantity of water that is returned to the sewer. AWC is currently multiplied by the flat sewer rate of \$5.45 per 1,000 gallons. New residents initially pay the City-wide average sewer rate which

is currently \$21.80 and a minimum fixed sewer charge of \$16.35 is applied to all accounts regardless of consumption. Single-family residences also pay a flat stormwater impact fee of \$2 per month; non-residential accounts are charged \$20 per acre per month.

3.3.3 METERING AND BILLING

Charging customers for the amount of water used contributes directly to water conservation. All water connections in the City are metered, enabling the water utility to charge customers based on their actual water use. Apartment accounts are the exception since they are metered by building, or building segment, rather than individual unit. To ensure meter accuracy, all residential meters are replaced every fifteen years and all other meters (from 1.5" to 6") have all internal components replaced every ten years. In the last three years, 97% of all residential meters have been replaced. Larger meters that are suspected to be inaccurate are sent to a private company to be tested and are replaced as necessary.

Individual customer meters are read on a monthly basis using an electronic radio receiver. The meter reading is automatically read into a handheld or laptop computer that accepts or rejects the reading if it is outside of the normal use pattern. Additional quality control occurs when the reading is again checked prior to a utility bill being issued. This system of meter reading checks helps ensure meter accuracy and detect system leaks.

3.3.4 LEAK FORGIVENESS POLICY

Each customer account is eligible to receive a one time, one-month leak adjustment. Leak adjustment requests must be made within six months of the original leak and documentation of repair is required within the same timeframe.

3.4 PAST AND CURRENT CONSERVATION ACTIVITIES AND IMPACT TO DEMANDS

The City began implementing water conservation initiatives in 2001 and completed its state-approved municipal water efficiency plan in 2007. Since that time, Northglenn has continued to operate efficiency activities and investigate new opportunities to maintain and expand the reliability of its water resources. Reducing demands through conservation plays a key role in the City's long-term planning and supports drought mitigation. Advanced conservation is considered in Northglenn's 2020 IWRP on the same level as the development of new water supplies and infrastructure alternatives.

Northglenn has implemented a conservation program focused on indoor rebates, landscape efficiency, and education with an average annual implementation budget from 2014 through 2018 of \$11,205. Over this period of time, Northglenn has spent approximately \$56,000 on conservation program measures.

Northglenn's average system-wide water use (including non-revenue water) declined from approximately 151 gpcd in 2000 to approximately 126 gpcd in 2006 (2007 WEP). Northglenn's system-wide water use has averaged 104 gpcd from 2014 – 2018, with 2018 at 111 gpcd. The 2018 per capita use reflects a 12% reduction as compared to the usage in 2006. The 2007 WEP reported an average annual treated water production of 5,458 AFY over the period 2000-2006. The annual produced water for 2018 was 4,837 AFY. This indicates an annual reduction in produced volume of about 11% since the 2007 WEP, reflecting savings from conservation and efficiency activities. Northglenn has exceeded its water savings goal of 600 AFY as set in the 2007 WEP.

Savings are influenced by a multitude of programs, making it difficult to attribute a specific savings volume to an individual program. Northglenn currently does not discretely track water savings by conservation program. Therefore, water savings by activity were estimated based on Northglenn's qualitative

assessment of program effectiveness, available estimated savings for programs with discreet savings tracked, and guidance from the Colorado Waterwise Guidebook of Best Practices for Municipal Water Conservation in Colorado (CWW 2010) (Table 9). The majority of savings may be attributed to the ongoing meter replacement program and systematic leak detection and repair. A number of the active measures currently operating within Northglenn are considered foundational, including educational activities, conservation-oriented water rates, and annual potable audits. Additionally, passive savings are likely realized through ordinances and regulations and the Colorado statewide legislation passed in 2016,¹⁰ which are also referred to as “Foundational” below.

These programs, as further described below, are assumed to continue to contribute to annual savings through maintenance and natural advancement of active programs and continuing support of passive or foundational programs. Education programs will continue to operate and advance in response to the community’s growth and building knowledge base, which is critical to all efficiency programs within the City. These programs were accounted for in the demand projection prepared for the baseline planning future used in the 2020 IWRP to estimate the future demand-supply gap needs. Ongoing support for the City’s existing conservation program will be crucial to achieving the goals presented in the 2020 IWRP and directly influence the sizing of other water supply, storage, and infrastructure projects needed to address the identified gap. Existing funding comparable to what is generated from Northglenn’s Water and Rates Fund program will need to continue into the future to support ongoing efforts, and additional funding will be needed to support the advanced conservation efforts presented below.

¹⁰ Effective September 1, 2016, Colorado Senate Bill 14-103 prohibited the sale of certain plumbing products if they were not WaterSense certified. The law’s intent is to require manufacturers to sell only WaterSense labeled fixtures to distributors, wholesalers, retailers, developers and homebuilders for the sale/resale and installation in the State of Colorado.

Table 9: Historical and Current Water Efficiency Activities (CWCB Worksheet B).

Historical and Current Water Efficiency Activity	Annual Water Savings for Past Five Years (AF or %)					Total Five-Year Water Savings (kgals)	Average Annual Savings (kgals)
	2014	2015	2016	2017	2018		
Foundational Activities							
Potable audit				Yes	Yes	Foundational	
Monthly Meter Reading with Leak Alerts and Repair	Yes	Yes	Yes	Yes	Yes	18	3,592
Meter Replacement	Yes	Yes	Yes	Yes	Yes	79,692	15,938
Tiered Water Rates	X	X	X	X	X	Foundational	
Targeted Technical Assistance and Incentives							
Slow the Flow	19 residential, 4 large commercial audits	18 residential audits	21 residential audits	22 residential audits	14 residential audits	1,610	322
Garden in a Box				51 gardens	61 gardens	940	470
Toilet rebate (2018: 1.28 gpf or less, before 2018: 1.6 gpf or less)	148	76	94	90	71	31,509	6,302
Clothes washing machine rebate (starting in 2018 moved to EPA WaterSense rather than CEE1)	74	46	19	41	26	6,948	1,390
Ordinances and Regulations							
Waste of Water Ordinance	X	X	X	X	X	Foundational	
1x Leak Forgiveness to Encourage Leak Repair	X	X	X	X	X	-	-
Education Activities							
Education Festival (with Westminster and Thornton)	1000 Students	1000 Students	1100 Students	1000 Students	1000 Students	1,833	367
Newsletters			2 bill stuffers: waste of water ordinance & water wise garden at City Hall	2 waste of water ordinance	12 - monthly	Foundational	
Resident Workshops	2 workshops: irrigation efficiency and organic gardening		2 water conservation and irrigation workshops	1 irrigation efficiency workshop			
Publicly Available Conservation Website	X	X	X	X	X		
Demonstration Garden	X	X	X	X	X		

Starting in 2019, Northglenn began piloting the following programs:

- **Rotary Sprinkler Head Rebate** – \$3 per sprinkler head, limited to 25 per address.
- **Irrigation Timer Rebate** – Up to \$100 per timer, limited to one per address. Timer must be WaterSense labeled.
- **Rain Barrel Rebate** – Up to \$50 per barrel, limited to one per address every five years. The rain barrel must comply with Colorado law that limits rainwater storage to 110 gallons of water to be used to irrigate yards.
- **Turf Replacement Rebate Program** - \$1 per square foot of irrigated turf that is replaced with water-efficient landscaping. See **Appendix A** for full details and 2019 program requirements.

Table 10 below shows the number and associated award amounts for approved rebates during 2019, including the newly implemented rebate programs. These rebate programs were not widely promoted during 2019, which resulted in lower customer participation rates. The associated water uses and savings are not included in the historical demand analysis, which extends through 2018, due to timing and availability of data.

Table 10: Northglenn Approved Water Conservation Rebates (2019).

Rebate	Number	Dollar Amount
Irrigation Timers	16	\$1476
Rain Barrels	0	\$0
Rotary Sprinklers	1	\$3
Toilets	69	\$5175
Turf Replacement	4	\$3512
Washers	20	\$2000
	TOTAL	\$12,166

3.5 PAST AND CURRENT LAND USE ACTIVITIES

The image contains three informational graphics related to the City of Northglenn's sustainability efforts:

- City of Northglenn Sustainability Plan - September 2018:** A cover page featuring a photograph of a park with a pond and trees.
- Goal Areas:** A grid of nine icons representing different sustainability goals: Arts, Culture, and Events; Community Education and Civic Engagement; Sustainable Economy; Environment and Public Health; Housing; Human Dignity; Open Space and Land Use; Resource Conservation; and Transportation.
- Resource Conservation:** A poster detailing goals and indicators for water, energy, and paper use, including specific percentage targets for 2020 and 2025.

Northglenn has a City Planning Department that oversees development in Northglenn. Historically, there has been no formal coordination between the Planning and Water Resources departments. This is an area that Northglenn has identified significant opportunity for future collaboration. One project that included input from both from Planning and from Water Resources was the preparation of a 2018 Sustainability Plan, developed by ICLEI – Local Governments for Sustainability and Economic & Planning Systems with direct support from City staff. An internal Sustainability Team was formed, consisting of Northglenn staff from each City department. The City selected nine “Goal Areas”, each focusing on a specific sector and aligning with Northglenn’s Sustainability Vision. Teams developed indicators to measure progress made toward meeting goals and to support recommendations and decisions into the future. This document addresses a diverse suite of sustainability initiatives, including goals for reduced water use, and involved representatives from across Northglenn’s sectors.

The goals and indicators identified in the Sustainability Plan that support water and resource conservation were considered during the preparation of the advanced conservation alternative for the 2020 IWRP. The Sustainability Plan identifies a goal to significantly decrease overall community consumption of resources including water. Additionally, the Sustainability Plan identifies a goal to transition City parks and facilities to use water conserving plants for landscaping. Both of these goals are supported through development of the advanced conservation program described herein and selected for implementation under the 2020 IWRP.

3.6 WATER DEMAND PROJECTIONS

Water demand projections were prepared using future population projections and a consideration of how future per capita water use is likely to decrease through the ongoing support of Northglenn’s existing conservation program, enhanced by the advanced conservation program selected through the 2020 IWRP process, even in light of climate change impacts.

3.6.1 PROJECTION APPROACH

A detailed assessment of demand and population projections was developed in support of the 2020 IWRP for the planning year 2050. The 2020 WEP uses the projection calculations developed for the IWRP to avoid duplicating efforts and to provide consistency. The 2020 IWRP should be referred to for additional information regarding population and demand projection methodologies. A summary of how these projections were applied in the 2020 WEP is provided below.

3.6.2 POPULATION PROJECTION

Population is one of the key drivers that influence water demand projections. The 2018 population in Northglenn, as reported by the State Demographer, was 38,811 and Northglenn is relatively close to buildout conditions. The City does not have recently developed population projections to rely upon for growth planning efforts. Therefore, population projections were prepared in support of the water demand projections for the 2020 IWRP and are reflected herein. Population projections described in Northglenn’s most recent Comprehensive Plan, published in 2009, were reviewed and relied upon along with input from Northglenn’s Planning Department regarding plans for anticipated future development of four infill projects. The population associated with the future development was estimated from the planned number of new units. Based on available data and observed trends from these sources, an estimated 10% growth was projected. A 2050 population of 42,555 people was used for each demand projection. Additional details can be found in the 2020 IWRP.

3.6.3 CLIMATE CHANGE EFFECT ON WATER DEMAND

Climate is another key driver that influences demands, primarily due to warming that increases landscaping water demands. A projection that considers effects of a modified future climate that increases Northglenn's seasonal demands was developed for the 2020 IWRP. This reflects a 9% increase in seasonal demands by 2050 due to impacts from a warmer and drier climate future, which was a climate scenario modelled under the CWP Technical Update for Adams County. Additional details can be found in the 2020 IWRP.

3.6.4 WATER DEMAND PROJECTION

Annual demand projections were developed using the analysis of historical demands presented in Section 3.2 above. Using different assumptions for each projection, the current (represented by 2018) per capita demands were adjusted annually by customer demand category for both non-seasonal and seasonal water uses. The five customer demand categories considered in the demand projections are:

- Residential (single-family + apartments + townhomes)
- Commercial
- Schools
- City of Northglenn
- Non-Revenue Water

Three separate demand projections were prepared as part of the 2020 WEP:

1. Future Population, Current Per-Capita Use

- Represents future demands assuming no change in per capita use. Includes ongoing conservation efforts only at levels required to maintain current per capita use with no additional savings.
- All customer classes are projected using current 2018 per capita demands levels with 2050 projected population.
- Used as future baseline projection for the WEP to monitor and track water savings and demand reduction influenced by full conservation program.
- Does not include climate change impacts; assumes current per capita conditions to help better track near-term savings.
- Projected population in 2050 of 42,555 people.
- Projected demand in 2050 of 5,304 AF.

2. Future Population, Current Conservation Program, Climate Adjusted

- Represents future demands assuming ongoing annual demand reductions from maintenance of existing conservation activities including passive savings relative to current per-capita use.
- Residential non-seasonal efficiency increases moderately, with an average annual reduction of 0.65%, resulting in a future residential indoor use of 42.6 gpcd. The future non-seasonal gpcd is similar to the current efficiency benchmark used for the CWP Technical Update, and reflects homes having water fixtures and appliances that generally meet or exceed EPA WaterSense specifications. This is a reasonable assumption, considering that most existing residential toilets, clothes washers, and dishwashers will be replaced between now and 2050 and some will have a higher efficiency than the current WaterSense specifications.
- All other demand sectors use current per capita demands without additional efficiency.

- Used as the future baseline projection for the 2020 IWRP, recognizing that a certain level of conservation will continue into the future to avoid over-representation of the potential future supply-demand gap.
- Includes adjustment of outdoor demands to reflect impacts from climate change.
- Projected population in 2050 of 42,555 people.
- Projected demand in 2050 of 5,016 AF.

3. Future Population, Advanced Conservation Program, with Climate Change

- Represents future demands assuming annual reductions from advanced conservation activities selected in the 2020 IWRP to help meet the future water supply-demand gap.
- Used as advanced conservation alternative projection in the 2020 IWRP.
- Includes adjustment of outdoor demands to reflect impacts from climate change.
- Projected population in 2050 of 42,555 people.
- Projected demand in 2050 of 4,846 AF.

Straight-line water demand projections that represent the average annual demand in 2050 for each of these scenarios are shown in Figure 9. These projections form the core of the 2020 WEP and are the values from which water savings estimates are calculated. Each projection shows demands starting in 2019, projected through 2050 (32 years). For purposes of the 2020 WEP, savings will be described as the difference between the Future Population, Advanced Conservation Program projection and the Future Population, Current Per-Capita Use projection. Approximately 287 AFY of savings are estimated for ongoing operation of the current conservation program. An additional 170 AFY of savings are estimated for implementation of the advanced conservation program. The full program is included in the 2020 WEP.

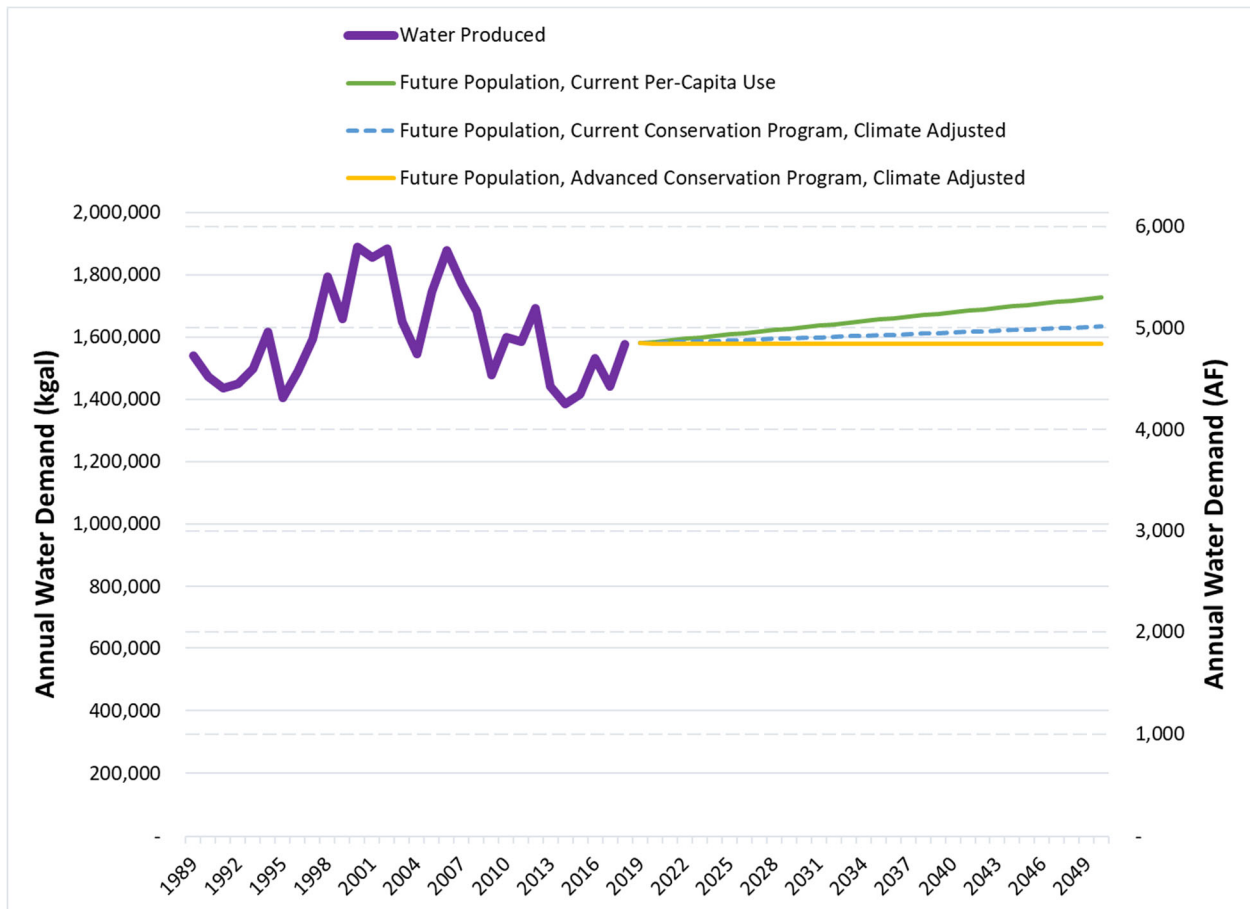


Figure 9: Northglenn Straight-Line Water Demand Projections for the Year 2050.

4. INTEGRATED PLANNING AND WATER EFFICIENCY BENEFITS AND GOALS

4.1 WATER EFFICIENCY AND WATER SUPPLY PLANNING

Water efficiency provides great benefits for municipalities, particularly in Colorado where water supplies are limited and growth is expected to continue. Northglenn recognizes the importance and impact that targeted conservation and efficient water use has in supporting a reliable water system. Northglenn is nearing its projected build-out population, however, the City is already experiencing supply shortages during warmer and dryer climate conditions. The 2020 IWRP assessed water needs and operational management strategies to maintain a resilient and reliable water supply system. Through this effort, Northglenn evaluated a number of water supply and infrastructure alternatives, as well as advanced conservation strategies that were developed in conjunction with the 2020 WEP. A Water Supply and Demand Model was prepared for the IWRP and was used to evaluate combinations of alternatives to meet the projected future supply-demand gap. Advanced conservation was paired with water supply and infrastructure alternatives and ultimately selected as part of the portfolio of solutions to meet future water needs. Additional details are provided in the 2020 IWRP.

4.2 WATER EFFICIENCY GOALS

The 2007 WEP set a goal to reduce Northglenn's per capita water demand from 126 gpcd to 116 gpcd by the year 2020. Northglenn has surpassed this goal, achieving a 2014 – 2018 average systemwide demand of 104 gpcd, with a current baseline demand of 111 gpcd selected for demand projections, based on 2018 water usage. These values are far below the baseline per capita demands documented in the CWP Technical Update of 141 gpcd in the Metro Region and 135 gpcd for Adams County.

The primary goal of the City's 2020 WEP is to support Northglenn's current conservation programs and the initiatives of the 2020 IWRP to achieve an advanced conservation savings goal of about 457 AFY by 2050. With an estimated planning population of 42,555 people by 2050, an additional 457 AFY of water savings translates into about a 9.6 gpcd reduction from current per-capita water use levels. Achieving these savings will support the advanced conservation program that was selected as part of the portfolio of future water solutions described in the 2020 IWRP.

More specifically, Northglenn has developed the following water conservation goals:

1. Decrease average annual water demands by a total of 457 AFY by 2050 through ongoing and new water conservation activities;
2. Reduce per capita water use from 111.3 gpcd in 2018 to 101.7 gpcd in 2050 (a 9.6 gpcd reduction) to meet the projected water savings goals;
3. Continue existing water conservation activities, which have proven effective and have been accepted by the community;
4. Continue to evaluate the costs and water savings associated with water conservation activities in order to select those which will provide the greatest savings for the least cost;
5. Consider high and/or inefficient water use categories when evaluating new water conservation activities;
6. Select additional measures and programs which will attain desired water conservation savings while maintaining residents' quality of living;
7. Promote water conservation education and awareness for all water users in the City's service area; and
8. Continue data collection, making modifications as necessary, to effectively monitor and characterize water use and conservation savings.

The 2018 Sustainability Plan identified a potable water use reduction of 25% by 2030. Additionally, the plan identified a total and per capita water use reduction of 5% each year from the previous 5-year average. The 2020 WEP conservation and efficiency programs are designed to achieve a reduction of about 11.7% by 2050, with about a 1.2% annual reduction in systemwide per capita demands. The 2018 Sustainability Plan set higher water demand reduction goals than the 2020 WEP, indicating Northglenn's strong support for water conservation activities. The City will closely monitor the 2020 WEP implementation to evaluate whether the higher levels of savings described in the 2018 Sustainability Plan are achievable in the relatively shorter 2030 timeframe and will use the findings to inform future updates to all of the related planning efforts, including the Sustainability Plan, WEP, and IWRP.

5. SELECTION OF WATER EFFICIENCY ACTIVITIES

Water efficiency activities were selected to achieve the water supply reliability goals identified through the process of preparing the 2020 WEP in tandem with the 2020 IWRP. The objectives considered when selecting water efficiency measures were:

- Applicability – does the measure make sense for Northglenn as a community?
- Effectiveness – does this measure save water or contribute to saving water?
- Feasibility and practicality – can this measure be reasonably implemented?
- Cost effectiveness – estimated costs and water savings.

Northglenn utilized the CWCB's Municipal Water Efficiency Plan Guidance Document (CWCB 2012) and the Colorado Waterwise Guidebook of Best Practices for Municipal Water Conservation in Colorado (CWW 2010) to inform and guide the development of the 2020 WEP. Through this process, Northglenn developed a goal of reducing treated demands by 457 AFY in the year 2050, relative to future projections using current per-capita water use. Savings realized through the advanced conservation program will be described and quantified in more detail as the current ongoing programs are recommended to continue with little or no modification from current levels.

5.1 SUMMARY OF SELECTION PROCESS

Northglenn implemented a tiered screening and selection process for evaluating potential water efficiency activities. Existing activities were included in the list of measures and were expected to continue as part of the ongoing water efficiency program unless specifically noted below.

Initial Screening. An initial screening was conducted by the consultant team, using the CWCB screening and evaluation worksheets (CWCB 2012) and the Colorado Waterwise Guidebook of Best Practices (CWW 2010) as the key technical resources, along with professional experience. Activities that passed the initial screening were summarized and presented to City staff for screening.

Final Screening. The final level of screening and selection of water efficiency activities was made by Northglenn staff. Activities selected during the final screening were then used to estimate the anticipated water savings and were used to support the 2020 IWRP evaluations.

5.2 WATER EFFICIENCY ACTIVITIES

Northglenn currently operates an active water conservation program focused on foundational practices such as full metering, tiered rates, customer rebates, outdoor use reduction, and customer education. The 2020 IWRP analyses emphasize the long-term benefits of reduced usage from conservation that add greater reliability and resiliency to Northglenn's water supply. The 2020 IWRP recommends expanding Northglenn's water efficiency program to achieve advanced levels of conservation. To achieve the water savings goals, the water efficiency activities from Northglenn's current program will be continued with adjustments to the program over time to take advantage of available water-efficient products and technology. To achieve savings associated with advanced conservation, the City will hire a new full-time water conservation specialist to implement a more robust efficiency program to reduce future demands and address some of the water supply-demand gap identified in the 2020 IWRP.

The new efficiency programs to be implemented include:

- Utility water loss control with annual M36 water audits.
 - **Estimated savings of 40 AFY by 2050.**
- Commercial valve toilet and urinal rebate available to non-residential customers.
 - **Estimated savings of 40 AFY by 2050.**
- Modify existing tank toilet rebate program.
 - **Estimated savings of 40 AFY by 2050.**
- Landscape transformation program.
 - **Estimated savings of 50 AFY by 2050.**

Based on the WEP program screening process and evaluation of advanced conservation through the 2020 IWRP analysis, a better-funded advanced conservation program was developed. Table 11 presents the existing, new, and updated water efficiency activities selected for the 2020 WEP. Estimated savings were quantified based on available information and reasonable planning assumptions. Full implementation of the program is projected to result in a total water demand reduction of 457 AFY by 2050 relative to projection using current per-capita uses. This reflects a reduction of 170 AFY from the advanced conservation program that is in addition to the 287 AFY savings projected from ongoing conservation activities and passive savings. Each measure or program is described in more detail in the sections below.

Table 11: New and Ongoing/Updated Water Efficiency Activities and Water Savings Estimates.

Selected Water Efficiency Activity	Activity Status (Ongoing, Modified, or New)	Annual Program Description & Target
Foundational Activities		
M36 Water Loss Audit and water loss control program	Modified	Annual water loss audit and improvement program, modified to follow AWWA M36 Water Loss Audit guidelines
Monthly Meter Reading with Leak Alerts and Repair	Ongoing	Continue leak alert and repair program
Meter Replacement	Ongoing	Residential meters replaced every 15 years or less, commercial components replaced every 10 years
Tiered Water Rates	Ongoing	Continue annual review of rate structure and revenue stability
Water Use Data Collection and Management	Ongoing	Additional monitoring by new conservation specialist
Targeted Technical Assistance and Incentives		
Slow the Flow	Ongoing	20 Audits
Garden in a Box	Ongoing	50 Gardens
Toilet rebate (1.1 gpf or less)	Modified	Modified from prior tank toilet rebate program to require higher efficiency 75 Rebates
Clothes Washing Machine Rebate	Ongoing	25 Rebates
Commercial Valve Toilet and Urinal Rebate (available to non-residential customers)	New	50 Rebates
Water Budget and Turf Replacement Program	New	30,000 total square-feet converted (approx. 30 properties at 1,000 square-feet each)
Ordinances and Regulations		
Waste of Water Ordinance	Ongoing	Recommended modification to support enforcement
Water Shortage Ordinance	Ongoing	Recommended modification under IWRP
Landscape Ordinance	New	Complete during year 1 of program implementation to support turf replacement and other outdoor incentive programs
Education Activities		
Education Festival (with Westminster and Thornton)	Ongoing	1,100 Students Impacted
Newsletters	Ongoing	Maintain newsletters
Resident Workshops	Ongoing	1 Workshop
Publicly Available Conservation Website	Ongoing	Continue to update with pertinent information
Demonstration Garden	Ongoing	Maintain demonstration garden
Land Use Activities		
Develop Formal Coordination Process between Planning Departments	New	Advance communication across utility departments
City Park and Open Space Landscape Transformation	New	City-focused landscape transformations to set active example and engage multiple departments

The following sections describe specific water conservation measures that will be implemented under the 2020 WEP.

5.2.1 FOUNDATIONAL ACTIVITIES

Foundational activities are programs that form the basis of a strong efficiency program and should be in place prior to implementing other efficiency activities, as recommended by CWCB. These activities focus on system operations and efficiencies, are under the utility's direct control, and can significantly improve the effectiveness of the overall water efficiency program.

5.2.1.1 METERING

A quality metering program is fundamental to the success of water management efforts. Colorado statute requires all water providers to meter the water use of their customers and to bill based on metered water use. All connections in the City are metered, enabling the water utility to charge customers based on their actual water use. Apartment accounts are the exception since they are metered by building, or building segment, rather than individual unit. Northglenn is a fully metered utility with all customers charged based on volumetric consumption. To help ensure meter accuracy, in the last several years, the City has replaced 100% of residential meters, many of which were over 20 years old.

An ongoing meter replacement program will continue to be operated. Northglenn also has an active water infrastructure replacement program that replaces sections of water distributions lines throughout the city in response to aging infrastructure. This program will also continue as part of the ongoing efficiency program.

5.2.1.2 M36 WATER LOSS AUDIT AND ENHANCED WATER LOSS CONTROL PROGRAM

Water loss control is an important area of emphasis for the 2020 WEP. To date, Northglenn has implemented its own potable water audit to estimate system losses. Moving forward, Northglenn will adopt the AWWA M36 water audit and loss control methodology to evaluate system losses in more detail using a widely practiced and accepted methodology. This falls in-line with the CWCB Colorado Water Loss Initiative, which is a comprehensive program of AWWA M36 water loss training and technical assistance for urban water systems across Colorado. CWCB recognizes the AWWA M36 water audit methodology as the "recommended best practice in North America to support informed decision making for water loss control and revenue recovery. Cost-effective water loss management reduces cost, increases revenue, serving the utility's bottom line and the rate-payer alike." While Northglenn has relatively low calculated non-revenue water compared with regional utilities, adopting a more rigorous water loss methodology will help support ongoing loss reductions, minimizing lost revenue. This water loss control program is projected to save about 40 AFY by 2050.

5.2.1.3 CONSERVATION-ORIENTED RATE STRUCTURE AND TAP FEES

The City has successfully implemented and will maintain its tiered rate structure. Surcharges will be applied as needed during times of water shortage to support additional savings for short periods of response. Over time, rates may be adjusted in response to rising water and operating costs. At this time, Northglenn will continue to monitor the current water rate structure but does not include plans for modification within its conservation program at this time. Northglenn will evaluate opportunities to adjust its tap fee structure to support integration of land use with water efficiency.

5.2.1.4 WATER USE DATA COLLECTION AND MANAGEMENT

Northglenn collects and reviews water use data through its monthly billing system software and water production data from the WTP production meter. No modifications to the data collection methodology are recommended at this time. The Northglenn Water Utilities department also collects and maintains water supply data through the maintenance of water rights accounting. Northglenn monitors water use on a regular basis and will continue to do so. Staff produce monthly and annual demand reports for each customer class and system-wide use, closely tracking demands. Northglenn has provided annual water demand reporting to the CWCB as required under House Bill 10-1051 (referred to hereafter as 1051 reporting) since 2016 and intends to continue to submit annual reports going forward. Management of data will include intermittent tracking and monitoring of qualitative and quantitative data associated with each conservation program, as detailed in Section 6.2 below. The new conservation specialist will coordinate and maintain these records, using this information and data to evaluate the effectiveness of each program and to support annual recommendations for the continuation of or modifications to each conservation program.

5.2.2 TARGETED TECHNICAL ASSISTANCE AND INCENTIVES

Northglenn implements a range of technical assistance and incentive programs aimed at reducing customer water use. These efforts will be continued and expanded in the coming years. Management of the technical assistance program will be assigned to the new staff member.

5.2.2.1 FIXTURES, APPLIANCES, AND INCENTIVES

Providing rebates encourages customers to purchase lower water use fixtures and appliances and may speed up replacement rates for older fixtures and appliances. The IWRP analysis shows that toilet and clothes washer rebates offer cost effective water savings compared to the costs of acquiring new water supplies. In addition, the community has come to expect both. The City plans to continue these successful programs.

Moving forward, tank toilet rebates will only be given for toilets meeting a 1.1 gallon per flush volume performance level. A list of qualifying fixtures is available for free download¹¹. The 2020 WEP adds a commercial valve toilet and urinal rebate program for non-residential customers. Estimated savings for these rebates are provided below.

Table 12: Estimated Future Savings from Rebate Programs.

Rebate Program	Estimated 2050 Savings (AFY)
Tank Toilet Rebate (1.1 gal/flush required)	40
Valve Toilet Rebate	40
Clothes Washer Rebate	5

5.2.2.2 OUTDOOR WATER EFFICIENCY

Reducing outdoor use in Northglenn is an important area of emphasis for the 2020 WEP. The following existing programs will continue to be supported:

¹¹ <https://www.map-testing.com/downloads.html>

- Slow the Flow
- Garden in a Box

New measures to be implemented include:

- Informational landscape water budgets to identify inefficient customers.
- Incentivized turf replacement program with the starting goal of transforming 30,000 sq-ft of landscape area per year (equivalent to about 30 sites at 1,000 sq-ft each with an incentive of \$2/sq-ft).
- Adoption of water efficient landscape ordinances for new development, redevelopment, and public facilities.

A landscape water budget is the calculated volume of water needed to reasonably irrigate a specific landscape, typically expressed over the course of the irrigation season. Water providers in Colorado, including but not limited to Boulder, Castle Rock, Centennial, Denver, and Greeley, use landscape water budgets to incentivize customers to improve management of seasonal water use. The approach of determining a reasonable volume of water for each property to evaluate actual usage is now an established water management best practice in Colorado and other states such as California.

Landscape water budgets can be developed and calculated in a number of ways, but water providers typically use geographic information systems (GIS) to estimate the pervious and impervious area for each parcel (often times this information is also utilized for utility storm water programs). Pervious area and local climate data are sufficient to calculate a basic landscape water budget. Water budget accuracy can be further refined through analysis of plant coverage and other factors.

Landscape water budgets are extremely useful because they enable a direct comparison between the water budget and actual metered use. Customers whose actual use greatly exceeds the calculated water budget are the best candidates for efficiency intervention programs such as residential efficiency evaluations and incentivized turf replacement.

Northglenn's expanded conservation program includes a turf replacement program targeting an average of 30 landscapes per year, with an approximate annual budget of \$60,000. During year 1, the program budget will be used to develop landscape water budgets for properties across Northglenn. This effort can be continued if necessary, but most landscapes can likely be characterized during the first year. Using landscape area measurements, Northglenn can calculate a simple annual water budget for each landscape and then compare that volume to actual metered water use. Customers with excessive consumption, e.g. 150% or more of the annual water budget, are the best candidates for efficiency evaluations, landscape design assistance, and a turf replacement rebate. The \$60,000 per year program budget will be used to provide rebates of \$2 per square-foot, up to 1000 square-feet per property, to replace high-water-requirement landscape areas with locally adapted landscapes that require little or no supplemental irrigation. Turf removal programs in Colorado experience water use reductions of about 5 to 15 gallons per square foot of turf removed when replaced with non-irrigated or very low water use landscaping. In order to achieve the projected savings of 50 AFY by 2050 through the turf transformation and removal program, selected landscapes will need to achieve savings on the higher end of this range. This will be supported through the water budget program and development of a new efficient landscape ordinance that is described further below. The City can also incorporate some turf transformation through low-traffic City spaces to demonstrate landscape modifications.

The landscape incentive program will focus on both residential and non-residential landscapes. Medians, narrow turf strips, commercial properties, schools, and others will also be eligible to participate. It is anticipated that the program will evolve as it is implemented, to ensure demand reductions are achieved and that the program supports the 2020 IWRP initiatives.

5.2.2.3 COMMERCIAL, INSTITUTIONAL, AND INDUSTRIAL WATER EFFICIENCY

Commercial, institutional and industrial (CII) customers in Northglenn qualify for the fixture and appliance rebates described earlier. CII customers are also eligible to participate in Northglenn's landscape conservation incentives.

5.2.3 ORDINANCES AND REGULATIONS

Ordinances and regulations are locally adopted policies encouraging water efficiency and serve to support active water efficiency programs and provide enforcement mechanisms. Northglenn is the governing authority covering its service area and therefore has the authority to adopt and enforce the City's local ordinances. Northglenn currently has a Waste of Water ordinance and Water Shortage ordinance, as described below.

5.2.3.1 REGULATORY MEASURES

The following is a list of Northglenn's existing ordinances and regulations related to water use.

Waste of Water

The Waste of Water ordinance is critical to the City's ability to minimize excessive water use. Chapter 16 Article 24 of the City of Northglenn Municipal Code prohibits the wasting of water, defining the wasting of water as:

1. Any irrigation of lawns or plants which, due to excess application of water, results in an excessive and/or prolonged flow of water off the property being irrigated; or
2. Use of any plumbing system, irrigation system, connection or fixture, which by reason of misuse, damage, disrepair, inadequate maintenance or dilapidation, wastes City water.

The City can issue fees to any person confirmed to be in violation of the code. The City's current Waste of Water Ordinance should be revisited and updated to provide additional clarity on what is considered "waste" and to enhance enforcement guidance and protocol. This will help support other efficiency programs and help staff enforce the minimization of water waste. A clear Waste of Water ordinance directly enhances and bolsters a robust water loss control program.

Water Shortage

During times of drought and other water shortage, more stringent measures may be required of or requested by the City to temporarily limit water use. Chapter 16 Article 23 of the City's Municipal Code defines rules and regulations regarding times of water shortage. As with other water providers in Colorado, the City will continue to utilize such measures as necessary to ensure that water supplies are sufficient to meet demands. While a Water Shortage ordinance does not necessarily support permanent demand reductions, the 2020 IWRP recommends Northglenn develop or expand its current water shortage mitigation and response plan and make necessary modifications to the municipal code to support the plan.

Water Efficient Landscape

As part of the WEP the City intends to adopt an Efficient Landscape ordinance to support the turf transformation program. Northglenn will work to adopt landscape ordinances that require proper soil amendments and irrigation system design and installation. These codes can also specify low-water-use landscapes for public spaces and beyond.

5.2.3.2 RAW WATER, REUSE, AND RECYCLING

Northglenn currently stores treated effluent in Bull Reservoir, located in Section 36 along with the City's WWTP. Treated effluent stored in Bull Reservoir is released to meet return flow obligations on the South Platte River. This is an efficient practice of reusing Northglenn's water supplies for a second use after it is used to meet potable demands.

As the City's water supply portfolio evolves, the City is evaluating the potential availability of treated effluent supplies for non-potable use within Section 36 in addition to the return flow requirements. This parcel of land mainly consists of farmland, Northglenn's wastewater treatment plant, and Bull Reservoir which stores treated wastewater. Because there are currently no potable demands in Section 36, these demands are not included in the current demand analysis nor are they part of the 2020 IWRP alternatives evaluation. Potential alternatives to meet future Section 36 demands are described in Appendix C of the 2020 IWRP. These will be evaluated in future IWRP updates.

5.2.4 EDUCATION ACTIVITIES

When coupled with other water efficiency activities, education and outreach programs can greatly enhance the overall water savings. An informed and educated public tends to be more engaged in community efforts, influencing a change in behavior through available programs.

5.2.4.1 PUBLIC EDUCATION AND INFORMATION

Public education and information programs are a key component of Northglenn's efficiency program. Being largely built-out, most future water savings will be realized through modifying the water use behaviors of existing customers. Northglenn partners annually with Westminster and Thornton to participate in an Education Festival, a daylong, hands-on learning experience attended by fifth grade students. Local professionals share their knowledge on a wide variety of water-related subjects including conservation, pollution, the importance of wetlands as wildlife habitat, and water law. Northglenn will continue to support this annual Festival.

Northglenn's website provides a wealth of information for residents and local businesses. Water conservation-related content will be expanded to provide information on existing and new conservation measures and links to a variety of external resources. The City will revise the website to make conservation information more prominent. This can be accomplished at a relatively low cost to the City.

Informational resources regarding outdoor water efficiency practices will support the landscape transformation program and may influence non-participating customers to implement some water saving techniques without incentives. Informed landscaping and irrigation design and maintenance will support outdoor efficiency programs. In conjunction with informational resources, the Xeriscape Demonstration Garden is well established and is a useful resource in helping residents assess ways in which they can modify their own landscaping. The City will continue to maintain and promote its Xeriscape Garden and provide citizens with Xeriscape educational materials and workshops.

5.2.4.2 TECHNICAL ASSISTANCE

Northglenn will continue to provide technical assistance to customers through the Slow the Flow program and Garden in a Box.

5.2.5 INTEGRATION OF LAND USE EFFORTS

The City utilized the general principles for selection of best management practices for implementing water conservation and demand management through land use planning efforts from the CWCB guidance document in preparing the 2020 WEP (CWCB 2019). The City has land use jurisdiction and began making a direct connection between land use and water planning in its Sustainability Plan, which identifies a goal of transitioning City parks and facilities to use water conserving plants for landscaping in non-turf and non-recreational public areas. Implementation of the 2020 WEP expands upon this goal through the creation of landscape water budgets and water efficient landscape ordinances for new development, redevelopment, and public facilities. The City can also incorporate some turf transformation through low-traffic City spaces to demonstrate landscape modifications to reduce water use and to engage other departments (e.g. Parks) as well as customers.

Northglenn has a City Planning Department that oversees development. Currently, there is not a formal coordinated effort between the Utilities and Planning departments for consistent data sharing or collaboration. Northglenn has identified significant opportunity for future collaboration. Initial efforts have begun through the development of the Sustainability Plan; however, ongoing data sharing and information use has not yet been formalized between the groups. Northglenn will engage staff across departments and identify key cross-coordination topics and opportunities for sharing data and information. Departments will develop communications and data-sharing plans and to ensure each department has relevant and consistent data. For example, planning projections for population growth and water demand implications are important for consistent planning between Utilities and Planning departments. Both departments are aware of the importance of consistent, aligned data and information across departments and will coordinate to develop a more concerted and formal information sharing process. Regular contact and sharing of information between the Utility Department and the Planning Department is the basic building block of better integration between water and land use planning, supporting water conservation. The CWCB guidance document will be further utilized by these groups as they further develop an ongoing working relationship.

6. IMPLEMENTATION AND MONITORING PLAN

6.1 IMPLEMENTATION PLAN

Northglenn staff are responsible for implementation of this plan and have been successfully implementing the City's water efficiency program since before the last plan was completed in 2007. The 2020 WEP calls for a substantial enlargement of the program to achieve demand reductions to help meet the water supply-demand gap identified in the 2020 IWRP, including the addition of a new dedicated staff person to oversee and implement the water efficiency program. As necessary, Northglenn will continue to budget money and may pursue CWCB water efficiency grants to further achieve its water efficiency goals.

Northglenn has developed a phased implementation approach, with many programs being implemented immediately as a continuation of existing programs. A summary of the implementation schedule for new

or substantially expanded programs is provided below. Ongoing programs that have already been operating in Northglenn are only described below if significant changes to the program are recommended. The new and significantly expanded efficiency programs include:

- Utility water loss control with annual M36 water loss audit.
- Modify existing tank toilet rebate to only be given for toilets meeting a 1.1 gallon per flush volume performance level.
- Commercial valve toilet and urinal rebate available for non-residential customers.
- Landscape transformation program including:
 - Informational landscape water budgets to identify inefficient customers.
 - Incentivized turf replacement program with the starting goal of transforming 30,000 sq-ft of landscape area per year (equivalent to about 30 sites at 1,000 sq-ft each with an incentive of \$2/sq-ft).
 - Adoption of water efficient landscape ordinances for new development, redevelopment, and public facilities.

These new advanced conservation programs are projected to reduce water demands by about 170 AFY by 2050 and contribute to the total 2050 projected savings of about 457 AFY including all current, passive, and advanced conservation efforts.

Northglenn's annual program budget was just over \$12,000 in 2019. This should be increased to support ongoing conservation activities to an average of about \$33,000 per year over the next 30 years, for a total cost of about \$1 million over 30 years. Costs associated with the new advanced conservation program will add an annual cost of about \$196,000 per year over the next 30 years, for a total cost of about \$5.89 million over 30 years. The cost of implementing the full conservation program, including activities associated with current efforts plus the advanced conservation program, has a total estimated cost of about \$230,400 per year over the next 30 years, for a total cost of about \$6.91 million over 30 years. Both current and advanced programs will need to be funded moving forward to support the projected savings.

6.1.1.1 YEAR 1 ACTIVITIES

The first task in the implementation plan is for Northglenn to hire a water conservation specialist to manage the advanced conservation program. The new conservation specialist will be responsible for implementing Northglenn's current conservation and rebate program and for expanding these new efforts. The conservation specialist will work with Utility staff to more clearly define the position's roles and responsibilities based on the hired employee's experience and the Utility's needs.

During the first year, the conservation specialist should conduct a desktop AWWA M36 water loss audit for Northglenn to establish a baseline level of non-revenue water and water loss. Water production and metered water use data will be prepared in a manner that facilitates the annual M36 audit and the annual 1051 reporting to the CWCB. The conservation specialist will use these annual exercises to monitor and evaluate water use efficiency and effectiveness of the conservation program.

The conservation specialist will also work with other Northglenn staff to develop the landscape transformation program, including landscape water budgets. Rebate programs will continue with existing and modified program requirements. The conservation specialist will develop a water efficiency program monitoring tool for tracking quantitative and qualitative data and information for each conservation program. This will support ongoing program evaluations and recommendations for program modifications or adjustments and funding needed to support the program.

6.1.1.2 YEAR 2 ACTIVITIES

The conservation specialist will evaluate results from the Year 1 desktop AWWA M36 water loss audit and make a recommendation for ongoing desktop evaluations or engagement of a technical support expert as needed. The conservation specialist will finalize the landscape transformation program structure and implement the turf replacement program¹², using landscape water budgets developed during Year 1 to identify candidates. Water efficient landscape ordinances will be researched and developed to support the landscape transformation program with the goal of piloting during the Year 2 irrigation season. During this pilot year, staff will develop recommended strategies and processes for formal implementation during Year 3. The conservation specialist will work with staff to develop the landscape standards and engage a technical support expert as needed. The conservation specialist will work with City staff to populate the conservation program monitoring tool and will make recommendations, as appropriate, for adjusting ongoing programs and funding sources.

6.1.1.3 YEAR 3 AND BEYOND

By the third year, Northglenn's advanced conservation program should be in full effect with incentives impacting an average of 30,000 sq-ft of landscape transformation each year. To improve the water loss control program, the conservation specialist should further consider engaging a technical support expert to review the M36 water audit and develop a water loss control plan. Landscape efficiency standards will be finalized by the beginning of Year 3. The conservation specialist will work with City staff to populate the conservation program monitoring tool and will make recommendations, as appropriate, for adjusting ongoing programs and funding sources. After operating new programs for at least 3 years, recommendations for adjusting those programs can also be facilitated through the monitoring tool. As time goes on, water use should be compared to the demand projections shown in Figure 9 above, the effects of climate on Northglenn's demands should be assessed, and the demand projections should be updated as new data and information become available.

6.2 MONITORING PLAN

Northglenn plans to review and update this water efficiency plan at least every seven years, or as needed. The City monitors water use by customer category through monthly billings and will continue to compare these water use data with production records. Progress toward meeting the water savings goal will be evaluated as part of Northglenn's annual water reporting to the CWCB. This tracking analysis will help determine what (if any) additional conservation programs are necessary to help Northglenn meet its savings goal by 2050. Alternatively, continuous monitoring and evaluation of water use may support modification to the City's water savings goal and respective demand projections. If warranted, the City will update the demand projections and modelling developed for the 2020 IWRP to determine the implication to the IWRP implementation strategy. This demonstrates the relationship between conservation, supply, and infrastructure projects to meet the future needs of Northglenn's customers. It also emphasizes the importance of ongoing and consistent monitoring of the conservation and efficiency programs selected through the 2020 WEP.

Northglenn's monitoring plan is represented in Table 13. Data will be collected and tracked by the conservation specialist annually, with ongoing evaluations of water savings, costs, and effectiveness of each identified program. Quarterly and annual summaries for each program, where appropriate, will be

¹² Northglenn began a pilot turf replacement program in 2019.

communicated with the Utilities department and an annual recommendation for program modifications and anticipated budget impacts will be provided. Modifications to rebate program specifications will be made as adjustments to efficiency requirements are made as advancements in technology are made over time. Much of the tracking will be reflected through 1051 reporting. Northglenn will continue to monitor the following on an ongoing basis, coordinated with 1051 reporting, until the next water efficiency plan update:

- System-wide water use
- Billed water use by customer class
- Treated water production
- Non-revenue water
- Population
- Per-capita water use rates

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Table 13: Advanced Water Conservation Program Monitoring.

Water Efficiency Activity	Data Collection Description
Foundational Activities	
M36 Water Loss Audit and water loss control program	Monthly production and billed water use data
Monthly Meter Reading with Leak Alerts and Repair	
Meter Replacement (residential meters every 15 years or less, commercial components replaced every 10 years)	Number of replaced meters, type and size of meter, when replaced, age of replaced meter, customer category, costs
Tiered Water Rates	Ongoing evaluation of billed water use, revenue, anticipated service and infrastructure costs
Water Use Data Collection and Management	New conservation specialist to develop internal monitoring program to support data collection, evaluation, and monitoring
Targeted Technical Assistance and Incentives	
Slow the Flow	Number of evaluations, who received, when received, estimate of impacted landscaping area, costs
Garden in a Box	Number of claimed gardens, costs
Toilet rebate (1.1 gpf or less)	Number of toilet rebates, when replaced, age of replaced appliance, rebate applications, costs
Clothes washing machine rebate	Number of washer rebates, when replaced, age of replaced appliance, commercial or residential, rebate applications, costs
Commercial valve toilet and urinal rebate available to non-residential customers	Number of toilet/urinal rebates, when replaced, age of replaced appliance, rebate applications, costs
Water budget and turf replacement program	Develop and review water budgets to potentially target best candidates Review billed consumption for targeted candidates and applicants Number of approved turf replacement rebates, when replaced, sq-ft or turf removal, rebate applications, costs
Ordinances and Regulations	
Waste of Water Ordinance	Number and type of violations
Water Shortage Ordinance	Declared water shortage stages and billed water use
Landscape Ordinance	Data collection opportunities will be identified as part of the landscape ordinance preparation (e.g. tracking information about landscapes installed under the new ordinance)
Education Activities	
Education Festival (with Westminster and Thornton)	Number of attendees, data of festival, cost
Newsletters	Estimate/document number of educational materials developed and distributed
Resident Workshops	Number and location of workshops, number of attendees, costs
Publicly Available Conservation Website	Frequency of new materials developed for website, number of web hits
Demonstration Garden	-Track water use at the demonstration garden and estimate number of annual visitors
Land Use Activities	
Develop Formal Coordination Process between Planning Departments	Data collection opportunities will be identified as the coordination process is developed (e.g. population projections, planned development activities, etc.)
City Park and Open Space Landscape Transformation	Areas modified, water use, and usage data trends

6.3 REVENUE IMPACTS

Northglenn has selected advanced conservation as a component of the 2020 IWRP implementation strategy. Monthly charges and water rate tiers will need to be adjusted to provide revenue stability while also promoting water efficiency and supporting costs of implementing the IWRP strategies, including advanced conservation. Northglenn is nearing build-out and its water customers have already achieved a high rate of efficiency. As water use decreases, less revenue is received by the City. However, conservation savings are shown to be a cost-effective measure to offset increases in demand resulting from a growing population and future climate change impacts. The “Water and Rates Fund” revenue from a tax in effect through 2025 provides the City with funds to be used exclusively for the purchase or lease of water or water rights for use in, and/or augmentation of, the municipal water system. This tax enables the City to develop the water supplies and infrastructure it needs while at the same time encouraging a water conservation ethic without the impacts of decreases in revenue that may result from lower water demands. It is imperative that this program be continued and/or an alternative program be created to support the programs identified in the 2020 WEP and 2020 IWRP.

7. ADOPTION OF NEW POLICY, PUBLIC REVIEW AND FORMAL APPROVAL

7.1 PUBLIC REVIEW

Public participation and action is critical to the success of Northglenn’s water efficiency efforts as many of the measures and programs rely on residents to utilize programs and modify water use behaviors. Northglenn posted a draft copy of the 2020 WEP on its website on XX, followed by a 60-day public review and comment period from XX to XX.

A public review process of no less than sixty days after the date on which the draft plan is made publicly available is required for all CWCB-approved plans per C.R.S. 37-60-126 (5). The public review process is described in Appendix B of this report.

7.2 LOCAL ADOPTION AND CWCB APPROVAL

Northglenn’s City Council reviewed an initial draft of the 2020 WEP prior to initiation of the public comment period. On XXXX, the Northglenn City Council XXXXX. A copy of the Council Resolution adopting the WEP is included in Appendix B.

7.3 PERIODIC REVIEW AND UPDATE

Colorado House Bill 04-1365 requires all water providers with annual demands of 2,000 AF or more have an approved Water Conservation Plan on file with the state. In addition, the Bill stipulates that water providers review and update their plans no less than every seven years. Northglenn plans to fully review and update the 2020 WEP in 2026 in order to have an updated plan on file by 2027.

As described above, water conservation data activities will be monitored and evaluated on an ongoing basis and an annual report will be compiled, complying with HB-1051 reporting requirements. Northglenn will most likely make modifications to measures and programs as a result. Additionally, changes in technology, state and federal laws, public perceptions, climatic conditions, and financial considerations, among others, may impact the City’s water efficiency program. The 2020 WEP is not meant to be a static

document, but rather a guidance document to enable the City to meet its water savings goals. Modifications made to the program will be documented in the following year's annual conservation report.

8. COMPLIANCE WITH STATE PLANNING REQUIREMENTS

8.1 STATUTORY REQUIREMENTS

C.R.S. Section 37-60-126 requires a covered entity to develop, adopt, make publicly available, and implement a water conservation plan that will encourage its domestic, commercial, industrial, and public facility customers to use water more efficiently. According to the statute, a "covered entity" is a "municipality, agency, utility, including any privately owned utility, or other publicly owned entity with a legal obligation to supply, distribute, or otherwise provide water at retail to domestic, commercial, industrial, or public facility customers, and that has a total annual demand for such customers of two thousand acre-feet or more".

Key elements that must be fully evaluated through the plan development are listed below:

- A. Water-saving measures and programs including:
 1. Water-efficient fixtures and appliances;
 2. Low water use landscapes, drought-resistant vegetation, removal of phreatophytes, and efficient irrigation;
 3. Water-efficient industrial and commercial water-using processes;
 4. Water reuse systems;
 5. Distribution system leak identification and repair;
 6. Information and education;
 7. Conservation-oriented rate structures and billing systems;
 8. Regulatory measures designed to encourage water conservation;
 9. Incentives to implement water conservation techniques including rebates.
- B. Role of conservation in entity's supply planning.
- C. Plan implementation, monitoring, review, and revision.
- D. Future review of plan within seven years.
- E. Estimated savings from previous conservation efforts as well as estimates from implementation of current plan and new plan.
- F. Best management practices for water demand management, water efficiency, and water conservation that may be implemented through land use planning efforts.
- G. A 60-day minimum public comment period (or other time period based on local ordinance).

8.2 NORTHGLENN WATER EFFICIENCY PLAN COMPLIANCE

Northglenn developed the 2020 WEP in order to comply with C.R.S. Section 37-60-126. Each element of compliance is documented below.

- A. **Consideration of specific water efficiency measures.**
 1. Fixtures and appliances: Northglenn will continue its toilet and clothes washer rebate program, promoting efficient indoor water use through replacement of older,

less efficient fixtures and appliances. The current toilet rebate program will be modified to require more efficient toilets to be qualified for rebate approval. Northglenn will continue an indoor audit through Resource Central's "Slow the Flow" program, which provides simple and economical recommendations for homes to increase their indoor water use efficiency at no cost to the homeowner. The advanced conservation program adds a commercial valve toilet and urinal rebate available to non-residential customers.

2. **Outdoor water efficiency:** Northglenn actively promotes water wise landscaping practices through its participation in Resource Central's "Slow the Flow" and "Garden in a Box" programs. These programs provide outdoor water efficiency opportunities and resources to homeowners at no or discounted costs to customers. The newly introduced rain barrel rebate program and irrigation timer rebate program will support the education of customers through efficient irrigation practices. The advanced conservation program includes a water budget and turf replacement program targeting 30 landscapes per year. The focus of the landscape incentive program is on both residential and non-residential landscapes, including medians, narrow turf strips, commercial properties, schools, and other areas.
3. **Commercial, Industrial, and Institutional (CII) measures:** Northglenn promotes CII water efficiency through its base conservation education efforts and conservation-oriented rate structure. As previously described, the advanced conservation program adds a commercial valve toilet and urinal rebate available to non-residential customers.
4. **Water reuse systems:** Northglenn currently does not have a non-potable reuse program. Treated effluent is stored in the City-owned Bull Reservoir, which discharges to the South Platte River for return flow credit. This is an efficient practice of reusing Northglenn's water supplies for a second use after it is used to meet potable demands. The City is actively investigating opportunities to develop non-potable reuse for irrigation in the areas around the City's WWTP.
5. **Water loss and system leakage reduction:** Northglenn currently estimates water loss based on billing data but is planning to implement a more robust water loss audit program applying AWWA M-36 water loss control audit methodology as part of its advanced conservation program. Northglenn currently repairs identified leaks throughout its system. A more systematic and proactive leak detection program could be implemented to find and repair smaller, less obvious leaks.
6. **Information and public education:** Northglenn has active public education programs including an annual Education Festival in partnership with Westminster and Thornton, irrigation efficiency workshops targeting residential customers, newsletters through bill stuffers, and a demonstration garden. The City's website is updated regularly to provide conservation information and resources for its customers.
7. **Water rate structure:** Customer water accounts are charged monthly based on designated customer classes. Residential and commercial customers pay a monthly fixed service charge and then are charged in a tiered-rate structure based on water use. Water volume rates are charged at an increasing tiered rate, designed to encourage water conservation and prevent excessive use of water. Rate structures differ by customer class.

8. **Regulatory measures:** Northglenn customers are subject to several regulatory measures that encourage water efficiency. The City's Waste of Water ordinance is critical to the City's ability to minimize excessive water use. The Waste of Water ordinance is part of Northglenn's Municipal Code and will be evaluated and revised as needed to clarify definitions and enhance enforcement mechanisms. The City's Municipal Code also includes mandatory water restrictions in the event of a drought or other water shortage or emergency.
 9. **Incentives:** Northglenn offers several incentives to implement water use efficiency techniques including rebates for water efficient appliances, irrigation efficiency evaluations, landscape design assistance, and education programs offered at no cost to customers. As part of the advanced conservation program, Northglenn is expanding a landscape rebate program targeting outdoor water use, as described above.
- B. Role of conservation in Northglenn's supply planning.** The 2020 WEP is designed to provide a comprehensive description of current and recommended water efficiency efforts that will be integrated with the City's water supply planning. The 2020 WEP informs the City's 2020 IWRP, which includes advanced conservation as a future water supply alternative that was evaluated, scored, paired with, and ranked against other water supply and infrastructure solutions to meet the City's modelled future supply-demand gap. Conservation is being treated as a future water solution at the same level of consideration as development of new supplies and additional storage options.
 - C. Plan implementation, monitoring, review, and revision.** Northglenn monitors water use on a regular basis and will continue to do so. Northglenn produces monthly and annual demand reports for each customer class and system-wide, closely tracking demands. Northglenn has provided annual water demand reporting to the CWCB as required under House Bill 10-1051 since 2016 and intends to continue to submit annual reports going forward.
 - D. Future review of plan within seven years.** Northglenn plans to review and update its WEP every seven years, or as needed. During this review, progress towards achieving the stated conservation goal will be evaluated.
 - E. Estimated savings from previous conservation efforts and current plan.** Northglenn's average system-wide water use was approximately 126 gpcd in 2006 (2007 WEP). Northglenn's system-wide water use averaged 104 gpcd from 2014 – 2018. The 2007 WEP reported an average annual treated water production of 5,458 AFY over the period 2000 – 2006. The annual produced water for 2018 was 4,837 AFY. This indicates an annual reduction in produced volume of about 11% since the 2007 WEP, reflecting savings from conservation and efficiency activities. Northglenn has exceeded its water savings goal of 600 AFY as set in the 2007 WEP.
 - F. Water efficiency and conservation that may be implemented through land use planning.** Northglenn will apply the turf transformation and will transition City parks and facilities to use water conserving plants for landscaping to engage multiple City departments and demonstrated stewardship to the community. The City includes both a water Utility and a Planning Department that intermittently communicate and share information. Both departments strive to improve and plan more regular communication to enhance and support both departments and align information and data being relied upon.

Departments will work together to develop communications and data-sharing protocol to ensure each department has necessary relevant and consistent data.

- G. Public comment period. Northglenn City Council was presented the 2020 WEP and 2020 IWRP recommendations and results at the April 13, 2020 Council meeting. Following Council's review and approval at that meeting, a 60-day public review process was held from XX through XX as described herein. XX comments were received during the public review period.

9. REFERENCES & RESOURCES

2007 IWRP. City of Northglenn Integrated Resources Plan. CDM. Dated March 2007.

2007 WEP. City of Northglenn Water Conservation Plan. Hydrosphere Resource Consultants, Inc. Dated July 2007.

2018 Sustainability Plan. City of Northglenn Sustainability Plan. ICLEI – Local Governments for Sustainability and Economic & Planning Systems. September 2018.

2020 IWRP. City of Northglenn 2020 Integrated Water Resources Plan. ELEMENT Water Consulting, Inc. Dated XX 2020.

Applegate Group. Engineering Report Prepared in Support of Case No. 17CW3210 for Change of Water Rights, Plan for Augmentation, and Exchanges/Alternate Points of Diversion. Prepared for the City of Arvada. Dated April 22, 2019.

CWCB 2012. Municipal Water Efficiency Plan Guidance Document. Prepared for Colorado Water Conservation Board by AMEC Environment & Infrastructure. July 2012.

CWCB 2019. Best Practices for Implementing Water Conservation and Demand Management Through Land Use Planning Efforts, Addendum to 2012 Guidance Document. Prepared for Colorado Water Conservation Board by Getches-Wilkinson Center. January 2019.

CWCB 2019. Analysis & Technical Update to the Colorado Water Plan. Colorado Water Conservation Board.

CWW 2010. Guidebook of Best Practices for Municipal Water Conservation in Colorado. Prepared for Colorado WaterWise with support from Colorado Water Conservation Board by Aquacraft Inc. October 2010.

DOLA. Population Data Website. Department of Local Affairs. Accessed online at <https://demography.dola.colorado.gov/population/> on August 10, 2019.

DRCOG. Community Profiles. Denver Regional Council of Governments. Accessed online at <https://drcog.org/services-and-resources/denver-regional-visual-resources/community-profiles> on August 10, 2019.

APPENDIX A

2019 Northglenn Turf Replacement Rebate Program Application Checklist

Rebate Application Checklist

Northglenn provides turf replacement rebates and other resources for your yard to help you reduce your outdoor water use, beautify your outdoor space, and save money on your water bill! Follow these steps to plan for a new and improved water-wise yard by replacing turf grass and apply for a rebate to use as credit towards your water bill.

1. **Review Northglenn's Water-Wise Landscape rebate requirements.** Review the rebate requirements (attached) to be sure that your planned projects will be eligible for a rebate. Still have questions? Email ConserveH2O@northglenn.org or call 303-450-4045.
2. **Take 'before' photos of the area where you plan to replace turf grass and update with water-wise landscaping.**
3. **Develop water-wise landscape design.** Work with a landscape designer or design your own landscape plan that consists of low- or no-water use plans and permeable hardscape (see Program Requirements and Design Submission Template included in this packet for instructions).
4. **Get HOA approval.** Submit your new landscape design for HOA approval (if applicable).
5. **Submit your landscape plan and apply for your rebate.** Download and complete your rebate application, and submit it with all necessary documents to Northglenn City Hall at:
11701 Community Center Drive, Northglenn, CO 80233.
6. **Receive project approval and begin implementing your water-wise plan.** Once you receive approval from Northglenn's water conservation staff you may begin transforming your yard into a beautiful, water-wise landscape.
7. **Send photos of installed garden before adding mulch to plant beds.** Email photos of your newly installed landscape to ConserveH2O@northglenn.org BEFORE mulch is added to any garden beds. You can add mulch once Northglenn staff give you approval.
8. **Schedule a site visit to receive plan approval.** Once your project is complete email ConserveH2O@northglenn.org or call 303-450-4045 to schedule a site visit.
9. **Receive final approval and your rebate.** Once you receive final approval, \$1 per square foot of approved project area will be applied as a credit to your water bill account within two months.



Questions? [Email ConserveH2O@northglenn.org](mailto:ConserveH2O@northglenn.org) or call 303-450-4045.

Northglenn Turf Replacement Rebate Program

Program Requirements

Before your shovel hits the turf, review these rules to make sure your landscape vision will qualify for Northglenn's water-wise landscape rebates.

Qualifying Projects

Qualifying landscape projects must replace between 200 square feet and 1000 square feet of existing and maintained irrigated turf grass with low-, or no-water use plant beds, and a limited portion of permeable hardscape or permeable deck. Only residential properties within the City of Northglenn are eligible for turf replacement rebates.

Mulched Plant Beds

Mulched plant beds must be designed to have no more than 30 percent bare mulch when plants mature. Mulch can include shredded bark, bark chips, or rock. The majority of plans must be ultra-low to low-water perennials, shrubs, or trees. A maximum of 30 percent moderate water demand plants will be accepted. No high water demand plants can be included in the rebate-eligible area.

Visit www.PlantSelect.org for information about approved water-efficient plants.

Low-Water Turf Zones

Low water use turf can replace existing high-water use turf. Artificial turf is not eligible for a rebate. Approved low-water turf types include:

Cool Season Turf:

- Turf Type Tall Fescue
- Fine Fescues (only Sheep, Blue, and Hard fine fescues)
- Texas Hybrid Bluegrass

Warm Season Turf:

- Mix of Buffalograss and Blue Grama
- Dog Tuff™ Grass from *PlantSelect.org*

Permeable hardscapes allow water to pass through to the ground below

Permeable Hardscapes

Installation of hardscapes such as paver paths or flagstone permeable patios are considered. However concrete patios and rock mulches in areas without plants are not considered permeable hardscapes and are not rebate eligible. Permeable hardscapes including pavers, patios, and decks cannot account for more than 50% of the area eligible for a turf removal rebate. Pavers cannot be cement grouted.

Decks

Decks and other outdoor entertainment areas must be constructed in a way that remains permeable and replaces an area of irrigated landscape.

All hardscape requirements of this program are in compliance with Northglenn's Urban Development Ordinance Section 11-7-7. More information: www.tinyurl.com/y67d3sw0



Questions? [Email ConserveH2O@northglenn.org](mailto:ConserveH2O@northglenn.org) or call 303-450-4045.

Northglenn Turf Replacement Rebate Program

Program Requirements

Irrigation Upgrades

In order for your new water-wise landscape to fully reduce your long term water consumption, your existing irrigation system will need to be adjusted or updated to provide the appropriate amount of water to your newly installed features.

Receiving Your Rebate

Rebate applications will be processed in the order they are received and funds will be awarded to rebate applicants while they are available on a first-come, first-served basis. Once your project is complete and you have received final rebate approval \$1 per square foot of approved project will be credited towards your water account.

Project applications must be submitted by August 15 of the year they will be completed to be considered eligible to receive a rebate.

Need help planning your new water-efficient yard?

For more information about how to remove your existing turf, water efficient plants, and many more tips visit www.northglenn.org/rebates.



Questions? [Email ConserveH2O@northglenn.org](mailto:ConserveH2O@northglenn.org) or call 303-450-4045.

Northglenn Turf Replacement Rebate Program

Design Submission Template

Follow this design template to create a landscape design that will provide all the information for a streamlined rebate approval process.

1. **Property Map** Print an aerial view of your property from an online map program.
2. **Proposed Turf Replacement Area** Use tracing paper and ruler or a computer program to create an outline of the proposed turf replacement area.
3. **Measurements** Measure your yard and the proposed turf replacement area and write measurements on tracing paper.
4. **Total Square Footage** Calculate the square footage of the proposed turf replacement area to add to your application.
5. **Irrigation Design** On the tracing paper or in a computer application, add the layout of your current underground irrigation system using a colored pen or pencil. Using another color indicate the layout of how you plan to change the irrigation system to accommodate your new design. If you do not have an irrigation system indicate if you plan to water by hand or install an irrigation system.
6. **Plant Design** On a second piece of tracing paper or in your computer program, draw the outline of your proposed turf replacement area. Draw in plants (at mature size) or use an online design application. Include a list of the names and quantities of each plant species.
7. **Submit Your Plan** Scan your landscape designs and email them to conserveH2O@northglenn.org before submitting your full application or deliver hard copies with the remainder of your application to Northglenn's City Hall at:

City of Northglenn
Attn: Water Resource Department
11701 Community Center Drive
Northglenn, CO 80233

See the next page for design submission examples.



Questions? [Email ConserveH2O@northglenn.org](mailto:ConserveH2O@northglenn.org) or call 303-450-4045.

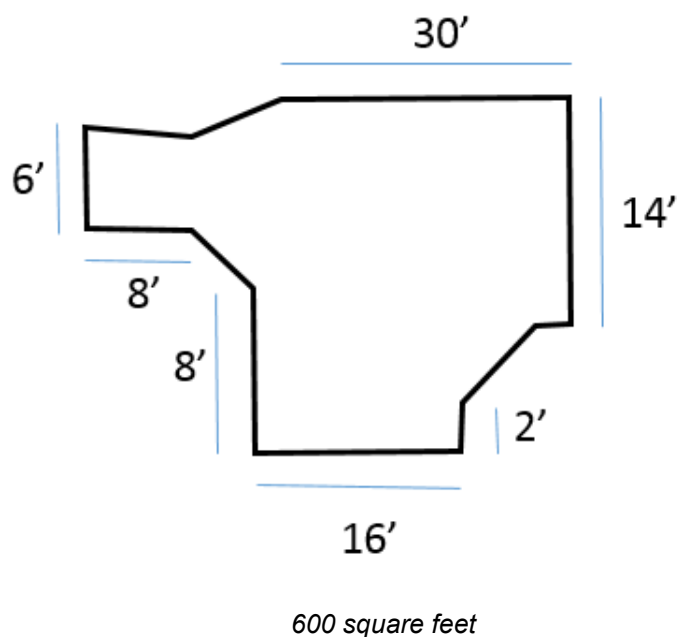
Northglenn Turf Replacement Rebate Program

Sample Design Submission

Steps 1 & 2 Print an aerial view of your property and use tracing paper or a computer application to outline the proposed turf replacement area.



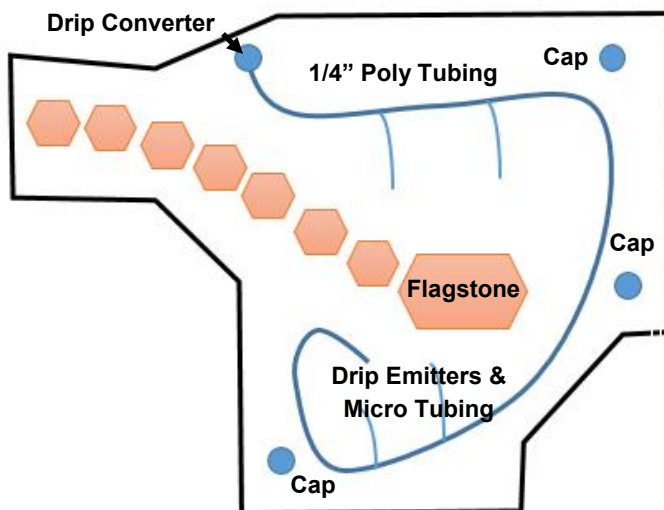
Steps 3 & 4 Measure your yard to describe the perimeter of the turf replacement area. Calculate the square footage.



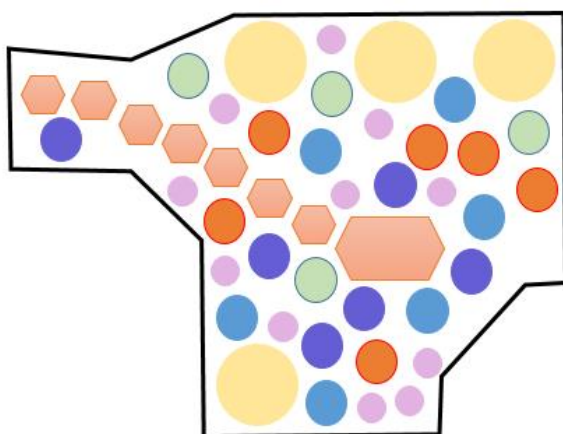
Questions? [Email ConserveH2O@northglenn.org](mailto:ConserveH2O@northglenn.org) or call 303-450-4045.

Northglenn Turf Replacement Rebate Program Sample Design Submission

Step 5 On the tracing paper or in a computer application, add the layout of your current underground irrigation system using a colored pen or pencil. Using another color indicate the layout of how you plan to change the irrigation system to accommodate your new design. If you do not have an irrigation system indicate if you plan to water by hand or install an irrigation system.



Step 6 On a second piece of tracing paper or in your computer program, draw the outline of your proposed turf replacement area. Draw in plants (at mature size) or use an online design application. Include a list of the names and quantities of each plant species.



Plant Key:

- Beacon Silver Nettle (4)
- Biokovo Geranium (11)
- Blue Avena Grass (4)
- Red Choral Bells (6)
- Rocky Mountain Penstemon (6)
- Woolly Creeping Speedwell (6)



Questions? [Email ConserveH2O@northglenn.org](mailto:ConserveH2O@northglenn.org) or call 303-450-4045.

Northglenn Turf Replacement Rebate Program

Residential Rebate Application

Approved turf-replacement projects will receive a \$1 per-square-foot rebate for a 200 to 1,000 square foot area, within two months after receiving Northglenn approval on a completed project. Projects must be submitted by August 15 to be considered for rebates.

Applicant Name: _____

Utility Account Number: _____

Installation Address:

STREET CITY STATE ZIP

Mailing Address (if different than installation address):

STREET CITY STATE ZIP

Email: _____ **Phone Number:** _____

Proposed Project Area (200-1,000 square feet): _____ square feet

I have read the Turf Replacement Rebate program rules attached to this form or available at Northglenn.org/rebates.

Turf Replacement Rebate Checklist & Required Documents

Print a copy of this application for your records and use this checklist as you move through the process.

- Completed Application
- Landscape and Irrigation Designs(s)
- Plant and/or Material List *including the amount of compost or mulch*
- HOA Approval Document - *if applicable*
- Pre-project Photos
- Site Visit for Completed Project Review
- Copy of Legal ID
- Signed Affidavit

For plant beds, after installing plants:

- Pre-mulch Photos

Office Use Only:

Date Application Approved

Pre-mulch Photos

Site Visit Approval Date

Check Request Date

Check Request Amount



Questions? [Email ConserveH2O@northglenn.org](mailto:ConserveH2O@northglenn.org) or call 303-450-4045.

APPENDIX B