



City of Boulder *Water Efficiency Plan*

January 23, 2024



Prepared for:
City of Boulder
Boulder, CO

City of Boulder

2023 Water Efficiency Plan



This Water Efficiency Plan was developed by the City of Boulder's Utilities Department staff, on behalf of the City Manager, with support from Martin and Wood Water Consultants, Inc. The Plan was developed through an engagement process that included outreach to the public, community members and stakeholder groups, and city departments and partners. On September 18, 2023, Boulder's Water Resources Advisory Board recommended that the City Manager approve this Water Efficiency Plan.

This Water Efficiency Plan was approved by the City Manager on December 11, 2023.

By: MPR
Nuria Rivera-Vandermyde, City Manager

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List of Acronyms

AF	acre-foot/feet, equivalent to 325,851 gallons per AF
AF/yr	acre-feet per year
AMI	advanced metering infrastructure
AWC	average winter consumption
BVCP	Boulder Valley Comprehensive Plan
C-BT	Colorado-Big Thompson
CII	commercial/industrial/institutional
C.R.S.	Colorado Revised Statute
CWCB	Colorado Water Conservation Board
EPA	U.S. Environmental Protection Agency
FLAWS	Foundations for Leaders Organizing for Water and Sustainability
FTE	full-time equivalent
gpcd	gallons per capita per day
gped	gallons per employee per day
IWR	irrigation water requirement
MFR	multi-family residential
NOAA	National Oceanographic and Atmospheric Administration
PACE	Partners for a Clean Environment
SFR	single-family residential
UCAR	University Corporation for Atmospheric Research
WCP	Boulder's Water Conservation Program
WEP	Water Efficiency Plan
WRAB	Boulder's Water Resources Advisory Board
WRRF	Water Resource Recovery Facility
WTP	water treatment plant

List of Terms

Water production – Equal to the sum of Boulder’s water treatment plant production meters. Represents the total treated water entering the distribution system, or the total of billed water use and non-revenue water, which are each defined below. This term can be used interchangeably with “systemwide water use”.

Billed water use – Equal to the sum of all metered and billed water.¹ Represents treated water that has been measured at the end use meters (customer meters). Per capita water use rates and indoor/outdoor water use presented in this WEP for specific customer sectors are based on billed water use in those sectors.

Non-revenue water – Calculated as the difference between water production and billed water use. Non-revenue water is also the sum of real and apparent loss and represents system water loss, or water produced but not billed.

Water demand projection – Estimated future water use associated with end uses measured at the end use meters.

Systemwide water demand projection – Estimated future water production, inclusive of both projected water demands and projected non-revenue water.

¹ Boulder’s municipal tap accounts do not pay for their water supplies. However, those accounts are included in the water billing system and are referred to as billed water use in the context of this WEP. At the time of this report, Boulder staff are not aware of any unmetered taps that are billed or metered taps that are not included in its billing system.

Executive Summary

This 2023 Water Efficiency Plan (WEP) builds upon the City of Boulder’s (City or Boulder) current Water Conservation Program (WCP) and replaces Boulder’s most recent WEP published in 2016. Development of this WEP was led by staff from Boulder’s Utilities Department (Utilities) with the goal of evaluating Boulder’s progress and guiding the WCP in a way that supports the City’s water conservation goals and programs, water resources management strategy, community values, and municipal and industrial conservation and efficiency goals identified in the 2023 Colorado Water Plan.²

Background

In 2022, Utilities provided water, stormwater, flood management, and wastewater services to a residential population of approximately 119,425 full-time residents and an employee (daytime) population of approximately 111,199 persons. Boulder’s service area includes approximately 26 square miles of lands within Boulder’s incorporated boundaries (Planning Area I) and Planning Area II as designated by the 2015 Boulder Valley Comprehensive Plan (BVCP). Approximately two-thirds of Boulder’s annual treated water supply originates from the Boulder Creek basin and the remainder comes from Boulder’s ownership of water diverted by the Northern Colorado Water Conservancy District in the Colorado-Big Thompson (C-BT) and Windy Gap Projects at the headwaters of the Colorado River basin. The WEP focuses on Boulder’s treated water production and use.

Historical Water Production, Billed Water Use, and Non-Revenue Water

Boulder’s water production and billed water use records were analyzed to evaluate trends. The 2016 – 2019 period was selected as a baseline period for the WEP because it occurred after the 2012 – 2015 evaluation period used for the 2016 WEP (2016 WEP baseline) and prior to the Global COVID-19 pandemic. In the 2016 – 2019 period, Boulder’s per capita water production averaged 133 gallons per capita per day (gpcd), a reduction of 6% as compared to the average annual water production of 142 gpcd from the 2016 WEP baseline. In 2016 – 2019, approximately 58% of Boulder’s water production was used by single-family residential (SFR) and multi-family residential (MFR) customers, 28% was used by commercial/industrial/institutional (CII) customers, and 4% was used by municipal customers. Boulder’s non-revenue water (calculated as water production minus billed water use) averaged 10% of water production in the 2016 – 2019 period.

Boulder’s Water Conservation Program (WCP)

Boulder’s WCP includes management and monitoring activities that Utilities staff perform internally as well as outreach/education programs that Boulder coordinates with partner organizations such as Resource Central, Partners for a Clean Environment (PACE), and Eco Cycle. Boulder’s highest annual water production (by volume) occurred in 2000 and 2001. Since then, Boulder has experienced a drop in per capita water production from 191 gpcd in 2001 to an average of 133 gpcd for the 2016 – 2019 period. This reduction was attributed to several factors, including increased customer awareness, natural transition to lower water-use fixtures/appliances (“passive savings”), Boulder’s water conservation programs, and residential densification.³

Since 2009, the cumulative total savings from the water efficiency incentive and assistance programs that Boulder has offered to its customers primarily through Resource Central and PACE was estimated to be 150 acre-feet per year of reduced customer water use.

Boulder WCP Goals

Boulder’s WCP aims to keep Boulder’s per capita water uses at or below 2016 – 2019 levels, with per capita water uses expected to drop further due to passive savings. Additionally, Boulder’s WCP aims to reduce

² <https://cwcb.colorado.gov/colorado-water-plan>

³ Residential densification refers to the transition from single family residences with large yards to a greater proportion of multifamily residential options with, typically, smaller irrigated areas per resident, resulting in less outdoor water use per resident.

Boulder’s non-revenue water percentage from around 10% of annual water production to 6% of annual water production by 2040. In addition to these targets, the WCP will also consider the multifaceted issues surrounding water conservation and urban landscaping, racial equity, ongoing engagement with community and stakeholders, coordination with other sustainability initiatives, and maintaining an adaptive-resilient WCP that responds to changing conditions.

Systemwide Water Demand Projection

Boulder’s systemwide water demand projection was updated based on baseline water use, proposed water efficiency targets, and population and employment projections. Achievement of the target per capita water use rates and non-revenue water percentage shown in Table 6.2 of this report would result in a 3.8% reduction in annual water production by 2030 and a 9.0% reduction in annual water production by 2040, as compared to projected water production if no water efficiency improvements are made.

Selection of Water Efficiency Programs

Boulder intends to continue operating its existing suite of water efficiency programs. Additionally, based on the engagement and planning activities conducted during development of the WEP, Boulder selected twelve new or enhanced water efficiency programs to evaluate further. Boulder’s implementation of these programs will depend upon the availability of funding and staffing. When possible and appropriate, Boulder may pursue funding opportunities (e.g. Colorado Water Plan grants) to support program implementation and operation.

The following new or enhanced water efficiency programs have been selected for further evaluation and potential implementation under the WEP:

- Integrate water conservation into other planning efforts
- Investigate non-revenue water and strengthen water loss program
- Evaluate customer water budgets
- Perform feasibility study for Advanced Metering Infrastructure (AMI)
- Assist customers with fixture/appliance upgrades
- Improve water efficiency of municipal irrigation
- Evaluate municipal code for water efficiency improvements
- Enhance water efficiency communication
- Expand demonstration garden program
- Set up landscaper water efficiency training program
- Enhance customer support
- Build water conservation partnerships with existing community groups

Implementation, Monitoring, and WEP Approval

Utilities staff are primarily responsible for implementing and monitoring progress under this WEP. Reporting of progress will be made to Boulder’s Water Resources Advisory Board (WRAB). This WEP was shared for Public Review from September 1, 2023 to November 20, 2023. The WEP was approved by Boulder’s City Manager on December 11, 2023 and by the CWCB on January 23, 2024. Update of this WEP is anticipated to begin in 2030.

1. Introduction

This Water Efficiency Plan (WEP) builds upon the City of Boulder's (City or Boulder) current Water Conservation Program (WCP) and replaces Boulder's most recent WEP published in 2016. Boulder's WCP was founded in 1992, prior to Boulder's first formal water conservation plan. Following Colorado's passing of the Water Conservation Act in 2004,⁴ water providers serving 2,000 acre-feet (AF) of water or more annually are required to have a State approved WEP containing certain required minimum plan elements. Boulder delivered an annual average of 15,736 AF treated water in the 2016 - 2019 period. This WEP is Boulder's third such document since this mandate began. Development of the WEP was led by staff from Utilities Department (Utilities) with the goal of evaluating Boulder's progress and guiding the WCP in a way that is compatible with the City's adopted water conservation goal and programs, water resources management strategy, community values, and municipal and industrial conservation and efficiency goals identified in the 2023 Colorado Water Plan.

Boulder has historically been a leader in water efficiency as an early implementer of universal customer metering in 1964, an increasing tiered water rate structure in 1989, and customer water budget billing in 2007. During the 2023 planning effort, feedback received through public outreach efforts suggested that Boulder community members and city staff recognize the importance of efficient water use and value resource stewardship. Boulder remains at the forefront of evaluating and planning for the potential future impacts of climate change to municipal water supplies and demands and values the role that water efficiency improvements can play in its stewardship of resources in the Boulder Creek and Colorado River basins.

1.1. Background

This WEP was developed in accordance with the Water Conservation Act of 2004 and meets the provisions of Colorado Revised Statute (C.R.S.) section 37-60-126. The WEP was prepared with reference to the Colorado Water Conservation Board's (CWCB) Municipal Water Efficiency Plan Guidance Document (July 2012), as well as its January 2019 Addendum related to land use planning.

As part of this WEP, Utilities staff led a planning and engagement effort, which included the following elements:

- Feedback from Boulder community members, employees, and visitors via 595 responses received to the WEP Questionnaire shared for public input from April 2 to May 1, 2023 on Boulder's Be Heard Boulder online engagement platform.
- Input from community organizations and stakeholder groups, including the University of Colorado program Foundations for Leaders Organizing for Water and Sustainability (FLOWS), Boulder Housing Partners, Boulder's Water Resources Advisory Board, Western Resources Advocates, Boulder Housing and Human Services, Boulder Valley School District, University Corporation for Atmospheric Research (UCAR), Corden Pharma, Mapleton Mobile Home Park, Boulder Community Health, a Boulder HOA representative, and a representative from a local landscaping company.

⁴ Colorado House Bill 04-1365

- Input from the following City of Boulder departments or partners gathered during a preparatory meeting and discussion workshop:
 - Utilities Maintenance
 - Utilities Water Resources
 - Utilities Engineering
 - Utility Billing
 - Planning and Development Services
 - Forestry
 - Information Services
 - Parks and Recreation
 - Transportation and Mobility
 - Climate Initiatives
 - City Attorney's Office
 - Partners for a Clean Environment (PACE)
 - Resource Central

1.2. Purpose of the WEP

The purpose of the WEP is to provide guidance for implementing Boulder's WCP. This includes evaluating Boulder's recent treated water use trends, updating its treated water use projections, and identifying additional water efficiency programs that will address water conservation goals that are both achievable and desired by the community. The WEP and related performance of the WCP will help inform Boulder's water demand projections used in future planning efforts, including any future Utilities capital improvement planning, and sustainable rates and revenue projections.

In the 2016 – 2019 period, Boulder's per capita water production averaged 133 gallons per capita per day (gpcd). This is lower than the State-wide 2050 target municipal water production rate of 143 gpcd as presented in the 2023 Colorado Water Plan's "Adaptive Innovation"⁵ planning scenario in which water efficiency improvements help reduce future water shortages. The Adaptive Innovation planning scenario also incorporates the greatest outdoor demand impacts from future climate change and high population growth, resulting in water shortages under this scenario.⁶ The Colorado Water Plan describes the South Platte River basin challenges as follows: "Improving municipal and industrial water use efficiency will remain a key element of water resources management, but significant future gains will require continued, concerted efforts." The Colorado Water Plan highlights actions that municipalities like Boulder can take to support the plan, which include implementing conservation-oriented rate structures, offering water-wise outreach and education, enhancing municipal water efficiency reporting and data integration, enhancing water loss tracking, integrating water supply planning and land use planning, and identifying turf replacement options. Boulder's WEP aims to direct Boulder's continued implementation of these actions.

The programs proposed in this WEP are designed to make Boulder's water supply system more resilient to stressors that may affect reliability and to bolster Boulder's stewardship in the face of Colorado's significant water challenges. Programs have been selected to provide water conservation opportunities to the broader community as well as to provide targeted support to specific customer groups.

⁵ The "Adaptive Innovation" planning scenario reflects impacts to water use from drivers that demonstrate the potential benefits of increased water conservation measures paired with high population growth and the highest impacts planned for climate change. This planning scenario shows future impacts from advanced conservation being offset with a hotter and drier climate, but still reflects a decrease in State-wide per capita water production rates from 164 gpcd to 143 gpcd.

⁶ Increases in outdoor demands as a result of climate change are not incorporated into the demand projections under this plan, as further described in Section 6.3.

2. Profile of Existing Water Supply System

In 2022, Boulder provided water, stormwater, flood management, and wastewater services to a full-time residential population of approximately 119,425 persons and an employee (daytime) population of approximately 111,199 persons. Boulder’s service area includes approximately 26 square miles of lands within Boulder’s incorporated boundaries (Planning Area I) and Planning Area II as designated by the 2015 Boulder Valley Comprehensive Plan (BVCP).

Approximately two-thirds of Boulder’s annual treated water supply originates from the Boulder Creek basin and the remainder comes from Boulder’s ownership of contract rights in the Colorado-Big Thompson (C-BT) and Windy Gap Projects at the headwaters of the Colorado River basin (Figure 2.1). Boulder’s water is treated at Boulder’s Betasso and Boulder Reservoir water treatment plants (WTPs) and is conveyed to customers through over 450 miles of water distribution mains and pipes. Wastewater is collected and treated at the Boulder Water Resource Recovery Facility (WRRF) on 75th Street. A full description of Boulder’s water supply and distribution system is provided in Boulder’s 2011 Water Utility Master Plan.

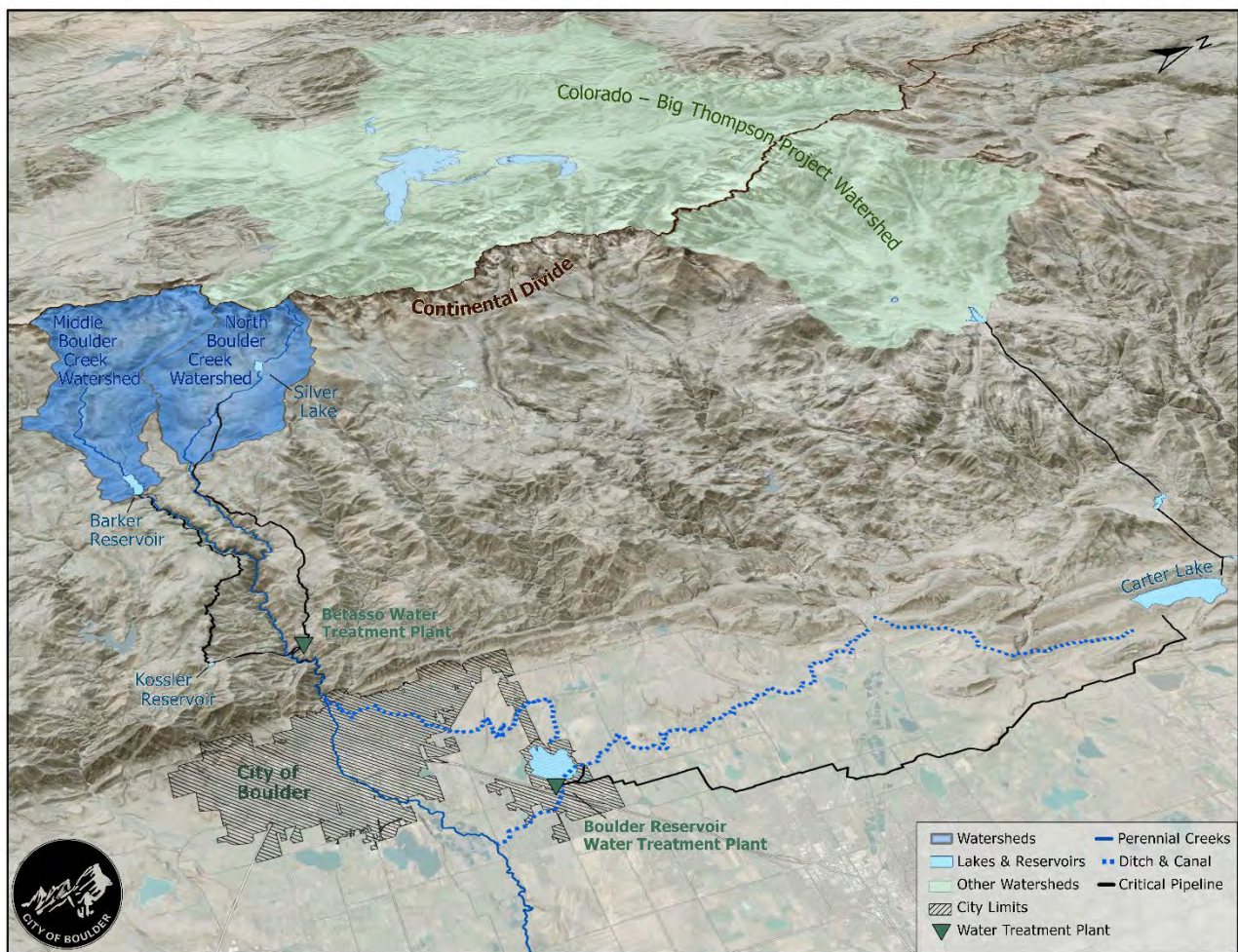


Figure 2.1: Source Area for Boulder’s Water Supply

Certain municipally owned facilities including the Flatirons Golf Course, Valmont Park, Elks Park, Martin Park, and Tom Watson Park use untreated (raw) water supplies from the Boulder Creek basin for irrigation, thus reducing the amount of treated water used for irrigation. Boulder also provides raw water supplies for hydropower and instream flow. Note that the WEP only considers treated water use and was prepared to

evaluate conservation programs affecting Boulder’s treated water system only. Customers who have private water rights (e.g., use of a well or irrigation ditch rights for lawn or landscape watering) are encouraged to follow the City’s water efficiency guidance but are not restricted under this plan for such uses because that water is not provided by the city.

Boulder has considered opportunities for water reuse in the form of residential graywater reuse, CII graywater reuse, or raw water supply projects that enable reuse of water supplies via Water Court decrees. To date, Boulder is still investigating the legal, regulatory, and water quality considerations that would be required for a City-wide graywater program. Boulder’s recent water rights decrees have included terms to allow reuse of those water rights, which will enable reuse of water within Boulder’s water supply system and potentially also future water reuse projects. Water reuse generally increases water consumption and reduces return flows that are otherwise sent to the WRRF, treated, and then discharged to Boulder Creek for others downstream to use. Boulder’s long-term planning efforts consider reuse opportunities as a potential future water supply.

2.1. Water Supply Reliability

The 2019 Technical Update to the Colorado Water Plan identified future water supply gaps⁷ in the South Platte River Basin, as well as potential import gaps for water from the Colorado River basin. Because approximately one-third of Boulder’s water supply originates in the headwaters of the Colorado River basin, Boulder remains vulnerable to supply irregularities from that basin, which may include Colorado River Compact curtailment in the future.

Boulder’s own assessment of its water supply reliability considers criteria developed as part of Boulder’s 1988 Raw Water Master Plan that aims to balance the costs and environmental impacts of increased water system reliability with the consequences of temporary water supply restrictions. These reliability criteria are listed below.

- For water uses deemed essential to the maintenance of public health, safety, and welfare such as indoor domestic, commercial, and industrial uses and firefighting uses, Boulder shall make every effort to ensure reliability of supply against droughts with recurrence intervals of up to 1,000 years.
- For that increment of water use needed to provide continued viability of outdoor lawns and gardens, Boulder shall make every effort to ensure reliability of supply against droughts with recurrence intervals of up to 100 years. (The phrase ‘continued viability of outdoor lawns and gardens’ has been defined as provision, at a minimum, of the amount of water necessary to meet the basic survival needs of outdoor landscaping in general, including trees and shrubs.)
- For that increment of water needed to fully satisfy all municipal water needs, Boulder shall make every effort to ensure reliability of supply against droughts with recurrence intervals of up to 20 years.

Boulder uses these reliability criteria to assess the adequacy of its water supply system and to make water supply planning decisions including water shortage declarations.

Boulder’s strategy for ensuring a reliable water supply includes managing its water demands. The City’s long-term water supply and demand modeling shows that, with planned investments in water conservation and water system infrastructure, Boulder’s water supply system can meet projected build-out demands in a manner that is consistent with the City’s water supply reliability criteria under current climate conditions. However, Boulder’s modeling based on currently available water supplies and potential future impacts due to climate change indicates that under certain future climate scenarios, Boulder’s reliability criteria described above are not met. Boulder also recognizes the potential for future supply gaps from supply disruptions including those that may be caused by Colorado River basin shortages, wildland fires, or infrastructure outages (both planned for

⁷ Volume 1 of the Technical Update defines gaps as being calculated as the “difference between the amount of water available to meet agricultural and municipal and industrial (M&I) diversion demands and the full diversion demand,” reflecting the amount by which demands could be shorted because of inadequate supplies.

operation and maintenance, or failures). Given these factors and the associated need to strengthen the City's water supply reliability, Boulder plans to advance its water efficiency performance and target water acquisition and development of new water supplies, such as establishing downstream storage facilities with a focus on increasing Boulder's reusable water supplies and improving its ability to reuse its existing water supplies.

2.2. Supply-Side Limitations and Future Needs

Boulder is located in the South Platte River basin, which is an area with expected future water supply shortages.⁸ Boulder's long-term planning projections suggest the potential for future water supply shortages within its system under certain future climate conditions. For these reasons, Boulder values the role that water efficiency can play in improving the reliability of its water supply system and stewarding Colorado's water supplies.

While Boulder's water service area is largely built-out, pockets of new development are occurring, and densification development is ongoing. Additionally, Boulder's water distribution infrastructure is aging. The City has committed future resources to repair and replace aging infrastructure as well as to continuously prioritize and target water system improvements, including development of additional water supplies.

⁸ South Platte River Basin Implementation Plan, Volume 1, January 2022, page 47
(https://dnrweblink.state.co.us/cwcbsearch/0/edoc/216719/South_Platte-Metro_BIP_Volume1_2022.pdf)

3. Historical Treated Water Use

To evaluate current water use trends, monthly water production and billed water use data was evaluated for the baseline (2016 – 2019) period of record. This reflects the historical period directly following what was used in support of the 2016 WEP and directly before impacts of the Global COVID-19 Pandemic began. Trends in Boulder’s water production and billed water use for the baseline period of record and prior periods of record are described in more detail in the following sections.

3.1. Background and Data Sources

Several data sources were used to evaluate Boulder’s historical water production and billed water use as described below.

- Water production records (monthly and daily) equal to the sum of Boulder’s water treatment plant (WTP) production meters were used and represent the total treated water entering the distribution system.
- Billed water use was evaluated using monthly utility billing records. Boulder identifies the following customer sectors:
 - Single-family residential (SFR),
 - Multi-family residential (MFR),
 - Commercial/industrial/institutional (CII),
 - Municipal (use by City departments), and
 - Irrigation-only accounts. Note that only Section 3.7 of this WEP evaluates irrigation-only accounts independently. Otherwise, billed water use from irrigation-only accounts has been distributed across the other customer sectors listed above based on the identity of each account’s owner.
- Non-revenue water was calculated as the difference between monthly water production and billed water use.
- Three historical periods were evaluated in this WEP:
 - 1971 – 2022 illustrates long-term trends in Boulder’s water use, which are useful for understanding the historical effects of Boulder’s growth and development, the drought of 2002 – 2006, and Boulder’s historical water conservation efforts.
 - 2000 – 2022 illustrates more recent trends in Boulder’s water use. This period also includes the severe drought year of 2002 and reflects impacts to water use from the mandatory water use restrictions imposed by Boulder.
 - 2016 – 2019 represents Boulder’s current baseline water use. This baseline study period begins the year after the 2016 WEP baseline period and reflects the cumulative effects of Boulder’s WCP to date. This period precedes the Global COVID-19 Pandemic, during which CII water use was potentially depressed by reduced commercial activities and residential water use potentially inflated due to a greater reliance on home spaces for work and daily activities (these effects were observed in Boulder’s 2020 and 2021 water use data). Boulder will continue to track and evaluate water use trends and evaluate whether the water use changes observed during the COVID-19 pandemic are sustained. Boulder will incorporate revised water use numbers into its next WEP.

3.2. Water Production

Water production, which is water measured at the meters of Boulder’s two WTPs, was evaluated on a total annual (acre-feet) and per capita basis based on full-time residential population. Water production is commonly evaluated on a per capita basis to assess water use trends over time.

Figure 3.1 depicts Boulder’s total and per capita water production in the 1971 – 2022 period. A notable feature of this figure is the downward trend in per capita water production since 2002. Some events during this period with the potential to impact water production are labeled in Figure 3.1. Boulder has experienced a drop in per capita water production from 191 gpcd in 2001 to an average of 133 gpcd for the 2016 – 2019 period. This reduction was attributed to several factors, including:

- An increased awareness of water use and water conservation by Boulder customers after water use restrictions were imposed in response to drought conditions beginning in 2002.
- The natural replacement of high water-use fixtures, appliances, and devices with more advanced and lower water-use models.
- Customer participation in Boulder’s water conservation programs.
- Densification of residential properties to more multi-family units.

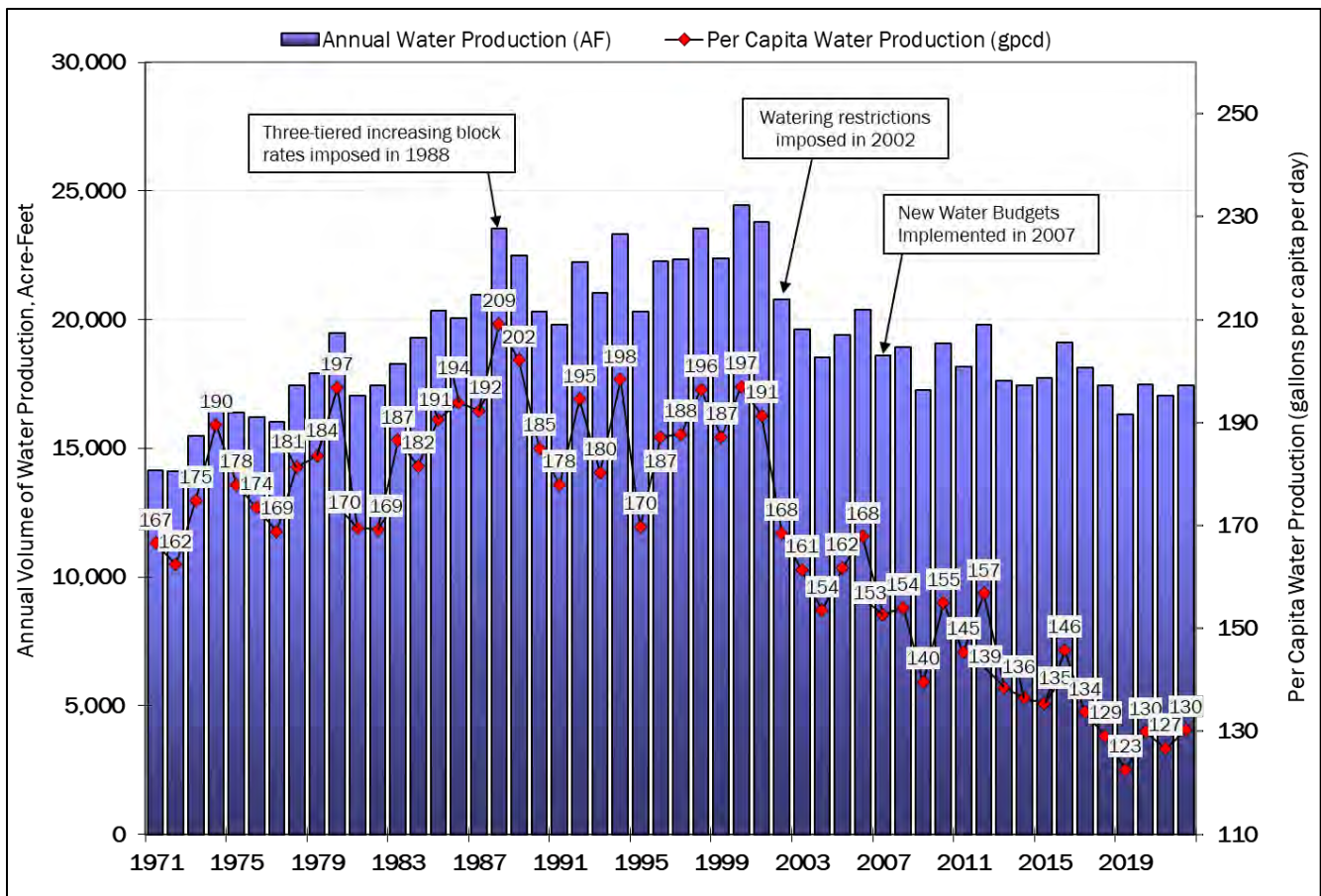


Figure 3.1: Annual and Per Capita Water Production, 1971 – 2022.

Much of the annual variability in Boulder’s water production was due to annual variations in weather conditions, which tend to influence customer irrigation practices. Section 3.5 describes Boulder’s outdoor water use trends.

Per capita water production for the 2016 – 2019 baseline period averaged 133 gpcd, as compared to the average rate of 142 gpcd from the 2016 WEP baseline. Section 3.6 describes per capita water use by customer sector.

3.3. Peak Day Water Production

The maximum combined daily water production from Boulder’s two WTPs each year is referred to as Boulder’s peak day water production. Boulder’s peak day water production for 1971 – 2022 is shown in Figure 3.2. Boulder’s highest historical peak day water production occurred on July 7, 1989 (50.5 MGD), and peak day production has generally declined since that time, with a recent plateau between 30 and 32.5 MGD in the 2018 – 2022 period. Boulder’s current total combined treated water production capacity is 56 MGD, with a long-term capacity goal of 60 MGD (three treatment trains of 20 MGD each). Long-range planning for infrastructure systems projects a future daily water production demand at full BVCP land use of 40 – 47 MGD, depending on climate change and potential land use changes.

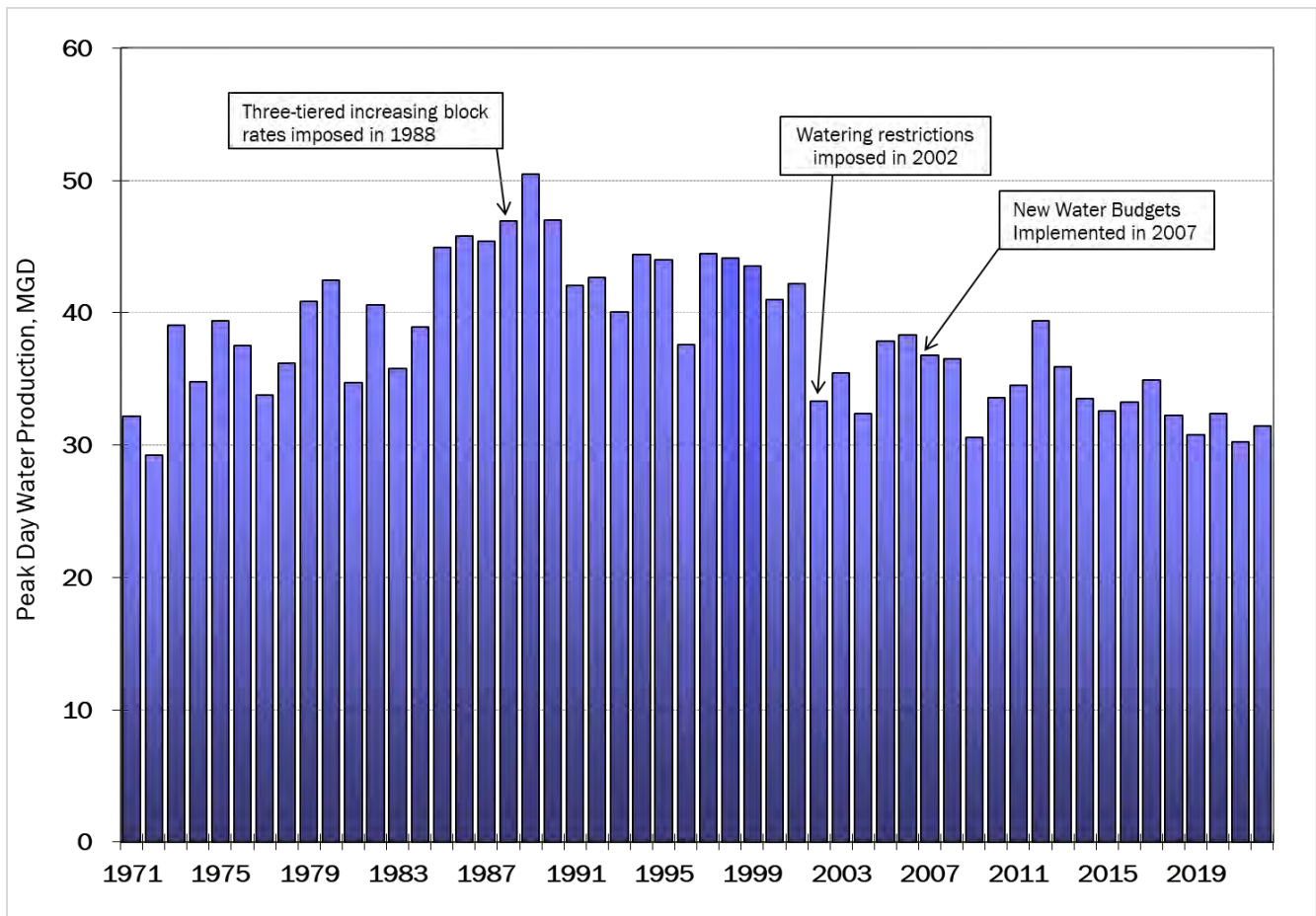


Figure 3.2: Boulder's Peak Day Production, 1971 – 2022.

3.4. Non-Revenue Water

Non-revenue water is defined as the difference between monthly water production and billed water use (typically water measured at customer meters). Boulder’s non-revenue water could consist of real losses (leakage) from Boulder’s distribution system, apparent losses, which could include over-measurement of water at the

production meters or under-measurement of water at customer meters, or end uses which are unbilled (such as unmetered truck fills, hydrant flushes, and distribution main flushes).

Figure 3.3 displays Boulder’s annual water production in the 1971 – 2022 period, subdivided as billed water use and non-revenue water, the latter also shown as a percentage of water production. During the baseline period, non-revenue water averaged 10% of water production.

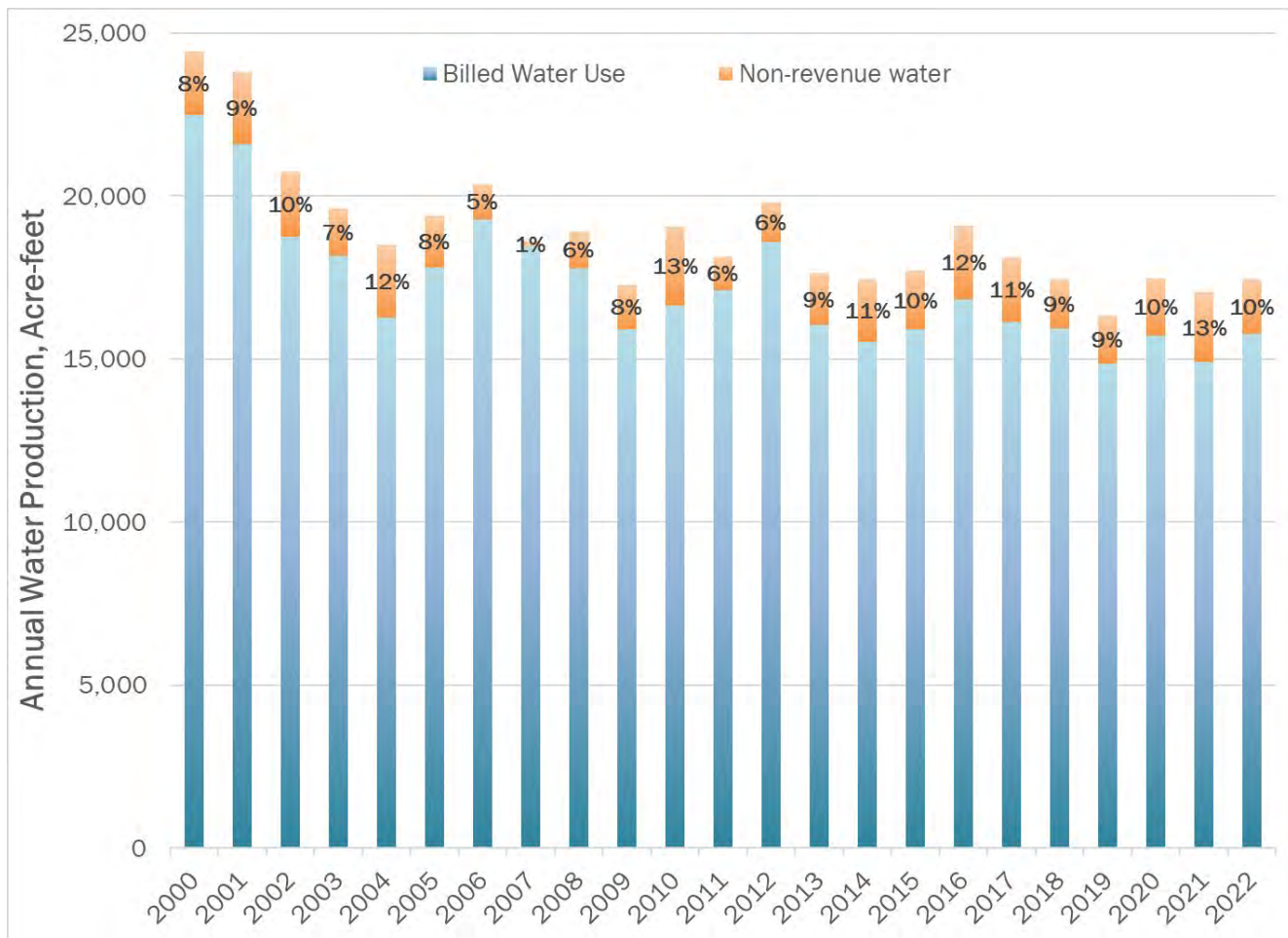


Figure 3.3: Boulder’s Annual Billed Water Use and Non-Revenue Water, 1971 – 2022.

3.5. Indoor and Outdoor Water Use

An average winter consumption (AWC) methodology was applied to calculate indoor and outdoor water uses for each customer sector using billed water use data. For December through February, all billed water use was assumed to be indoor water use; for March through November, indoor water use was calculated to be the minimum of each month's billed water use or the average monthly billed water use for the previous December through February period. Outdoor water use was calculated as the difference between total monthly billed water use and calculated indoor water use, so the sum of indoor water use and outdoor water use is the total billed water use.

Figure 3.4 shows Boulder’s annual indoor water use and outdoor water use. During the baseline period, indoor water use averaged 57% of annual billed water use while outdoor water use averaged 43% of annual billed water use.

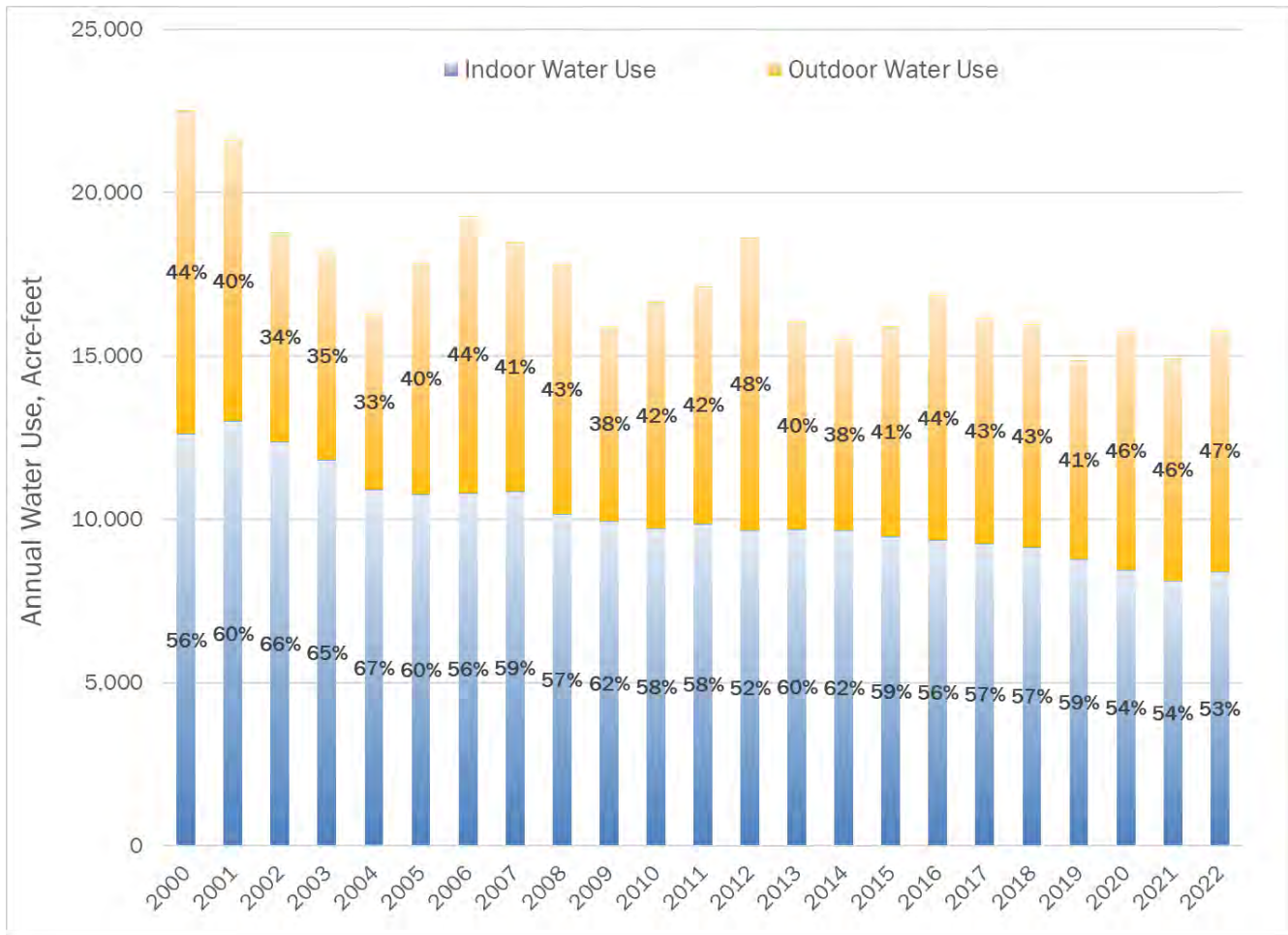


Figure 3.4: Annual Indoor and Outdoor Water Use, 2000 – 2022.

Figure 3.5 shows Boulder’s outdoor water use in the 2000 – 2022 period. The dark orange line indicates the relative annual irrigation water requirement (IWR) as a percentage of the 1950 – 2022 average IWR. IWR is the amount of water needed to supply the net evapotranspiration of a given type of plant after considering precipitation. Historical monthly temperature and precipitation data from the Boulder National Oceanic and Atmospheric Administration (NOAA) weather station were used to calculate the annual IWR for Kentucky Bluegrass, a representative urban turf grass, in the Boulder service area. ⁹IWR is greater in years with relatively warm and dry irrigation seasons, and less in relatively cool and wet years. Therefore, higher percentages indicate warmer and drier years and lower percentages indicate cooler and wetter years.

In Figure 3.5, Boulder’s outdoor water use (yellow bars) was normalized (divided) by relative IWR percentages, resulting in the striped, orange bars showing normalized outdoor water use, which represents the expected outdoor water use in a year with average temperature and average precipitation. Outdoor water use was normalized to reduce the annual variability from weather influences on outdoor water use. As such, normalized outdoor water use generally varies less from year to year than non-normalized outdoor use, and it may better reflect trends in outdoor water efficiency. Per capita outdoor water use and outdoor water demand projections presented in this WEP have been normalized by IWR.

⁹ Kentucky Bluegrass IWR was calculated using the modified Blaney-Criddle method and calibrated monthly crop growth stage coefficients published by Pochop et al (1984), adjusted to account for elevation. Effective precipitation, assumed to be 70% of monthly precipitation, was subtracted from ET to obtain IWR.

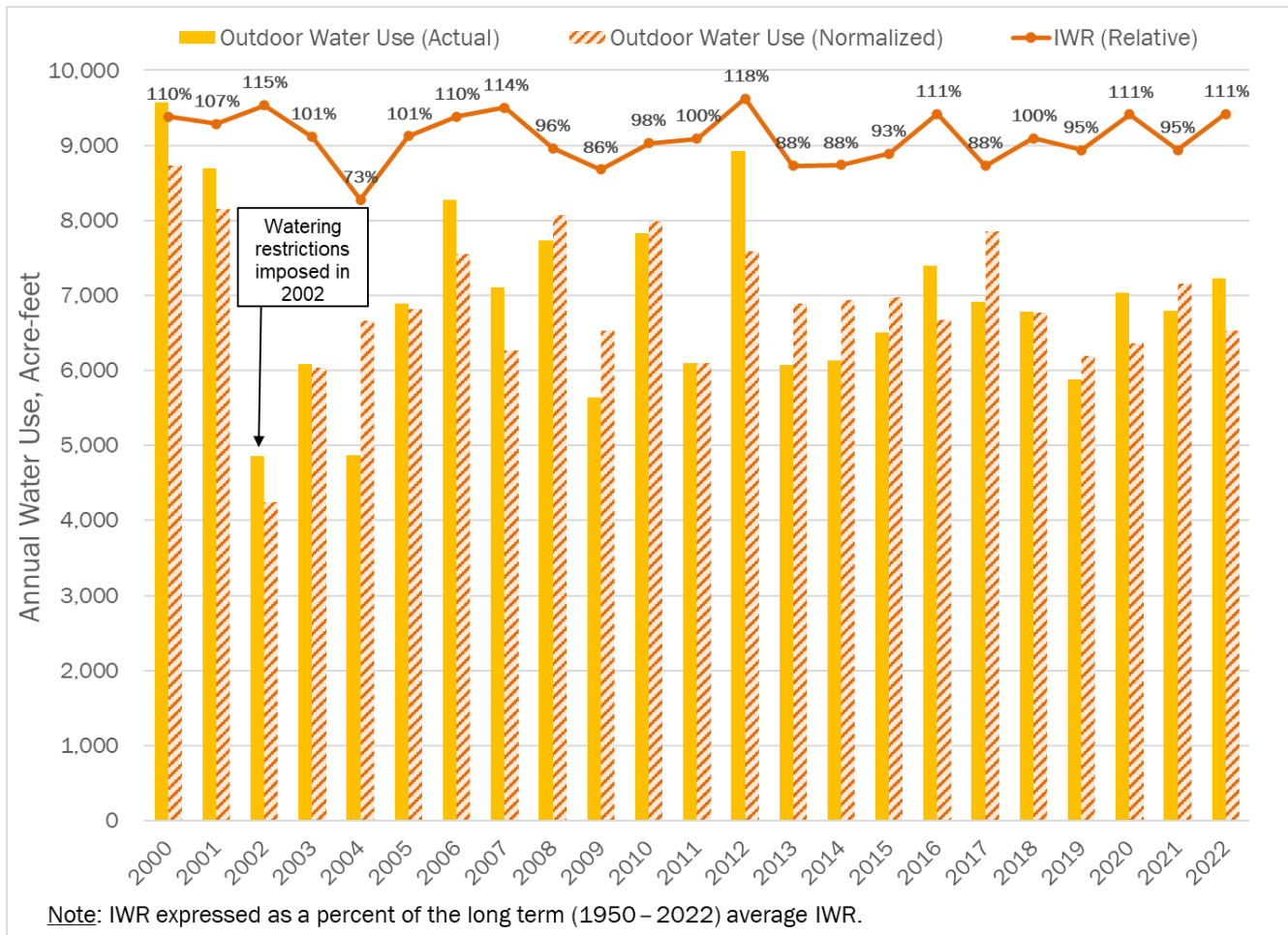


Figure 3.5: Outdoor Water Use, Actual and Normalized, 2000 – 2022.

3.6. Billed Water Use by Customer Sector

Figure 3.6 shows the average annual billed water use by customer sector for the baseline period. SFR was the largest customer sector with an average annual billed water use of 6,433 acre-feet, comprising 40% of total billed water use. CII was the second largest customer sector with an average annual billed water use of 4,896 acre-feet, comprising 31% of total billed water use, followed by MFR and municipal customer sectors, respectively. Overall, all residential use (SFR plus MFR) represents approximately 65% of billed water use.

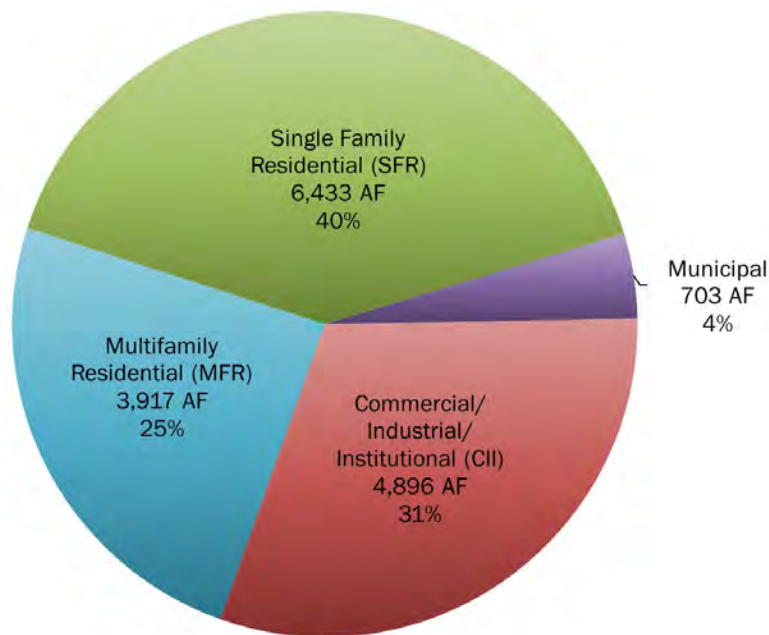


Figure 3.6: Average Annual Billed Water Use by Customer Sector, 2016 – 2019.

As shown in Figure 3.7, annual billed water use in each customer sector has declined since 2000, although relative proportions of billed water use among the customer sectors have remained relatively constant.

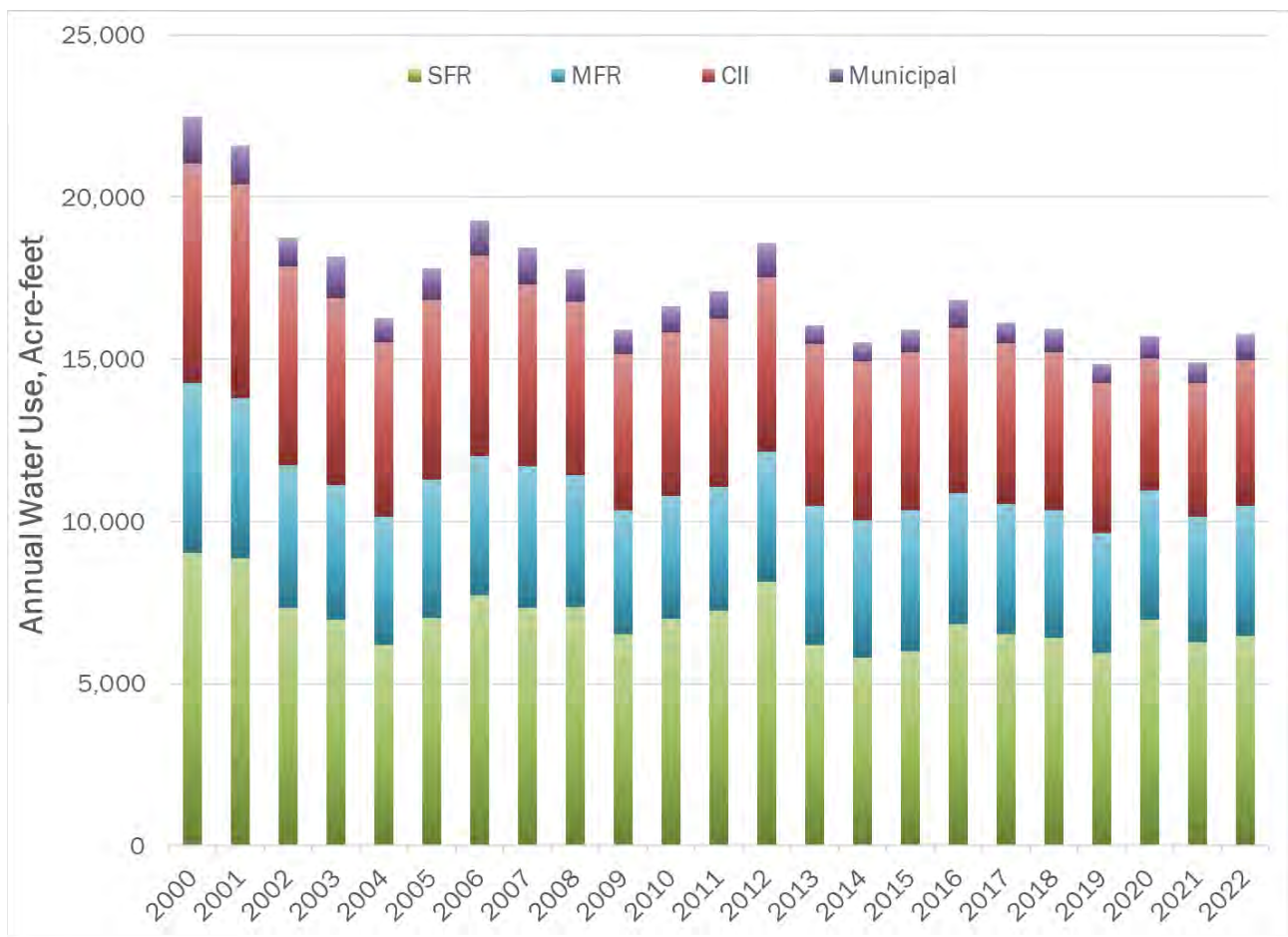


Figure 3.7: Billed Water Use by Customer Sector, 2000 – 2022.

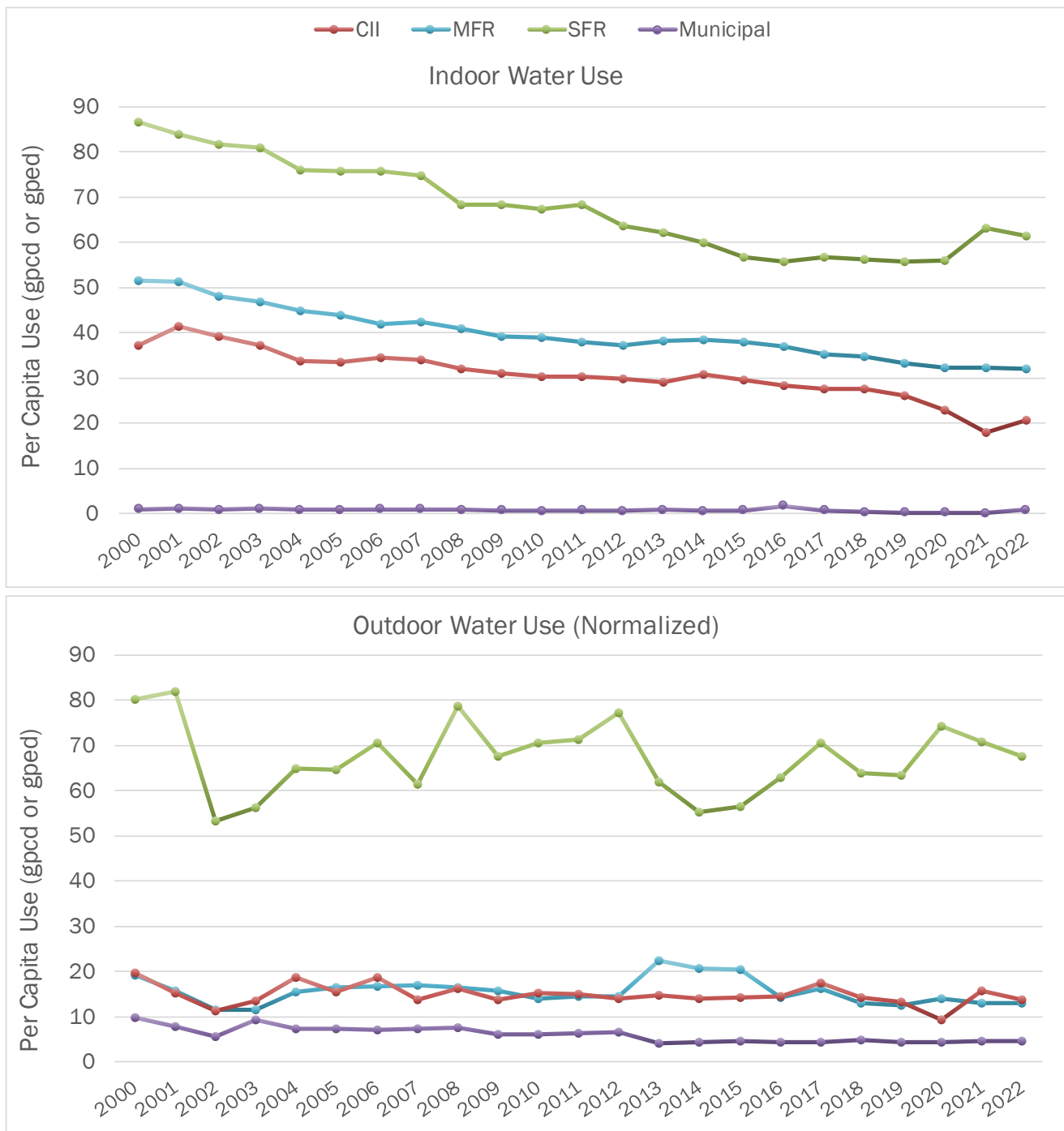
Customer sector-specific per capita water use was designated as indoor or outdoor based on the AWC methodology described above, with outdoor uses by customer sector also being normalized based on calculated IWR. The indoor and outdoor per capita water use for each customer sector¹⁰ was calculated by dividing the billed water use for that sector by the estimated population most representative of that customer sector water use. Customer sector populations were estimated as described below.

- **SFR:** Boulder’s full-time residential population occupying single-family homes was estimated by subtracting from the service area residential population the group quarter population (e.g. residents of CU Boulder dormitories) and multiplying the difference by the annual percentage of households estimated to be single-family (historically, 45%, but estimated as 40% in 2022). SFR per capita uses are reported as gpcd, with the denominator representing only the SFR population.
- **MFR:** Boulder’s full-time residential population occupying multi-family homes was estimated as the difference between service area residential population and the SFR population. MFR per capita uses are reported as gpcd, with the denominator representing only the MFR population.
- **All residential:** Total full-time residential population within Boulder’s service area. All residential per capita uses are reported as gpcd, with the denominator representing Boulder’s total full-time residential population.
- **CII:** Employment population within Boulder’s service area. CII per capita uses are reported as gallons per employee per day (gped).
- **Municipal:** Total full-time residential population within Boulder’s service area. Municipal per capita uses are reported as gpcd, with the denominator representing Boulder’s total full-time residential population.

Per capita uses for individual customer sectors are not directly relatable to the per capita water production presented in Section 3.2 because of the following: 1) different population denominators are used for individual customer sectors; 2) customer sector per capita uses are based upon customer billing records and exclude non-revenue water; and 3) customer sector-specific outdoor water use has been normalized by IWR (Section 3.5) while per capita water production has not.

Figure 3.8 displays customer sector-specific indoor and outdoor per capita water use trends over time. In this figure, residential water use was presented separately for MFR and SFR.

¹⁰ SFR and MFR per capita water uses are presented to depict trends over time but may not be generally accurate due to a discrepancy between how Boulder’s Utility Billing categorizes MFR taps compared to how Planning and Development Services characterizes residences. This discrepancy has typically caused MFR per capita rates to be underestimated and SFR rates to be over-estimated, an issue that was described in more detail in the 2016 WEP.



Notes:

- Non-revenue water is excluded.
- Population denominators used to calculate per-capita uses vary based on customer sector.
- Outdoor water use rates were normalized by irrigation water requirement (IWR).

Figure 3.8: Indoor and Normalized Outdoor Per Capita Water Use, By Customer Sector, 2000 – 2022.

3.7. Customer Water Budget Blocks

Boulder has implemented water budget-based customer water billing since 2007. The classification of customers by water use characteristics incentivizes water conservation with tiered rates for water usage and allows Boulder to identify that some customers may be using water inefficiently. Boulder's customer water budget blocks are:

- **Block 1:** Customer water use is 0-60% of monthly water budget. The customer is billed the lowest water rate for that water use.
- **Block 2:** Customer water use is 60-100% of monthly water budget. The customer is billed for this water use at a slightly higher rate than for its Block 1 water use.
- **Block 3:** Customer water use is 100-150% of monthly water budget. Water use falling into Block 3 is considered to be excessive water use and is billed at a higher rate than Block 1 or Block 2 water use.
- **Block 4:** Customer water use is 150-200% of monthly water budget. Water use falling into Block 4 is considered to be very excessive water use and is billed at a higher rate than Block 1, Block 2, or Block 3 water use.
- **Block 5:** Customer water use is above 200% of monthly water budget. Water use falling into Block 5 is considered to be extremely excessive water use and is billed at a higher rate than Block 1, Block 2, Block 3, or Block 4 water use.

Figure 3.9 displays the percentage of billed water customers that fell within each water budget block in 2022, separated both by month and by sector. As can be seen in the figure, the water use of over 80% of both SFR and MFR customers fell within either Block 1 or Block 2 levels in every month of 2022. Excessive water use (Block 3, Block 4, or Block 5 levels) is most likely to occur in the summer months, likely due to outdoor water use. More customers in the CII, municipal, and irrigation-only categories have water use exceeding recommended levels. While Boulder is aware that some of these exceedances may be due to underestimation of appropriate water budget levels and Boulder plans to re-evaluate some aspects of its customer water budget structure. Nevertheless, this information provides Boulder with a useful indication of which types of customers might be having difficulty achieving their water budgets at which times of the year.

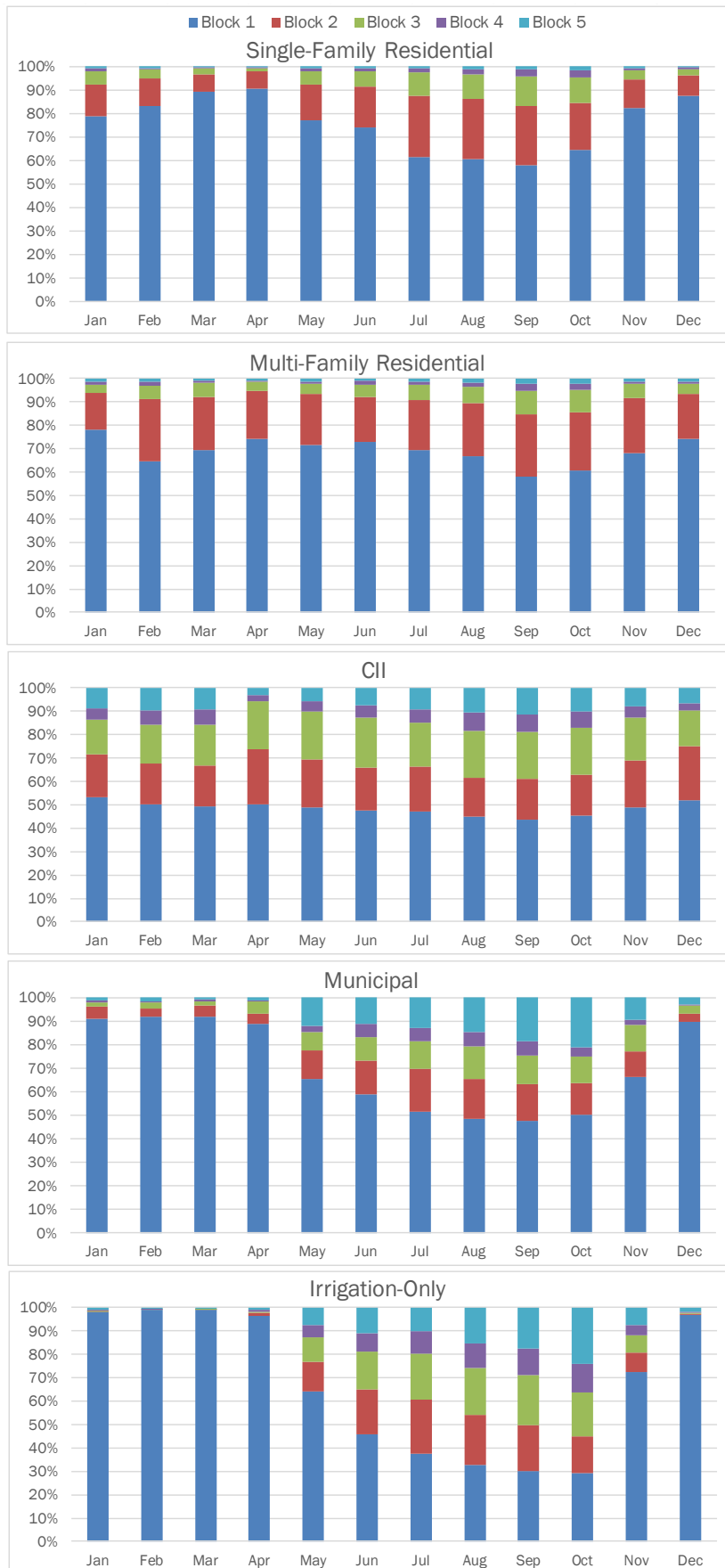


Figure 3.9: Number of Customers by Billing Block, 2022.

4. Current WCP

4.1. WCP Description

All of Boulder’s current water conservation programs are managed through Boulder’s WCP, which was established in 1992 and is managed by staff in Utilities. A comprehensive list of Boulder’s current water conservation programs is shown in Table 4.1. The programs are subdivided into four groups: Foundational, which includes metering, billing, and water loss programs; Technical Assistance and Incentives; Rules and Ordinances; and Education and Outreach. Programs that Boulder provides in coordination with partner organizations are highlighted in Figure 4.1.

Boulder intends to continue existing programs into the 2024 – 2030 implementation period of this WEP. However, both existing and new programs proposed in this WEP will be evaluated on an annual basis for efficacy and program participation to determine if Boulder will continue with or modify the program in the following year.

Table 4.1: Comprehensive List of Boulder’s Current Water Conservation Programs Active in 2022.

Category	Program
Foundational	Meter of all water taps
	Track monthly meter reads and water billing
	Track water use by customer type
	Maintain customer water budgets
	Track system loss with annual AWWA M36 Water Loss Audits
	Maintain and repair distribution system
	Plan for water infrastructure improvements and implement Boulder’s existing Drought Plan, Water Utilities Master Plan, and Source Water Master Plan.
Technical Assistance and Incentives	Maintain membership with EPA WaterSense
	Provide matching funding for City projects that focus on water savings (\$50,000 Annual Fund).
	Work with PACE to offer commercial/institutional water customers commercial water use audits, free faucet aerators and pre-rinse spray valves, and rebates for commercial dishwashers and ice machines.
	Work with Resource Central to offer Garden-In-A-Box Program, Lawn Replacement Program, and Slow-the-Flow outdoor irrigation audits.
Rules and Ordinances	Use of raw water for irrigation – Parks and Recreation
	Boulder Municipal Code 11-1-25.5 – Duty to Avoid Waste of Water and to Maintain Service Lines and Fixtures
	Turf restrictions in Boulder code – minimum width, maximum percent of lot, maximum slope allowed for turf
Education and Outreach	Perform as-built inspections of landscapes associated with a building permit
	Work with Resource Central to offer water customers Waterwise Yard Seminars.
	Communicate water efficiency topics to customers via social media and bill stuffers
	Attend water fairs and support K-12 classroom education on water efficiency, primarily supported by Boulder’s partnership with Eco-Cycle.
	Maintain Boulder’s Water Conservation Website
Maintain xeriscape demonstration gardens	

Water Conservation Program

OUR PARTNERS



CII Analysis
Targeted Outreach (Poor Irrigation Practices)
Water Efficiency Installs
Water Efficiency Advising



Garden in a Box – 265 kits sold in 2022
Lawn Replacement – 24,595 ft² lawn removed
Slow the Flow – 100 sprinkler consultations performed
Waterwise Landscape Seminars – 309 attendees



Elementary school water education seminars



Figure 4.1: Boulder's Water Conservation Partners and Customer Program Offerings Active in 2022.

4.2. Water Savings Attributed to Boulder's WCP

As shown in Figure 3.1, Boulder's per capita water production has decreased significantly since the early 2000's, from 191 gpcd in 2001 to an average of 133 gpcd for the 2016 – 2019 baseline period. While the greatest decrease occurred in the early 2000's, the downward trend has continued following the 2016 WEP. Water use restrictions imposed in response to drought conditions beginning in 2002 and subsequent ongoing programs associated with Boulder's WCP initiated this downward trend, while drought awareness efforts across the Front Range and the natural replacement of high water-use fixtures, appliances, and devices with more advanced and lower water-use models likely helped sustain the trend.

Since 2009, Boulder has worked with Resource Central and PACE to offer the programs shown in Figure 4.1 and more, including water fixture rebates, Slow the Flow water audits, and various landscaping programs. Through their implementation, these programs have resulted in a total annual savings of 150 acre-feet.

Boulder's per capita billed water use rates for the previous two WEP evaluation periods are shown in Table 4.2. Indoor water use rates had a lower or equivalent average for the more recent 2016 – 2019 baseline period as compared to the 2012 – 2015 period used as the 2016 WEP baseline except for municipal indoor water use. Outdoor water use rates were higher in the more recent (2016 – 2019) period for SFR and CII sectors, but lower in the remaining customer sectors.

Table 4.2: Boulder’s Average Annual Per Capita Water Use by Customer Sector (gpcd).

Customer Sector	Water Use Type	2016 WEP 2012-2015 Average	Target from 2016 WEP	Baseline 2016-2019 Average
SFR	Indoor	61	-	56
	Outdoor	62	-	65
	Total	123	126	121
MFR	Indoor	38	-	35
	Outdoor	19	-	14
	Total	58	57	49
All Residential (SFR & MFR)	Indoor	48	-	43
	Outdoor	37	-	35
	Total	85	-	78
CII	Indoor	30	-	27
	Outdoor	14	-	15
	Total	44	44	42
Municipal	Indoor	0.7	-	0.8
	Outdoor	5.0	-	4.5
	Total	5.7	6.2	5.3
Notes:				
<ul style="list-style-type: none"> ▪ Non-revenue water was excluded. ▪ Population denominators used to calculate per capita uses vary based on customer sector, see description in Section 3.6. For the “All Residential” rate, total service area residential population was used. ▪ Outdoor water use rates were normalized by irrigation water requirement (IWR). 				

5. WCP Goals

5.1. Water Efficiency Goals

Through the continued implementation of its WCP, Boulder has developed the following water efficiency goals:

1. Maintain or reduce current baseline (2016 – 2019) per capita water use across all Customer Sectors. This will be supported by achieving anticipated “passive savings” targets (Table 6.2) realized by the natural replacement of older low-efficiency water fixtures and appliances with newer, more water-efficient models compliant with the EPA WaterSense standards.¹¹
2. Reduce non-revenue water percentage from its current average around 10% of annual water production to 6% of annual water production. This goal was originally defined in Boulder’s 2000 Water Conservation Futures Study. Boulder aims to achieve this goal by 2040.

5.2. Planning Considerations

While the primary goal of Boulder’s WCP is to guide Boulder toward its water conservation goals, Boulder staff have identified the following parallel objectives that are beneficial to advance in conjunction with the WCP.

1. **Water Conservation and Urban Landscaping:** Urban landscaping is an important element impacting residents’ quality of life. Trees and vegetation can lower air temperature, an important function during high temperature periods, which are expected to be more frequent in the future. Utilities recognizes that many decisions related to urban landscaping require coordination from multiple City departments and stakeholders, and Utilities will coordinate with these groups on topics of water efficiency, climate readiness, and land use planning.

In balancing water use reduction with maintenance of functional landscapes that serve the community, some water utilities in the Western United States have defined the term “non-functional bluegrass” to refer to bluegrass turf areas which serve no functional purpose such as recreation or cooling. Areas that serve solely aesthetic purposes are not typically considered functional by these definitions. Boulder has not yet defined non-functional turf within its service area, but any such definition would require coordination between multiple departments and stakeholders.

2. **Racial Equity:** In February 2021, Boulder’s City Council adopted a Racial Equity Plan which provides guidance in advancing racial equity within the organization and the broader community. The City defines racial equity as the elimination of racial disproportionalities so that race can no longer be used to predict success, and the ability of all community members, regardless of race, to experience a high quality of life and access to opportunity. Staff from Utilities will continue to evaluate and adapt the WCP using the City’s Racial Equity Instrument.
3. **Ongoing Engagement with Community and Stakeholders:** During the development of the WEP, Boulder prioritized an extensive engagement effort that included a public questionnaire and meetings with community groups and with a variety of water users. Boulder incorporated the feedback received from the engagement process into this WEP. Boulder intends to continue engaging with community groups and water users with the goal of enhancing the City’s outreach to underserved communities, continuing to gain feedback on water efficiency programs, aiding information exchange among MFR and CII water users engaged in their own water efficiency efforts, and developing educational material, programs, and projects

¹¹ Note that even with this achievement of per capita water use targets, Boulder’s total water demand volume is expected to increase over time as residential and employee populations increase.

that meet the needs of sector specific water uses (e.g., differences among SFR, MFR, and specific categories of CII users).

4. **Coordination with Other Sustainability Initiatives:** The WCP is not the only effort within Boulder to increase water efficiency. Several MFR and CII water users in Boulder have their own sustainability and water efficiency programs, and Boulder seeks to support the work of those programs. Other City departments, particularly Transportation and Mobility and Parks and Recreation, have programs to improve irrigation efficiency. To the extent that Boulder's water efficiency targets intersect with other City initiatives, water efficiency programs will be developed in coordination with the leaders of those initiatives.
5. **Adaptive-Resilient WCP:** Utilities staff will monitor the effectiveness of Boulder's WCP and respond to emerging issues, through the process detailed in the implementation and monitoring plan presented in Section 8.0.

6. Water Demand Projections

Boulder’s systemwide water demand projections were estimated through 2040 using new population and employment demographic projections developed by Boulder’s Planning and Development Services paired with projected per capita water demands and non-revenue water percentage targets, as further described below. Projection milestones used in this WEP are described below.

- **2023:** First year of projection, with per capita water rates defined by baseline water use (2016 – 2019).
- **2030:** End of implementation period for this WEP.
- **2040:** End of WEP projection period. Target water efficiency levels are assumed to be reached.

Although the WEP is a near-term planning document focusing on the 2024 – 2030 plan implementation period, water demand projections through 2040 were considered useful to evaluate the full impacts of anticipated per capita water efficiency improvements, which helps Boulder to inform its longer-term planning efforts including water supply planning.¹²

6.1. Demographic Projections

The City of Boulder updates its official population projections every 10 years as part of every major update to the BVCP. The most recent BVCP population projection was prepared in 2015, with a population projection of 136,100 and employment projection of 120,500 for Boulder’s Service Area. In October 2022, Boulder’s City Council approved the East Boulder Subcommunity Plan which included 5,000 dwelling units and 3,000 jobs. These additional numbers were used to support the preparation of this WEP. This interim update represents the best information that Boulder currently has on future population levels and is not considered to be an official update to the population projection. The City’s next official population projection update will be completed during the 2025 BVCP update, which may reflect changes in planning policies or assumptions, and that information will be used to inform future water demand planning efforts. Table 6.1 presents both current 2022 populations and the interim population projection for Boulder’s service area in 2040.

Table 6.1: Boulder’s Service Area Population, 2022 Actual and 2040 Projected.

Population Group	2022 (Actual)	2040 (Projection)
Residential Population	119,425	147,400
Employment Population	111,199	123,500

6.2. Per Capita Water Use and Non-Revenue Water Projections

As discussed in Section 3.6, Boulder’s per capita billed water uses were calculated by customer sector and include normalization of outdoor water use based on IWR. The 2016 – 2019 period was used to represent baseline water use for this WEP. As discussed in Section 5.1, Boulder aims to ensure, at a minimum, that per capita water uses do not increase above the baseline levels shown in the first row of Table 6.2.

Further, as shown in the second row of Table 6.2 , Boulder anticipates that indoor water efficiency will improve beyond the current baseline levels due to “passive savings” realized by the natural replacement of older low-efficiency water fixtures and appliances with newer, more water-efficient models compliant with EPA WaterSense standards. Boulder expects all residential (both SFR and MFR) per capita indoor water use to decrease to 38.9 gpcd by 2040 (from the baseline of 43.5 gpcd) from passive savings, based upon studies of residential end uses of water and a comparison of EPA WaterSense standards versus water use of slightly older

¹² City of Boulder water supply planning horizon includes population and employment buildout through 2078. This projection is beyond the scope of the WEP.

fixtures and appliances. This would represent approximately 10% passive savings in residential indoor water use. Similarly, Boulder assumes that 10% passive savings would be realized in the municipal indoor category over the same period. In the CII indoor category, Boulder assumes 5% passive savings due to the greater variability of CII sector uses. No passive savings are assumed for outdoor water uses. While Boulder categorizes these indoor water efficiency improvements as passive savings, Boulder also values the role that its water efficiency programs can play in helping the City’s customers achieve the target per capita water uses.

In addition to the passive savings described above, Boulder aims to reduce its non-revenue water to 6% of annual water production by 2040. This reduction can occur through distribution system maintenance and improvements that are ongoing, as well as by the programs described in this WEP. The target of 6% for non-revenue water was first established by Boulder in its 2000 Water Conservation Futures Study.

Table 6.2: Per Capita Water Use and Non-Revenue Water as Percent of Water Production.

Period	All Residential Indoor (gpcd)	All Residential Outdoor (gpcd)	CII Indoor (gpcd)	CII Outdoor (gpcd)	Municipal Indoor (gpcd)	Municipal Outdoor (gpcd)	Non-Revenue Water (%)
Baseline (2016-2019 Average)	43.5	34.5	27.4	14.9	0.8	4.5	10.1%
Passive Savings Only by 2040	38.9	34.5	26.1	14.9	0.72	4.5	10.1%
Target: Passive Savings + Non-Revenue Water Reduction by 2040	38.9	34.5	26.1	14.9	0.72	4.5	6.0%

6.3. Climate Change

The City of Boulder is committed to building a more resilient community and a better future for everyone in Boulder. As such, Boulder is looking at climate change mitigation and adaptation across city-wide initiatives to plan collaboratively and comprehensively (e.g., Climate Initiatives, Land Use, Tree Canopy, and Water Conservation). As part of its water supply planning efforts, Boulder incorporates and evaluates the significant influence of climate change on its current and future water supplies and demands.¹³ A more arid climate future or climate-induced temperature and precipitation extremes is expected to decrease the availability of water supplies and potentially increase outdoor water demands in response to the hotter and drier conditions. Reduced supply availability paired with an increase in future demands both through growth and potentially higher per capita outdoor water demands puts Boulder at risk for not providing a sufficient or reliable water supply to meet customer needs. While the demand projections presented in this WEP do not reflect potential influence from climate change, it is acknowledged that reducing per capita demands through conservation programs will help mitigate some of this potential future supply and demand gap.

To begin mitigating the effects of a changing climate on Boulder’s water supply, this WEP introduces specific programing, including the promotion of waterwise landscaping practices, and the provision of resources to support the efficient use of water. Furthermore, Boulder will continue to track and evaluate the impacts on water supply and water demands of climate change which will play a pivotal role in shaping future iterations of the WEP, strategies for water conservation goals, collaboration with city-wide climate initiatives, enhancements to the WCP, and future water supply planning.

¹³ City of Boulder, Water Resources Advisory Board, August 19, 2019 Meeting, Updated Boulder Climate Change Water Supply Assessment (Attachment C).

6.4. Systemwide Water Demand Projections

Boulder’s systemwide water demand is projected to increase in the future due to anticipated population and employment growth. Table 6.3 shows Boulder’s systemwide water demand projection based on updated baseline water use and population and employment projections. The systemwide water demand projections reflect average-year weather conditions (as opposed to dry-year or wet-year conditions) and therefore do not account for inter-annual variability.

Table 6.3 summarizes Boulder’s water demand projections in 2030 and in 2040. The Baseline Demand scenario reflects current baseline per capita and per employee demands multiplied by the projected populations. In 2030, Boulder’s systemwide water demand projection is 19,839 acre-feet per year (AF/yr) under baseline demand conditions. Relative to this level, passive savings are anticipated to reduce Boulder’s systemwide water demand projections by 395 AF/yr in 2030. The combination of passive savings and non-revenue water reduction to 6% would reduce Boulder’s systemwide water demand projections by 754 AF/yr (3.8% reduction) in 2030 relative to projected baseline. By 2040, passive savings are projected to reduce Boulder’s systemwide water demand projections by 1,062 AF/yr and passive savings plus the target non-revenue water reduction are projected to reduce Boulder’s systemwide water demand projections by 1,967 AF/yr (9.0% reduction). If updated climate modeling indicates that climate changes may occur within this planning period, these systemwide water demand projections would change to reflect anticipated impacts to water demands.

Table 6.3: Systemwide Water Demand Projection (Change from Baseline Demand) (AF/yr).

Scenario	2030	2040
Baseline Demand	19,839 (+0)	22,313 (+0)
Passive Savings	19,590 (-395)	21,235 (-1,062)
Target: Passive Savings + Non-Revenue Water Reduction	19,361 (-754)	20,309 (-1,967)

7. Selection of Water Efficiency Programs

Boulder evaluated a wide range of both existing and potential new water efficiency programs, including those recommended by the CWCB and those required for review by statute (Appendix A). Boulder also engaged a wide variety of City staff and community members through the engagement activities summarized below.

- **January – June 2023:** Ongoing planning meetings linking water supply planners, land use and infrastructure planners, municipal facilities and water billing staff, communications staff, and Boulder’s community members
- **March 17, 2023:** Water Efficiency Planning Kick-Off Meeting for City staff, 20 attendees
- **April 2 – May 1, 2023:** Public Water Efficiency Questionnaire (Bilingual), 595 responses
 - A summary of public questionnaire responses is provided in Appendix B
- **April 17, 2023:** Water Efficiency Planning Workshop for City staff, 24 attendees
- **May 8 – May 10, 2023:** City of Boulder Staff participated in the Growing Water Smart Workshop to strategize connections among water supply planning, water efficiency, and long-range land use planning
- **May 17, 2023:** Meeting with FLOWS, community group leading work in water efficiency and environmental and social justice
- **June 20, 2023:** Water Efficiency Workshop with selected community members representing a range of MFR and CII entities

Boulder used input received at the events above to select water efficiency programs to pursue or continue during the 2024 – 2030 implementation period. A summary of engagement findings and how those were incorporated into this plan is provided in Appendix C.

7.1. Staffing and Program Implementation

Boulder’s implementation of the new programs listed in this section will depend upon the availability of funding and staffing. Many of the new programs proposed in this WEP cannot be achieved without additional funding and/or staffing dedication to the WCP. When possible and appropriate, Boulder will seek grant funding for program implementation.

Boulder currently has 0.75 full-time equivalents (FTE) dedicated to staffing the WCP. The programs proposed in this plan can be fully implemented with an additional staffing dedication of 1.0 FTE, for a total dedication of 1.75 FTE to the WCP.

The sections below describe proposed new, or enhanced, water efficiency programs that have been selected for further evaluation and potential implementation under the WEP.

7.2. Foundational Water Efficiency Programs

Foundational water efficiency programs are under the city’s direct control and include metering, water billing, and monitoring of water use and loss. Boulder was an early adopter of customer water metering, and the City’s water billing structures have incentivized water efficiency since the 1960’s. Boulder also operates a robust distribution system maintenance and replacement program, and staff monitor non-revenue water trends.

Provided adequate funding and staffing levels are obtained, Boulder will advance the foundational programs listed below.

1. **Integrate Water Conservation into Other Planning Efforts:** Embed water conservation planning into larger resilience, land use, climate, and energy planning. Utilities staff will continue to collaborate with Climate Initiatives, Planning, Transportation and Mobility, Parks and Recreation, and other departments to collectively progress City-wide policies in a manner that encourages water efficiency and water conservation.
2. **Investigate Non-Revenue Water and Strengthen Water Loss Program:** Boulder will complete an internal assessment of water use and treated water production data relied upon to prepare the annual AWWA M36 water loss audit. Boulder will develop recommendations for improving data quality and identifying potential water loss programs to reduce non-revenue water. Recommendations may include improved quantification of unmetered end uses, distribution meter and customer meter testing, and/or installing intermediate distribution meters to isolate the measured total water distribution in each pressure zone. The selection and implementation of new water loss programs may require additional funding and/or staffing, which will be further investigated based on the resulting recommendations.
3. **Evaluate Customer Water Budgets:** Evaluate customer water budgets and identify potential opportunities to improve customer rate structures to better support the efficient use of water through budgets and communication.
4. **Perform Feasibility Study for Advanced Metering Infrastructure (AMI):** Boulder will consider a feasibility study for AMI implementation across all City water customers. Based on benefits identified, staff would evaluate how the city could implement a Pilot Project on some customer meters including number and selection of customers to be included in Pilot Project, external funding opportunities to support a Pilot Project, and recommendations for implementation of a Pilot Project. Additional funding and/or staffing will be required for implementation of this program.

7.3. Technical Improvements and Incentives

Technical improvements and incentives programs aim to increase customer water efficiency by providing better equipment, fixtures, appliances, and/or technical support. As described previously, Boulder maintains contracts for technical assistance and incentive programs with two local organizations specializing in water efficiency: Resource Central and PACE. Boulder strives to provide technical assistance and incentives to customers from all backgrounds in an equitable manner. Boulder intends to increase the technical assistance and incentives programs it offers by 2030. Boulder will evaluate the potential new programs listed below.

5. **Assist Customers With Fixture/Appliance Upgrades:** Staff will evaluate a program for income-qualified residential customers for replacing older low-efficiency fixtures and appliances with new high-efficiency fixtures and appliances using vouchers or other mechanisms other than reimbursement (for example, a direct install of appliances). Qualifying fixtures and appliances may include toilets, dishwashers, rain sensors, outdoor irrigation equipment, and smart irrigation controllers. The City will investigate opportunities to also assist qualified customers with costs associated with the removal of old appliances and installation of new appliances. Additional funding and/or staffing will be required for implementation of this program. Staff will investigate potential external funding opportunities to support refinement and implementation of this program.
6. **Improve Water Efficiency of Municipal Irrigation:** Utilities staff will work with the Parks and Recreation and Transportation and Mobility departments to support outdoor water efficiency within City projects. This may include removing/replacing non-functional turf, upgrading irrigation equipment, and/or refining irrigation practices. Additional funding and/or staffing will be required for implementation of this program.

7.4. Water Efficiency Rules and Ordinances

Rules and ordinances can be cost-effective ways for municipalities to increase customer water efficiency. Historically, Boulder has emphasized incentives-based and voluntary programs to increase customer water efficiency. However, looking forward, and in response to community feedback, Boulder would like to evaluate the efficacy of new regulations.

7. **Evaluate Municipal Code for Water Efficiency Improvements:** Boulder staff will evaluate its current Municipal Code, rules, regulations, and ordinances to identify sections that could be modified to better integrate and support efficient water use. Staff will work with other stakeholders and departments to develop recommended updates for consideration. Ordinances and regulations prepared by other local water providers may be reviewed for applicability within Boulder and can serve as examples for consideration. Staff will generate an internal report on recommendations. Additional funding and/or staffing will be required for full implementation of this program. Possible programs for Boulder to evaluate include:
 - Retrofit water efficient appliances on resale of properties;
 - Time-of-day/day of week water requirements;
 - Additional efficiency requirements for new and re-development;
 - Vegetation height code that allows for native grasses;
 - Viability of outdoor water savings from redevelopment/new development; and
 - Viability of graywater programs.

7.5. Education and Outreach Efficiency Programs

Education and outreach programs convey water efficiency information to the community. Boulder's communication of water efficiency topics to customers have included bill stuffers, communication at water fairs and via K-12 education outreach, communication via social media and Boulder's website, customer water use workshops, and xeriscape demonstration gardens.

Boulder will evaluate the potential new planning or communication programs listed below.

8. **Enhance Water Efficiency Communication:** Continue to improve outreach to the community on water efficiency topics and water efficiency programs, including developing more educational material and resources. Staff will evaluate messaging strategies and will maintain consistency in its messaging materials. An annual outreach schedule will be developed to provide relevant seasonal information and resources to customers throughout the year.
9. **Expand Demonstration Garden Program:** Evaluate potential improvements or additions to Boulder's waterwise demonstration garden program, including inter-departmental coordination on climate-ready landscapes, native grass landscapes, low-maintenance landscapes, and developing educational materials for customers based on Boulder's waterwise demonstration garden program. Additional funding and/or staffing will be required for implementation of this program.
10. **Develop or Adopt Landscaper Water Efficiency Training Program:** Boulder will evaluate the implementation of a voluntary or incentivized landscaper training program. This will be done through the lens of racial equity. A mandatory certification requirement is not recommended at this time but may be considered in the future. Boulder will evaluate opportunities to partner with neighboring water providers using a regional approach. Additional funding and/or staffing will be required for implementation of this program.

- 11. Enhance Customer Support:** Boulder will evaluate opportunities to support customers (homeowners associations, CII customers, etc.) with technical assistance in applying for and managing grants that would support projects that advance or support efficient water use. This may lead to technical and/or financial assistance on turf removal. Boulder will improve general communication, water use data, and customer leak notifications so that they are sent to the responsible parties that can take immediate action. Boulder will consider hosting targeted water conservation workshops for specific groups of MFR and CII water customers to facilitate discussion of water conservation measures, needs, and support. Additional funding and/or staffing will be required for implementation of this program.
- 12. Build Water Conservation Partnerships with Existing Community Groups:** Develop and implement a process to work with and build water conservation partnerships with community groups to build racial and economic equity by 1) identifying water conservation needs and opportunities in specific communities and 2) supporting efforts to implement their priority water conservation outreach and projects. This work will be informed by Boulder’s Racial Equity Instrument.

8. Implementation Plan and Monitoring Plan

Boulder intends to further evaluate implementation of the programs proposed in Section 6 of the WEP starting in 2024. This section describes the plan for implementation of water efficiency programs (Section 8.1) and the plan for monitoring individual program results and water use trends (Section 8.2).

8.1. Implementation Plan

This WEP was developed through a process of data review, community and City staff engagement, internal planning and discussion, and review of the draft WEP by City staff, City leadership, and the public.

Boulder Utilities staff are primarily responsible for implementing this WEP. All of Boulder’s existing water efficiency programs will be continued and twelve new or enhanced water efficiency programs (Table 8.1) will be evaluated and considered for implementation as part of this WEP. Boulder’s implementation of the new programs may depend upon the availability of funding and staffing, but a tentative implementation schedule is indicated for all programs, assuming that all required funding and staffing is secured.

Table 8.1: Implementation Schedule for Proposed Water Efficiency Programs.

Program No.	Program Description	Implementation Schedule						
		2024	2025	2026	2027	2028	2029	2030
1	Integrate water conservation into other planning efforts							
2	Investigate non-revenue water and strengthen water loss program							
3	Evaluate customer water budgets							
4	Perform feasibility study for Advanced Metering Infrastructure (AMI)							
5	Assist customers with fixture/appliance upgrades							
6	Improve water efficiency of municipal irrigation							
7	Evaluate municipal code for water efficiency improvements							
8	Enhance water efficiency communication							
9	Expand demonstration garden program							
10	Develop or adopt landscaper water efficiency training program							
11	Enhance customer support							
12	Build water conservation partnerships with existing community groups							

Implementation of the WEP is expected to achieve water savings, which in turn would reduce Boulder’s volumetric billing-based revenue. However, Boulder is an established, financially stable water utility with reserves that are anticipated to adequately respond to loss in revenue associated with the potential water savings proposed in this WEP. In part due to water conservation efforts already accomplished in Boulder, the City has increased the fixed-fee portion of the water bill (service charge) to help stabilize revenue and account for baseline operation and maintenance costs that do not fluctuate with production. Further, some operation and maintenance costs can be avoided with lower per capita water use, and these avoided costs could help offset some anticipated revenue losses. Actual water use reductions realized from the WCP and associated programs will be evaluated as part of Boulder’s next water rate study likely to be completed in the upcoming years.

8.2. Monitoring Plan

Utilities staff will be responsible for monitoring the effectiveness of the programs proposed in this WEP as well as monitoring Boulder's per capita water use trends.

On an annual basis, Utilities staff will perform the following monitoring efforts:

- Prepare the annual AWWA M36 Water Loss Audit and monitor changes and trends in non-revenue water as a percentage of water production over time.
- Update Figure 3.1 and determine per capita water production for the previous calendar year.
- Add the previous calendar year's per capita water use data to Table 4.2 to determine sector-specific and indoor/outdoor water use trends.
- Internally compile lessons learned, reports from partner organizations (Resource Central and PACE) and prepare a plan for staff time allocation in the upcoming year.

On a biannual basis (every other year starting in 2025), Boulder's Utilities staff will perform the following outreach and reporting:

- Convene at least one meeting of representatives from Boulder's largest water users, and possibly host sub-meetings to foster information exchange among water users of similar type. Use the meeting(s) as a forum for feedback on water efficiency programs and highlight opportunities for coordination.
- Report to the Water Resources Advisory Board (WRAB) on Boulder's recent WCP achievements and upcoming programs.

9. Public Review and Formal Approval

9.1. Public Review Process

The WEP was shared for Public Review from September 1, 2023 to November 20, 2023 and was publicized via Beheard Boulder Webpage. Boulder Utilities staff reviewed the 15 public comments received and incorporated relevant feedback from the comments into the WEP draft dated December 4, 2023.

9.2. Local Adoption and State Approval Processes

On August, 16, 2023, the WEP was provided to the CWCB for review and comment. The CWCB provided positive feedback on the WEP and recommended no significant changes. On September 18, 2023, WRAB recommended that the Boulder City Manager approve the WEP, and City Manager did approve it on December 11, 2023. CWCB provided its final approval for this Boulder WEP on January 23, 2024.

9.3. Periodic Review and Update

Update of Boulder's WEP is anticipated to begin in 2030. During that update, information from the monitoring program described in Section 8.2 and engagement efforts conducted at that time will be used to revise and refine the focus of Boulder's WCP.

Appendix A – Water Efficiency Programs Considered

Water Efficiency Programs Considered

During development of this WEP, Boulder Utilities staff screened the list of programs in Worksheets D - G of the Colorado Water Conservation Board's Municipal Water Efficiency Guidance Document (July 2012), including those programs added in that document's January 2019 Addendum (Land Use Planning). In particular, Boulder staff considered the following water-saving measures and programs:

- Water-efficient fixture and appliances, including toilets, urinals, showerheads, and faucets;
- Low water use landscapes, drought-resistant vegetation, removal of phreatophytes, and efficient irrigation;
- Water-efficient industrial and commercial water-using processes;
- Water reuse systems;
- Distribution system leak identification and repair;
- Dissemination of information regarding water use efficiency measures, including by public education, customer water use audits, and water-saving demonstrations;
- Water rate structures and billing systems designed to encourage water use efficiency in a fiscally responsible manner (note that the Department of Local Affairs may provide a technical assistance to entities that are local governments to implement water billing systems that show customer water usage and that implement tiered billing systems);
- Regulatory measures designed to encourage water conservation; and
- Incentives to implement water conservation techniques, including rebates to customers to encourage the installation of water conservation measures.

Appendix B – Public Questionnaire Results Summary

Public Questionnaire Results Summary

The Water Efficiency Plan (WEP) 2023 Update Questionnaire was shared for public review from April 2 to May 1, 2023 via the Be Heard Boulder platform. The Questionnaire was publicized via news and social media and received 594 responses in English and 1 response in Spanish. The overall themes of the questionnaire responses are summarized below.

- In ranking conservation actions for Boulder to promote, respondents ranked actions in the following order (with the first listing having the highest preference by respondents):
 1. Require water-wise landscaping (limit the amount of bluegrass turf) in new and redeveloped properties,
 2. Help community members reduce existing bluegrass turf (e.g. promote turf replacement programs),
 3. Help community members reduce indoor water use (e.g. low-flush/high efficiency fixture rebates),
 4. Create and distribute education materials on best water conservation practices (e.g. how to install a water-wise landscape),
 5. Increase engagement on individual use (1-on-1 support to review your individual water use and identify areas where reduction would be possible).
- In reviewing photographs of various landscaping options, the majority of respondents preferred climate adaptive/native landscapes, either purely or with some bluegrass mixed in, as opposed to full bluegrass landscapes, on both residential and commercial properties. However, an appreciable number of respondents thought landscaping should not be governed by local ordinance.
- Forty six percent (46%) of respondents had not participated in a Boulder water conservation program. Of the other 54% who had participated in a program, the programs with highest participation were Garden in a Box, a visit to one of Boulder's xeriscape gardens, Boulder's water conservation webpage, and the "Understanding your water budget" infographic.
- Questionnaire responses indicated that respondents want Boulder to do a better job of publicizing water efficiency programs that are offered, and the majority of respondents preferred email updates or an e-newsletter or utility bill inserts as a way to receive water efficiency information from Boulder.
- New water efficiency programs that respondents expressed most interest in participating in consisted of 1) Appliance and fixture rebate program, 2) Visiting Boulder's water conservation webpage, 3) Reviewing educational material on water-wise landscapes, 4) Visiting one of Boulder's xeriscape/rain demonstration gardens, and 5) a turf replacement program.
- A majority of respondents who had a preference (60%) thought Boulder should focus its conservation efforts on public property (city parks, libraries, municipally owned facilities) rather than on private property (single-family, multi-family, HOAs).
- Respondents who rented their homes (as opposed to owning their homes) were more likely to express interest in assistance to reduce their indoor water use.
- Of those who answered they would be "very willing" to adopt a water-wise landscape, the most common barriers keeping them from replacing some or all of their grass with water-wise landscaping (listed from most common to least common) consisted of: 1) Cost, 2) Physical labor involved with converting, 3) Lack of design information (e.g. what plants to use), 4) Time, and 5) Knowledge/expertise.
- Seventy seven percent (77%) of respondents felt it is "extremely important" for Boulder to expand its water conservation efforts, 16% felt it is "somewhat important" for Boulder to expand its efforts, 5% felt "neutral" on that importance and 2% felt it is "not important" for Boulder to expand its efforts.

WEP Update Questionnaire

SURVEY RESPONSE REPORT

02 April 2023 - 01 May 2023

PROJECT NAME:

Water Efficiency Plan/Plan de Eficiencia del Agua

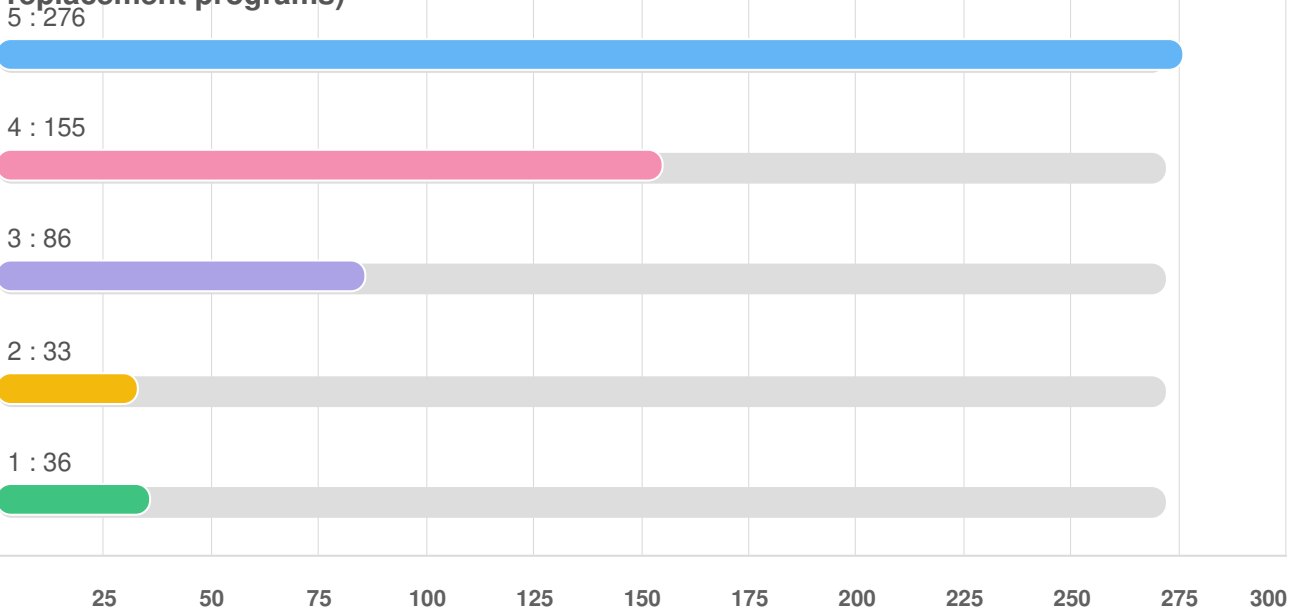
Q1 | Please rank how important it is for the city to promote the following conservation actions on public and private property. ...



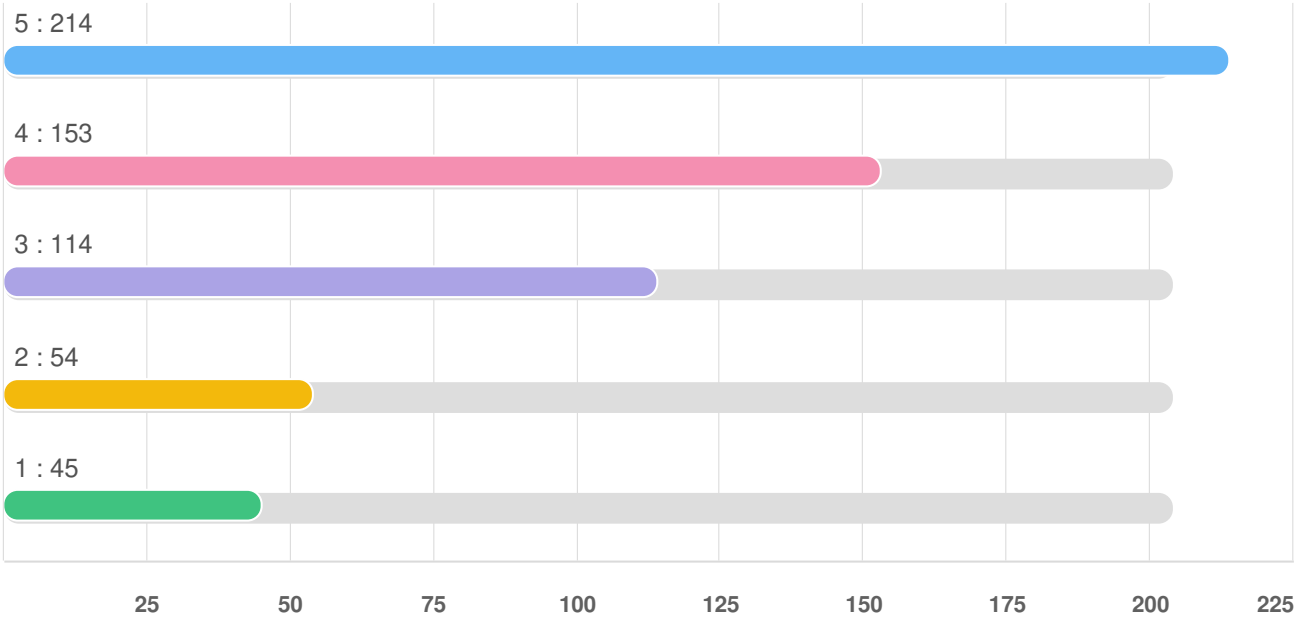
Optional question (593 response(s), 1 skipped)
Question type: Likert Question

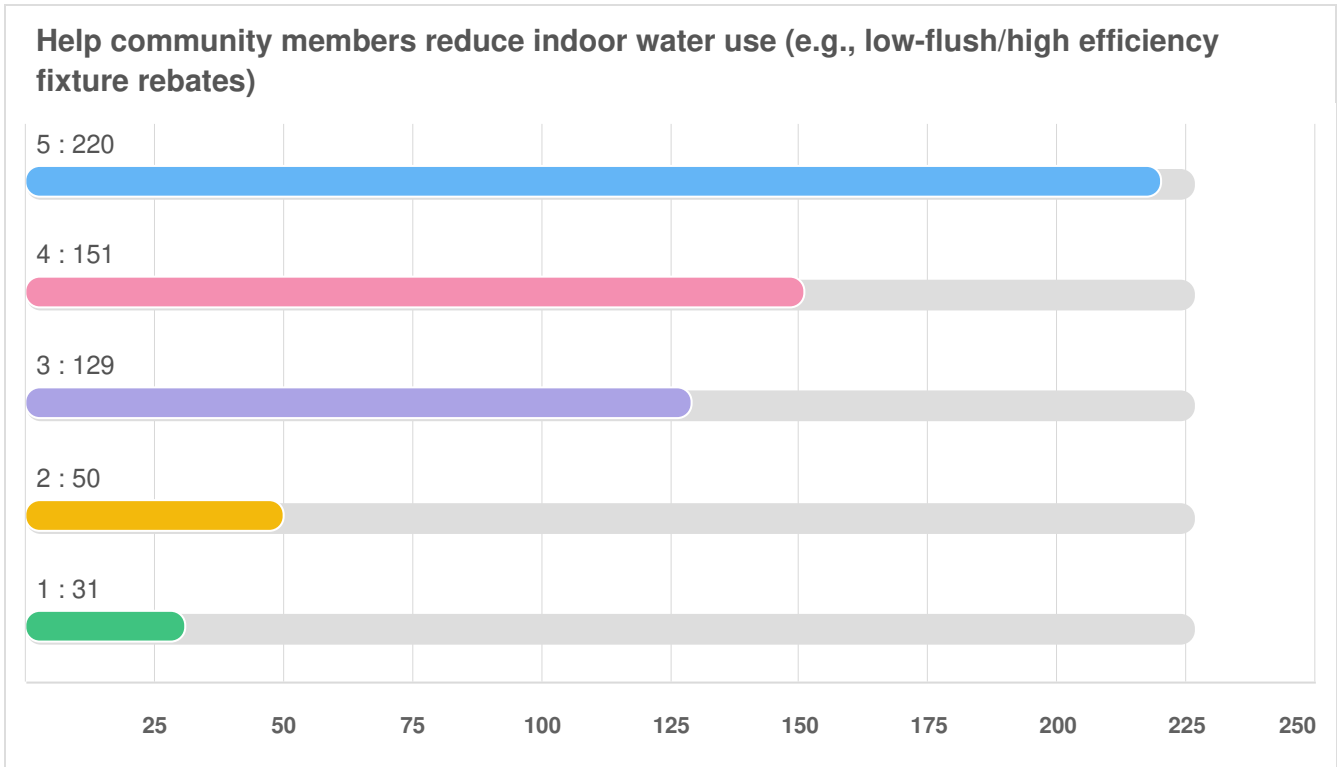
Q1 | Please rank how important it is for the city to promote the following conservation actions on public and private property. ...

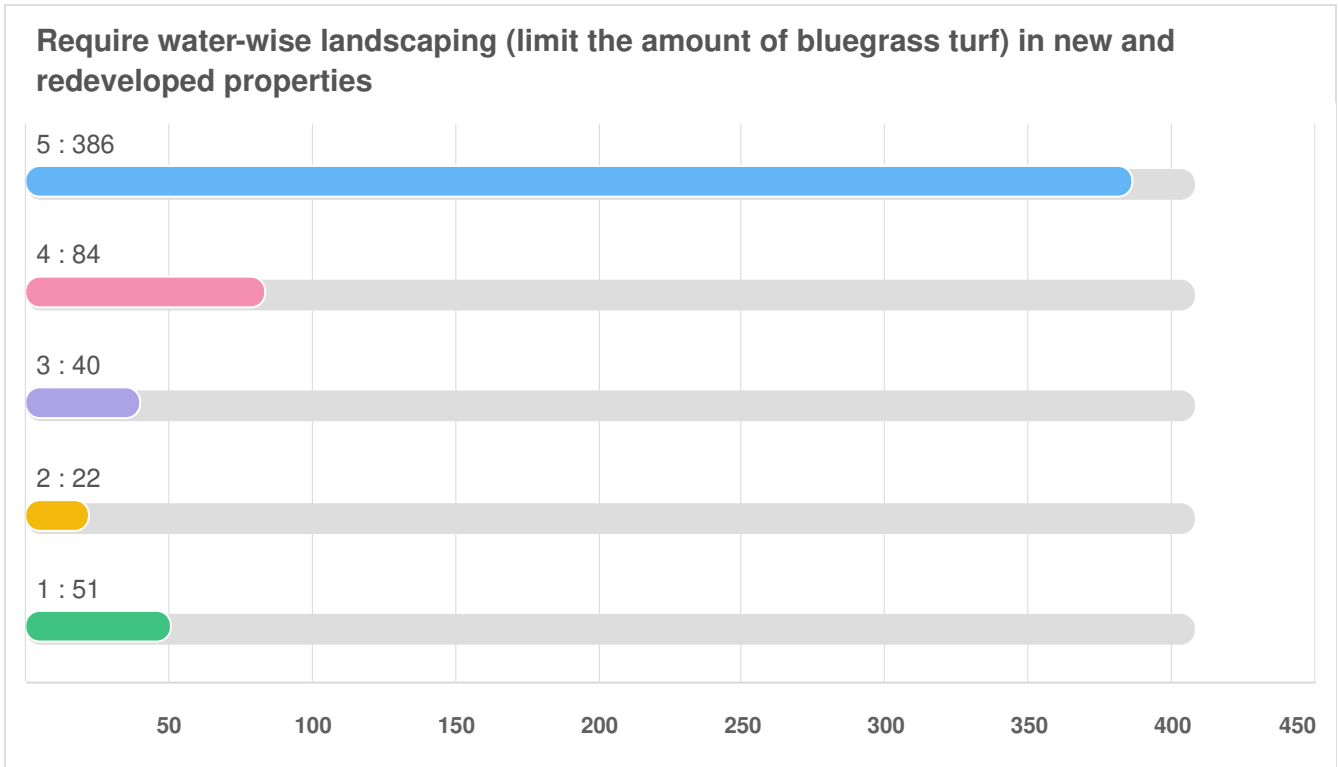
Help community members reduce existing bluegrass turf (e.g., promote turf replacement programs)



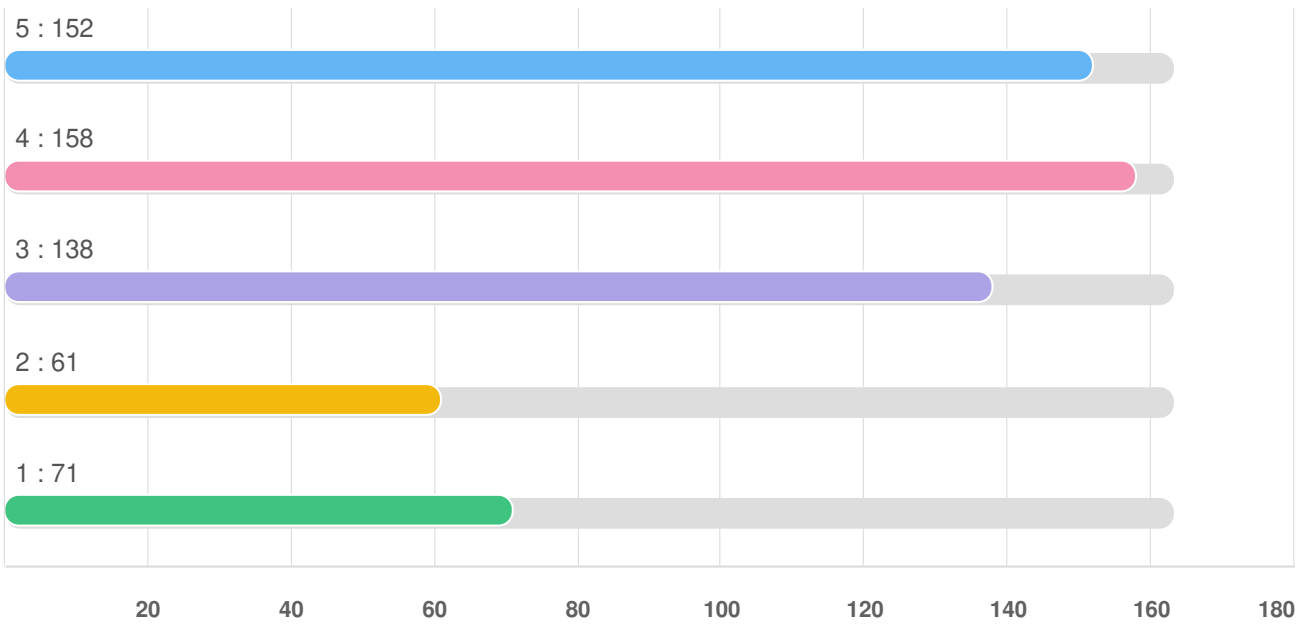
Create and distribute education materials on best water conservation practices (e.g., how to install a water-wise landscape)

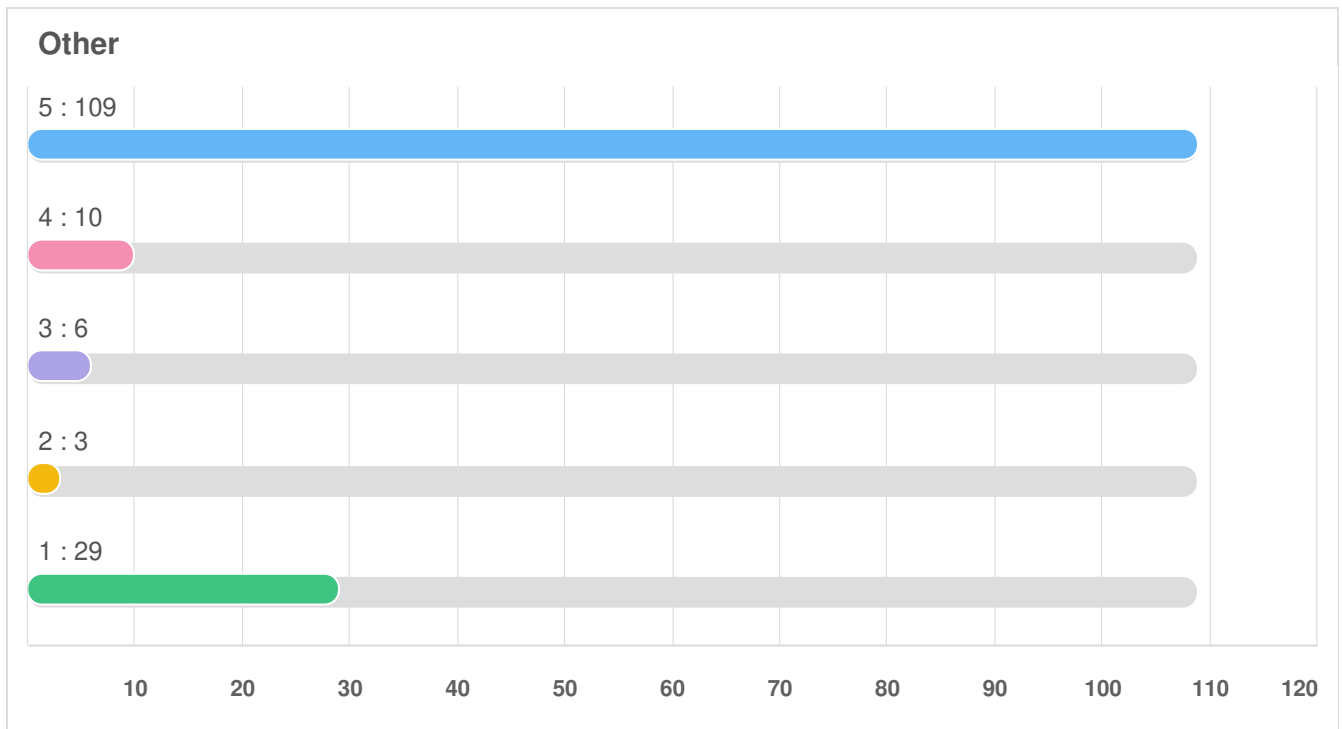






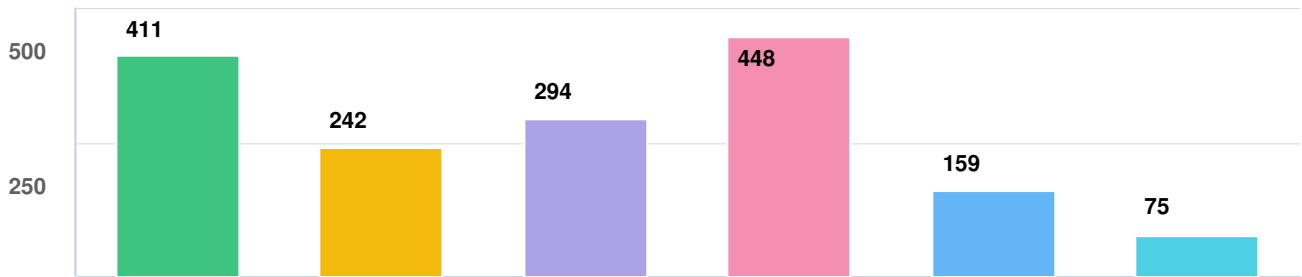
Increase engagement on individual water use (1-on-1 support to review your individual water use and identify areas where reduction would be possible)





Q2 | If you selected other, please explain

Q3 Of the answers provided in the previous question, select the top three that you feel are most important for Boulder to prom...

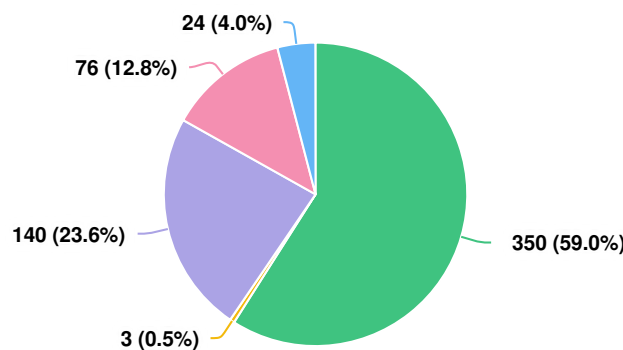


Question options

- Other (please specify)
 - Increase engagement on individual water use (1-on-1 support to review your individual water use and identify areas where reduction would be possible)
 - Require water-wise landscaping (limit the amount of bluegrass turf) in new and redeveloped properties
 - Help community members reduce indoor water use (e.g., low-flush/high efficiency fixture rebates)
 - Create and distribute education materials on best water conservation practices (e.g., how to install a water-wise landscape)
- ▲ 1/2 ▼

Optional question (584 response(s), 10 skipped)
Question type: Checkbox Question

Q4 Next, are examples of private spaces. In your opinion, what should Boulder's landscape look like in residential areas? (you...

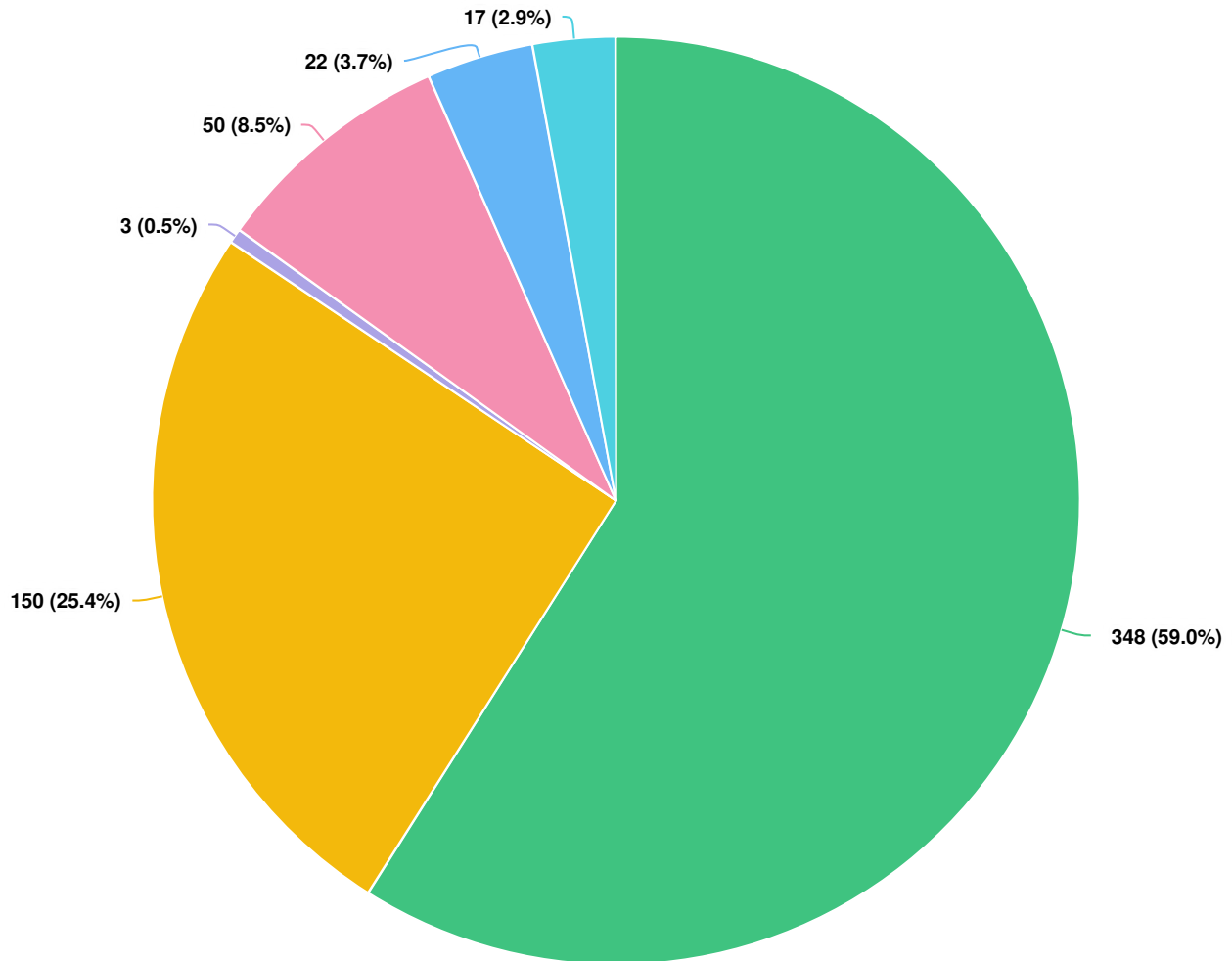


Question options

- Other
- Private landscape: My private property is for my use and should not be governed by local ordinance
- Private landscape: A combination of climate adaptive landscaping and traditional bluegrass
- Private landscape: Traditional bluegrass
- Private landscape: Climate adaptive landscape

Optional question (593 response(s), 1 skipped)
Question type: Radio Button Question

Q5 Next, are examples of retail/office/commercial spaces. In your opinion, what should Boulder's retail/office/commercial landscapes look like? (you may select one option)

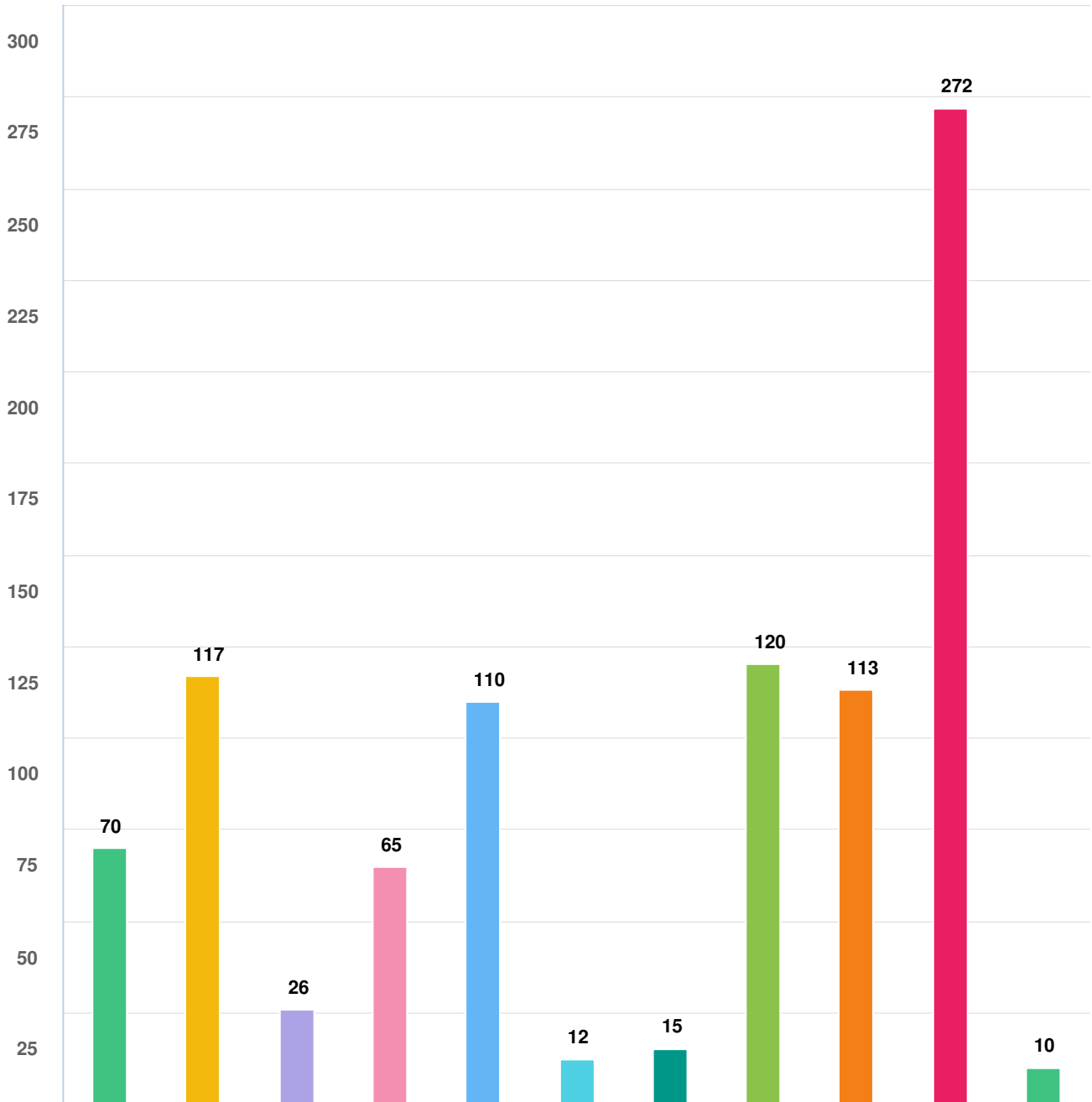


Question options

- Other
- Retail/Office/Commercial landscape: Should not be governed by local ordinance
- Retail/Office/Commercial landscape: Should be a combination of climate adaptive landscaping and traditional bluegrass
- Retail/Office/Commercial landscape: Traditional bluegrass cover
- Retail/Office/Commercial landscape: Hardscape with some vegetation
- Retail/Office/Commercial landscape: Native vegetation

Optional question (590 response(s), 4 skipped)
Question type: Radio Button Question

Q6 The City of Boulder currently offers all the following water conservation programs, tools and resources to customers. Which of the following have you participated in? (Select all that apply)



Question options

- Programs I have Participated In Are No Longer Available (please specify) ● None
- Understanding Your Water Budget infographic (available on bouldersaveswater.net) ● Boulder's Water Conservation Webpage
- Commercial Installation of Faucet Aerators/Pre-rinse Spray Valves ● Commercial Water Use Assessment
- Visit to One of Boulder's Xeriscape Demonstration Gardens ● Outdoor Irrigation Assessment
- Turf Replacement Program ● Garden in a Box program ● Water-wise Yard Seminars

Optional question (584 response(s), 10 skipped)
 Question type: Checkbox Question

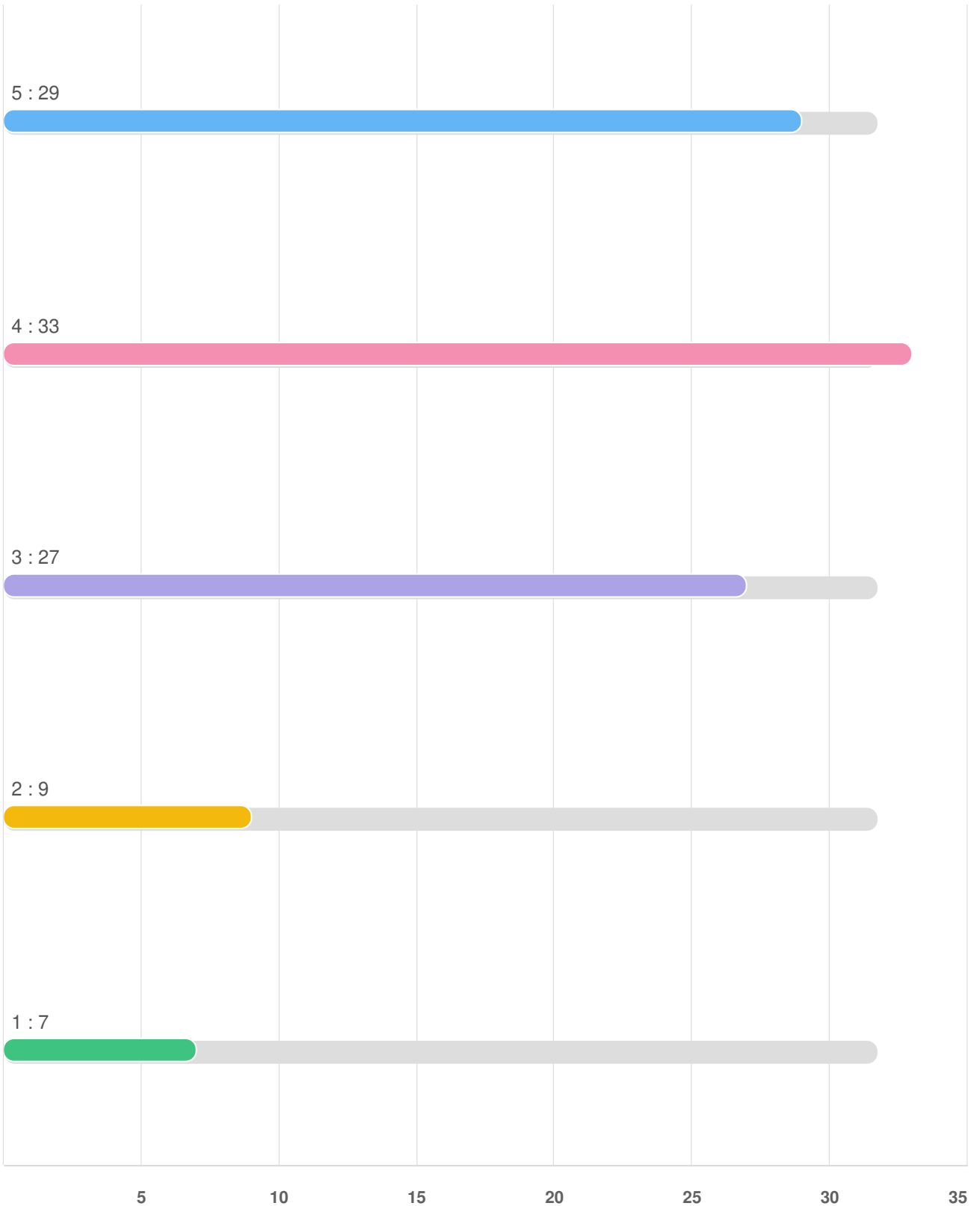
Q7 | Of the programs you have participated in, how helpful were they? (1 - very unhelpful, 5 - Very helpful)

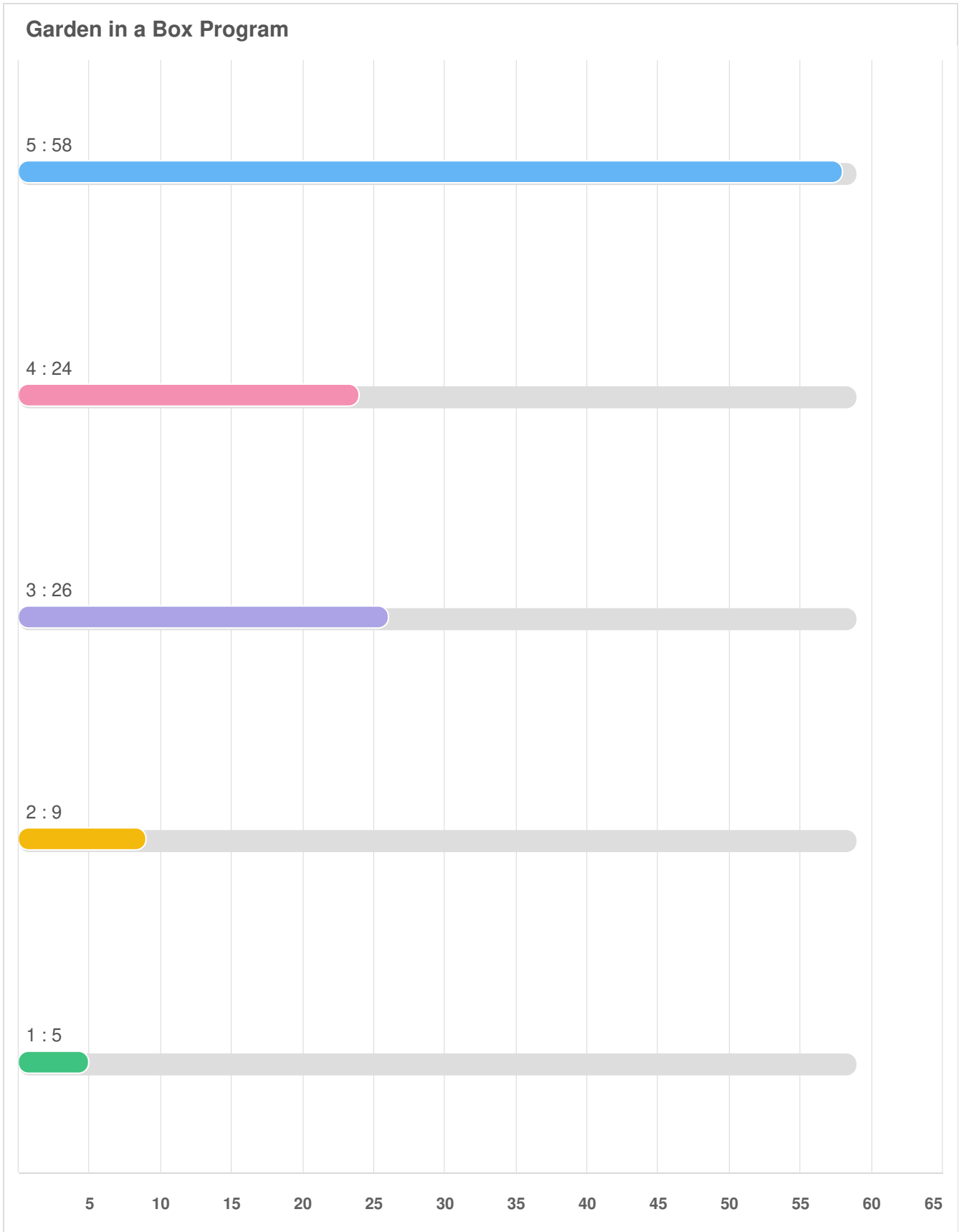


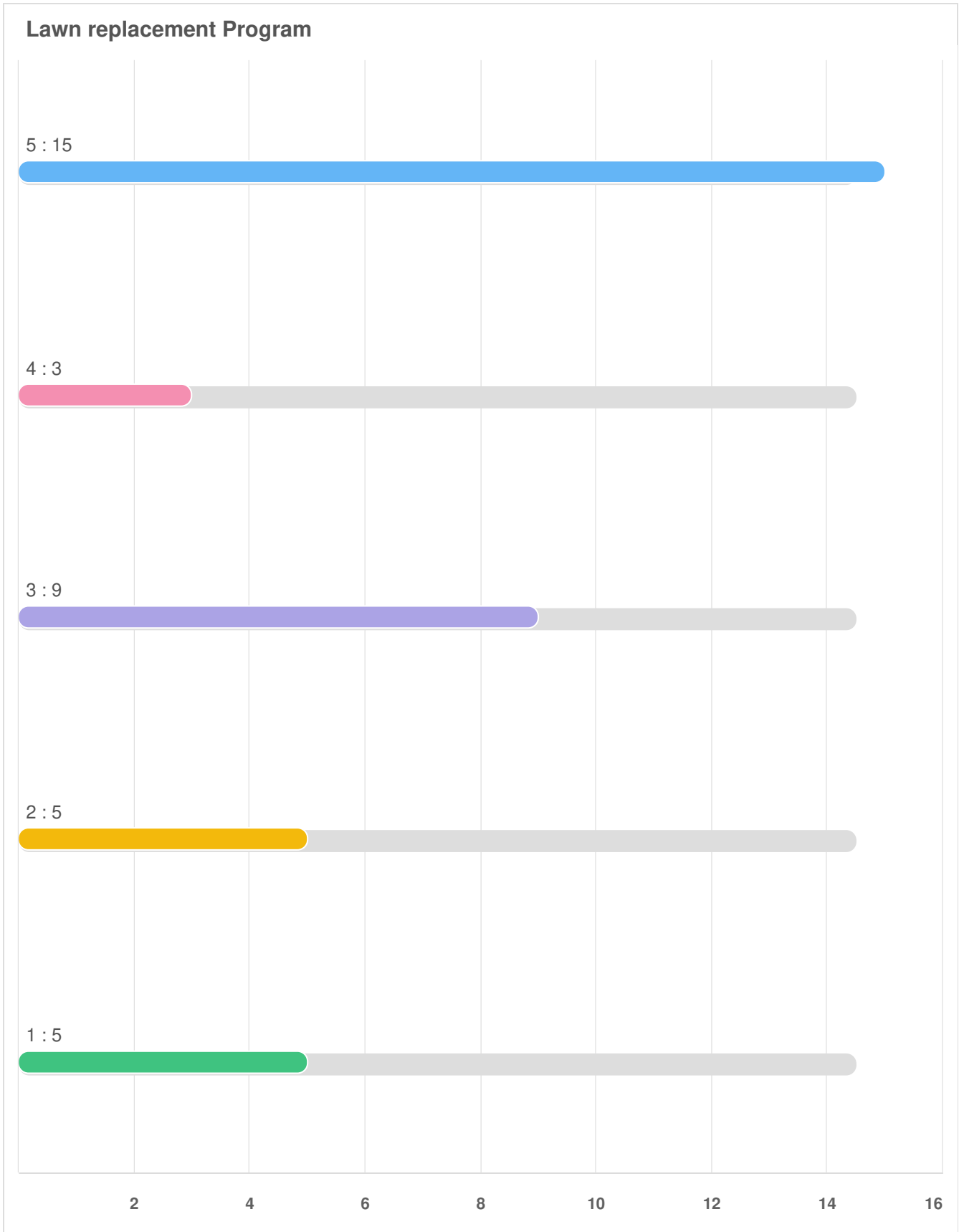
Optional question (307 response(s), 287 skipped)
 Question type: Likert Question

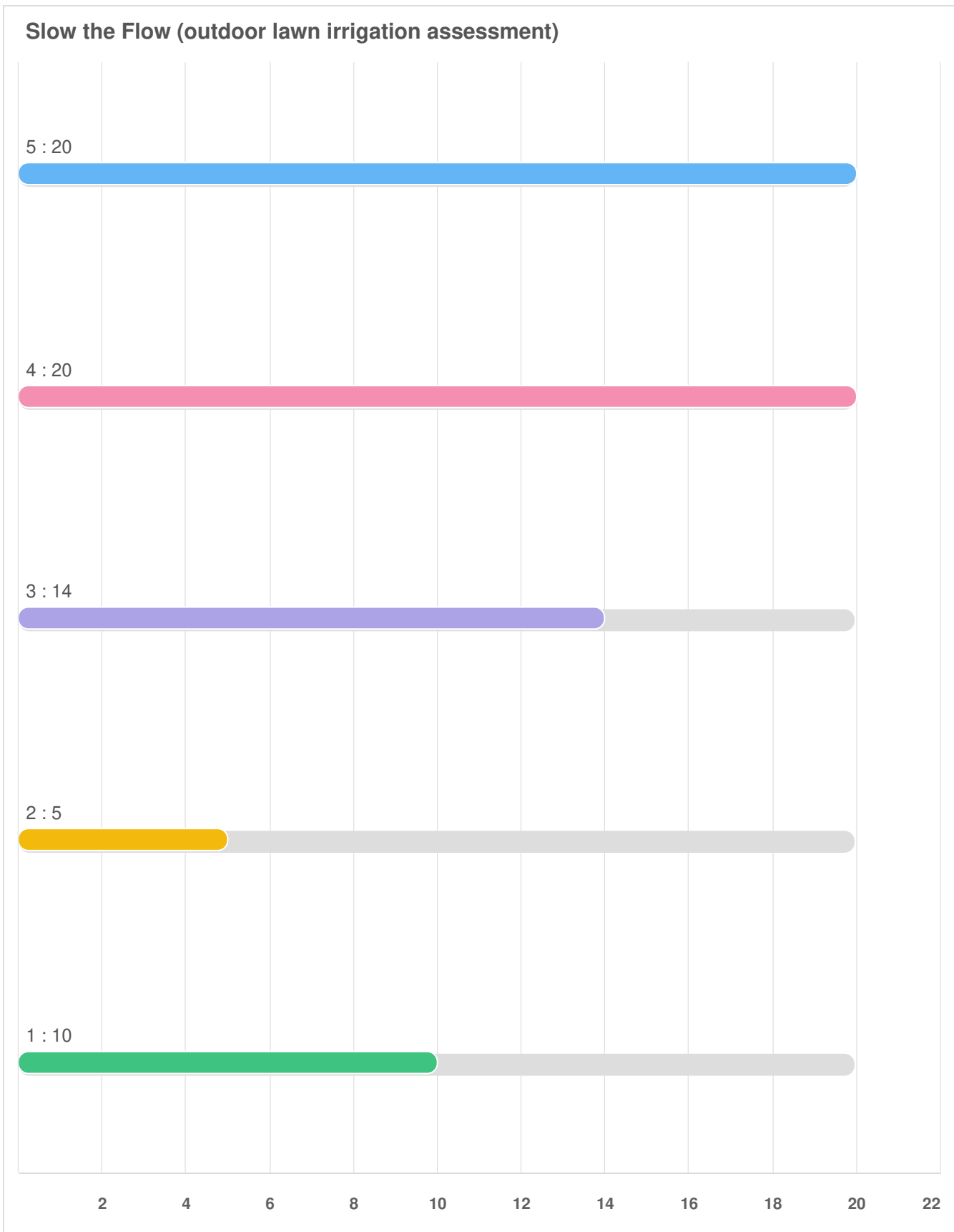
Q7 | Of the programs you have participated in, how helpful were they? (1 - very unhelpful, 5 - Very helpful)

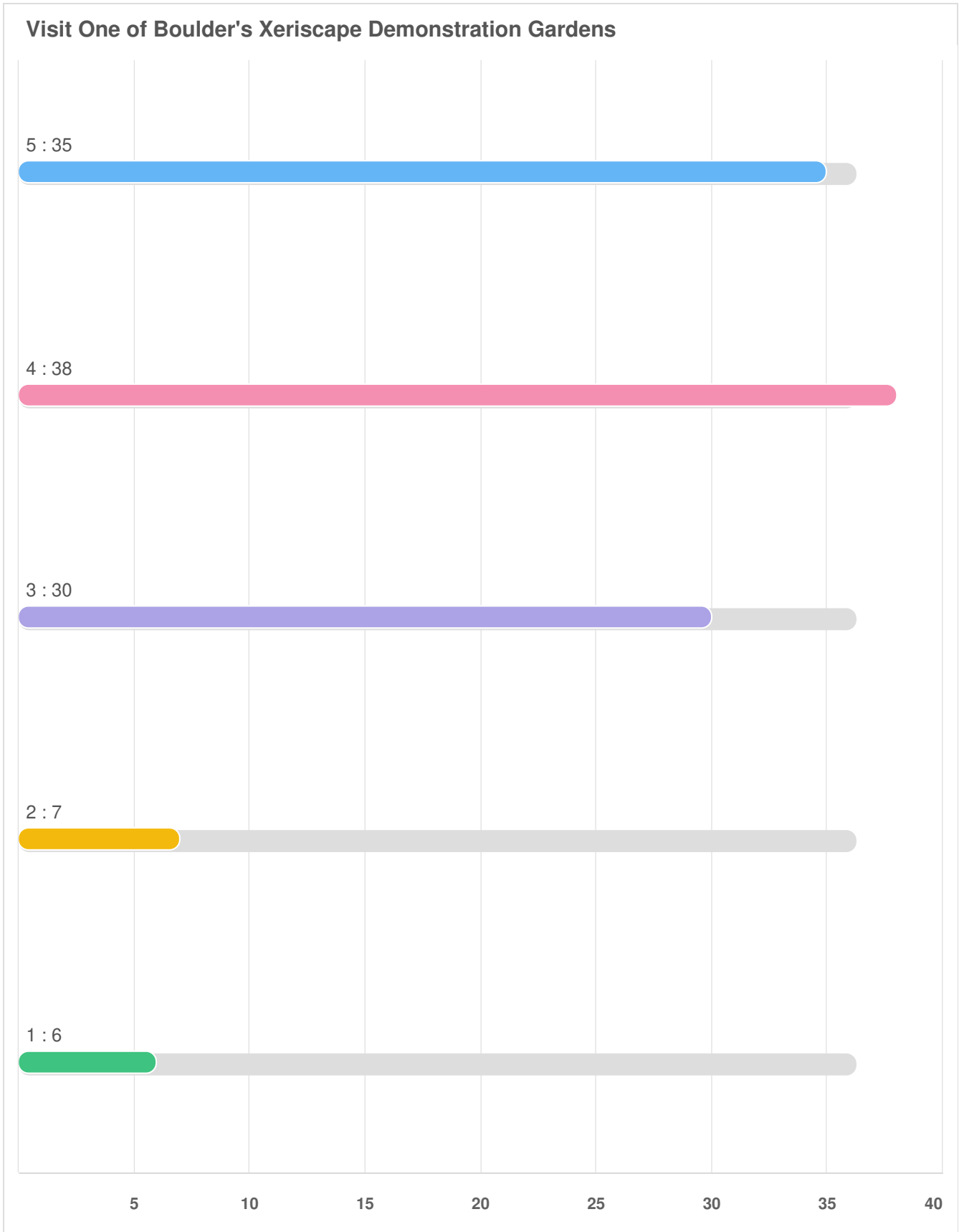
Waterwise Yard Seminars

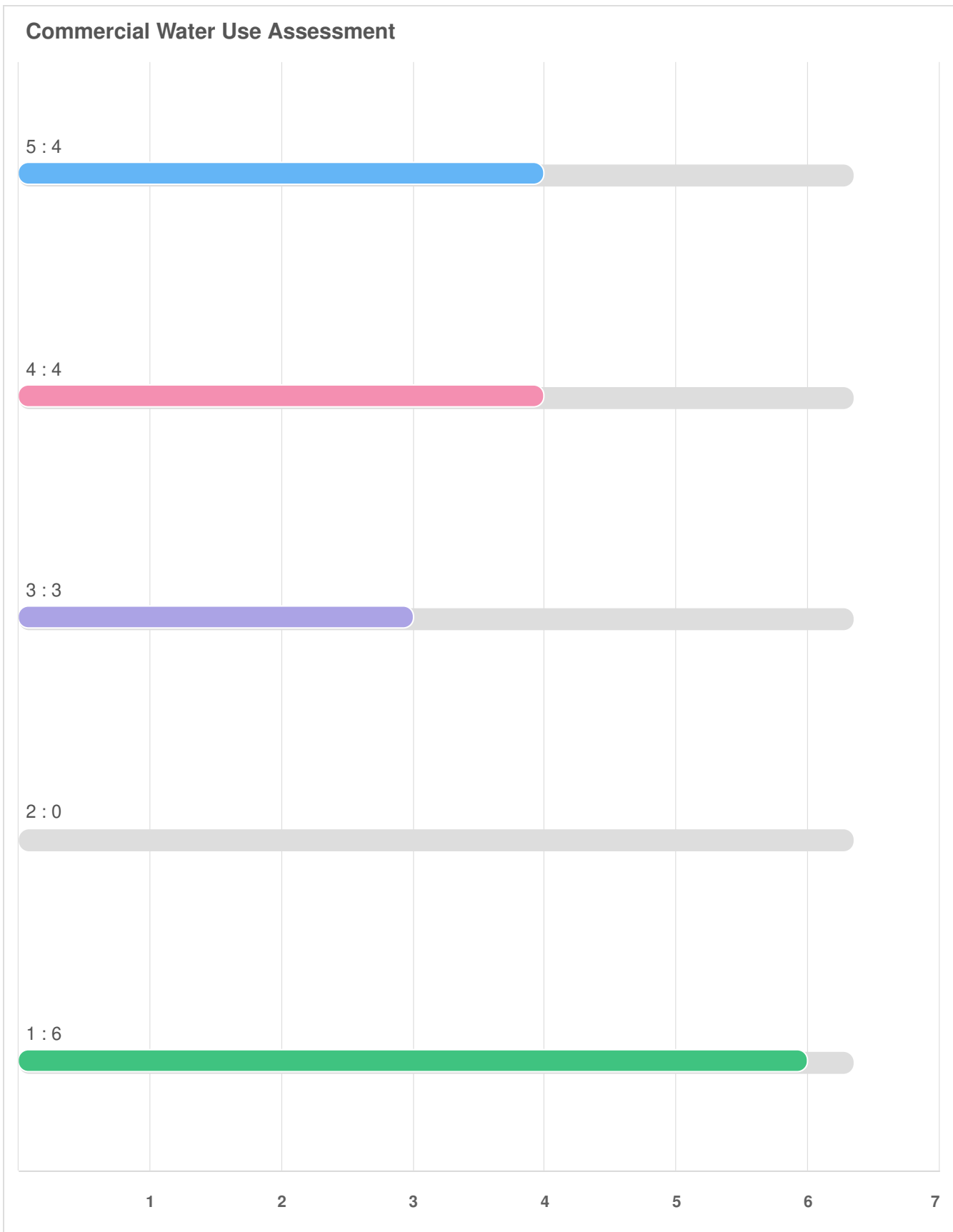


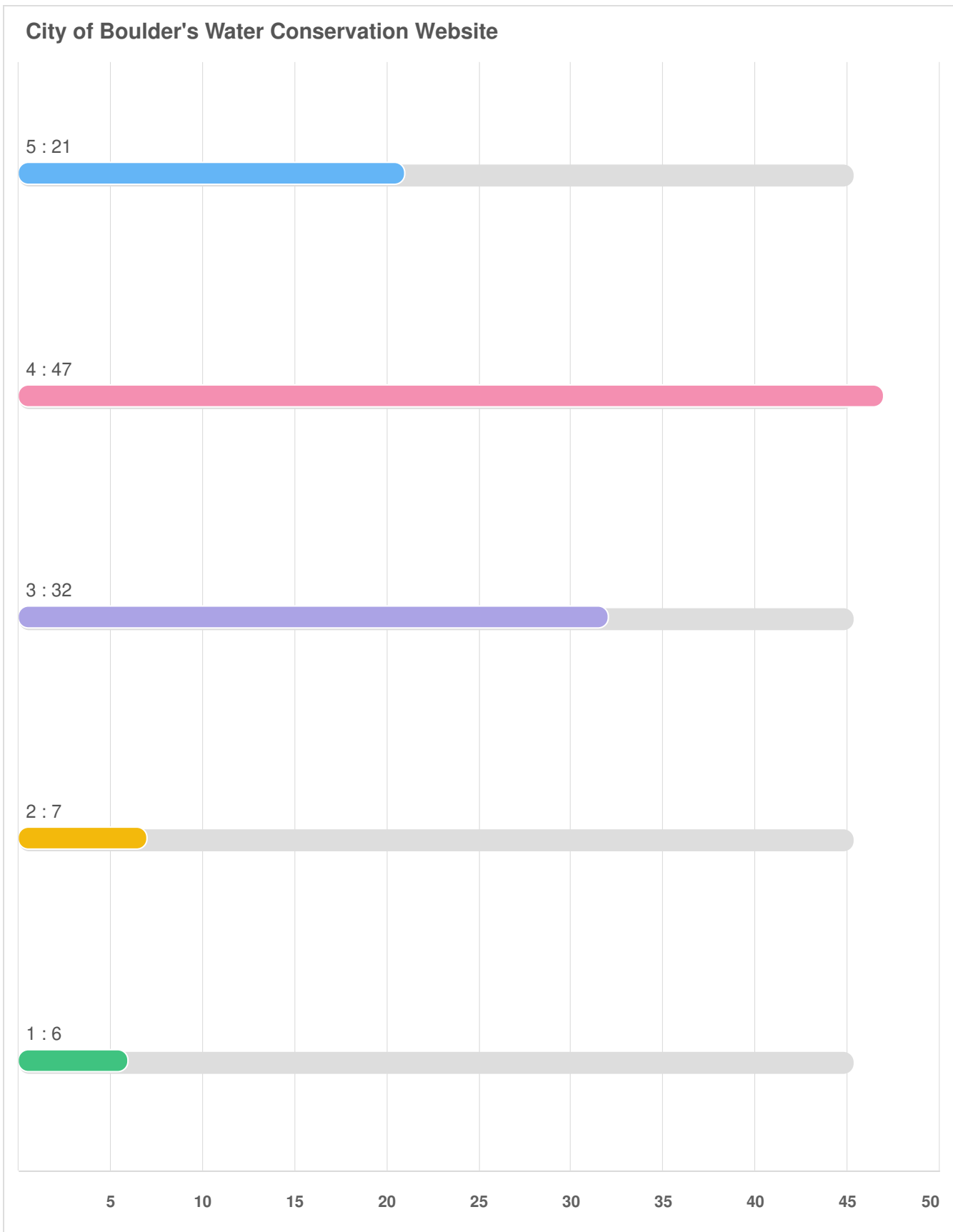


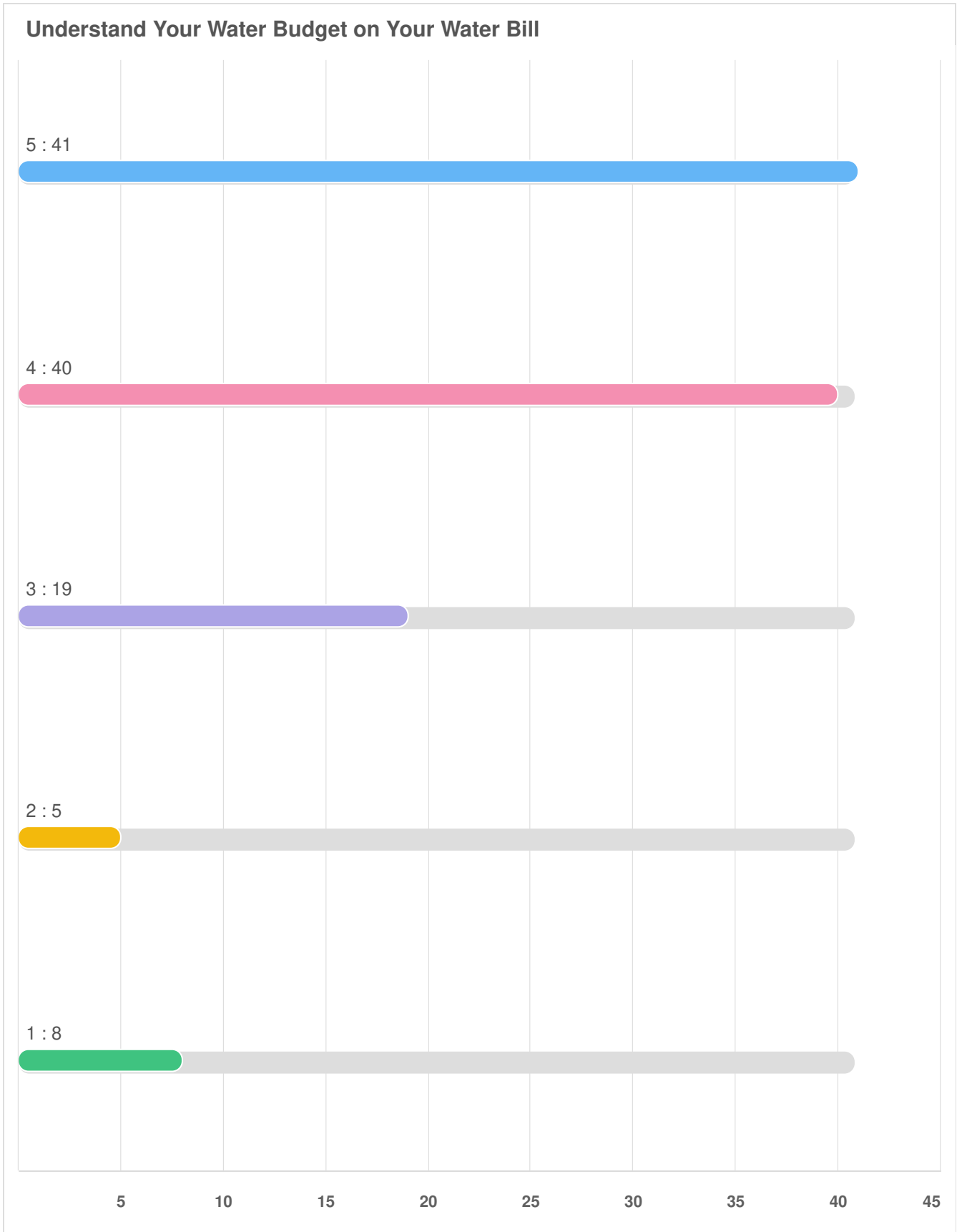


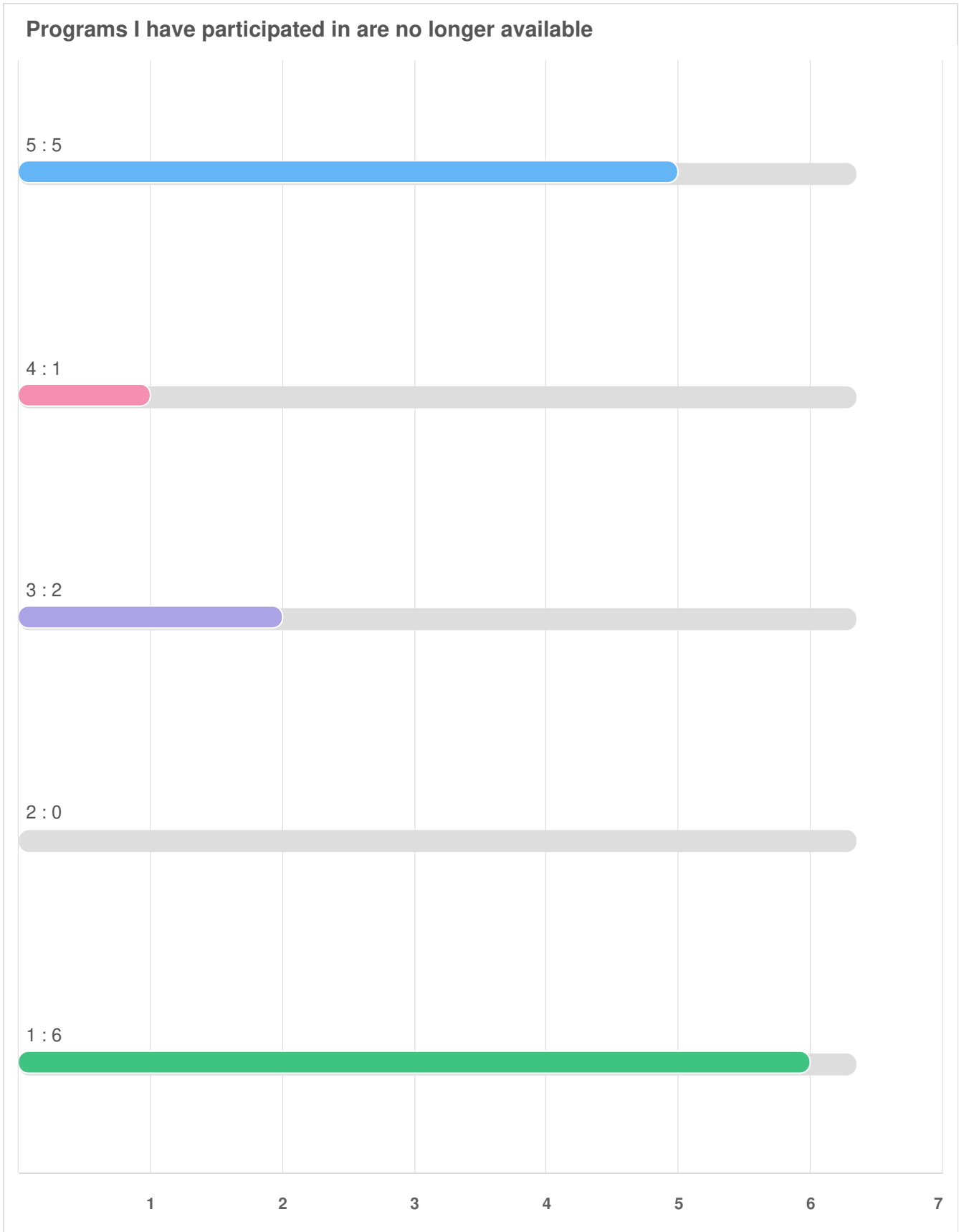




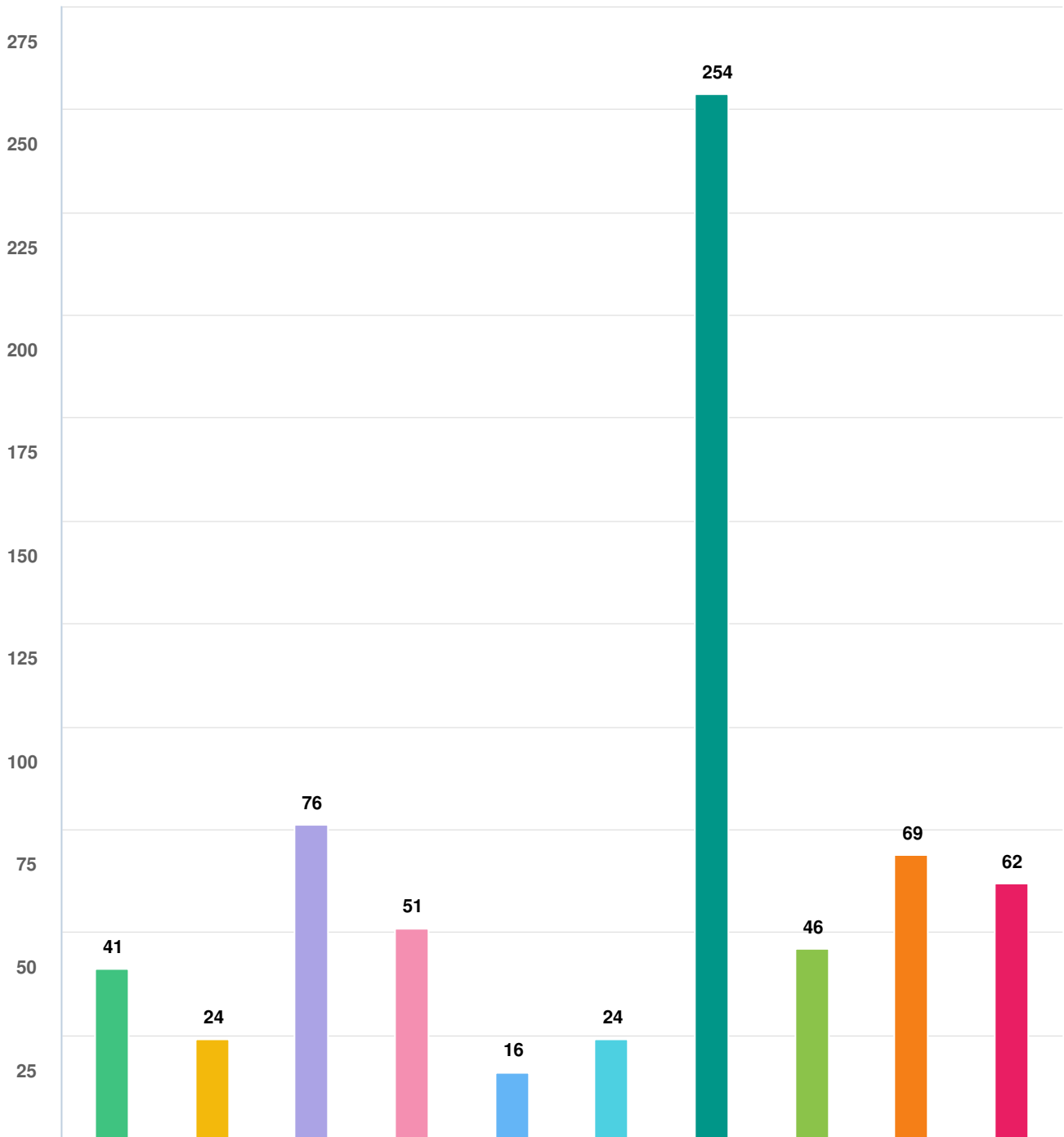








Q8 If you have NOT participated in a City of Boulder conservation program what are the reasons for not participating? (Select all that apply)

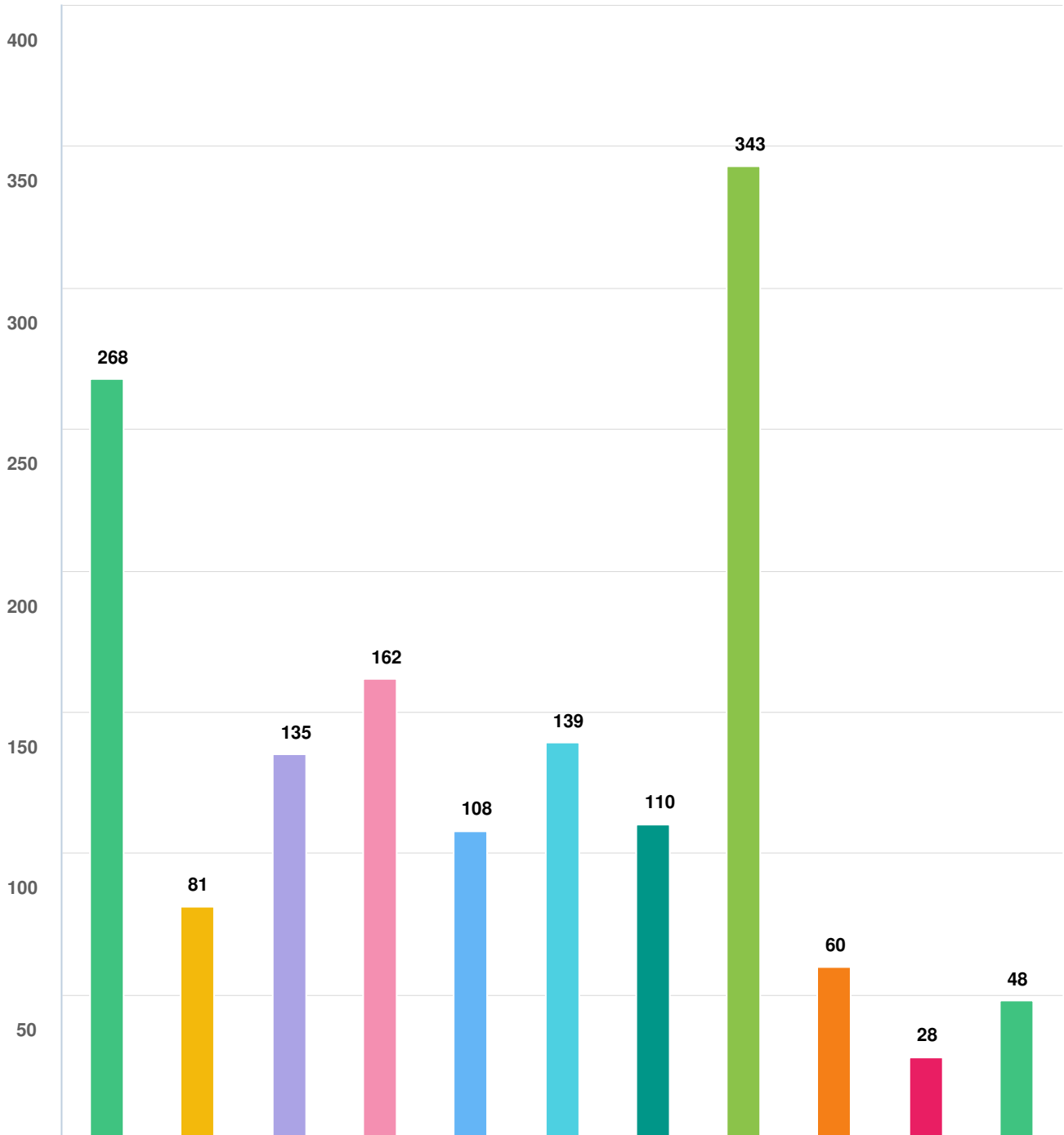


Question options

- Other (please specify) ● I Currently Rent ● HOA Rules ● I Didn't Know These Programs Were Offered
- The Programs Didn't Fit With My Schedule ● Doesn't Save Enough Water to be Worth the Effort ● Knowledge / Expertise
- Time ● Physical Labor Involved ● Cost

Optional question (440 response(s), 154 skipped)
 Question type: Checkbox Question

Q9 How do you prefer to receive information about saving water and Boulder's water conservation programs? (Select all that apply)

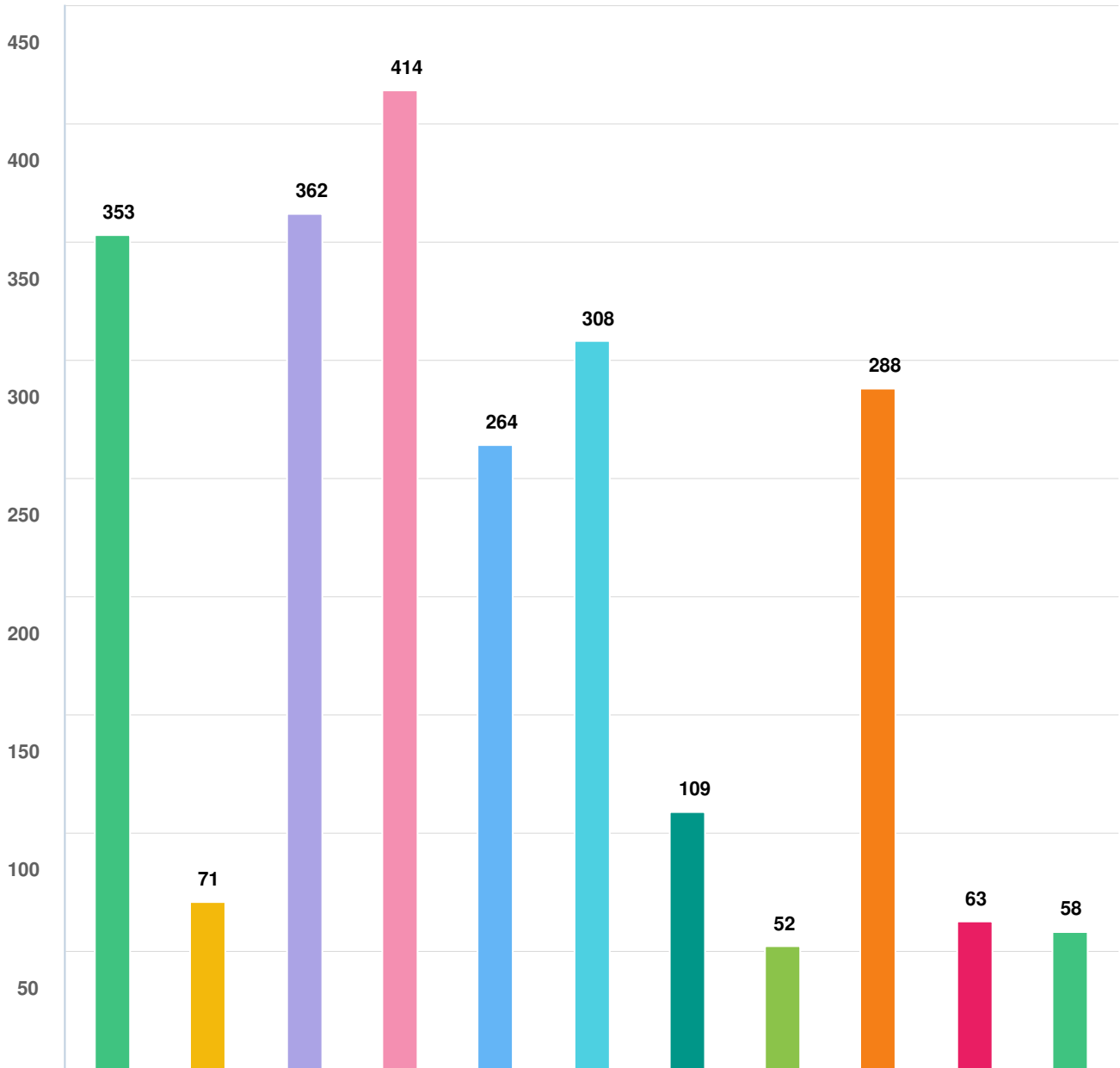


Question options

- Other (please specify)
- I do not seek out this information
- Local Radio Stations
- Email Updates / eNewsletter
- Hands-on Demonstration/Classes
- Local Newspaper
- Social Media*
- Boulder's Water Conservation Webpage
- Direct Mailer to my Home or Business
- Utility Billing Customer Portal
- Utility Bill Insert

Optional question (591 response(s), 3 skipped)
 Question type: Checkbox Question

Q10 The following is a list of possible outdoor water saving actions for your home or business. Which actions - if any - have you taken in the last 5 years to reduce your water use? (Select all that apply)

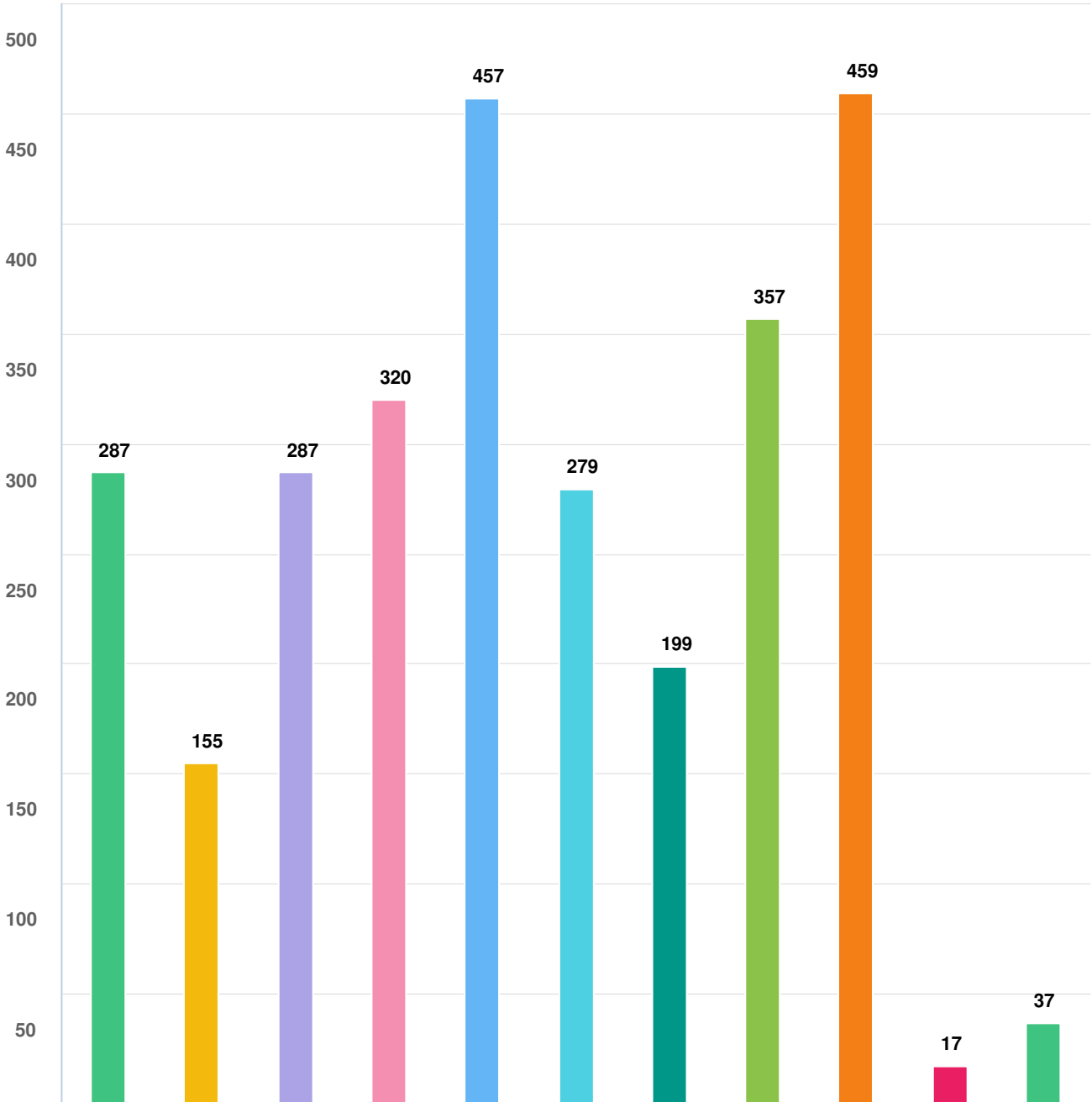


Question options

- Other (please specify) ● None ● Fixed any leaks ● Installed rain barrel or cistern
- Upgrade irrigation system with high-efficiency nozzles
- Review irrigation system to ensure I am only watering plants and trees, not sidewalks/roadways
- Replaced lawn or garden with low water plants or other material (e.g. low water use landscape, rock, mulch, hardscape)
- Water only between 6 p.m. and 10 a.m. ● Wait to turn on irrigation system in the spring until after the last freeze
- Installed a rain sensor to automatically turn off irrigation system when it rains
- Adjusted irrigation system and timers to reflect weather conditions

Optional question (588 response(s), 6 skipped)
Question type: Checkbox Question

Q11 The following is a list of possible indoor water saving actions for your home or business. Which actions - if any - have you taken in the last 5 years to reduce your water use? (Select all that apply)

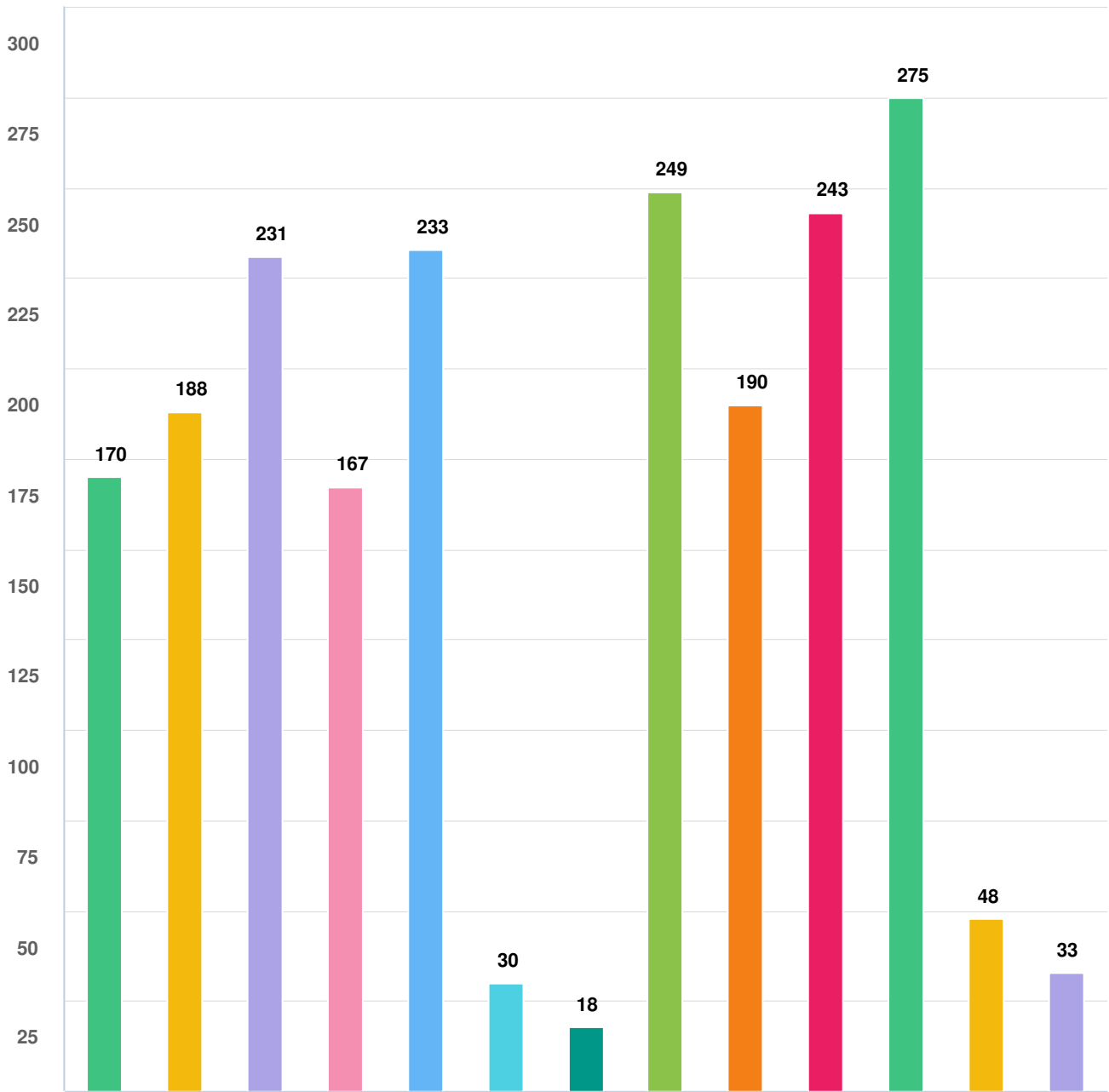


Question options

- Other (please specify)
 ● None
- Don't let the water run unnecessarily (e.g. while brushing your teeth or washing your hands)
 ● Fixed any leaks (toilets, faucets)
- Take fewer baths
 ● Take shorter showers (around 5-minutes)
 ● Only run full loads in the dishwasher and clothes washer
- Installed water efficient toilet(s)
 ● Installed low-flow shower heads
 ● Installed faucet aerators
- Installed high-efficiency clothes washer

Optional question (589 response(s), 5 skipped)
 Question type: Checkbox Question

Q12 Which of the following water efficiency programs, tools, and incentives would you participate in or utilize within the next 3-5 years? (Select all that apply)

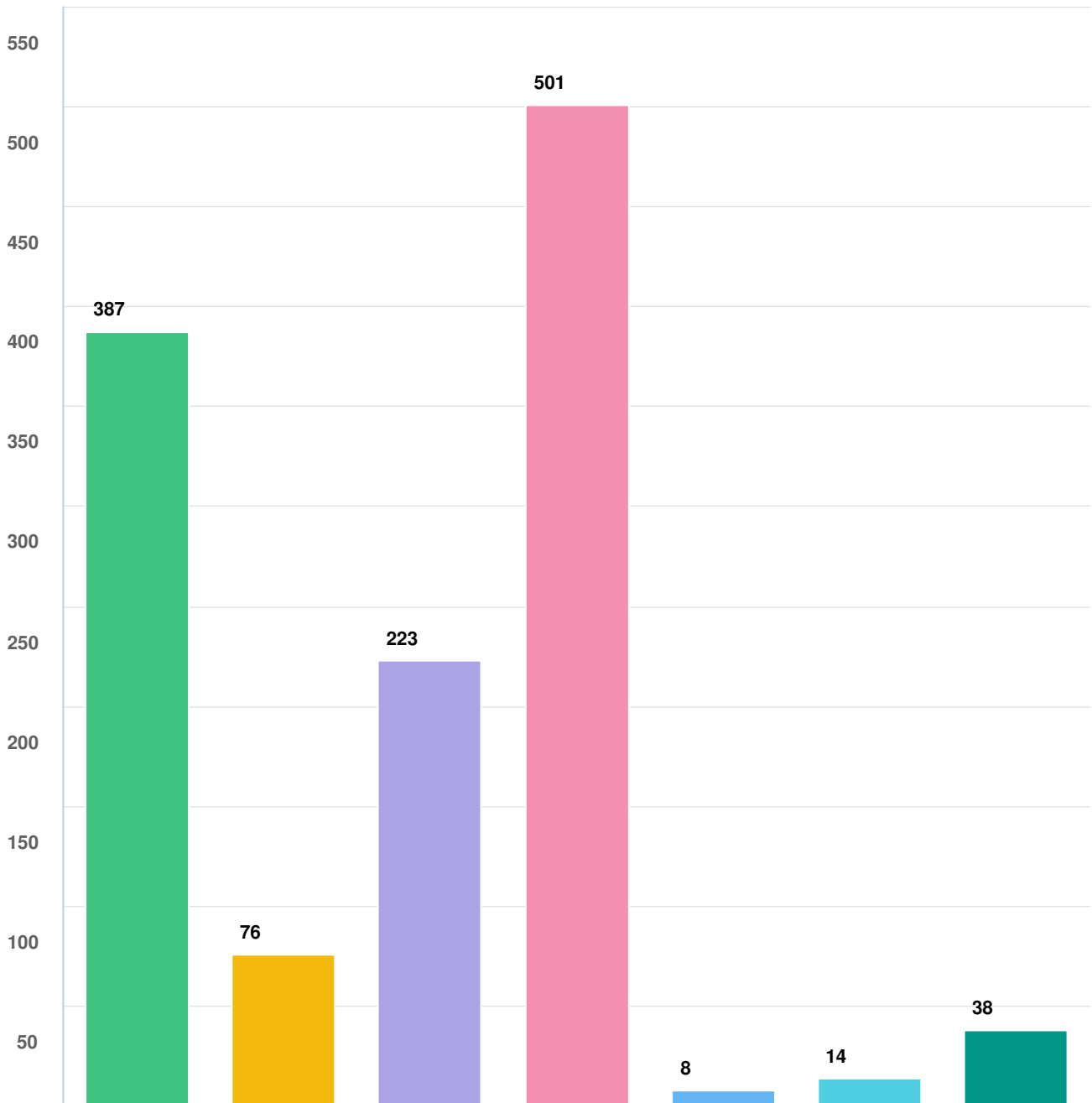


Question options

- Other (please specify)
 ● None
 ● Appliance and fixture rebate program
- Review educational material on water-wise landscapes
 ● Review "Understand Your Water Budget" pdf
- Visit Boulder's water conservation webpage (bouldersaveswater.net)
- Commercial installation of faucet aerators/pre-rinse spray valves
 ● Commercial water use audit
- Visit one of Boulder's xeriscape/rain demonstration gardens
 ● Outdoor lawn irrigation audit
 ● Turf replacement program
- Garden in a Box program (including income qualified garden in a box)
 ● Water-wise Yard Seminars

Optional question (585 response(s), 9 skipped)
 Question type: Checkbox Question

Q13 | What would motivate you to participate in the city's water conservation program or water-conserving activities? (Select all that apply)

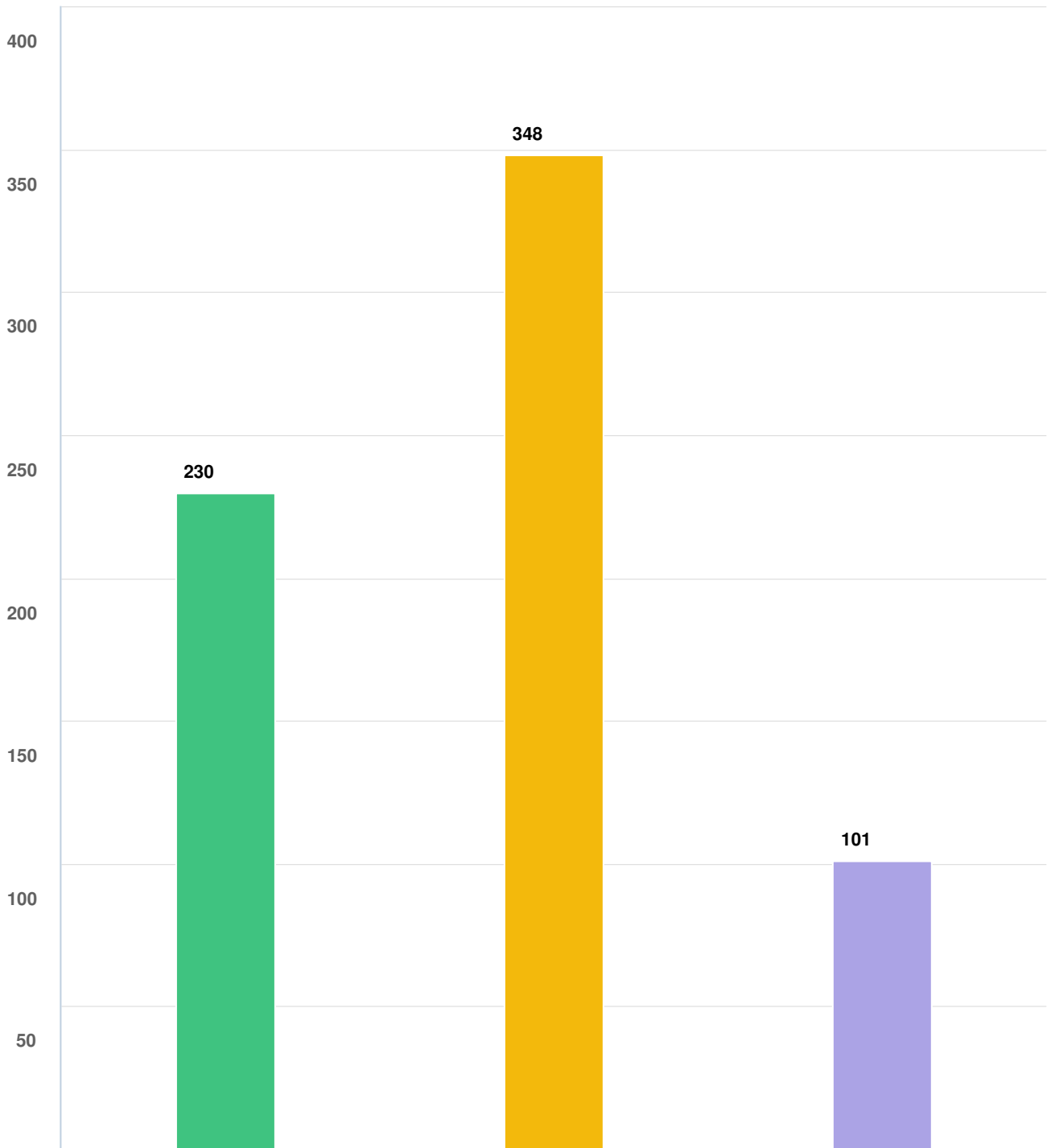


Question options

- Other (please specify) ● Not applicable or I'm not motivated to participate
- I would only conserve water if the city required it by code and enforcement
- It is the right thing to do to protect our limited water resources
- Payment assistance for a fixture/appliance that I want to replace (e.g., toilets, smart irrigation controller, etc.)
- To save more water than my neighbors ● To save money on my water bill

*Optional question (586 response(s), 8 skipped)
Question type: Checkbox Question*

Q14 Knowing the city's water conservation funds are limited, where should the city focus its conservation efforts?

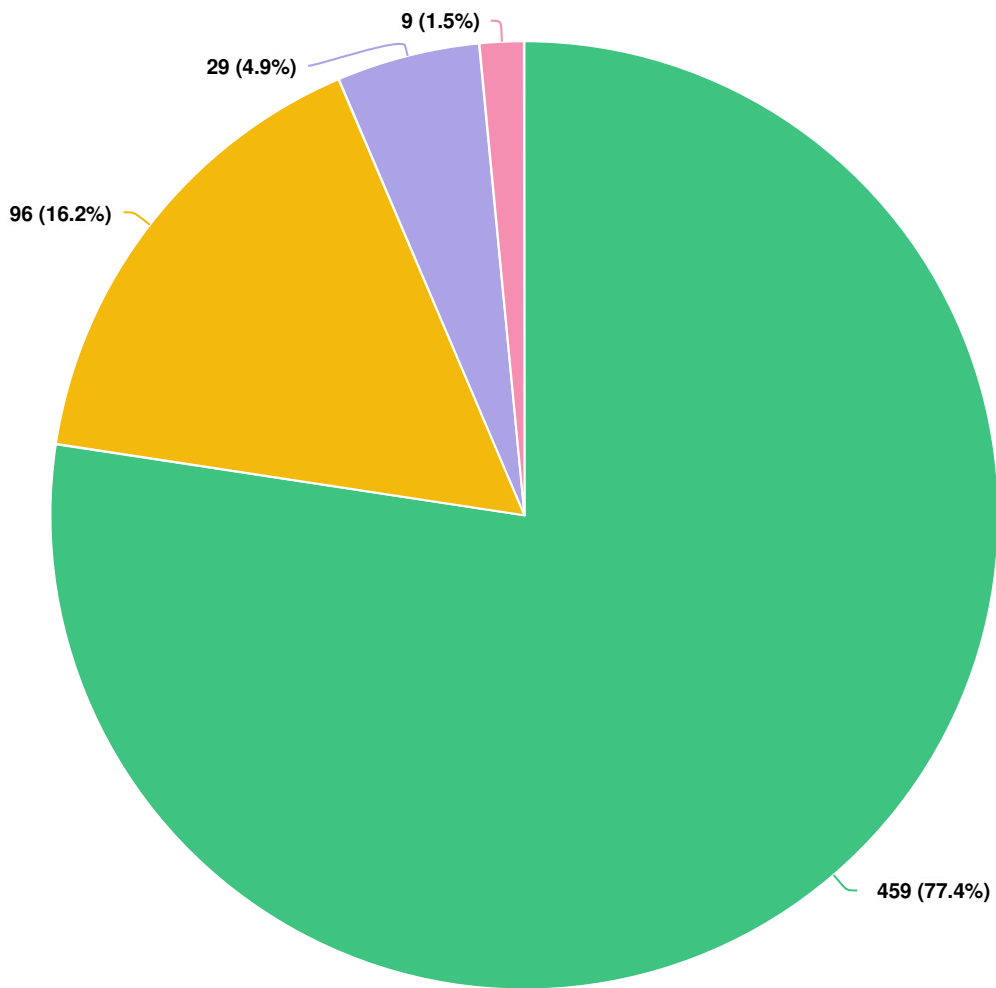


Question options

- No opinion
- Public property (city parks, libraries, municipally owned facilities)
- Private property (single-family, multi-family, HOAs)

Optional question (582 response(s), 12 skipped)
Question type: Checkbox Question

Q15 How important do you feel it is for the city to expand its water conservation efforts?

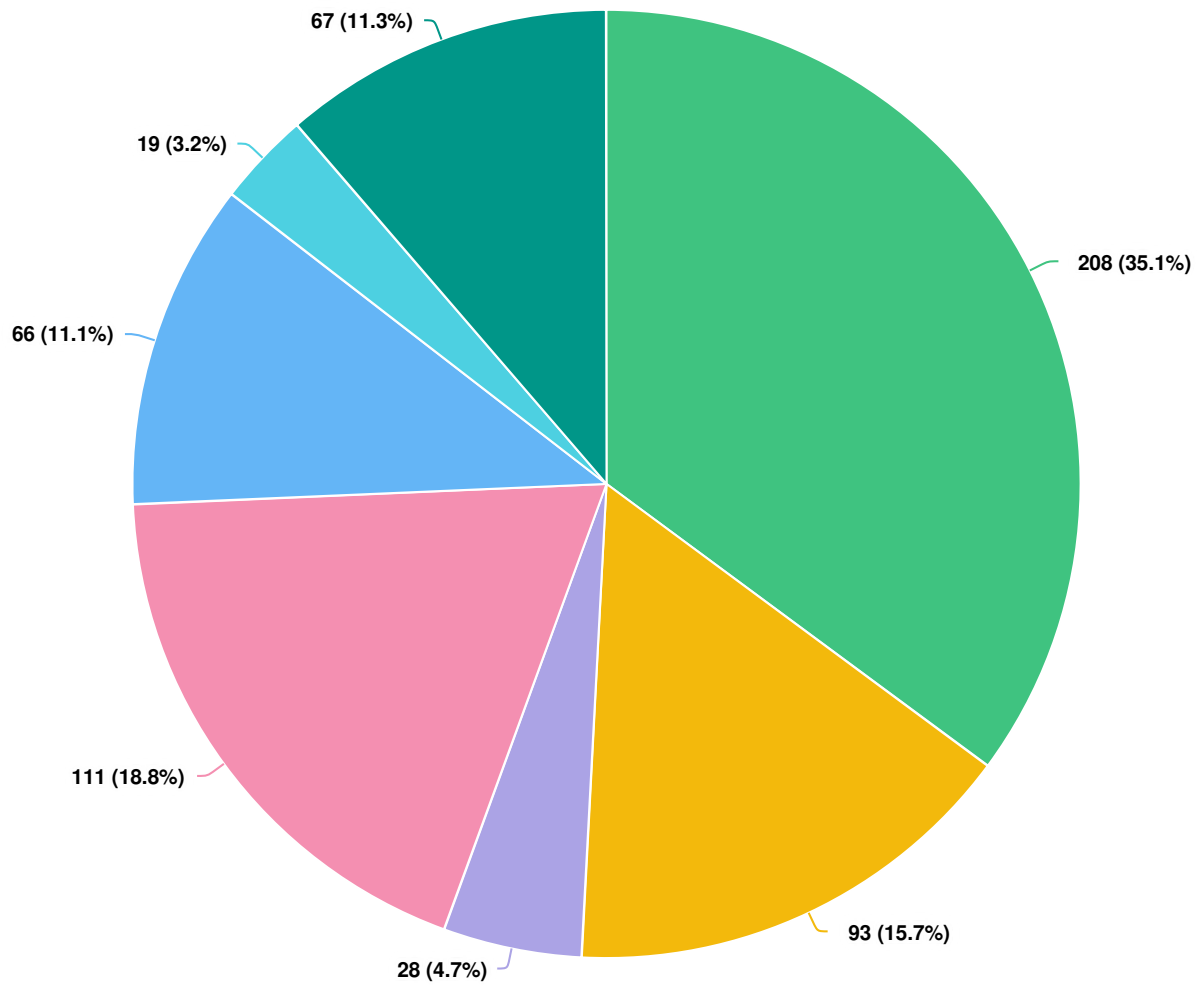


Question options

- Not Important
- Neutral
- Somewhat Important
- Extremely Important

Optional question (593 response(s), 1 skipped)
Question type: Radio Button Question

Q16 | How willing, if at all, would you be to adopt a water-wise landscape by removing turf grass from your front yard/business?

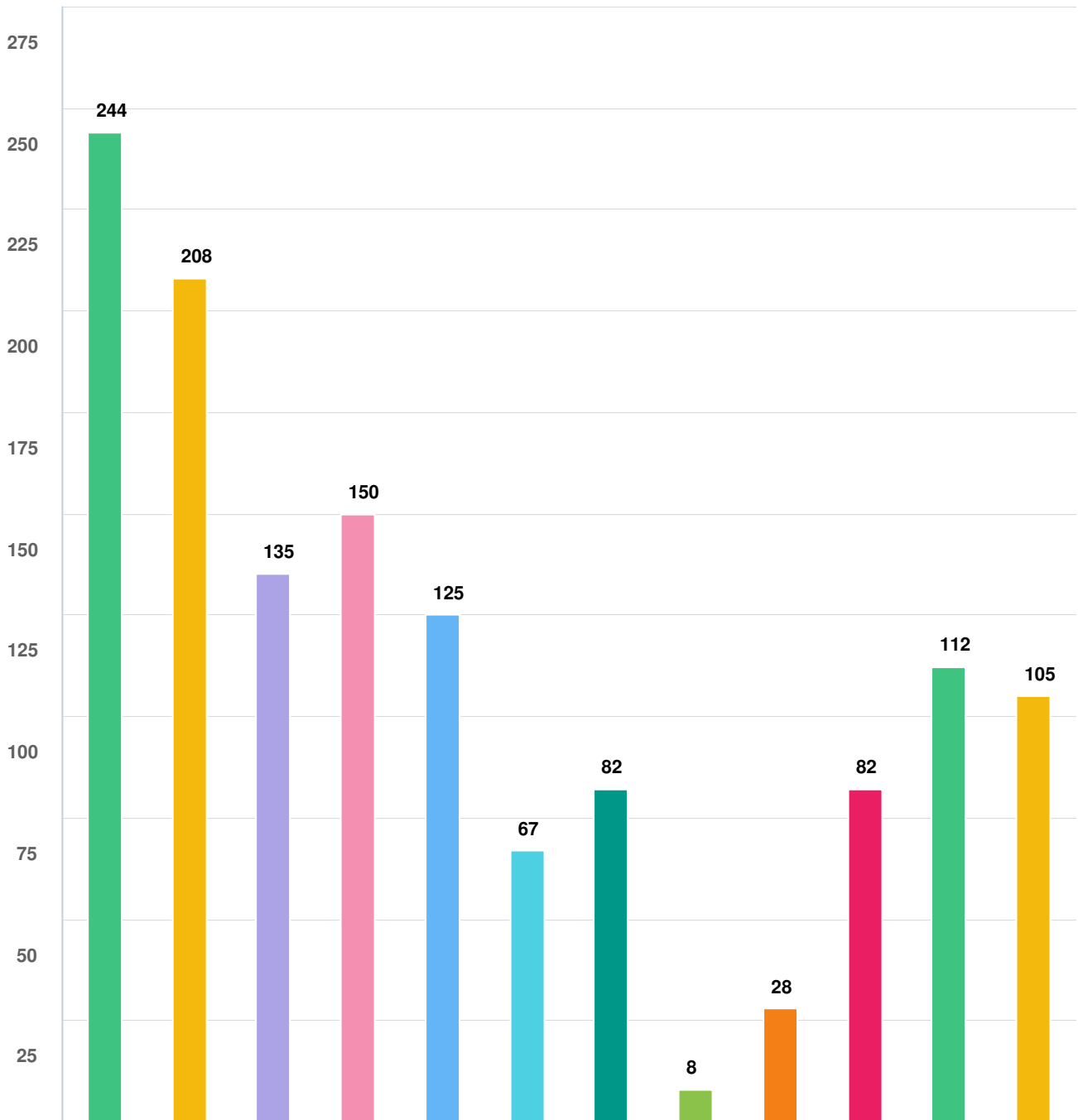


Question options

- Would depend upon... (please specify)
- Don't know / Not sure
- Not applicable - I don't have a yard
- Already converted my space
- Would not consider
- May consider
- Very willing

Optional question (592 response(s), 2 skipped)
Question type: Radio Button Question

Q17 What are the primary barriers keeping you from replacing some or all your grass with water-wise landscaping? (Select all that apply)

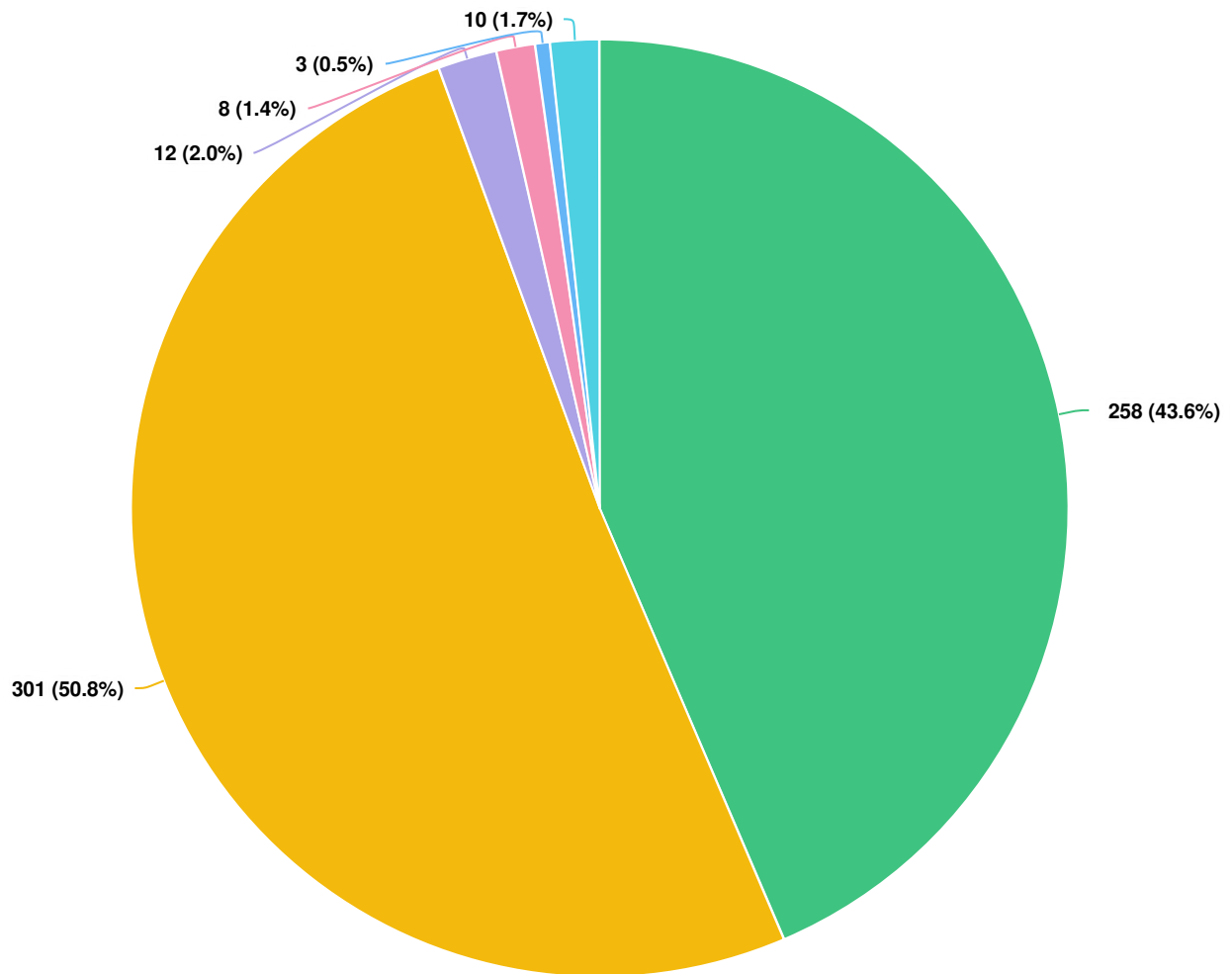


Question options

- Other (please specify)
 ● Not applicable - I already converted my lawn to a water-wise landscape
 ● HOA rules / regulations
- Doesn't save enough water to be worth the effort
 ● Neighbors would disapprove
 ● I like my lawn
- Future maintenance concerns
 ● Knowledge / expertise
 ● Lack of design information (e.g. what plants to use)
 ● Time
- Physical labor involved with converting
 ● Cost

Optional question (573 response(s), 21 skipped)
 Question type: Checkbox Question

Q18 | How important is water conservation compared to other priorities in your life?

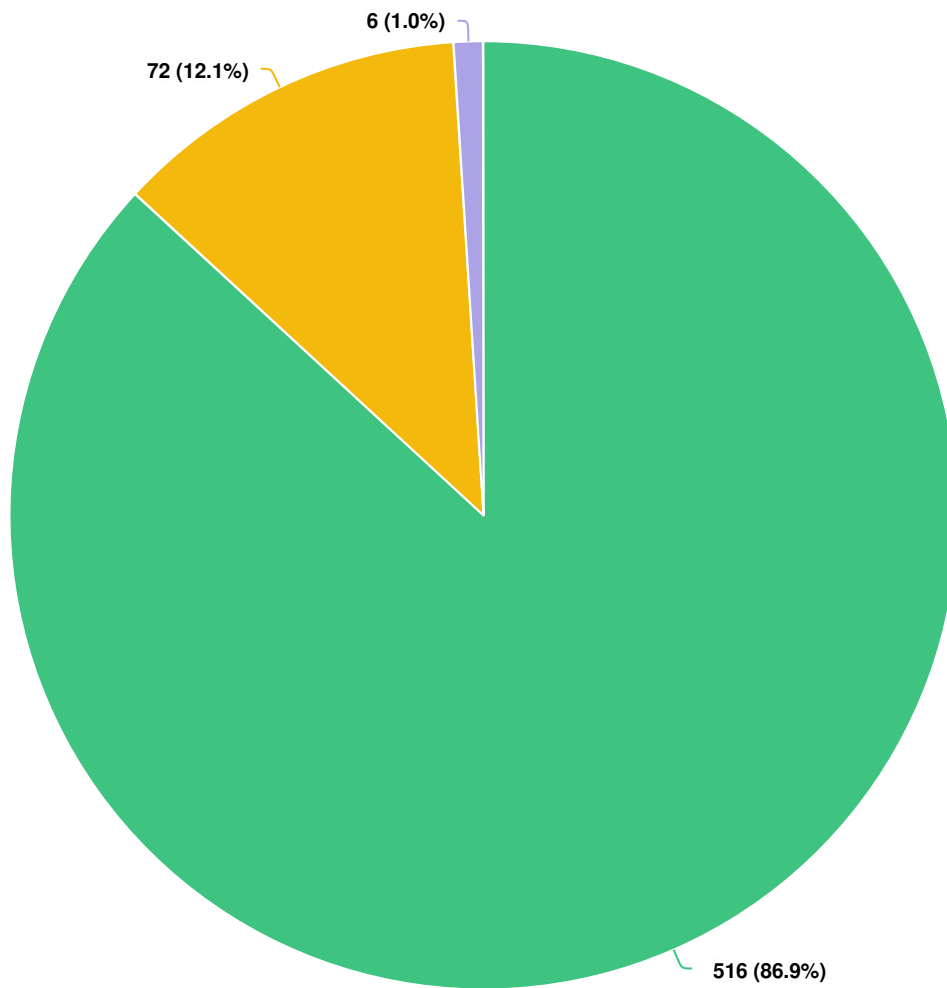


Question options

- Other (please specify)
- I'm not interested in water conservation
- It's important to me, but I don't have the time/resources to take action
- I'm neutral to water conservation
- It's important to me, and I conserve water where I can, but it's not my top priority
- It's very important and I'm actively engaged in my everyday habits

Optional question (592 response(s), 2 skipped)
Question type: Radio Button Question

Q21 | What type of water utility account do you have?

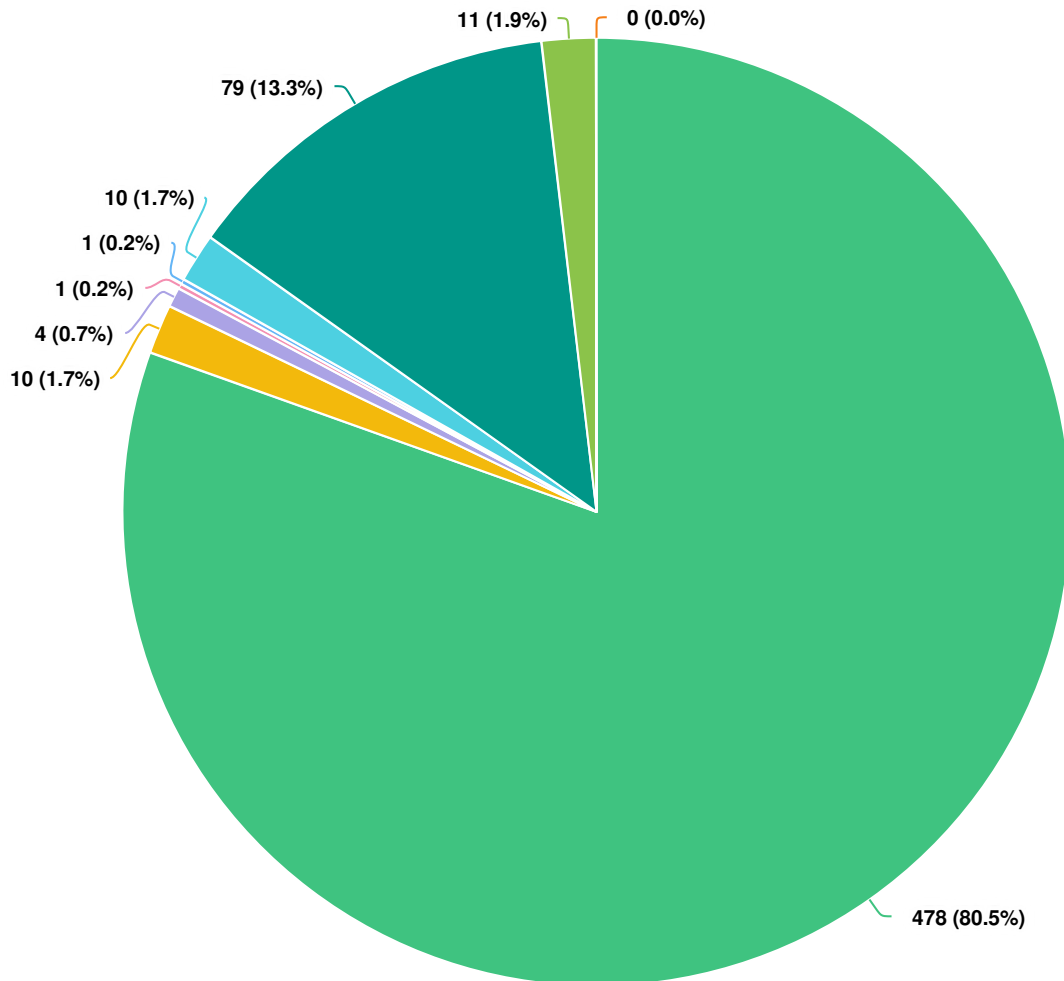


Question options

- Commercial, Industrial, or Institutional
- Large Property (e.g., HOA, multi-family)
- Residential

Mandatory Question (594 response(s))
Question type: Radio Button Question

Q22 Which race or ethnicity do you identify with most?

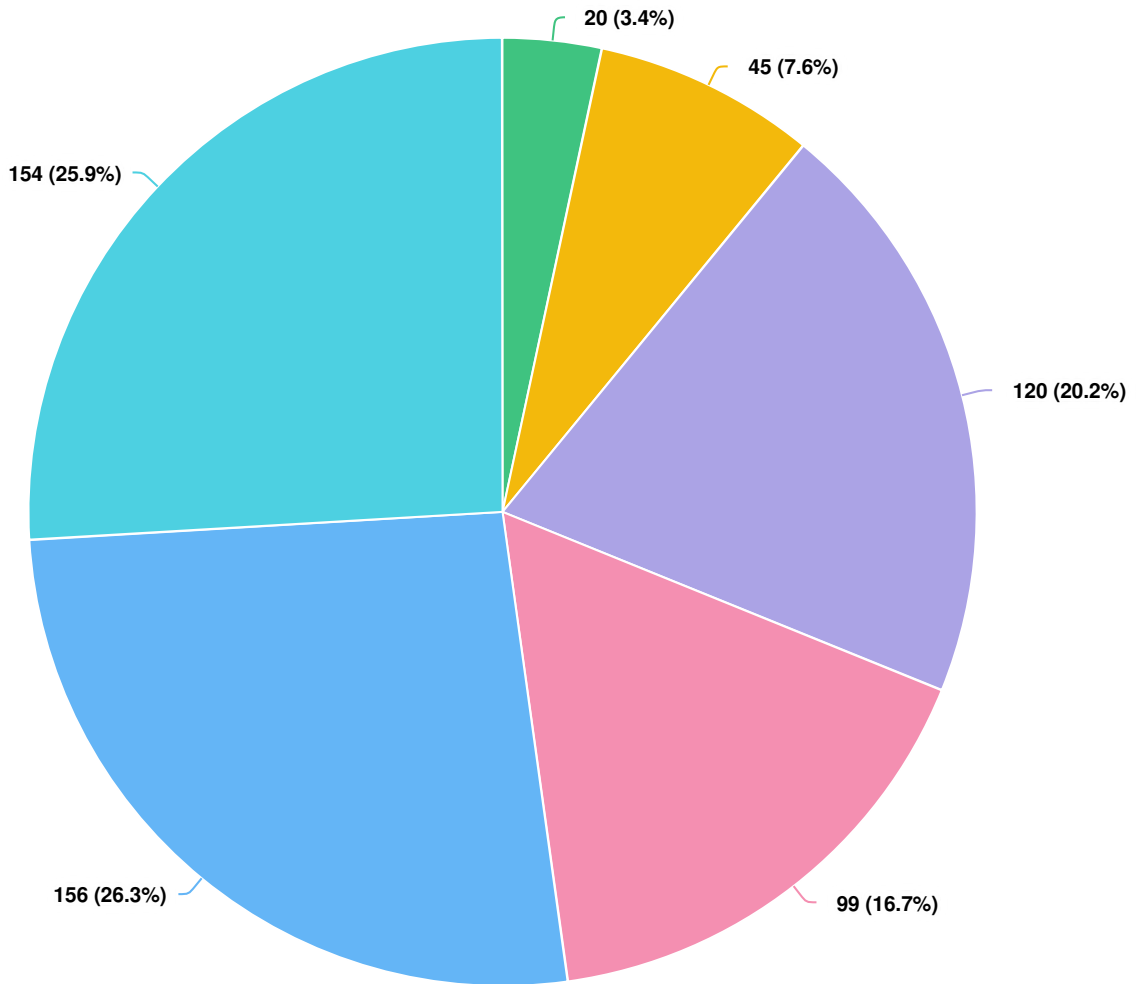


Question options

- Native Hawaiian or other Pacific Islander
- Other (please specify)
- I prefer not to say
- Two or more races
- American Indian or Alaska Native
- Black or African-American
- Asian
- Hispanic or Latino/a
- White

Mandatory Question (594 response(s))
Question type: Radio Button Question

Q23 How would you describe your annual household income?

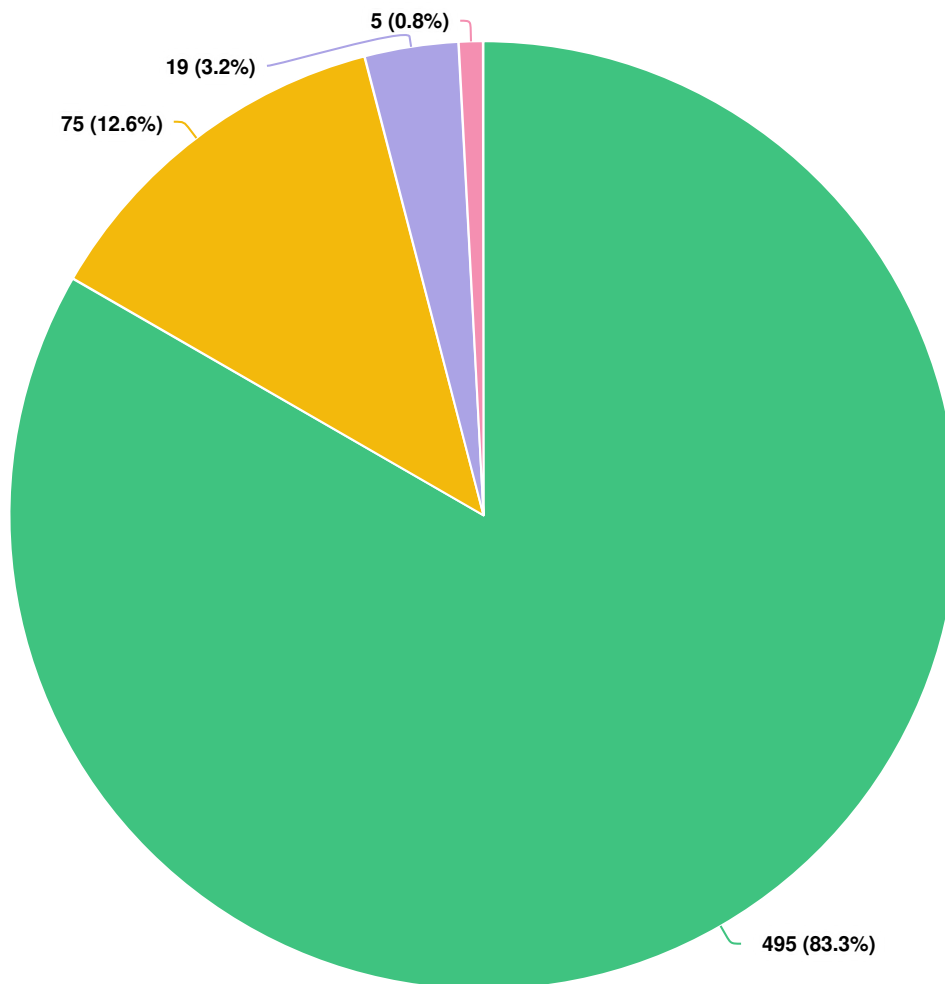


Question options

- I prefer not to say
- \$150,000 a year or more
- \$100,000 to \$149,999 a year
- \$50,000 to \$99,999 a year
- \$25,000 to \$49,999 a year
- Less than \$25,000 a year

Mandatory Question (594 response(s))
Question type: Radio Button Question

Q24 | Do you rent or own your home?

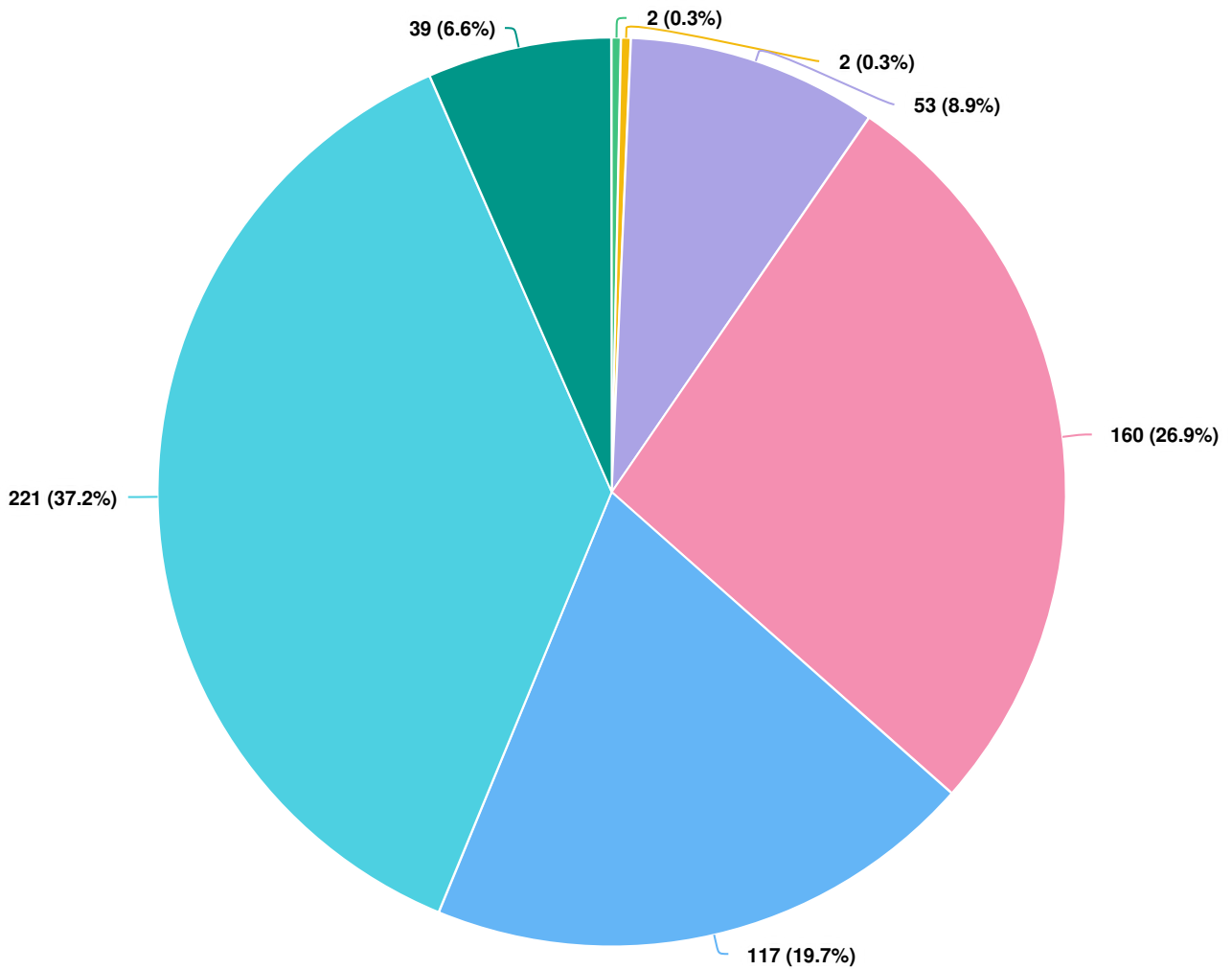


Question options

- Other (please specify)
- Prefer not to say
- Rent
- Own

Mandatory Question (594 response(s))
Question type: Radio Button Question

Q25 | What is your age range?



Question options

- I prefer not to say
- 65 and over
- 55 to 64
- 35 to 54
- 25 to 34
- 18 to 24
- Under 18

Mandatory Question (594 response(s))
Question type: Radio Button Question

Appendix C – WEP Engagement Summary



WATER EFFICIENCY PLAN

COMMUNITY ENGAGEMENT SUMMARY

KEY TOUCH POINTS



1 Single-family Residential

Be Heard Boulder on-line questionnaire - offered in English and Spanish with 595 total responses received.



2 Large Water User Accounts

Stakeholder meeting with a dozen representatives from organizations from the Commercial, Industrial & Institutional sectors as well as HOAs



3 FLOWS Meeting

Meeting with members from the Foundations for Leaders Organizing for Water and Sustainability



4 City Staff Workshop

Staff from multiple departments convened to discuss water efficiency best practices as they relate to the work each department oversees.

5 Water Resource Advisory Board

The project team met with a representative from the Water Resource Advisory Board (WRAB) throughout the project and conducted a public hearing at a WRAB meeting.

BE HEARD BOULDER

02 April - 01 May 2023

594 English Be Heard Boulder Responses
1 Spanish Be Heard Boulder Response

PURPOSE

COLLECT COMMUNITY FEEDBACK & VALUES AROUND WATER EFFICIENCY

HOW FEEDBACK IS

INCLUDED IN THE PLAN

- EVALUATE A PROGRAM FOR CUSTOMERS TO REPLACE OLDER LOW-EFFICIENCY FIXTURES AND APPLIANCES WITH NEW HIGH-EFFICIENCY FIXTURES
- IMPROVE OUTREACH TO THE COMMUNITY ON WATER EFFICIENCY TOPICS AND WATER EFFICIENCY PROGRAMS
- SUPPORT OUTDOOR WATER EFFICIENCY WITHIN CITY OWNED PROPERTIES
- EVALUATE POTENTIAL IMPROVEMENTS OR ADDITIONS TO BOULDER'S WATERWISE DEMONSTRATION GARDEN PROGRAM
- EVALUATE BOULDER'S RULES AND ORDINANCES FOR WATER EFFICIENCY UPGRADES



KEY TAKEAWAYS

- 1 COMMUNITY MEMBERS RANKED WATER-WISE LANDSCAPES, REDUCING THE AMOUNT OF BLUEGRASS, DEVELOPING EDUCATIONAL MATERIAL, AND REDUCING INDOOR WATER USE AS THE HIGHEST PRIORITIES FOR THE CITY TO PURSUE.
- 2 OVER THE NEXT 3-5 YEARS, COMMUNITY MEMBERS EXPRESSED INTEREST IN AN APPLIANCE AND FIXTURE REBATE PROGRAM, VISITING BOULDER'S WATER CONSERVATION WEBPAGE, AND REVIEWING EDUCATIONAL MATERIAL ON WATER-WISE LANDSCAPES
- 3 46% OF RESPONDENTS HAVEN'T PARTICIPATED IN OUR CURRENT PROGRAMS BECAUSE THEY DIDN'T KNOW THEY EXISTED
- 4 COMMUNITY MEMBERS WOULD LIKE TO RECEIVE INFORMATION VIA AN E-NEWSLETTER OR EMAIL
- 5 THERE IS A SLIGHT PREFERENCE TOWARDS PRIORITIZING PUBLIC PROPERTY OVER PRIVATE PROPERTY FOR REDUCING BLUEGRASS FOOTPRINT.
- 6 >90% OF COMMUNITY MEMBERS BELIEVE THE CITY SHOULD ENHANCE THE WATER CONSERVATION PROGRAM/FUNDING

COMMUNITY WORKSHOP

KEY TAKEAWAYS

1 STAKEHOLDER ENGAGEMENT NEEDS TO BE SECTOR SPECIFIC

2 CONSERVATION PROGRAMS SHOULD ALSO BE TARGETED TO LOW INCOME CUSTOMERS, RENTERS, LATINX COMMUNITY

3 CURRENT CODE IS CONTRADICTORY TO SOME WATER-WISE LANDSCAPING BEST PRACTICES

4 NEED TO PRIORITIZE A BEHAVIOR CHANGE AROUND WATER CONSERVATION

5 NEED TO REDUCE THE DISCONNECT BETWEEN PROPERTY OWNER, PROPERTY MANAGEMENT AND ACTUAL WATER USERS

HOW FEEDBACK IS INCLUDED IN THE PLAN

- BOULDER WILL CONSIDER A FEASIBILITY STUDY FOR ADVANCED METERING INFRA-STRUCTURE (AMI) IMPLEMENTATION ACROSS ALL CITY WATER CUSTOMERS
- EVALUATE CUSTOMER WATER BUDGETS AND IDENTIFY POTENTIAL OPPORTUNITIES TO IMPROVE CUSTOMER RATE STRUCTURES. EVALUATE BOULDER'S RULES AND ORDINANCES FOR WATER EFFICIENCY UPGRADES
- IDENTIFY THE POTENTIAL BENEFITS OF SUPPORTING A LANDSCAPE AND IRRIGATION TRAINING PROGRAM.
- IMPROVE OUTREACH TO THE COMMUNITY ON WATER EFFICIENCY TOPICS AND WATER EFFICIENCY PROGRAMS
- EVALUATE OPPORTUNITIES TO SUPPORT WATER CUSTOMERS WITH TECHNICAL ASSISTANCE IN APPLYING FOR WATER EFFICIENCY GRANT FUNDING.



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Representatives of various customer types within the Commercial, Industrial and Institutional sector as well as HOAs

MOVING FORWARD

Look for opportunities to continue conversations with CII customers and HOAs. There is a desire to “do the right thing”

FLAWS

Foundations for Leaders Organizing for Water and Sustainability

15 FLOWS VOLUNTEERS WORKING IN THE COMMUNITY

15

PURPOSE

UNDERSTAND THE ROLE OF EXISTING COMMUNITY GROUPS ALREADY ENGAGED IN WATER CONSERVATION AND HOW THE CITY CAN SUPPORT THEIR EFFORTS

HOW FEEDBACK IS INCLUDED IN THE PLAN

- DEVELOP AND IMPLEMENT A PROCESS TO WORK WITH AND DEVELOP PARTNERSHIPS WITH COMMUNITY GROUPS TO 1) IDENTIFY WATER CONSERVATION NEEDS AND OPPORTUNITIES IN THE COMMUNITY AND 2) SUPPORT COMMUNITY GROUP EFFORTS TO IMPLEMENT WATER CONSERVATION OUTREACH AND PROJECTS IN THE COMMUNITY.
- IDENTIFY THE POTENTIAL BENEFITS OF SUPPORTING A VOLUNTARY TRAINING PROGRAM FOR LANDSCAPE IRRIGATION PROFESSIONALS IN THE TECHNIQUES OF WATER EFFICIENT IRRIGATION.
- EVALUATE A PROGRAM FOR CUSTOMERS TO REPLACE OLDER LOW-EFFICIENCY FIXTURES AND APPLIANCES WITH NEW HIGH-EFFICIENCY FIXTURES.



KEY TAKEAWAYS

1 FLOWS COMMUNITY HOLDS A TON OF INDIVIDUAL KNOWLEDGE - THE CITY NEEDS TO PROTECT THEIR CONTRIBUTIONS AND INTELLECTUAL PROPERTY

- 2** INTENTIONAL ENGAGEMENT WITH UNDER-REPRESENTED COMMUNITY MEMBERS SHOULD BE A PRIORITY
- 3** BE MINDFUL OF USER CATEGORIES - RENTERS MAY NOT PAY THEIR WATER BILLS DIRECTLY AND MAY NOT HAVE IMPACT ON OVERALL SAVINGS
- 4** LANDSCAPE INDUSTRY IS HEAVILY PROVIDED BY LATINX COMMUNITY. HOW DO WE SUPPORT THEM/LIFT THEM UP?
- 5** DEVELOP PARTNERSHIPS WITH ORGANIZATIONS ENGAGED IN THE CONSERVATION WORK IN THE COMMUNITY

CITY STAFF WORKSHOP

KEY TAKEAWAYS

1

BOULDER SHOULD DEMONSTRATE WATER CONSERVATION AND EFFICIENCY AT CITY OWNED FACILITIES AND REDUCE SYSTEM WIDE WATER LOSS

2

ADVANCED METERING INFRASTRUCTURE HAS THE ABILITY TO COMMUNICATE REAL TIME WATER USE TO CUSTOMERS - BOULDER SHOULD IMPLEMENT A PILOT PROJECT TO EVALUATE IMPACTS ON COST AND STAFF RESOURCES

3

BOULDER IS CURRENTLY UNLIKELY TO ADD MUCH NEW DEVELOPMENT, SO WATER EFFICIENCY CODES AND ZONING POLICIES MAY NOT BE AS EFFECTIVE AND SHOULD BE EVALUATED FURTHER.

4

INVESTIGATE WAYS TO PROMOTE WATER EFFICIENCY THROUGH THE USE OF MANUALS, CERTIFICATIONS, POLICY

5

CONTINUE TO ENGAGE WITH COMMUNITY MEMBERS AND DEVELOP AWARENESS ON EDUCATIONAL MATERIAL AND AVAILABILITY OF PROGRAMS.

6

DEMONSTRATION GARDENS AND PILOT PROJECTS WOULD BE BENEFICIAL TO DEVELOP EDUCATIONAL MATERIAL

7

APPLIANCE REBATE AND RETROFIT PROGRAMS COULD BE AN OPPORTUNITY TO HAVE A BIG IMPACT ON WATER SAVINGS

8

CONTINUE TO BUILD INTER-DEPARTMENTAL RELATIONSHIPS TO EMBED WATER CONSERVATION INTO CITY LED EFFORTS

HOW FEEDBACK IS INCLUDED IN THE PLAN

- BOULDER WILL COMPLETE AN INTERNAL ASSESSMENT OF WATER USE AND TREATED WATER PRODUCTION DATA TO PREPARE A WATER LOSS AUDIT.
- BOULDER WILL WORK TO SUPPORT OUTDOOR WATER EFFICIENCY WITHIN CITY OWNED PROPERTIES.
- IMPROVE COMMUNICATION TO CUSTOMERS ON WATER EFFICIENCY TOPICS, INCLUDING PURSUING AN E-NEWSLETTER.
- BOULDER WANTS TO IMPROVE ITS XERISCAPE DEMONSTRATION GARDEN PROGRAM.



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Workshop consisted of 12 separate divisions/departments of the city organization and included representation from our partners at PACE and Resource Central

IDENTIFIED NEED

Work towards building resources within the city organization to support the growing need to enhance the current water conservation program.