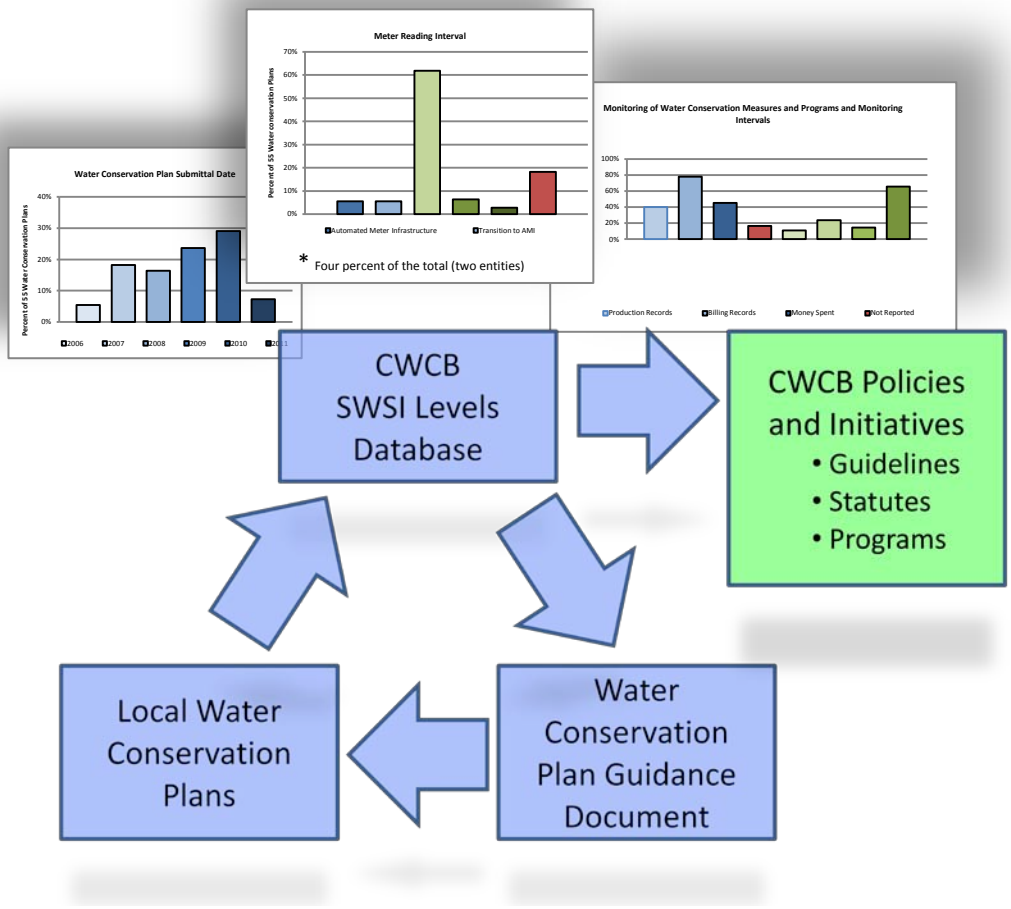
SWSI Conservation Levels Analysis – Phase II

Final Report



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Colorado Water Conservation Board

June 2011

GREAT WESTERN INSTITUTE
Reshaping Water Conservation in the West

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Acknowledgements

This report was prepared under an agreement with the Colorado Water Conservation Board. Technical review and comments were received to guide production of the analyses and the report from the Office of Water Conservation and Drought Planning Section staff.

Section 1
Project Background and Purpose

Background

Water conservation planning and implementation efforts have been ongoing in Colorado at various levels and in various ways for decades. Outdoor water use restrictions employed during non-drought conditions are perhaps the simplest form of local water conservation programs that have persisted over the years.[1] More fundamental water conservations programs conducted by water utilities over the years include those efforts that test for and correct water distribution system losses – both apparent losses and real losses.[2]

However, there currently are no comprehensive archives or databases that capture the breadth of experience and type of successes (and lessons learned) that water utilities and special districts have regarding planning for and implementing water conservation programs – integrated with all the business activities that these organizations conduct (e.g., infrastructure management, financial management, data collection and use, etc.). Having such a database would greatly benefit the State and the State's water providers in a number of ways. For example:

- At the highest level, such a database could be used to inform the Interbasin Compact Commission (IBCC) and Statewide Water Supply Initiative's (SWSI) ongoing research to characterize the gap between current and future water supply needs since future demand reductions influenced by local water conservation efforts will impact the size and timing of the "gap."

- At the next level, data characterizing changing water demands will provide utilities with important insights into what customers and water utilities are doing to reduce future water demand since these linked, but often independent actions, influence water sales and therefore water pricing and future water supply planning for utilities related to treatment, new water development, and delivery infrastructure needs.

- At another level, utilities can use such a database to inform local and regional water conservation planning and implementation efforts – identifying lessons learned (including both successes and failures) by other water providers, and characterizing costs and benefits related to the efficacy of specific types of potential water conservation measures and programs. In this manner, the database can be used to help with benchmarking water conservation planning efforts at the local water provider level.

[1] Non-drought water use restrictions have typically been used to ease peak demand infrastructure limitations, as opposed to water availability limitations.
[2] Apparent losses are those losses related to inaccurate or nonexistent metering of customer water use; whereas real losses are those losses caused by leaking distribution lines and values.

- Finally, water conservation regulation and finance by the State, which is a vital role of the CWCB as determined by the Colorado legislature, can be supported by data obtained from the local water conservation planning and implementation efforts. These data are expected to provide important information on the characteristics of local water conservation efforts regarding:

    - Programs types and costs;
    - Funding needs (and developing priorities for the administration of CWCB grant programs (e.g., water supply reserve account, water efficiency grant program);
    - Potential and realized water demand reductions; and
    - Nuances of water conservation programs based on local conditions.

Figure 1 seeks to illustrate the connectivity between the local water conservation data and these various data uses and planning efforts.

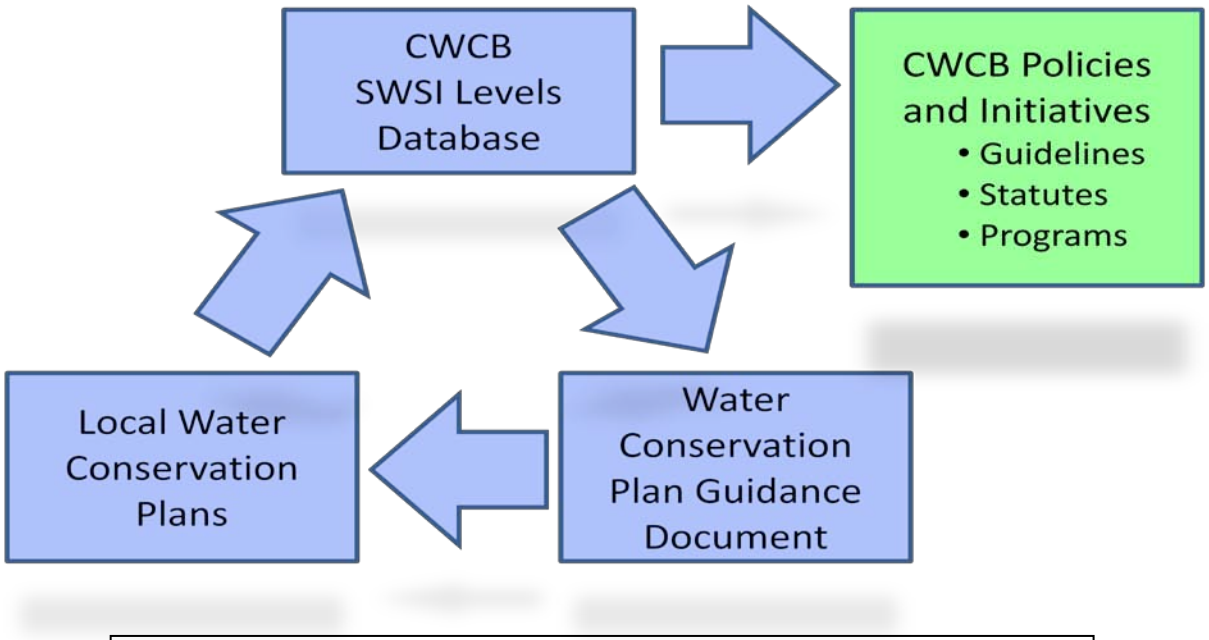


Figure 1- Water Conservation Data Uses and Planning Efforts Flow Chart

Purpose

The purpose of this project is to develop and analyze the SWSI Conservation Levels database that summarizes the currently available data contained in those Water Conservation Plans on file with the CWCB's Office of Water Conservation and Drought Planning (Office) to support the wide set of potential uses described above. To achieve this objective, the database was organized into an expanded SWSI

Levels framework[3] to facilitate organization and analysis of the data. The expanded framework helped to identify:

- Overall trends in water conservation planning efforts;
- Trends in expected future water demand reductions and related water conservation savings;
- Types of water conservation measures and programs selected for implementation by planning entities;
- Goals for preserving or reducing current customer water demands; and
- Expected costs for implementation of selected water conservation programs.

Organizing the data from the Water Conservation Plans into the framework also helped to identify specific challenges and limitations that water utilities[4] have regarding the implementation of certain types of water conservation measures and programs (e.g., development and use of certain types of ordinances).

This project report was therefore performed by the execution of three sets of tasks as follows:

- Develop the expanded SWSI Levels based on past and current CWCB policies and expected data uses.
- Review the Water Conservation Plans on file with the CWCB (a total of 55, see Table 1)) and populate the database with information from those plans.
- Present a summary of observations, findings and recommendations based on the results of the water conservation plan review.

The report presents each of these tasks individually in the sections that follow.

[3] The CWCB developed the SWSI Levels Analysis in 2010 (CWCB, 2010) to re-assess the water conservation classification "levels" developed and used in the SWSI I and to estimate future water demand reductions associated with passive and active water conservation savings. Water conservation in SWSI I was defined as those future demand reductions associated with "passive" and "active" water savings. Passive (or naturally-occurring) water conservation savings are defined as water savings that result from the impacts of plumbing codes, ordinances, and standards that improve the efficiency of water use. These conservation savings are called "passive" savings because water utilities do not actively fund or implement programs that produce these savings. In contrast, water conservation savings from utility-sponsored water conservation programs are referred to as "active" savings (SWSI I, Appendix E, (CDM, 2004)).

[4]For purposes of simplifying the language used in this report, the labels "water utilities" and "water providers" are used interchangeably to represent any entity in Colorado that develops, treats and distributes water on a retail basis for M&I uses, including municipalities, special districts, utilities, and water companies.

Table 1- Water Conservation Plans Reviewed as Part of this Project[5]

• Alamosa, City of • Arapahoe County Water and Wastewater Authority • Arvada, City of (Draft) • Aurora, City of • Boulder, City of • Brighton, City of • Castle Pines Metro District • Castle Pines North Metro District • Castle Rock, Town of • Centennial Water and Sanitation District • Cherokee Water District • Colorado Springs Utilities • Consolidated Mutual Water Company (Draft) • Cortez, City of • Denver Water • Durango, City of (Draft) • East Larimer County Water District • Erie, Town of • Evans, City of • Firestone, Town of • Fort Collins, City of • Fort Collins-Loveland Water District • Fort Lupton, City of • Fort Morgan, City of • Fountain, City of • Grand Valley (Draft) – Clifton Water District – Grand Junction, City of – Ute Water Conservancy District	• Glenwood Springs, City of • Greeley, City of • La Junta, City of (Draft) • Lafayette, City of • Lamar, City of • Left Hand Water District • Longmont, City of • Louisville, Town of (Draft) • Meridian Metropolitan District (Draft) • North Table Mountain Water and Sanitation District • North Weld County Water District • Northglenn, City of • Pagosa Area Water and Sanitation District • Parker Water and Sanitation District • Pinery Water and Wastewater District • Pueblo, City of (Draft) • Rifle, City of • Salida, City of • Security Water District • St Charles Mesa Water District • Steamboat (Draft) – Mount Werner Water – Steamboat Springs, City of • Sterling, City of • Thornton, City of • Tri-County Water Conservancy District • Widefield Water and Sanitation District • Windsor, Town of

[5] Draft plans have been submitted to the CWCB for review and approval in accordance with State requirements; however, staff was conducting the review and approval process at the time of project execution.

Section 2
Policy Implications of the Expanded SWSI Levels Framework

Background

The expanded SWSI Levels Framework was developed based on the recent past and current CWCB policy initiatives which have, or are being developed to support more meaningful water conservation in the State of Colorado. The most important of these efforts include:

- SWSI Conservation Levels Analysis
- Colorado WaterWise Best Practices Guidebook
- HB 10-1051 Statute
- Revised CWCB Water Conservation Planning Guidance Document
- Other Ongoing CWCB and DNR Programs and Initiatives

Insomuch that the expanded framework was informed and shaped by each of these policy programs, each are discussed below.

SWSI Conservation Levels Analysis

In 2010, the CWCB working with the Water Conservation Technical Advisory Group developed "a new framework for characterizing meaningful water conservation[6] at the water utility level." This new framework was used to compare and contrast representative water conservation plan programs proposed since 2006 by local water providers (Great Western Institute, 2010).[7] The new framework has proven to be helpful and effective in directing and shaping local water conservation planning efforts, by identifying levels of program priorities and characterizing the most important features of an effective water conservation plan.

The new framework has proven to be helpful and effective in directing and shaping local water conservation planning efforts, by identifying levels of program priorities and characterizing the most important features of an effective water conservation plan.

[6] The CWCB defines meaningful water conservation as those measures and programs that provide for measurable and verifiable permanent water savings – which may include measures and programs that are being implemented for political reasons and/or to improve customer satisfaction. Although cost-effectiveness is one metric to evaluate and select meaningful water conservation efforts, other selection criteria may be used by planning entities. However, not all water conservation measures and programs can be considered meaningful.

[7] Local water providers that were required to submit updated Water Conservation Plans to the CWCB after July 2006 were considered covered entities. Covered entities are those municipal water providers that have a legal obligation to supply, distribute or provide water at retail to domestic, commercial, industrial, or public facility customers with a total annual demand of 2,000 acre-feet of water or more.

The new framework included measures and programs in the following four categories:

- Foundational Programs for Utilities
- Targeted Customer Technical Assistance and Incentives
- Ordinances and Regulations Controlling Customer Water Use(s)
- Customer Education

The figure below, which is described in the following paragraphs, represents the interrelationship between these four categories.

The SWSI Conservation Levels Framework was based on focusing local water conservation programs being implemented by water utilities on those business practices that a utility can control. Foundational measures and programs are therefore those measures and programs that all water utilities should have in place before embarking on other water conservation measures and programs that they have less control over, and/or do not directly influence utility water efficiencies. These foundational measures and programs involve metering, billing and rates (including water rate structures), water loss management, and data collection and analyses (related to tracking the water efficiency programs and the costs incurred to implement utility efforts). Once these foundational measures and programs are in place, a water utility should have the tools and mechanisms in place to support customer demand management based on utility business-based decision-making and specific customer water use behaviors and needs.

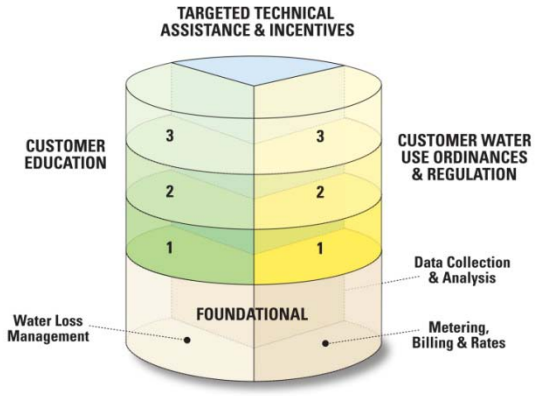


Figure 2 – New SWSI Water Conservation Framework

The remaining three categories of the new framework are built upon the foundational measures and programs conducted by the utility.[8]

The framework developed in 2010 differentiates education from reducing customer demands (through audits and rebates, etc.) from ordinances and regulations. Although these three groups of measures and programs are most effective when implemented in combinations, each has a specific role in meaningful water conservation, and each creates a strikingly different result when implemented independently. For example, providing audits, rebates and incentives to improve the efficiency for ongoing water use has been found to create a market penetration rate often in the range of 10 to 25 percent (Water Resources Engineering, Inc., 2002; Gleick and Cain, 2004; Maddaus, 2007; Whitcomb, 2002). On the other hand, ordinances and regulations have market penetration rates of 100 percent if adequate enforcement and oversight efforts are funded and performed. Education also has the

[8] "Ongoing Water Use Reductions" used as a category in the 2010 SWSI Levels Analysis was renamed to "Targeted Technical Assistance and Incentives" in order to be more descriptive of the category.

potential to penetrate 100 percent of the market; however, education by itself has not been shown to permanently or measurably reduce customer water demand (Artz and Cook, 2007; Chestnut, 2000).

The importance of the new framework reported in the SWSI Conservation Levels Report (Great Western Institute, 2010) is that for the first time, the CWCB has identified specific water conservation related priorities for planning entities. There are other tools that planning entities and the CWCB can use to support local water conservation planning and implementation efforts (e.g., BP Manual (Colorado WaterWise and Aquacraft, 2010), CWCB Water Conservation Guidance Document (Colorado Water Conservation Board and Bouvette Consulting, 2005), GreenCO BMP Manual (GreenCO and Wright Water Engineering, 2008), SWSI 2010 Municipal and Industrial Water Conservation Strategies Report (Aquacraft Inc. and Headwaters Corp, 2010)), but the SWSI Conservation Levels Report provides a key framework for the planning efforts currently be conducted by covered entities throughout the state.

BP Manual

One of the most valuable tools currently available in Colorado to support local water conservation planning efforts is the Colorado WaterWise Guidebook of Best Practices (Colorado WaterWise and Aquacraft, 2010). This guidebook was developed for the following purpose:

> *"The Colorado WaterWise Guidebook of Best Practices for Municipal Water Conservation in Colorado is a planning tool prepared for the purpose of improving and enhancing water efficiency in Colorado. The Best Practices Guidebook for Municipal Water Conservation in Colorado (Best Practices Guidebook for short) offers a detailed description of specific water conservation measures, program elements, regulations, policies, and procedures that can be implemented by Colorado water providers to help ensure reliable and sustainable water supplies for future generations.*
>
> *Colorado WaterWise (CWW) envisions that this Best Practices Guidebook will be used by water professionals including water providers, local governments, consultants, building managers, design engineers, irrigation professionals, and others throughout the state to help select the most sensible and cost effective water conservation measures and programs to implement. Utilities can use the Best Practices guide to help select water conservation program options to include in their conservation plans to be submitted to the Colorado Water Conservation Board (CWCB)."*

The guidebook contains information on 14 best practices (BPs), which align with the requirements of the CWCB and State regulations. The 14 BPs also align with the SWSI Conservation Levels as shown in Table 2.

The presentation of each BP in the guidebook is structured in the same format with a clear definition that describes the practice itself as well as implementation techniques, scope, potential water savings,

water savings estimating procedures, cost effectiveness considerations, and references to assist in implementation.

Table 2 – Alignment of the BPs with the SWSI Conservation Framework

SWSI Conservation Levels		Corresponding BPs
Foundational		
	Metering, Billing and Rates	BP 1, BP 4
	Water Loss Management	BP 3, BP 4
	Data Collection and Analysis	BP 2, BP 4
Targeted Technical Assistance and Incentives		
	Level 1 – Utility Facilities	BP 7, BP 9, BP 10, BP 12, BP 14
	Level 2 – Largest Customers	BP 7, BP 9, BP 10, BP 12, BP 13, BP 14
	Level 3 – Remaining Customers	BP 7, BP 9, BP 10, BP 12, BP 13, BP 14
Customer Water Use Ordinances and Regulation		
	Level 1 – Water Waste	BP 5
	Level 2 – New Construction	BP 8, BP 11
	Level 3 – Retrofit/Upgrade of Existing Construction	BP 8
Customer Education		
	Level 1 – One-Way	BP 6
	Level 2 – One-Way with Feedback	BP 6
	Level 3 – Two-Way	BP 6

Although the guidebook presents valuable information regarding these various topic areas, it does not provide a listing of key priorities that water utilities should include in local water conservation planning efforts, per se. The guidebook does contain a listing of six "foundational – no excuses" BPs that water utilities should have addressed within their water conservation plan which align fairly well with the SWSI Conservation Levels. However, there are a few notable exceptions since the foundational BPs in the guidebook include water waste ordinances and education.

Since the SWSI Conservation Levels included ordinances and education as separate categories, these two "foundational – no excuses" BPs will be tracked within those categories in the Expanded SWSI Levels Analysis. This has been done for two reasons.

- First, the expanded SWSI Levels Analysis will be used to create the framework for developing and populating a database that will be used to track local water conservation planning efforts. Therefore, it makes sense to track ordinances and education in separate worksheets in the database that address those kinds of measures and programs to minimize redundancy in the database, and eliminate potential confusion to future users of the database.

- Second, the efficacy of education and/or water waste ordinances (which may be unenforced and/or voluntary) to create meaningful water conservation is unclear. For example, some educational programs related to one-way communications (e.g., bill stuffers, websites, mass

mailings, etc.) may not create measurable water savings (Artz and Cook, 2007; Chestnut, 2000). As for water waste ordinances, there are some water utilities that have indicated in their planning efforts that they use water waste ordinances as a drought response measure (versus a water conservation measure) and that until drought conditions persist, all water waste is adhered to on a voluntary basis. Voluntary water waste practices may not produce measurable water savings if customers are either unaware of the programs and/or not influenced by the lack of enforcement measures in place.

Therefore, these two measures and programs are best allocated to non-foundational categories.

One addition to the original SWSI Conservation Levels foundational framework was the BP for water conservation staff. This was considered to be a foundational measure and program for water utilities since it involved allocation of resources that the utility controls – namely job responsibilities and staffing. Although having dedicated staff to water conservation does not create measurable water savings, programs that the staff managed will create savings; and having staff will facilitate the implementation of meaningful water conservation measures and programs, including the collection and analysis of water use data that tracks costs and water savings associated with implementation efforts. For these reasons, having dedicated water conservation staff (even if not full time) was considered to be a foundational measure and program for water utilities.

House Bill 10-1051

HB 10-1051 is a bill "concerning additional information regarding covered entities' water efficiency plans (see Appendix A for the House Bill)." In this bill, the CWCB is required to develop guidelines defining how covered entities shall report water use and conservation data; ostensibly to support statewide water supply planning. Given that the data currently contained in Water Conservation Plans can be categorized as both water use and conservation data, it will be helpful to use information contained in the plans on file with the State to inform the guidelines that the CWCB is required by statute to develop.

To this end, the framework that is developed as part of this project will need to organize and summarize those data that have already been reported to the State. In addition, the database that is created as part of this project must be effective in not only capturing the characteristics and attributes of the existing data, but must be flexible enough to capture and organize data reported by covered entities in the future. For these reasons, the expanded SWSI Framework database will contain not only data worksheets for the four framework categories (i.e., foundational, targeted technical assistance and incentives, ordinances and regulation, and education), but it will also contain summary data tracking other key attributes such as:

- Current and projected water use
- Categories of water use customers
- Non-revenue water

- Estimates of population served and number of connections/taps
- Expected water savings goals
- Implementation costs

Revised CWCB Water Conservation Planning Guidance Document

The CWCB is currently developing a revised guidance document that will provide direction and support to those covered entities, and other water utilities, that are developing and updating Water Conservation Plans. The review of past Water Conservation Plans, and the summary of data that has been reported to the Office as part of past plan submittal and approval efforts, will play an important role in helping to develop a better guidance document. Of particular importance will be the following areas of plan development and reporting:

- Current foundational measures and programs being conducted by utilities (some past plans have excluded reporting on foundational measures and programs being conducted by the planning entity);
- Reporting on customer categories of water use, including a listing of the utilities largest water users;
- Reporting on monitoring and verification efforts that will be used to identify water demand reductions and clarify for the utility the benefits of ongoing water conservation efforts;
- Developing meaningful goals including differentiating the impacts of passive savings[9], drought impacts, and active conservation efforts conducted by local water utilities;
- Documenting local water use forecasting methods;
- Reporting consistently and accurately on water loss (real and apparent);

Other findings related to this phase of the SWSI Conservation Levels Analysis will also be helpful in shaping the content of the revised guidance document.

The framework and database that this project creates will have a clear link to the ongoing SWSI efforts, including the support of future decision support system development and basin level planning.

Other Ongoing CWCB and DNR Programs and Initiatives, and the Water Conservation Database

The CWCB initiated Statewide Water Supply Initiative (SWSI) has been ongoing since 2004. As SWSI has matured and developed, it has taken on characterizing the impacts of water conservation on future demands – both with respect to passive and active water demand reductions. Better characterization of future M&I demands has been used to inform both statewide and major river basin planning efforts and evaluations, and will continue for many years to come. The framework and database that this project

[9] See footnote 3 on page 4 for a definition of "passive savings."

creates will have a clear link to the ongoing SWSI efforts, including the support of future decision support system development and basin level planning.

The exact nature of how this project supports and integrates with SWSI and other CWCB and DNR programs, studies and investigations will evolve over time[10]. It is nonetheless clear that for the water conservation database to effectively support statewide water supply planning, the data must be organized in a manner that makes it accessible and expandable in the future as more data becomes available. For current circumstances, the new framework is an effective tool with which to organize the water conservation database (populated with information contained in those Water Conservation Plans on file with the CWCB). In the future, it may be that the database needs to be amended or revised, but for now organizing data into the four categories described by the new framework (in addition to the summary and cost tables):

- Is consistent with the types and nature of data that is available in the Water Conservation Plans that are on file with the Office; and
- Aligns with the priorities and structure of water conservation plans that the planning entities should be striving to develop.

[10] Including, but not limited to the Basin Needs Assessments, the Basin Reports being produced by the Round Tables, the Basin Needs Decision Support System (BNDSS), and the Water Conservation Strategies Report.

Section 3
SWSI Conservation Levels and Water Conservation Database Design

The design of the water conservation database is governed by the expanded SWSI Levels and by those influencing policies and programs described above. As indicated prior, the four categories of the expanded SWSI Levels are:

- Foundational
- Targeted Technical Assistance and Incentives
- Ordinances
- Education

Three additional tables – a summary table, a listing of planning entity customer types and non-revenue water[11], and a cost table – have been developed to capture Water Conservation Plan data and inform the various policies and programs being developed by and within the state.

The water conservation database, created to capture and summarize data reported in the water conservation plans submitted to the CWCB, is organized into individual worksheets defined by the "SWSI Levels" and "tables" listed above. In this format, the information can be readily accessed, and planning organizations can find specific information on measures and programs based on the SWSI Level categories. Using this format also helps to reinforce the core differences between different types of water conservation planning elements.

Table 3 summarizes the types of data and data attributes that are contained in each database worksheet. Table 3 also summarizes those data that are captured in the summary worksheet (including those water use and water system data, and characteristics important for current and future evaluations of water conservation program effectiveness), and the cost worksheet.

[11] Non-revenue water is a term that has been developed by the American Water Works Association (AWWA) to describe the water that a water company or utility produces by does not sell. The components of non-revenue water include real losses (due to leaks, etc.) and apparent losses (due to inaccurate meters, etc.). Non-revenue water also includes unbilled authorized uses such as hydrant flushing, filter backwash, etc. This report will use the term non-revenue water in place of the less accurate term unaccounted for water.

Table 3 -Summary of Collected Data

Summary • Submittal Date • Planning Horizon • End of Planning Horizon • Stated Water Demand Reduction at end of Planning Horizon • Current number of connections • Current Demand (at planning submittal) • Future Forecasted Demand without Water Conservation • Future Forecasted Demand with Water Conservation • Projected Water Demand Reduction in 2020 • Population • Per Capita Water Use • Water Demand Reductions • Expected Passive Savings through 2020 **Foundational** • Metering and Data Collection • Type of Billing • Demand Management with Tap Fees • Water Loss Tracking and Management • Data Tracking • Planning • Staff **Targeted Technical Assistance and Incentives** • Utility/Municipal Facility Water Use Efficiency • Understanding of Largest Customers • Reducing Large Uses • Incentives • Technical Assistance	**Customer Water Use Ordinances and Regulation** • Time of Day Watering Restrictions • Day of Week Watering Restrictions • Water Waste • Ability to Levy Fines • Green Building Construction • Soil Amendments • Turf Restrictions • Landscape Requirements • Indoor Plumbing Codes • Point-of-Sale Ordinances • Non-Residential Requirements • Reuse • Non-potable • Limitation on Residential Water Use **Customer Education** • One way • One way with feedback • Two way **Costs to Implement** • Cost by SWSI Level Category • Cost by Water Conservation Measure and Program • Costs for Monitoring and Verification **Customer Categories and Unaccounted For Water** • Customer Categories for Each Planning Entity • Reported % Unaccounted For Water by Entity

Section 4
Water Conservation Plan Data

This section is an overview of all the Water Conservation Plans on file with the CWCB using the SWSI Levels framework as the means to review and summarize water conservation goals and goal setting, planning elements, and expected outcomes. Each worksheet listed in Table 3 will be discussed and presented.

Summary Data

The water conservation planning efforts conducted at the local level by the State's covered entities (and in some cases smaller water providers that are not yet covered entities) is governed by State statute CRS 37-60-126.5 (see Appendix B). This statute indicates the minimum requirements for local water conservation planning. The Office has further clarified these requirements through its guidelines which expand upon the statutory requirements for those entities seeking Water Efficiency Grant Funding. In addition, the CWCB has adopted a guidance document that supports and guides meaningful local water conservation planning based on a nine step planning process developed by US Environmental Protection Agency for water utilities.

Water Conservation Plans submitted to the Office contain substantial information characterizing current and future water demands; water system characteristics; and the value and use of water conservation efforts at a local level. These data have been captured in the database to assist the CWCB in its efforts to understand and support the water conservation needs of the water provider community in Colorado. Key to the characterization of local water conservation programs is an understanding of the current and future water demands in each location and the relative importance of water conservation in future demand management.

Appendix C contains the worksheet created to capture the summary data contained in the Water Conservation Plans submitted to the Office for review and approval. This worksheet contains data reported within each individual plan, including those attributes listed in Table 3.

For the purposes of this report, the following attributes and planning characteristics will be discussed:

- Overall planning horizon for water providers;
- Water conservation goals and estimated demand reductions;
- Water demand forecasting methods;
- Key water use characteristics (e.g., gallons per capita per day (gpcd))

These summary attributes were selected since:

- There was substantial data available from the plans to characterize each data type;
- Each attribute plays part of a vital role in understanding the current status of water conservation planning in Colorado; and
- The analyses presented based on these data help to inform future decisions that the CWCB and the IBCC will be making regarding water conservation planning and the role of water conservation in meeting future water demands statewide.

Each of these data types are discussed and summarized in the text that follows.

Planning Horizon and Plan Updates

The typical planning horizon (median) used by those covered entities submitting plans to the Office was 10 years, with the average planning horizon length being 12 years beginning when the plan was submitted (See Figure 3). Planning horizons ranged from one year to 40 years, noting that 60% of the plans had a planning horizon between 7 and 10 years and another 10% of the plans had planning horizons less than 7 years. The State statute requires that Water Conservation Plans be updated with the CWCB once every 7 years; however, it is reasonable for planning entities to use a planning horizon longer than the 7 year period required for updates since a planning horizon should take into account mid- to long-term trends in water use and water supply.

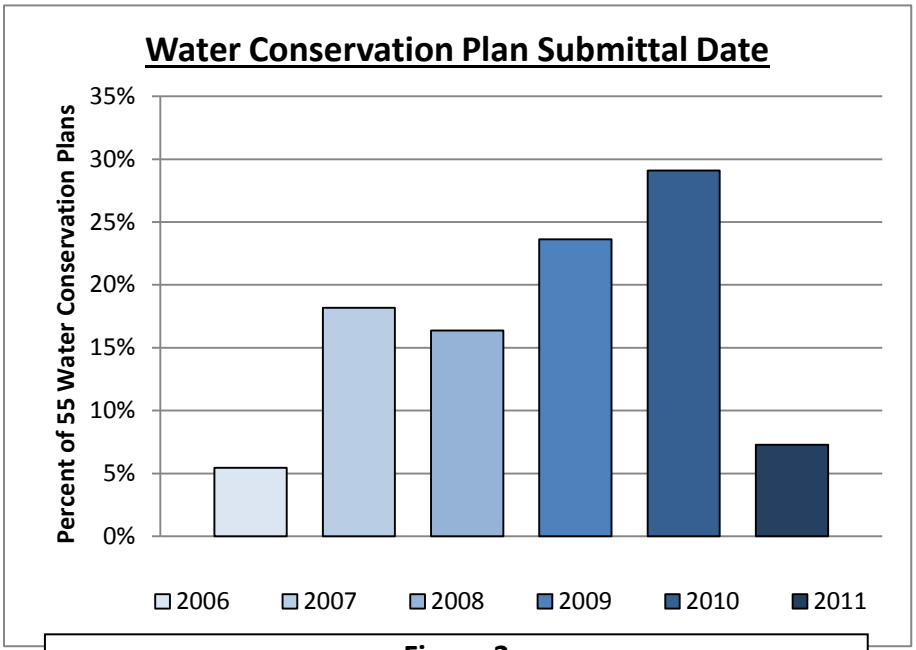


Figure 3

Given that the state of the science of water conservation is changing rapidly, due to changes in technology, and customer water use behaviors, planning entities should be collecting data and re-evaluating the efficacy of their plans and programs regularly. It is therefore recommended that utilities collect and analyze data characterizing their customer water use and water conservation implementation costs on a yearly basis, such that information regarding the successes and challenges of specific water conservation programs can be collected and used to inform future utility decision-making and resource expenditures.

Note that some of the State's water utilities have the resources and staff to continually collect and analyze data; and revise their water conservation programs. These utilities, which are typically those planning entities that have need for aggressive water conservation programs, realize a benefit in the enactment of a continuous improvement approach to water conservation, in part because the science of water conservation implementation is still developing.

Some utilities that would benefit from more aggressive water conservation programs lack the resources to perform such rigorous analyses. These organizations may benefit from utilizing alternative staffing methods to support annual reviews of their efforts to support reporting within their organizations and help in the allocation of utility resources in support of the best programs related to their stated goals. See page 28 for a discussion of how many planning entities have full- and part-time staff.

Goals and Estimated Water Demand Reductions

Water providers are required to estimate the amount of water that will be saved due to the implementation of their water conservation plan measures and programs. Guidelines and regulations do not presently exist regarding the amount of water savings that are required for any planning entity, therefore water conservation goals range from future demand reductions of between 0% to 39% depending on the nature of the water provider's water rights portfolio, expected growth, infrastructure limitations, and past water use reductions.[12]

Comparing and contrasting water conservation goals is challenging given that the goals contained in each water conservation plan are dependent on the planning horizon for each planning entity as well as a number of other factors. Therefore, future water demands with and without water conservation programs specified in the plans on file with the Office were normalized to the year 2020 using information contained in the plans. Water demands and water savings were extrapolated for those organizations with planning horizons that did not reach 2020; and were interpolated for those that did. In general, linear extrapolations and interpolations were used except in those situations that were dictated by either:

- Build-out conditions occurring before 2020; or
- Water demands and savings were specifically included in the referenced plan for the year 2020.

Based on the estimates contained in the Summary Worksheet presented in Appendix C, the following observations were made:

[12] Note that some planning entities do not have the need to fund water conservation programs due to their water rights portfolio, nature of their water rights, a lack of available carry-over storage, limited future growth, and/or other considerations and circumstances. Nonetheless, it is valuable for all planning entities to develop an understanding of their foundational programs and they behaviors and needs of their water customers.

- Current water demand (for planning year[13]) for the 55 planning entities is approximately 742,000 AF.
- Forecasted water demand for the 55 planning entities in 2020 is 967,000 AF, or an increase of 30% over current demands.
- Total water demand reductions associated with the combined water conservation programs proposed for implementation of the 55 planning entities is about 80,000 AF or about 8.3% of forecasted demands in 2020.

…the goals that have been stated by the water providers in their plans on average may roughly align with the expected passive savings quantified by the CWCB for the period between 2008 and 2020.

Noteworthy is that the water conservation goals identified within each of the Water Conservation Plans submitted to the Office did not differentiate the impacts of active versus passive water savings related to future water provider programs and customer influences, respectively.[14] Passive savings estimates for the period from 2008 to 2020 (Great Western Institute, 2010), range from about 5 to 8% of total M&I demand.[15] Therefore, using this broad assessment, the goals that have been stated by the water providers in their plans on average may roughly align with the expected passive savings quantified by the CWCB for the period between 2008 and 2020.

A more detailed analysis indicates that the majority of water providers have water demand reduction goals that exceed the passive savings estimates for their specific geography, since passive savings are dependent upon a number of local attributes (e.g., potential for growth before 2016, age of local housing stock, etc.). The breakdown of those entities with goals less than estimated passive savings, versus those with goals greater than passive savings are summarized in Table 4.

Based on these summary data, it would appear that the local planning efforts have not necessarily incorporated the effects of local passive water savings into goal setting or plan implementation. This is understandable given that the passive savings analyses have only been available since June 2010.

This is a fundamental change that needs to be included into the local planning efforts; otherwise, local entities may not properly account for the impact of passive savings when assessing future customer water use data; which may result in overestimating the impact and value of utility sponsored water

[13] Planning date varies from 2006 to 2011.

[14] Passive (or naturally-occurring) water conservation savings are defined as water savings that result from the impacts of plumbing codes, ordinances, and standards that improve the efficiency of water use. These conservation savings are called "passive" savings because water utilities do not actively fund or implement programs that produce these savings. In contrast, water conservation savings from utility-sponsored water conservation programs are referred to as "active" savings (CDM, 2004).

[15] Actual estimated passive savings may range from as low as 2% and as high as 16% depending on the rate of growth and the current size and age of the housing stock. The values reported in the text relate to averages statewide. Appendix C contains the location specific estimates for passive savings related to each planning entity.

conservation measures and programs. For this reason, planning entities need to include the impact of passive savings in the development of future water demand forecasts and local water conservation goals.[16]

Table 4 - Comparison of Planning Entities Water Conservation Goals with Expected Passive Water Conservation Savings

	% of Planning Entities	% of Total Forecasted 2020 Water Demands Represented by Planning Entities (of 967,000 AF)	Average Water Demand Reduction Forecasted by 2020[17]
Those with Goals Below Passive Savings Estimates	31	23	4.1%
Those with Goals Above Passive Savings Estimates	69	77	9.4%

Figure 4 presents a depiction of how passive savings impacts will influence future water demands, and how future water conservation goals should be developed to account for this influence.

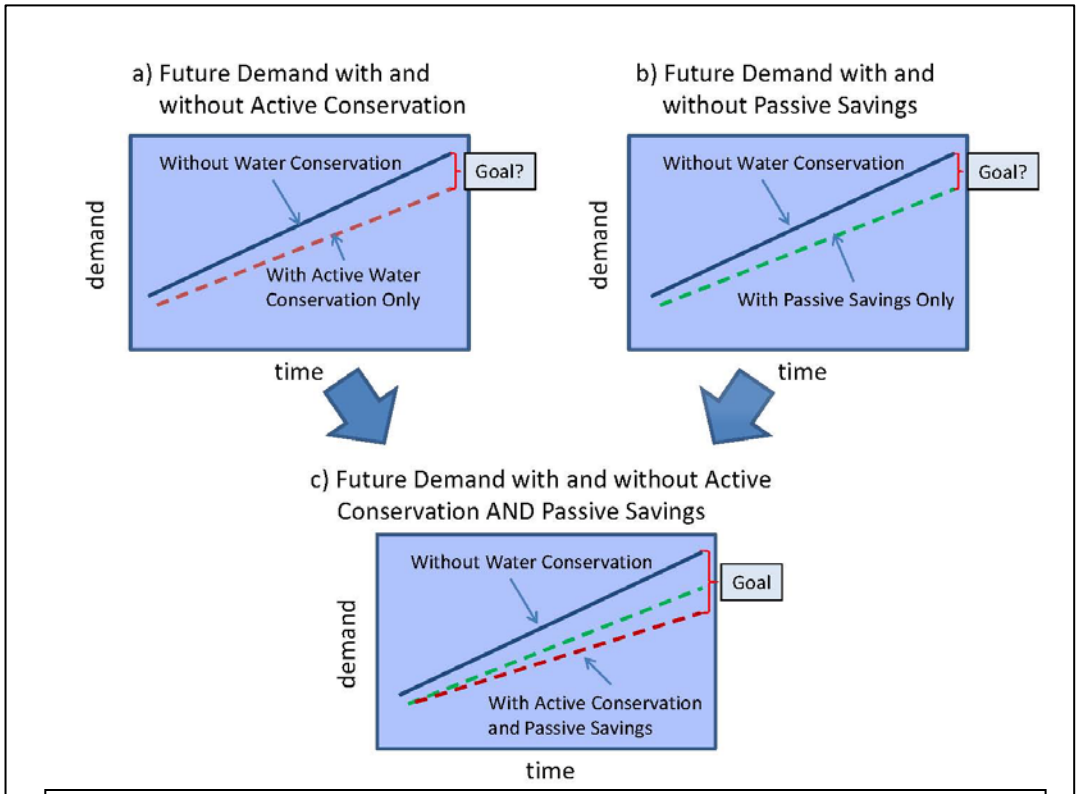


Figure 4 – Effect of Passive Savings on Water Conservation Goal Setting

[16] There is also evidence that some water utilities have not differentiated the impact of the 2002-3 drought on their estimated water conservation savings. These entities may have attributed past reductions in customer water use to the effects of active conservation programs instead of drought impacts. Planning entities will need to conduct evaluations that help them to differentiate the potential impacts of passive savings, and the impacts of past and future droughts from active savings programs.

[17] Based on planning entity estimates for reducing forecasted 2020 water demands.

Water Demand Forecasting Methods

Another key attribute of the Water Conservation Plans that has been of interest to the CWCB and other statewide planning efforts relates to local water demand forecasting methods. SWSI has used a combination of population data and gallons per capita per day (GPCD) for forecasting future water demand on a "by county basis." As indicated by the Water Conservation Plans, local water providers use various methods to forecast water demands, including population and per capita water use, per tap and per equivalent tap methods, and other methods that estimate the number of persons per tap, and/or the number of future jobs to taps, etc. Figure 3 presents a summary of the forecasting methods presented in the plans on file with the Office.

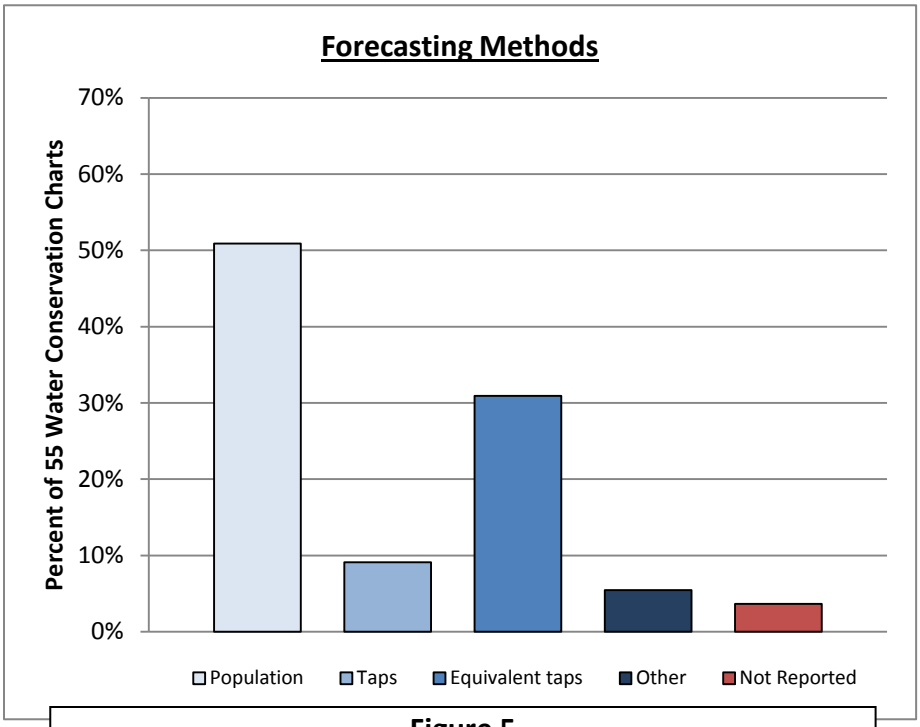


Figure 5

Based on the available data, about 50% of the planning entities use a population based forecasting method. Note that the population based forecasting method is used chiefly with those planning entities that are municipalities or public utilities. Planning entities that are special districts were found to typically use tap and/or equivalent tap based forecasting methods.

For those entities that use population based forecasting methods, the majority used per capita water use to estimate future water demands. However, many organizations combined per capita water use demand forecasting for residential use with other methods to forecast commercial use. For example, East Larimer County Water District, Castle Pines North, Louisville and Lafayette used acres of development to predict future commercial water demand. Brighton, Pagosa Springs and Longmont used projected commercial growth rates to estimate future commercial water use.

GPCD in Water Conservation Planning and Monitoring

GPCD is one metric that was typically reported in Water Conservation Plans submitted to the Office. GPCD is consistently included in water conservation discussions and planning efforts even though the calculation and use of GPCD can be somewhat controversial. For example, GPCD can be influenced by water use characteristics that can be beyond a local water provider's control (e.g., GPCD is influenced by

land use, tourism, non-residential uses, etc.). Even GPCD calculated solely for residential use may be influenced by factors not under the control of a local water provider since factors such as lot size, age of housing stock and local community norms can impact average per person water use.

The majority of planning entities used GPCD to track past water use efficiency since GPCD normalizes water demand using population served (thus removing most of the impact of population growth on increased water demands). Although GPCD is an effective means to track system wide and residential per capita water use, as previously stated it has limitations as well. These limitations include the following:

- Water providers with large tourism-based use cannot effectively track population served, especially in areas with large seasonal and or fluctuating daily use (e.g., Vail, Pagosa Springs, Steamboat Springs).
- Special districts and municipal water providers sometimes have more difficulty accurately tracking population served within their service area since organizational databases typically track billed water and treated water distribution (both of which are based on numbers of taps and customer connections).
- Water use within different customer classes can be substantially different from one community to the next, even for residential use, depending on the age of the housing stock, lot size, and the market penetration of automated sprinkler systems.
- Many Colorado communities have large commercial and/or industrial uses which can skew system wide per capita water use. [18]

Although tracking per capita water use is a valuable metric for judging the impacts of active and passive water conservation (as well as the impacts of drought) at a local level, the broad-based use of the parameter(s) for comparison between water providers is not reliable and may create unrealistic understandings of local water conservation planning and implementation efforts. For these reasons, use of GPCD to compare water use from community to community is not suggested (Dziegielewski and Keifer, 2010).[19]

[18] About 20% of the planning entities forecast increases in system wide per capita water use (including the effects of water conservation) by 2020 as compared to current per capita water use including the impacts of future water conservation. These increases are in areas with large expected growth in commercial water use and/or other non-residential uses (i.e., City of Boulder, City of Brighton, Centennial Water and Sanitation District, East Larimer County Water District, Town of Erie, Town of Evans, City of Fountain, Left Hand Water District, City of Louisville, and Pagosa Springs Area Water and Sanitation District).

[19] For effective monitoring and verification of ongoing water conservation measures and programs, water providers must be constantly mindful of the impacts of non-active water conservation influences such as drought and related drought responses (e.g., watering restrictions) and passive savings on current and future water demands. Water providers must collect data that helps them to differentiate these influences on water use, and be able to quantify the specific impact of their active conservation measures and programs to support utility-level decision making.

Foundational Components of the Water Conservation Plans

The foundational components of water conservation planning have been identified through analyses performed by the Office and the CWCB, most notably including the 2010 SWSI Conservation Levels Analysis and the Colorado WaterWise Guidebook. These policy statements have identified that water conservation planning by local water providers should include the discussion of a number of key elements - foundational elements - that are integral to utility operations and effective water conservation planning and implementation. These foundational elements, or components, are those that the planning entity conducts on a daily basis to manage the organization's assets including:

- Metering and billing
- Meter testing and replacement
- Rates
- Tracking water losses
- Leak detection and repair
- Water line replacement
- Staffing
- Data tracking and monitoring
- Water resources planning

Insomuch as the Water Conservation Plans on file with the Office include information regarding foundational components of the planning entities operations, these data were tracked and organized as part of this project (see Appendix D). The results of this tracking and organizing effort are presented below.

Metering and Billing (BP 1, BP 4)

The most basic of interfaces between the utility and its customers is the meter which registers use and is the basis for the vast majority of all billings.[20] Metering in the past involved the installation of a mechanical mechanism that counted the number of gallons (or tens or hundreds or thousands of gallons) that a customer drew from the utility's distribution system. Today, there are a number of alternative meter reading devices that allow for mechanical and electromagnetic measurements that can be either manually or electronically collected.

Increasingly, Colorado's water utilities are installing automated meter reading (AMR) technology on existing meters to allow for the collection of water use data using remote sensing or drive-by data collection technologies. This upgrade in technology not only improves the accuracy of data collection (i.e., there are less misread meters or transcription errors), but AMR also reduces the cost of data collection by reducing the time required to read meters and record the usage. For certain high altitude

[20] Some utilities have flat rate billings for construction water use and other small uses.

and mountain communities, AMR also allows for the collection of water usage during periods of time when meters are inaccessible due to snow and other seasonal impediments.

AMR technology can be enhanced with advanced metering infrastructure (AMI) that allows for the transmittal of water use data electronically to the utility, bypassing the need for meter reading to occur at or near the customer. AMI allows the utility to not only collect water use data at any time, but it allows for the detection of leaks by monitoring off hour water use on an hourly basis.[21] This is a benefit for both the water efficient utility and its customers.

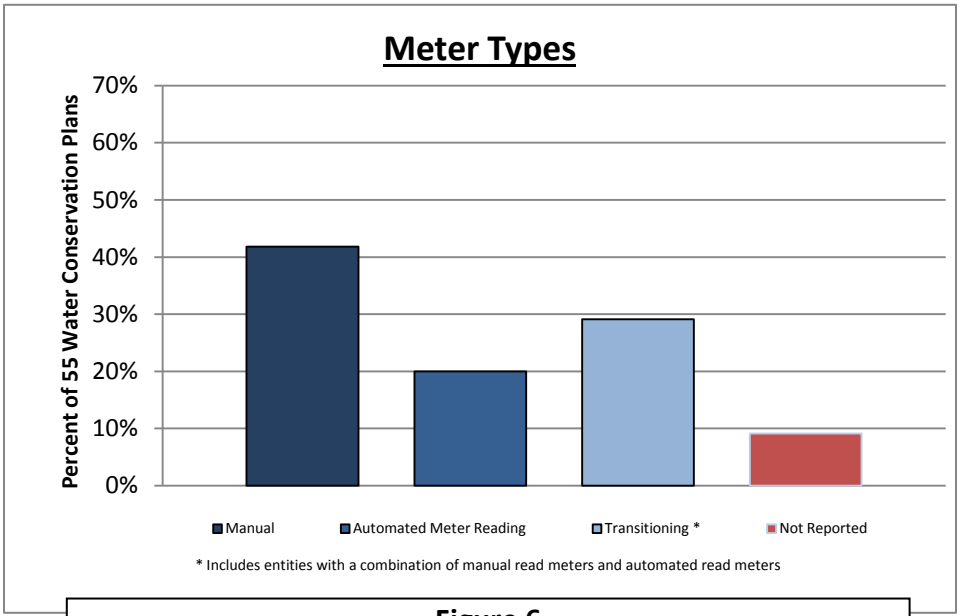


Figure 6

Currently, just over 40% of planning entities have only manually read meters, with another 29% in transition (meaning that about 70% of the planning entities have some amount of manual-read meters in place). This means that nearly 50% of the planning entities have some AMR systems in place, noting that 20% have 100% coverage of AMR for metered customers (see Figure 6).[22] Note that some utilities have focused AMR installations on their largest water users (e.g., Longmont, Colorado Springs), since the cost of AMR installations can be substantial.[23]

One about fourth of the utilities that have some amount of AMR (27) have begun to transition to AMI (7) (which amounts to about 12% of all planning utilities); including the only two entities that have complete AMI systems - Pagosa Springs Area Water and Sanitation District and Consolidated Mutual.

Given that about 40% of the planning entities have only manual-read meters and about 70% of planning entities have at least some manual-read meters, consistent meter reading and water use data accuracy many still be impacted by reader error, weather impacts, and meter access. Tracking customer water

[21] Pagosa Springs Area Water and Sanitation District uses AMI to detect middle of the night water use in seasonal properties. Red flag warnings are sent to staff each morning identifying properties that have unexpected usage. Leaks and related water damage in second homes and vacation properties have been detected and minimized using this method.

[22] The 40% of planning entities with some amount of AMR in place represent about 36% of forecasted 2020 water demand.

[23] For Pagosa Springs Area Water and Sanitation District, AMR for about 5,000 connections cost about $1.5 million to install (in combination with AMI).

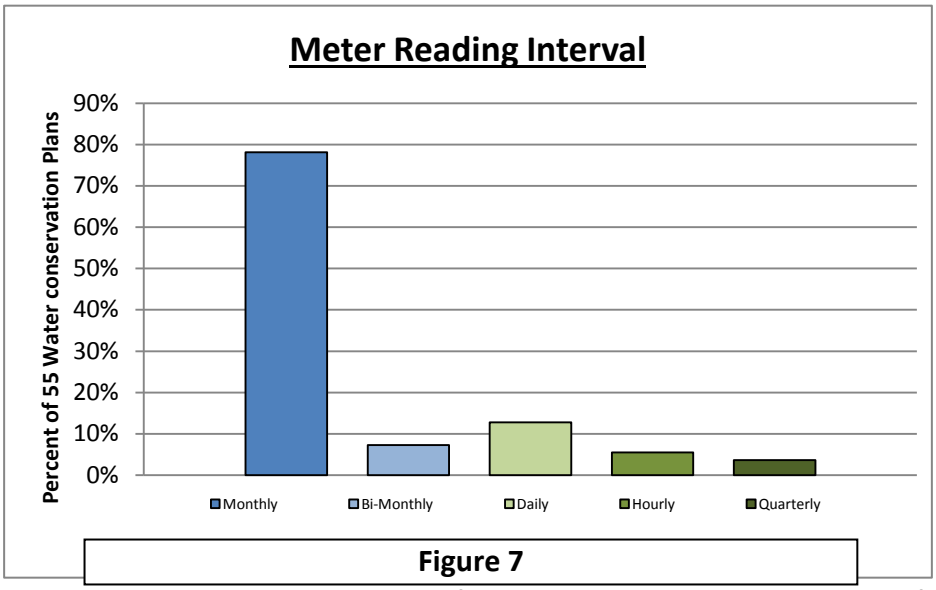


Figure 7

use, tracking real and apparent water loss, and providing messaging back to customers regarding their water usage can be hampered if meter reading and billing is not completed in a consistent and timely manner. For example, manual-read meters do not allow for the collection of synoptic data collection (meaning data collected all at the same time). In addition, AMR coupled with AMI has been used to identify customer water leaks in real time, facilitating substantial water savings for both the utility and the customer.

A monthly meter reading interval is the most prevalent for those planning entities with manual-read meters and AMR; however there are bi-monthly and even quarterly meter reading intervals in practice with the planning entities (see Figure 7). Collecting customer water use data at intervals greater than one month can compromise the water conservation efforts of those organizations, since meter reading interval impacts customer billing and messaging.

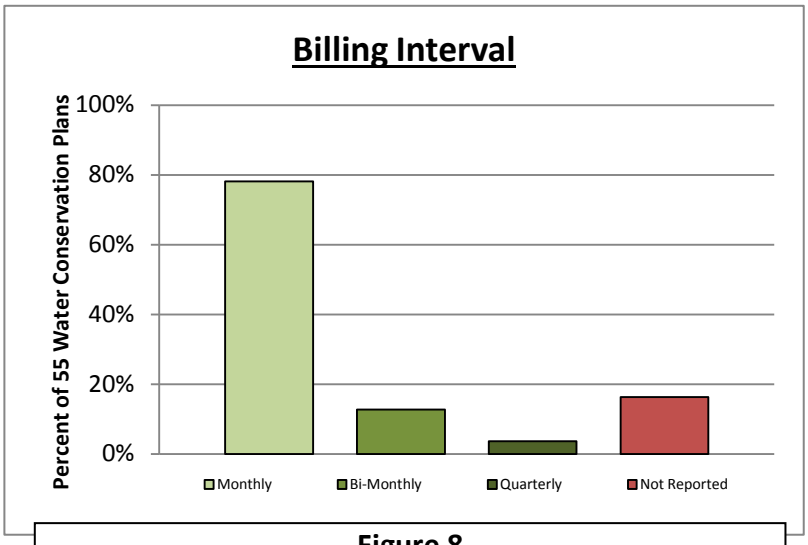


Figure 8

For example, billing interval is important for conveying messages to the customer (e.g., last month the customer over watered, exceeded a water budget, or entered a higher tier of water rate billings) – and the closer to real time the better. Billings sent to a customer more than a month after a wasteful watering practice has occurred may not give the customer time to adjust or correct a poor behavior. Figure 8 presents a summary of the reported billing intervals for the planning entities.

As illustrated in this figure, a monthly billing interval is the most popular among the planning entities with nearly 80% using this method. Bi-monthly billing interval is used by about 10% while quarterly billing is used by only two entities. [24]

Meter Testing and Replacement (BP 1, BP 4)

About 70% of the planning entities indicated that they maintain ongoing meter testing and replacement programs. These programs offer various levels of meter testing and replacement dependant on the level of available funding and local need. Some utilities focus their meter testing and replacement programs on their largest customers since these customers are most likely to have meter reading inaccuracies over time.

Most Water Conservation Plans lack detail regarding the level of effort involved in planning entity meter testing and replacement programs, and the rate of testing and replacement. Given that losses from the water distribution system may be partially attributed to inaccurate metering, it will become increasingly important for meter testing and placement to address aging meters, large meters, meters servicing large variability in delivered flow rates, and unmetered uses.

Water Rates (BP 1, BP 4)

Every Water Conservation Plan submitted to the CWCB included information regarding the nature of the planning entity's water rates. Water rates have long been used to impact local water use in locations across the US; however in Colorado, increasing water rates has not consistently been effective in reducing customer water use[25] (and conversely, in some locations water use reductions have been measured without active water conservation programs or water rate increases[26]).

Water conservation related water rates have long been associated with inclining block rates, which increase water price (per unit of water sales) as water use increases. Based on the plans submitted to the CWCB, about 80% of the planning entities have inclining block rates for residential customers and about 60% have similar for commercial, institutional and industrial customers.

The broad use of inclining block rates may be considered in some cases to be unjust, for customers with large families and/or large lots may be penalized for higher water use even when their water use is in-line with acceptable water conservation practices. Sophisticated water utilities that have geographic

[24] North Table Mountain uses quarterly billing for its residential customers; whereas the City of Salida uses quarterly billing for all of its customers. Quarterly billing is utilized as a cost savings measure at these utilities, saving on printing and mailing costs.
[25] Centennial Water and Sanitation District has increased water rates and instituted water budgets along with other active water conservation programs, yet per capita water use has increased since 2004 (with the exception of 2009 when outdoor irrigation was down due to a wet spring and early summer) (Great Western Institute, 2007).
[26] City of Durango has observed reductions in per capita water use since 2003 without an active water conservation program or water rate increases (Great Western Institute, 2011b).

information systems (GIS) and mapping attributes related to individual customer irrigated acreage, have been able to develop individualized water budgets for their customers. In this way, water budgets can be designed to take into account family size, irrigation needs, etc. of individual customer accounts. About 16% of the planning entities with plans on file with the CWCB either have implemented or plan to implement water budgets for all or some subset, of their customers.

Information regarding the nature and effectiveness of the water rate structures were not readily available from the plans. For example, some inclining block rates may only raise water price by $0.25 per thousand gallons between tiers. Other utilities may have tier increases of between two to four times the lower tier rates. The impact and effectiveness of these kinds of inclining block rate structures, which was beyond the scope of this project, is worthy of additional evaluation by the CWCB in the future.

Non-Revenue Water (which replaces the less accurate unaccounted for water) (BP 3, BP 4)

In 2001, the American Water Works Association commissioned an extensive survey of state and regional water resource and environmental agencies to characterize the nature and usefulness of water loss accountability statutes and regulations (AWWA, 2009). Relevant excerpts from this report include:

> *"The results of the survey found that widely varying language existed regarding the definition of terms typically used to track and report agency water losses. Many organizations still use "unaccounted for" water to define water loss, but the use of this term leaves considerable openings for interpretation. For example, some utilities routinely include volumes from known leaks in "accounted for" water categories. In attempting to gather voluntary data from water utilities, one state agency found that water utilities that earnestly attempt to audit their supplies reported figures that appeared less flattering than counterparts who reported unrealistically low losses."*

The final report from the AWWA recommended that "a better system of accounting is necessary if accountability is to be instilled in drinking water utilities." Specifically, the M-36 "water Audits and Water Loss Control Programs" manual states, "It is recommended that water utilities, state agencies and drinking water stakeholders avoid the use of the imprecise term unaccounted for water. See instead non-revenue water…"

Through the review of water conservation plans on file with the CWCB, the term "unaccounted for" water is wide spread throughout Colorado's water providers. It is, however, difficult to determine whether the value for "unaccounted for water" is developed using consistent practices and methodologies among the reporting water utilities. For example, of the 55 organizations that have plans on file, only 16 (or about 30%) have no unmetered uses. This means that about 71% of water utilities either have some unmetered uses or did not report on unmetered use (see Table 5 and 6). The difference in reporting unmetered water uses is indicative of how the use and reporting of unaccounted for water may be different between water utilities.

Table 5 – Summary of Planning Entities with Reported Unmetered Water Uses

Existing Unmetered Uses	Percent of Planning Entities with Some Unmetered Uses Reported	Percent of Planning Entities That Did Not Report Regarding Unmetered Uses
Unmetered Uses	53%	18%

Table 6 – Reported Unmetered Uses by Planning Entities

• Aerial pipes • Construction • Firefighting • Interconnections • Line/Hydrant Flushing • Municipal Buildings	• Park Irrigation • Schools • Street Cleaning • Unauthorized uses • Unmetered Residential/Commercial Taps • Water Treatment Plant Processes

Another example of the potential for inconsistent reporting of "unaccounted for water" is shown in Figure 9 (on the next page). This figure presents the percent of "unaccounted for water" reported by each planning entity. The figure also indicates which organizations have conducted system wide water audits to help characterize real and apparent water losses.[27]

Based on the information contained in the figure, it can be seen that only three water utilities (Castle Pines Metro District, Consolidated Mutual Water Company and Centennial Water and Sanitation District) have conducted system wide water audits to characterize their system real and apparent water losses. The average of the water loss reported by these three utilities is about 6.4%.

Organizations with low reported "unaccounted for water" may not have the tools and processes in place to accurately determine their real and apparent water loss due to one or more of the following reasons:

- Meter reading for billed customers are not completed on the same calendar day for most of Colorado's water utilities (since 60-70% of the water utilities have manual meter reading programs completed on a monthly basis for some, if not all of their customers[28]). Meter reading is completed for all meters within the same day only for those entities with AMI, or less than 5% of the planning entities.

[27] Real and apparent water losses are those losses that make up the part of the non-revenue water that a utility delivers to its distribution system, but does not sell. Unbilled but authorized consumptions (like water treatment plant backwash) also are considered to be a component of non-revenue water; but are not considered to be real or apparent losses.

[28] Substantial improvements have been made in recent years regarding the use of automated meter reading (AMR) technologies in collecting meter data by Colorado's water utilities (see Figure 5); however, only about 40% have some amount of AMR technologies in place representing about 37% of the forecasted 2020 water demands. In addition, AMR technology does not necessarily allow for a synoptic reading of customer meters.

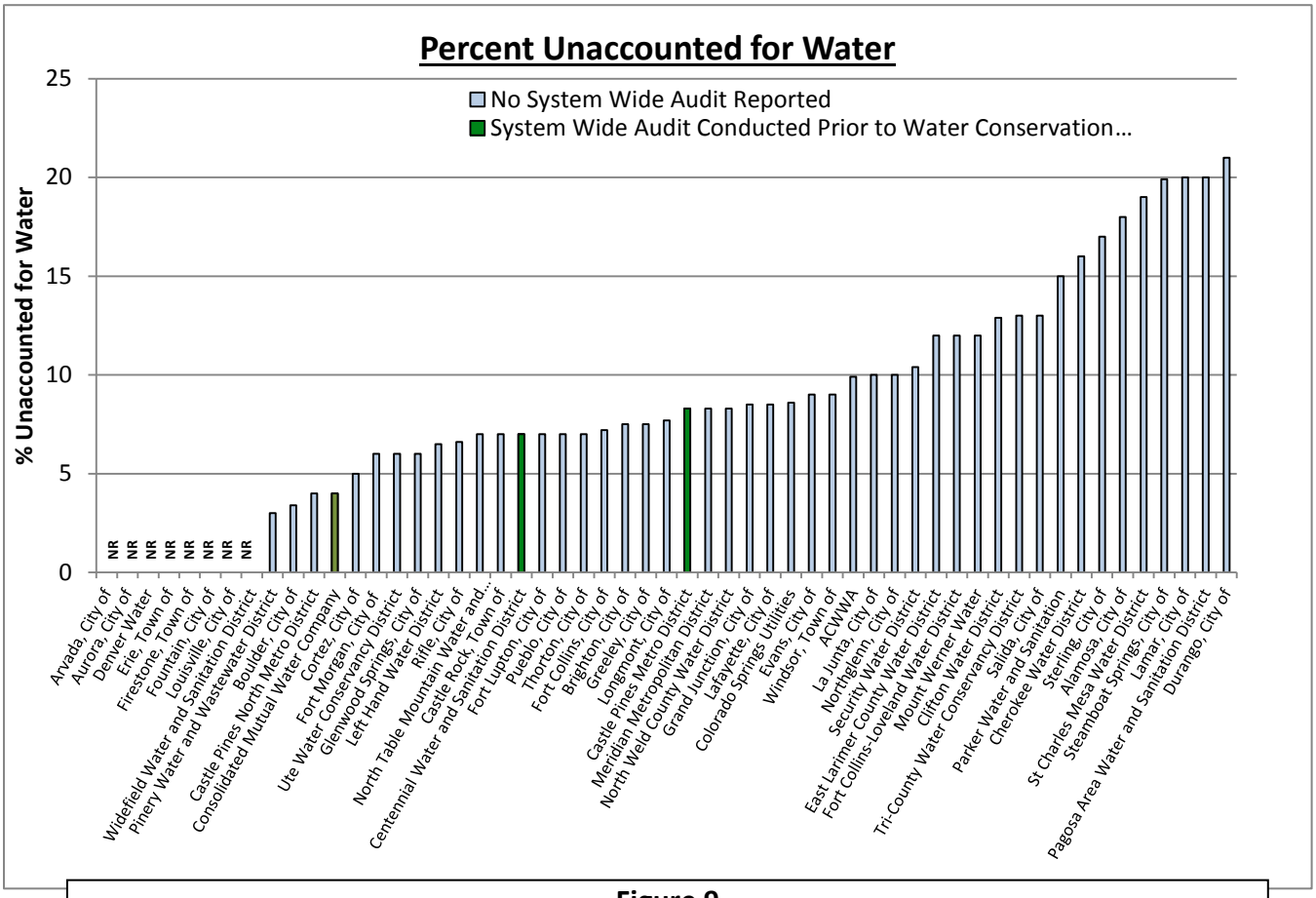


Figure 9

- Metering testing and replacement programs, which are conducted by nearly all water utilities, typically do not target maintaining meter accuracy for the highest and largest water users. Therefore, meter inaccuracy (and apparent losses) may be significant for many Colorado water utilities that do not regularly test and/or replace meters on taps two inches and greater.
- About seventy percent of the planning entities do not appear to fully meter all of their known water uses and/or track their unbilled water uses (for either metered or unmetered uses).
- Ninety-five percent of the water utilities characterizing water loss as "unaccounted for water" in their systems have not conducted system-wide audits.

Leak Detection and Repair, and Water Line Replacement (BP 3, BP 4)

Nearly 95% of the planning entities indicate that they have leak detection and repair programs, and about 55% reported that they have water line replacement projects scheduled within their planning horizon. It appears that both of these program types are under reported since all utilities fix known water leaks when they are found. Therefore, planning entities would benefit by adding additional information regarding the nature and scope of their leak detection and repair programs, and the

associated level of funding (e.g., funding as contained in ongoing utility capital improvement programs (CIPs)). This information should be readily available such that a planning entity could report on leak detection and water line repair without substantial effort, since the majority of the plans on file with CWCB do not include CIP budget data within the plan discussion. It is likely that funding for infrastructure improvements to improve water use efficiency at the utility level is currently under reported and under publicized (since all utilities perform these activities). It would benefit local, regional and statewide planning efforts to have the utility's leak detection and repair efforts better quantified and characterized.

It should be noted that it is estimated that only a small percentage of the planning entities maintain a proactive leak detection and repair program, given that plans on file do not generally include any information regarding this issue. Proactive leak detection which involves using sonic testing, system wide audits, and other in-field testing methods have been reported by a number of organizations; however most programs in this area relate to only repairing leaks that have been found in the field.

Data Tracking (BP 1, BP 2, BP 3, BP 4)

State statute requires that water utilities include a discussion of the monitoring processes that will be used to review and revise the Water Conservation Plan during implementation. Paramount to monitoring is the collection of water conservation related data generated by different departments within the organization – including but not limited to billing data (e.g., from the finance department) and water treatment production data (e.g., from the operations department).

These data are critical to the measurement and verification of water conservation savings predicted by the water utility in its planning process, as well as tracking per capita or per connection water use, customer water use by category, and real and apparent system losses.

Based on those Water Conservation Plans on file with the Office, data collection is focused on collecting those data included in Figure 10. Figure 10 also presents the timing of data collection (shown in shades of green) currently conducted by the planning entities.

This figure indicates that the majority of the planning entities will be using billing data to track water conservation impacts, and they will do the data collection annually. About 25% indicated that they would collect data monthly.

Given that most water conservation programs require at least monthly data to track effectiveness and efficiency, it is unclear how many planning entities will effectively evaluate their programs. For example, indoor water retrofits and rebates require that average wintertime usage be tracked to segregate out irrigation use for taps that provide indoor and outdoor water supply. Similarly, outdoor irrigation programs similarly require the segregation of indoor use from the outdoor irrigation use to

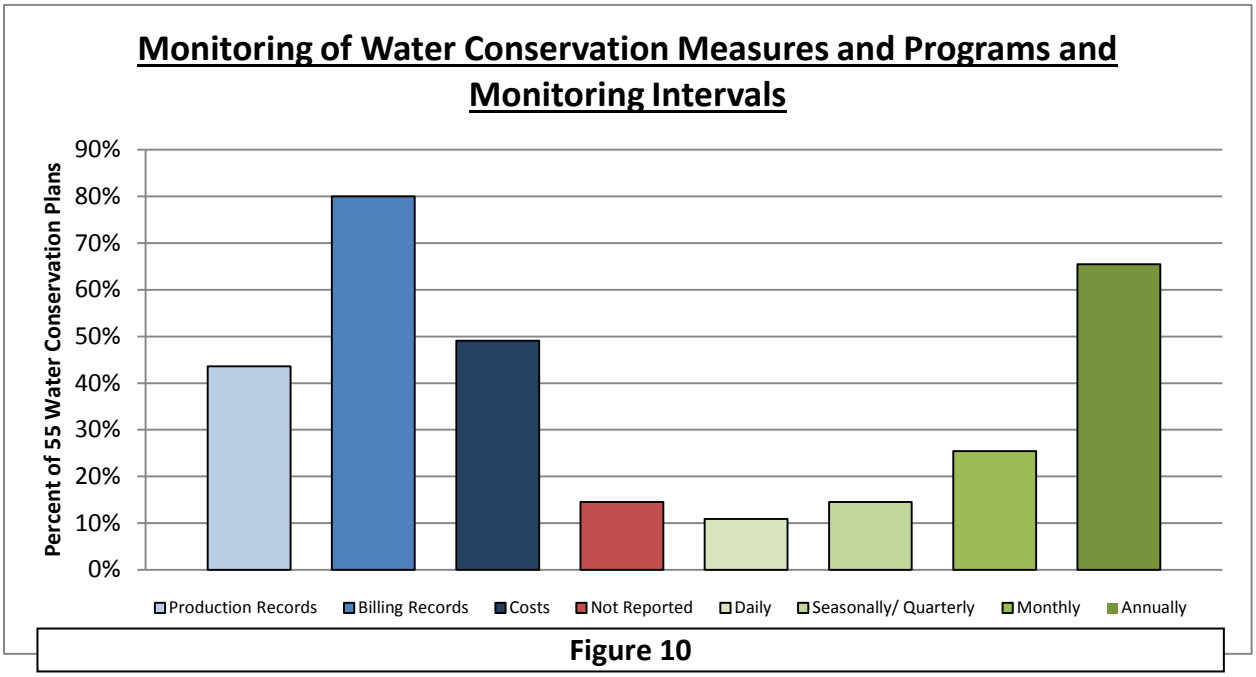


Figure 10

measure reductions in irrigation water application.[29] Tracking real and apparent water losses in the distribution system requires the matching of monthly production records with same month billing records, as well as other information. Just over 40% of the planning entities report that future monitoring and verification efforts will include tracking production records; therefore, it is unclear how real and apparent water losses will be tracked in the future (since both billing and production records are needed to quantify water loss) during plan implementation, for example.

Since many meaningful water conservation measures and programs focus upon specific types of water use customers (e.g., commercial audits and retrofits, municipal facility audits and retrofits, installing centralized irrigation controllers in parks, etc.), the tracking of water use by customer category (see Table 7) is essential to any implementation plan. Water use by customer category is tracked by nearly every planning entity, as reported in the plans on file with the CWCB. Table 7 lists those customer categories tracked by the majority of the planning entities.

Table 7 – Customer Categories of Water Use Tracked by Planning Entities (listed as percent of 55 plans)

Residential – General	Residential – Single Family	Residential - Multifamily	City/Municipal	CII	Irrigation	Non-Potable
35%	65%	65%	47%	100%	69%	13%

CII – commercial, institutional and industrial use

[29] Those programs also require the tracking of temperature and precipitation data to estimate evapotranspiration and therein characterize the impacts of weather on customer demand.

Dedicated Staff (BP 4)

The Colorado WaterWise BP Guidebook indicates that having a staff person dedicated to water conservation planning and implementation is a foundational need for planning entities. Based on the data provided in the plans, about 40% of the planning entities have dedicated staff (either full time or part-time).

The lack of dedicated staff is expected to directly impact the planning entities ability to measure and verify its water conservation program effectiveness and costs. Not having data and the related analyses associated with ongoing water conservation practices will impact future planning efforts including forecasting accurate customer demands and evaluating the impacts of candidate water conservation measures and programs.

Integration with Other Utility Planning (BP 2, BP 4)

Water conservation planning has become increasingly important to overall water resources portfolio management for the State's water providers as water resources become scarcer and water conservation program effectiveness and science matures, since water conservation can be used for many purposes including, but not limited to:

- Postponing future infrastructure projects related to treatment plants, transmission line and distribution systems, for example;
- Reducing future water development costs; and
- Improving water supply reliability (in conjunction with new and expanded water storage).

Given the nexus of water conservation with other water utility programs and missions, it is becoming increasingly important for water conservation planning and implementation (including data tracking to measure and verify water demand impacts and customer water use behaviors) to be integrated with water supply master plans, water pricing evaluations, and other water resource management planning efforts.

Targeted Technical Assistance and Incentives

Reduction of customer demands is perhaps the most readily "measurable" area of water conservation available to water utilities, if the utility maintains adequate metering and data tracking. Historically, management of customer demands has been the focus of most water conservation programs - through rebates, audits and retrofits. Unfortunately, a substantial amount of historical water conservation programs have not based funding on cost benefit analyses or measurable outcomes. For this reason, programs with a low rate of return in cost per acre feet of demand reduction (e.g., residential toilet

rebate programs vs. high use commercial programs) may have been selected over better investments or actions that produce more substantial results.

This section reviews those water conservation measures and programs that utilities have selected for implementation and compares them to those measures and programs that provide for a high rate of return on a utility's investment and/or address core business needs of the utility (e.g., cash flow, water loss management). Note that it is understood that customer "good will" is something that has value to water utilities, and that some water conservation measures and programs create good will that is important to support other utility programs and strategic initiatives. Since the value and nature of good will cannot be measured in specific terms from utility to utility, the discussion presented herein will not include influences associated with creating good will, but will rather focus on creating opportunities for meaningful water conservation that is either cost effective and/or effects the business of providing water to customers (noting that the two issues are not necessarily mutually exclusive).

As defined by the SWSI Conservation Levels, it is recommended that utilities focus their earliest efforts on two key areas: improving water use efficiency in their own facilities (Level 1), and collecting data and implementing programs that address water use by the utility's largest customers using audits, retrofits, etc. (Level 2). Once adequate data has been collected, a local water provider can develop and implement measures and programs that create meaningful water conservation based on cost benefit analyses and other contributing factors (e.g., how water savings will delay future debt service). Once the higher priorities are addressed, water utilities can begin to develop data collection and active conservation programs to meet and support the needs and water uses of its remaining customers.

Appendix E contains the worksheet created to capture those data contained in the Water Conservation Plans submitted to the Office for review and approval. This worksheet contains data reported within each individual plan, including those attributes listed in Table 3.

Each of the three levels of targeted technical assistance and incentives is discussed below.

…by improving water use efficiency at the utility's own facilities, a utility can send a strong, consistent message to its customers – "we will not waste water."

Utility/Municipal Facility Water Efficiency (BP 7, BP 9, BP 10, BP 12, BP 14)

For purposes of this report, utility/municipal facility water efficiency programs are those programs that apply to the water use at those facilities that the water utility directly operates and/or manages. For some municipal entities, this could include administration buildings, police stations, recreational centers, parks, etc. For some other organizations (e.g., special districts) there may be fewer opportunities for "municipal" water savings because these organizations may not have direct responsibility for as many types of water using facilities and grounds. Nonetheless, water savings at those facilities that are operated by the water provider are the first priority for implementation of improved water use efficiency efforts, since these facilities can be readily accessed, and have water use patterns that can be easily characterized and evaluated; and by improving

water use efficiency at the utility's own facilities, a utility can send a strong, consistent message to its customers – "we will not waste water."

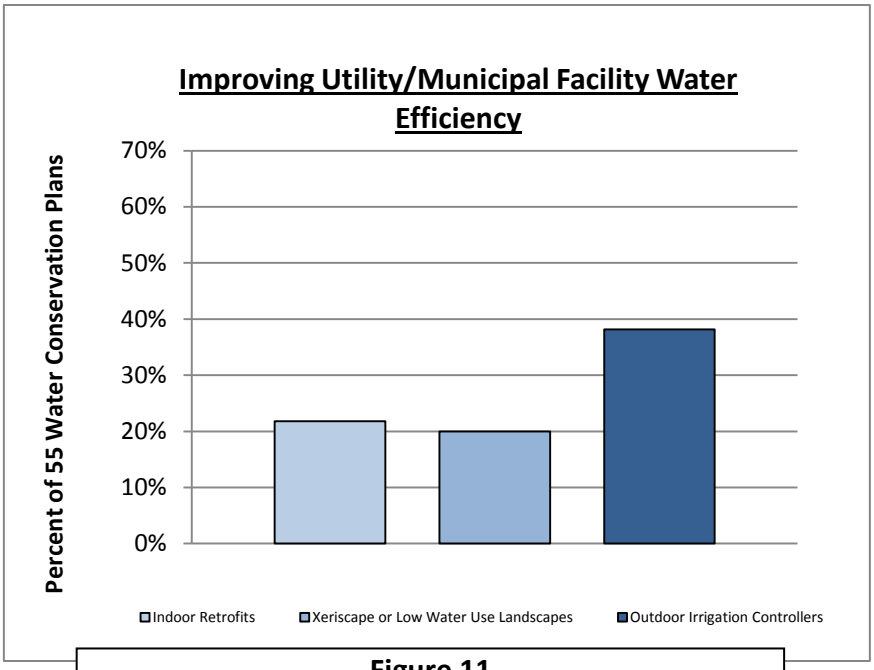


Figure 11

According to the Water Conservation Plans on file with the Office, nearly 40% of the planning entities are looking to implement outdoor irrigation efficiencies at municipal facilities (see Figure 11); whereas just about 20% are expecting to replace current landscaping with Xeriscape or other low water use planting materials. About 21% will be installing indoor fixture and/or appliance retrofits to improve water use efficiency. It is interesting to note that installing indoor water conservation improvements typically have better payback than outdoor irrigation improvements, since indoor retrofits, especially faucet aerators and showerheads, reduce energy consumption as well as water use. Indoor improvements may also reduce water and sewer connection costs (which may combine to be a $6 to $10 per 1000 gallons savings versus $2 to $4 per 1000 gallons for outdoor water use). However, outdoor water is typically about 50% or more of overall municipal water use, such that irrigation improvements can substantially reduce overall demand and peak day demand (which for many water utilities is more of a concern than total water use). In either case, there are reasons and justifications why municipal water use efficiency improvements are good in practice and good in policy.

It is important to note that only about 4% of planning entities indicate that they plan to do indoor facility audits, and about 10% indicate that they plan to do outdoor facility audits. Any planning entity that does not have enough data to develop a cost-benefit analysis to evaluate specific water use efficiency improvements should consider collecting information on facility water use before deciding to complete retrofits. Adequate data exists in the literature to show that retrofits in public facilities have a higher rate of return than do residential rebates and retrofits, due to the higher use of fixtures and appliance in these settings. However, facility audits can help to uncover irregularities in water use, and have been successful in the past in identifying leaks that were not otherwise found. In addition, facility audits can identify specific limitations to and needs for retrofits that may be dictated by local conditions, not necessarily consistent with the literature. Therefore, facility audits conducted to evaluate overall water

use patterns and support cost benefit analyses are recommended as a top priority for water providers, followed by the implementation of indoor and/or outdoor water efficiency improvements.[30]

Working with the Utilities Largest Customers (BP 7, BP 9, BP 10, BP 12, BP 13, BP 14)

Many water utilities focus water conservation measure and program implementation on their largest water users, since demand reduction for large water users can be some of the most cost effective measures and programs that a planning entity can implement. For example, the City of Longmont has chosen to focus its meter replacement program on its largest water users – using AMI to link integrated water use measurements with their 250 largest water users. In this way, the City can not only respond to changes to its customers water use behaviors (which may affect the utility's cash flow), but it can track the impact of the City's water conservation programs on water use from its largest customers. Nearly 40% of the planning entities indicated that they are focusing facility audits supported by the utility on large customer water use as part of their water conservation plan. About 18% are focusing meter testing and replacement on their largest customers.

On a similar note, Denver Water and Colorado Springs Utilities focus technical assistance (i.e., customer audits, cooling tower technical support) and irrigation improvement incentives on their largest water customers. Pagosa Springs Area Water and Sanitation District (PAWSD) focused their energies on supporting improved water use efficiencies in area hotels and restaurants.[31] In another example, Fort Lupton worked with its largest single water customer to develop and implement improved metering and other water use efficiencies addressing a substantial amount of the water utility's water conservation goals. These examples help to illustrate that some utilities have recognized the value of working with fewer, but larger, water customers to customize water conservation programs. Using these examples as a guide, it can be seen that planning entities can benefit from focusing their water conservation programs on their largest customers to realize some of the most cost effective water savings available within their specific service areas.

As previously stated, one of the best techniques to better understand water customers, large or small, is to conduct water audits such that past and current water use patterns can be evaluated and characterized. From the audits, information can be obtained that will assist the utility in making business decisions regarding future investment and potential pay-back periods for candidate improvements. In addition, water audits can be used to focus technical assistance and educational efforts with individual customers on a one-on-one basis, which can improve water use efficiency at a facility level without any additional investment of resources. Leaks, which can account for 10% or more of total customer demand, can also be detected through the audit process.

[30] For these same reasons, utilities should conduct audits with their largest customers before implementing retrofit and/or other incentive programs.

[31] PASWD found that showerhead and faucet aerators in hotels and restaurants had a pay-back period of weeks to months; and toilets in bars and restaurants had pay-back periods of less than ten years. Conversely, toilet pay-back in a single family residential setting was decades.

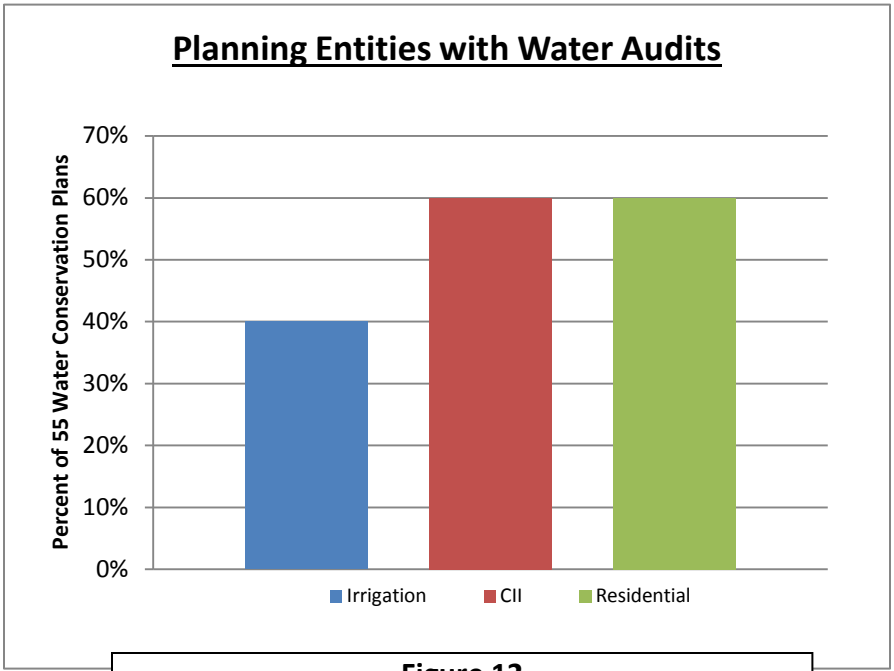


Figure 12

As indicated in Figure 12, about 60% of planning entities are implementing audits for their CII customers (or at least a subset of their CII customers), and about 40% are planning on implementing irrigation audits.[32] The majority of the audits (but not all) are expected to be utilized by the planning entities to help focus future water conservation programs such as rebates and retrofits on the needs of the audited customers. This is exactly the type of data collection and future water conservation planning activities that are deemed to be the most cost-effective and productive for water utilities in the state.

Planning entities also identified specific measures and programs that they expected to implement to improve large customer water use efficiency, as shown in Figure 13. This figure indicates that first, the planning entities do not have as many specific water efficiency programs as they do audits; which is indicative of the utilities recognizing the need for data collection to better define customer needs and support business decision-making within the utility. Second, for those utilities that are moving forward with specific water conservation programs, they are providing grants and awards for recognition, in favor of providing retrofits and technical assistance. Grants and awards can create important incentives for customer-specific improvements to water use efficiency, and these improvements can be tracked on an individual customer basis; however, currently there is no available data from local water utilities about the costs or established water savings related to these programs. It is expected that water utilities may decide to implement more indoor and outdoor retrofits, as well as process water efficiency improvements as more audits are completed and more data is collected to support utility level decision making.

[32] Slightly over one half of the residential audits were selected by planning entities to be "outdoor only" audits.

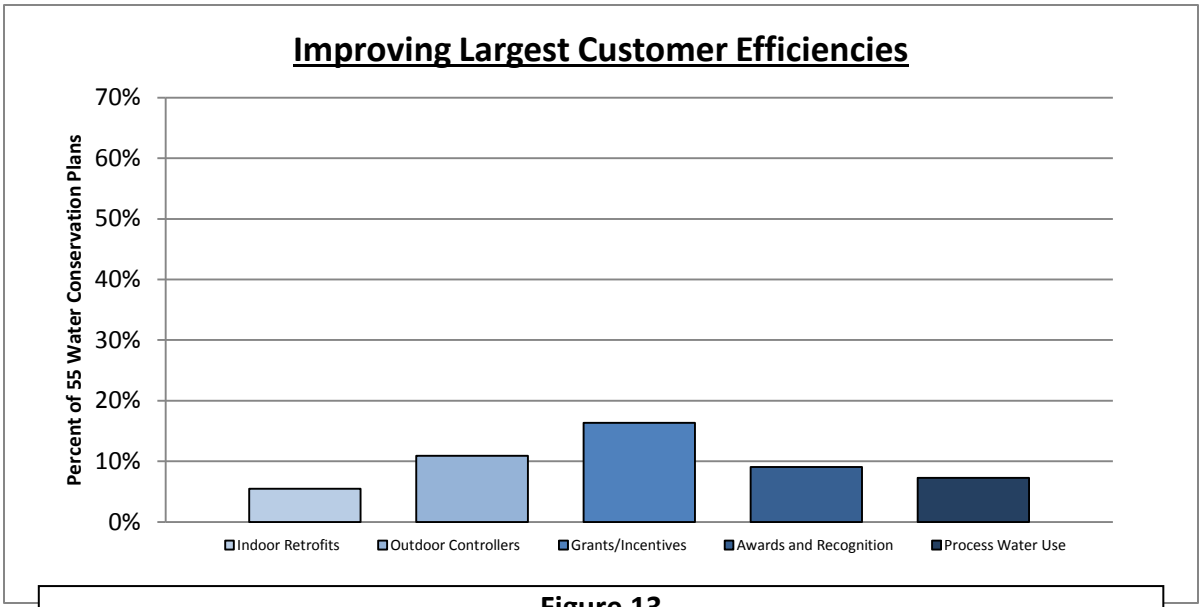


Figure 13

Another program type that planning entities have developed and/or are developing for large customers are focused technical assistance programs. Figure 14 presents a listing of those focused technical assistance programs that are included in the plans on file with the Office.

Based on the plans on file, focused workshops and customer education are the most popular programs being used in Colorado; however these programs are being implemented by a total of about 1 of 4 planning entities, or about 25%.

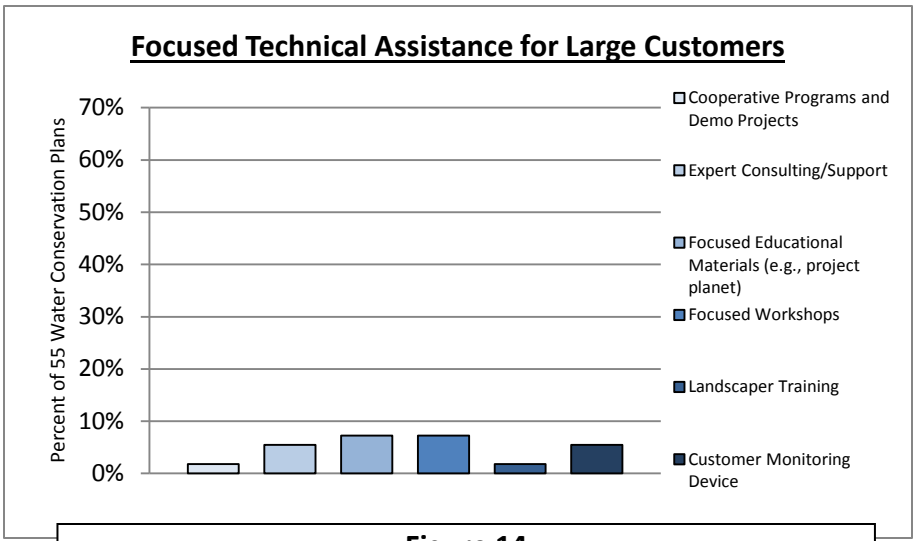


Figure 14

Overall, the results of the data review for large customer water conservation programs illustrates that most water utilities will be collecting data to better understand their biggest water users and will be using that data to develop programs to address what they find and make utility level decisions. It is also apparent

that there is sizable diversity in the types of programs that water utilities plan or may plan to implement in cooperation with their largest customers. This is indicative of the diversity of circumstances and situations that exist across the state, and the impact this diversity has on local planning efforts.

It is anticipated that as more data is collected, better information will be available to planning entities to support local decision-making. The process of plan submittal, and data collection and organization by the Office will help to support new and better local water conservation planning as more data is collected by the water utilities and more examples of effective water conservation programs are documented.

Management of Remaining Customer Demands (BP 7, BP 9, BP 10, BP12, BP 13, BP 14)

Planning entities have identified in their Water Conservation Plans that they intend to implement a broad range of water conservation programs to improve local water use efficiency and reduce future demand. Although some of the Water Conservation Plans provide good documentation of the decision-making process for selecting candidate measures and programs, many of the plans on file do not provide adequate information regarding how and why specific measures and programs were selected for implementation. Given that many water utilities have yet to conduct audits of their largest water customers and/or do not have adequate data to fully characterize their real and apparent water losses, it appears that substantial data collection efforts are warranted for most planning entities before they decide on which specific measures and programs to implement, especially for the purpose of designing water conservation measures and programs for their smaller customers.

The number of customer audits that are proposed by 60% of water utilities (as shown in Figure 12 on page 35) indicates that planning entities realize that they need more data to effectively develop and commit resources to future water conservation programs. The commitment of water utilities to other water saving measures and programs is somewhat confusing, however, given that over 70% have proposed supporting residential indoor rebate programs and over 60% have proposed supporting residential outdoor rebates (see Figure 15). Admittedly, these programs can instill good will with residential customers; however, the cost-effectiveness of these programs is dubious for the following reasons:

- There are more cost-effective fixture replacements available in high use commercial and institutional facilities where fixtures can be used 5 to 10 times more often than residential fixtures.
- Residential fixtures and appliances are expected to be replaced naturally due to changes in current technology, and California state regulation (which directly influence what fixtures and appliances are commercially available in Colorado).

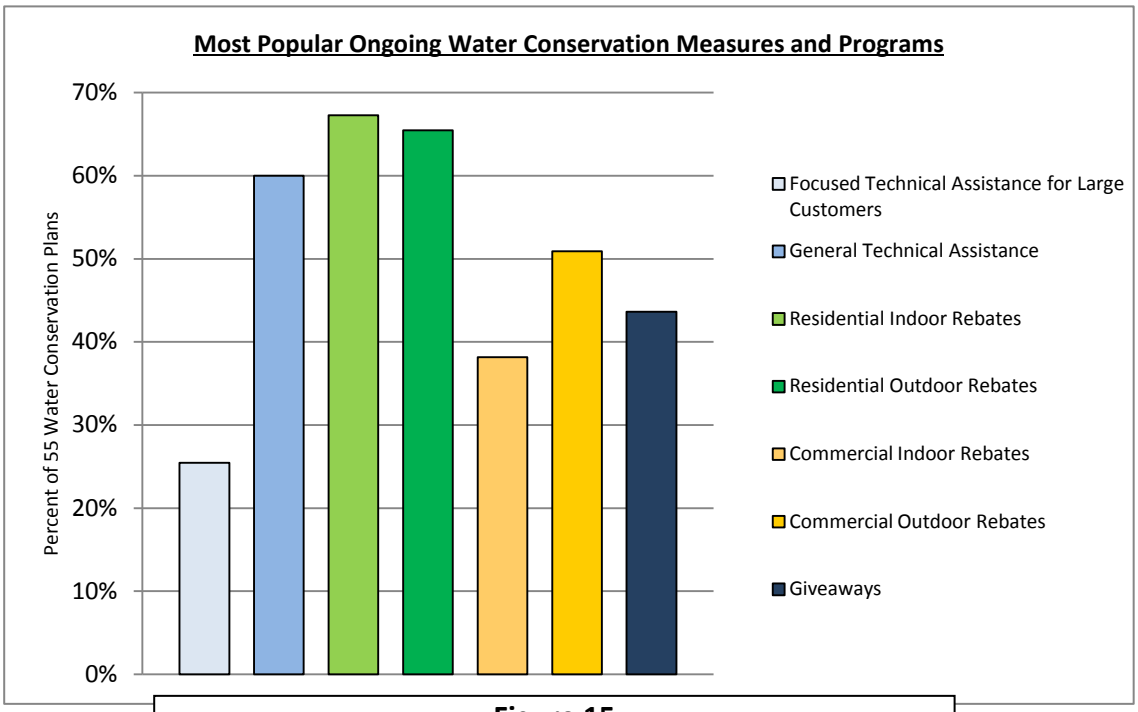


Figure 15

Table 8 summarizes the types and popularity of selected types of residential and CII rebate programs currently being implemented by water utilities in the state.

Table 8 – Summary of Incentive Programs (in percent of Planning Entities selecting each)

Indoor Water Use Incentives						
	Toilets	**Clothes Washers**	**Dishwashers**	**Showerheads**	**Faucet Aerators**	**Other**
Residential	62	55	9	11	11	4
CII	35	18	15	4	2	4
Outdoor Water Use Incentives						
	Rain/Wind Sensors	**Soil Moisture Sensors**	**ET/ Smart Controllers**	**Landscape Materials**	**Soil Amendments**	**Other**
Residential	44	5	53	13	7	11
CII	17	2	23	4	3	3

This table, coupled with the understanding that most water utilities have not conducted substantial water audits prior to the development of their water conservation plans, indicates that the majority of the planning entities are committing resources to incentive programs that are not necessarily based on specific water use evaluations, or expectations of significant market penetration. In other words, water utilities are generally committing resources to programs that are not substantiated by detailed cost-benefit analyses, or expected total demand reductions, since CII programs typically have been shown to

create greater water demand reductions than do residential programs (for the same dollar spent) (Great Western Institute, 2009 a, 2009 b, 2011a; Bouvette, 2010).

For example, the reach or market penetration of the proposed rebate programs for many planning entities are typically small, reaching a fraction of a percent of each customer class as proposed by the planning entity. For example, 22 planning entities report total rebate budgets of less than $20,000 per year over 10 years (see Figure 16). This amount of expenditure would account for perhaps as many as 15,000 toilets in ten years (assuming a $100 rebate per toilet) – noting that these 22 organizations are estimated to serve about 350,000 toilets.[33] The total amount of budgeted rebates (assuming all indoor rebates were for toilets) would account for replacing about 4% of the existing toilets over a 10 year period.

Similarly, outdoor rebate programs appear to be under funded to make a measurable impact on overall forecasted water demand for those water utilities that included these measures and programs in their implementation plans. Over two thirds of those planning entities that selected residential outdoor rebate programs for implementation budgeted less than $25,000 per year over the planning period, which equates to perhaps as many as 5,500 ET controllers supplied statewide by active water conservation programs. This is again a small percentage of the existing market of single family residences that have automated irrigation systems.

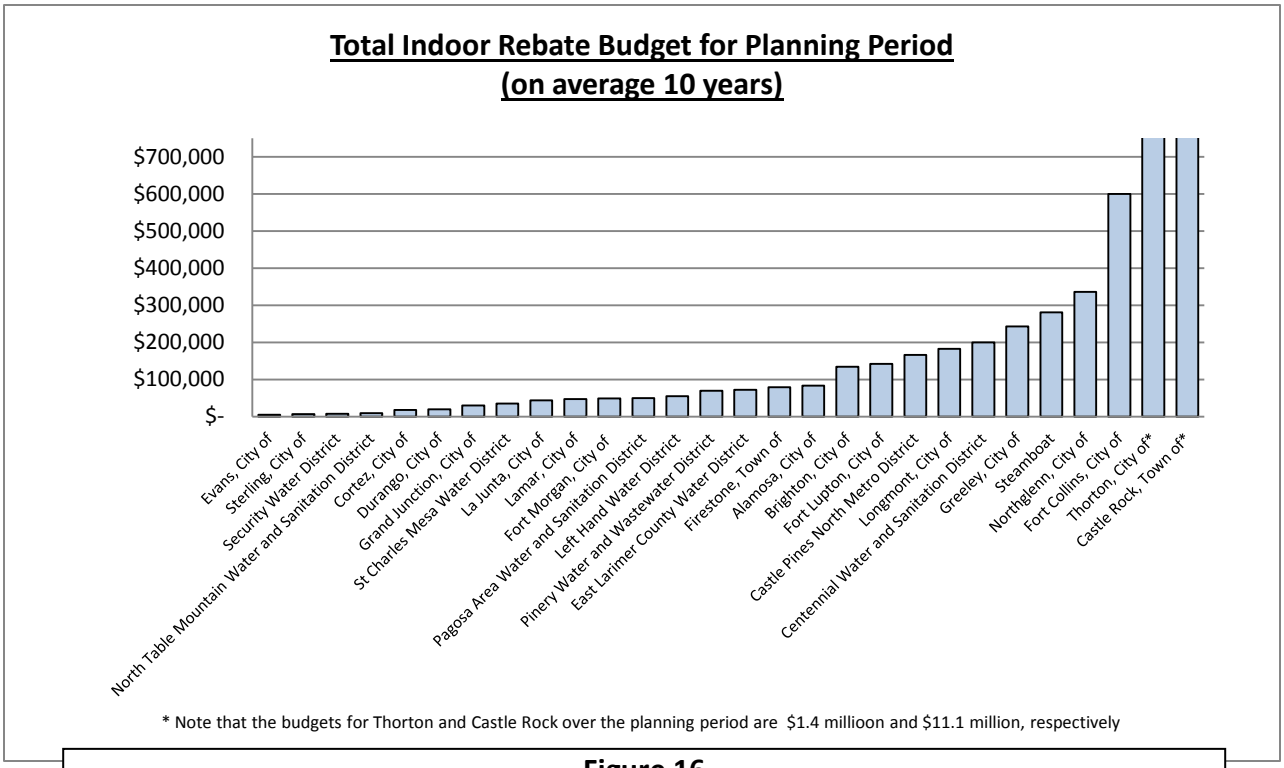


Figure 16

[33] These 22 water utilities service about 454,000 people currently. Number of toilets was calculated assuming 2.6 persons per household and 2 toilets per household.

It would be more effective for the water utilities to spend their limited resources on making water efficiency improvements that create a higher market penetration and/or a greater amount of water demand reductions by focusing on their largest customers and their water use; rather than replacing an small amount of residential fixtures and appliance a year, especially since these fixtures and appliances will be replaced naturally over the coming 10 years (dishwashers and clothes washing machines) to 30 years (toilets). There are circumstances that can exist that dictate the need for the implementation of residential rebate programs; however, data collection and analyses are needed to support these programs such that utilities can base resource allocation on costs, demand reductions and predictable outcomes.

The total amount of budgeted rebates statewide (assuming all indoor rebates were for toilets) would account for replacing about 4% of the existing toilets over a 10 year period. It would require 250 years at this pace to replace all the existing toilets.

Ordinances

Water Waste Ordinances (BP 5)

Ordinances control the use of water through regulation, certification, inspection and in some cases, fines. The most common ordinance used by water utilities are so called "water waste ordinances," which can include:

- Time of day watering restrictions;
- Day of week watering restrictions (which are typically used more for drought response or situations with peak day delivery limitations); and
- Overspray restrictions/general water waste.

Appendix F contains the worksheet created to capture the ordinance data contained in the Water Conservation Plans submitted to the Office for review and approval. This worksheet contains data reported within each individual plan, including those attributes listed in Table 3.

Based on the plans on file, about 55% of the planning entities have some form of water waste ordinance, including some, if not all, of the three categories of water waste listed above with another 13% planning to implement a water waste ordinance (or similar). The water waste ordinances listed by local water utilities typically include both water conservation and drought response measures, and can be voluntary in nature or mandatory. Interestingly, of the 22 planning entities that indicated that they have mandatory water waste ordinances in place, only 7 (or about 33%) of these planning entities indicated that they have any budget allocated to enforcement. It is therefore unclear how effective or tightly enforced the water waste ordinances are for most of the planning entities. In fact, only 12 of the planning entities (or around 40% of those with water waste ordinances) indicated that they could file warnings, fine, and/or shut off the water of those customers that violated the water waste ordinance. The majority of the planning entities did not indicate how their water waste ordinance was enforced.

It is important to note that a small number (2) of planning entities indicated that they did not have the authority to enforce water waste ordinances. Both of these organizations had water waste ordinances, but no enforcement measures in place.

The characteristics of the water waste ordinances currently in place with the planning entities are illustrated by the following table.

Table 9 – Number of Planning Entities with Each Type of Water Waste Ordinance

	Time of Day	Day of Week	General Water Waste
Voluntary	10	4	1
Mandatory	6	6	21
Combination of Voluntary and Mandatory	8	8	0
Sub-Total	24	18	22

The number of water providers that utilize either voluntary or mandatory water waste ordinances are identified in this table. From this information, it appears that a significant number of the planning entities (perhaps 33%) link their "mandatory" drought response watering restrictions to their "voluntary" water waste ordinances. This is evidenced by the number of combined voluntary and mandatory restrictions that are currently part of ongoing water waste programs. It is not entirely clear from the plans how water waste requirements are linked to drought responses and whether or not the drought responses in some way tied to the water conservation measures and programs or vice-versa. Future water conservation planning should be more integrated with drought response planning as these programs mature and become more sophisticated in the future.

New Construction Ordinances (BP 8, BP 11)

Controls on new construction are somewhat popular among planning entities, since it is relatively straightforward to establish and enforce indoor and outdoor water use regulations at the local level for new construction, especially for municipalities[34] (noting that new construction regulation must include plan review and approval, and site inspection check-offs to be effective); however, the majority of municipalities do not have current or future plans for new construction controls of indoor or outdoor water use. Given that new construction ordinances and regulation would be effective in addressing the new homes and businesses that will be built in Colorado in the decades to come,[35] it would be beneficial for new construction controls to be developed and implemented to reduce expected future water demands without requiring substantial retrofits and data collection costs imposed on local water utilities.

[34] As compared to special districts, since special districts do not have the construction plan review and approval authorities that municipalities typically have in place.

[35] It is estimated that about 75% of the homes that will exist in Colorado in 2050 have yet to be built (Great Western Institute, 2010).

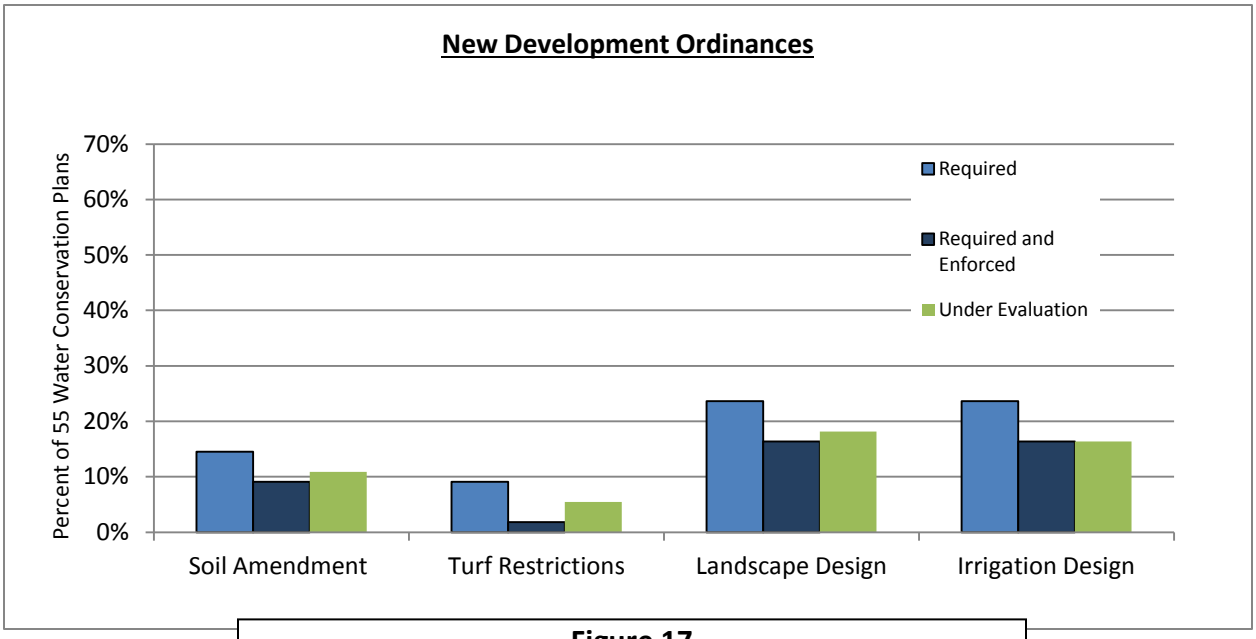


Figure 17

As for current controls on new construction, planning entities have developed and implemented a number of meaningful programs. It can be seen from Figure 17 that a number of different new construction ordinances are either in place or being evaluated for implementation by local water utilities. In fact, about 50% of the planning entities either have or are considering developing new construction ordinances the same as or similar to those contained in Figure 17.

The most prevalent new construction ordinance is landscape design requirements, selected by about 25% of the planning entities. Landscape design requirements typically involve using certified landscape designers and plan-review check off (and field inspections) for all new landscape construction – either for specific customer categories and/or development sizes. Noteworthy is that these types of new construction ordinances can substantially reduce per connection use, especially related to seasonal peaking, but only if plan review, site inspections and certification training are included in the program.[36] It is questionable how effective landscape design requirements (or any new construction ordinance for that matter) can be if field inspections of the newly constructed landscape and irrigation system are not included in the implementation effort.

Soil amendments are also included as one of the new construction ordinances that water utilities have selected to implement. These programs require that soil amendments be added to topsoil before new turf or plant materials are placed – for purposes of improving the water holding capacity and nutrient composition of native clayey soils. Soil amendments are considered to be one of the seven Xeriscape principles. Five of the planning entities (or just over 60% of those with the program) indicated that their required soil amendment regulations have onsite inspections as part of the funded program. As more

[36] About 70% of those with landscape design requirements indicated that they had inspection budgets.

locations plan for and implement soil amendment ordinances, it will be important for plan review and site inspection to be included in the implementation budget.

Of the five entities with turf restrictions, only one entity indicated that site inspections were part of the funded program. Without adequate funding for onsite inspection and approval, it is not clear how any new construction regulation can be utilized to reduce future water demand.

Ordinances Impacting Existing Construction (BP 8)

There are no Water Conservation Plans dictating controls or regulations that impact existing construction. It is important to note that regulations on existing construction that have been promulgated in California are impacting water conservation efforts in Colorado. Specifically, three regulations will impact water demand in Colorado in the future.

2002 – California Energy Commission (CEC) Water Efficiency Standards – the California legislature ordered the CEC to establish water efficiency standards for residential clothes washers. Accounting for a reported 22% of an average household's water usage; washing machines are prime candidates for increased water efficiency regulation. The proposed standards required machines to meet a certain "water factor" (WF) ratio calculated by dividing a washer's gallons of water used per load by its water capacity starting in 2007. Although the federal Energy Policy and Conservation Act (EPACT) expressly preempts states from regulating "energy efficiency, energy use, or water use of any product covered by federal energy efficiency standards," the CEC requested a waiver from the DOE that would allow California to regulate water efficiency standards for residential washing machines. CEC won its request for a waiver in 2009 (Proctor, 2010).

2007 – California Assembly Bill 715 – this bill required high-efficiency (HE) standards for all toilets (1.28 gallons per flush (gpf) or less) and urinals (0.5 gpf or less) sold in the state after January 1, 2014[37].

2009 – US Department of Energy State Energy Efficient Appliance Rebate Program – is a program that will provide states with $300 million to design and implement rebate programs that encourage consumers to turn in their old, inefficient appliances for new energy efficient ENERGY STAR models. Water-efficient dishwashers and clothes washers are included under the ENERGY STAR label and will be targeted to receive the biggest rebates. Using these funds, the State of California targeted dishwashers (Griffiths-Sattenpiel, 2009).

[37] The import and relevance of this bill to the production and sales of high efficiency toilets and urinals in California and the western United States was further increased by the passage of California Senate Bill 407 which requires point-of-sale retrofits for all residential and commercial property sold after January 1, 2014.

The impact of these regulations has already been measured in selected locations in Colorado.[38] Additional impacts are expected into the future as documented by the CWCB (2010).

Education (BP 6)

The educational components of water conservation measures and programs have long been documented as vital customer engagement and overall communications. As indicated in past CWCB policy documents, education can occur in one of three ways:

- One way (those educational efforts that send out information without tracking or specific follow-up)
- One-Way with feedback (those educational efforts that send out information and allow for some level of tracking or feedback); and
- Two-way (those educational efforts that involve two-way communications).

Including meaningful two-way education into planning efforts may represent a cultural change from past organizational practices for some water utilities; however, it is valuable for this change to occur to better inform utility level decision-making.

Appendix G contains the worksheet created to capture the educational data contained in the Water Conservation Plans submitted to the Office for review and approval. This worksheet contains data reported within each individual plan, including those attributes listed in Table 3.

Most past water conservation education in the State has involved one-way communications without feedback including mass mailings, bill stuffers, pamphlets, newsletters, demonstration gardens, and untracked websites. All of these educational programs continue to be very popular, albeit by themselves they are not particularly effective in reducing future water demand (Great Western Institute, 2010).[39]

One-way educational efforts with some feedback are more desirable and effective in creating meaningful water conservation since the utility can receive feedback regarding the applicability and effectiveness of its programs and can track the number of "eyeballs" that see and react to the

[38] In the Town of Superior, indoor water use decreased by about 3% since 2005 in single family residences that were largely constructed since 1994 presumably as a result of the replacement of dishwashers, clothes washers and toilets with newer, high efficiency models as predicted by Great Western Institute (2010), (CH2M Hill and Great Western Institute, 2011). Similarly, indoor water use decreased by about 4% in Durango since 2006 in single family residences (Great Western Institute, 2011b). On average Durango has older housing stock than does the Town of Superior.

[39] Nearly 80% of planning entities have budgets for bill stuffers and pamphlets. About 45% have Xeriscape demonstration gardens. About 50% do mass mailings and/or newsletters. About 70% have informational websites.

information provided. Water utilities can also craft simple feedback tools or instruments that allow for some means to adjust its message in accordance with how the audience receives and interprets the broadcasted information. Planning entities have realized the importance and value of these kinds of one-way with feedback educational programs, since about 60% include in-classroom educational programs as part of their educational programs. Homeowner and irrigator educational programs and water fairs are also supported by 30 to 40% of water utilities.

In addition, about 15% of water utilities have or plan to implement specific messaging programs related to their water conservation efforts in their customer educational programs. Messaging programs are considered an important part of any water utility's water conservation program since the utility needs to engage and consider customer input and behaviors into how it plans for and implements water conservation. This is why it is considered such a high priority for water providers to improve their own water use efficiency – to show leadership and organizational commitment to water conservation. Messaging efforts are best when utility actions match the information that is being broadcast regarding the organizational commitment to water conservation. Therefore, it is suggested that water utilities develop messaging programs that are integrated with their own actions, as well as their water conservation programs.

True two-way educational programs are rarer than other types of educational programs[40], although they are understood to be very important. Citizen advisory boards and focus groups are two of the more prevalent types of two-way educational programs, for these programs are effective in bring together citizens and utility staff to exchange ideas, information and perceptions. Given that water conservation has long been known to be influenced by customer behaviors, it is vital that water utilities and planning entities encourage and value public input. Including meaningful two-way education into planning efforts may represent a cultural change from past organizational practices for some water utilities; however, it is valuable for this change to occur to better inform utility level decision-making. Without customer input, planning entities will be effectively working to impact customer behaviors and water uses in a vacuum, without understanding customer needs and perceptions.

Costs

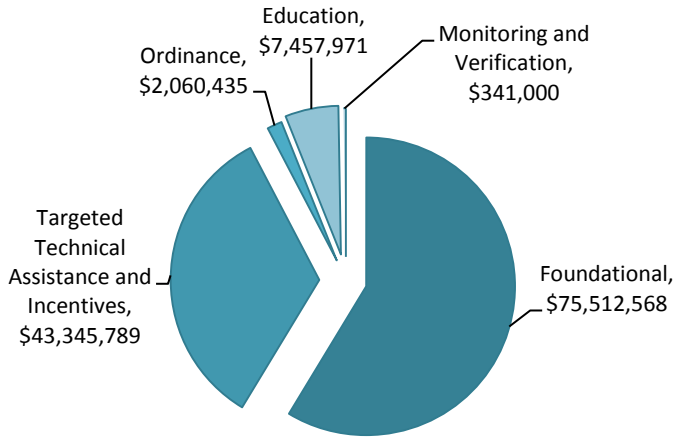
The Water Conservation Plans on file with the Office included data associated with implementation budgets in a manner that was not consistent from plan to plan even though these data are vital to support water utility-level decision making in general and meaningful planning specifically. Although many Water Conservation Plans provided substantial detail on the funding for each combination of measures and programs; other plans included little to no budgetary information.[41] For this reason, it was difficult to track trends in water conservation program funding and budgets across all planning entities. Nonetheless, the data that was available was used to summarize overall types of water

[40] About 36% of planning entities indicated that they include two-way educational programs into the implementation of their Water Conservation Plans.
[41] About 20% of the planning entities did not report any budget information in their plans.

conservation measures and programs that are currently planned for implementation as selected by the planning entities (see Appendix H).

Figure 18 provides a summary of the overall reported breakdown of proposed water conservation budgets[42] for each of the four SWSI conservation level categories. To begin with, Figure 18 indicates that the total combined budget for the planning entities is $129 million excluding Denver Water, Aurora, Greeley and Colorado Springs programs. Denver Water estimated a ten year program cost of about $70 million, where as Aurora reports an annual budget of about $2 million (or $20 million in 10 years) (Baker, 2011), and Greely reported a $7 million budget over 10 years. Assuming Colorado Springs has a budget similar to Aurora's, these four organizations would contribute about $117 million in water conservation implementation costs over the planning horizon, nearly doubling the $129 million reported by the other planning entities. In addition, about 20% of the planning entities did not include budget estimates in their plans. If these 20% maintain similar budgets to those entities that did include budget, another $25 million in water conservation budget would be included over the planning horizon. Based on these assumptions, it is estimated that the total budget for water conservation in the State for all the planning entities is in the range of $260 to $280 million.

Proposed Budgets by Category for All Reporting Planning Entities



Total budget reported by the planning entities was $128.7 million excluding Denver Water, Greeley, Aurora, and Colorado Springs who did not report their itemized 10-year implementation budgets, such that their budgets are not included.

Figure 18

Figure 18 also illustrates that the combined budget for foundational water conservation measures and programs (less the monitoring and verification budget) is about 58% of the total water conservation plan implementation budget for the current planning horizon (which is estimated to be between 10 years on average). Funding for targeted technical assistance and incentives is about 34% of the overall combined budget. The budget for ordinances and education (including monitoring and verification) correlates to the remaining 8% of the total combined budget, using 2% and 6%, respectively. [43]

[42] Excluding staff labor costs.

[43] Monitoring and verification tasks were budgeted at a level of about $8,500 per year for all those water utilities that reported budgets in this category (which was a total of four).

Examples of foundational water conservation programs included in the funding summary are as follows:

- Consolidated Mutual spends $2,000,000 annually on capital replacements and upgrades, and another $120,000 annually on leak detection.
- Arvada spends its reported foundational budget ($3,800,000) on water line replacement.
- Fort Morgan spends its reported foundational budget ($200,000 annually) on system maintenance.
- Thornton spends its reported foundational budget on its pipeline replacement program.
- Salida spends 90% of its reported foundational budget on meter testing and replacement.
- St Charles spends 76% of its foundational budget on meter upgrades and the rest on leak detection and the replacement of water mains.
- Mount Werner spends 89% of its reported foundational budget on system infrastructure repairs and improvements with the remaining budget allocated to billing rate structure (3%), meter enhancements (5%), hydrant testing (0.2%) and meter monitoring (2.8%).
- Steamboat spends 72% of its foundational budget on system infrastructure repairs/improvements with the remaining budget allocated to billing rate structure (3%), meter enhancements (21%), hydrant testing (1%) and meter monitoring (3%).

A breakdown of the total funding for targeted technical assistance and incentives over the next ten years is included in Figure 19 on the following page. This figure differentiates the costs planned for implementation of utility/municipal programs (blue hues) (30%), large customers (red hues) (2%), residential programs (orange hues) (38%) and CII programs (not differentiated as large customers – green hues) (27%). The remaining budget (3%) is for general technical assistance and giveaways.

This summary figure represents 19 different types of targeted technical assistance and incentives measures and programs, which in themselves are representative of various sets of other measures and programs. That said, this figure illustrates the breadth of measures and programs selected for implementation by the planning entities. The diversity of the listed measures and programs is indicative of the role of local conditions and customer needs which influence water utility decision-making.

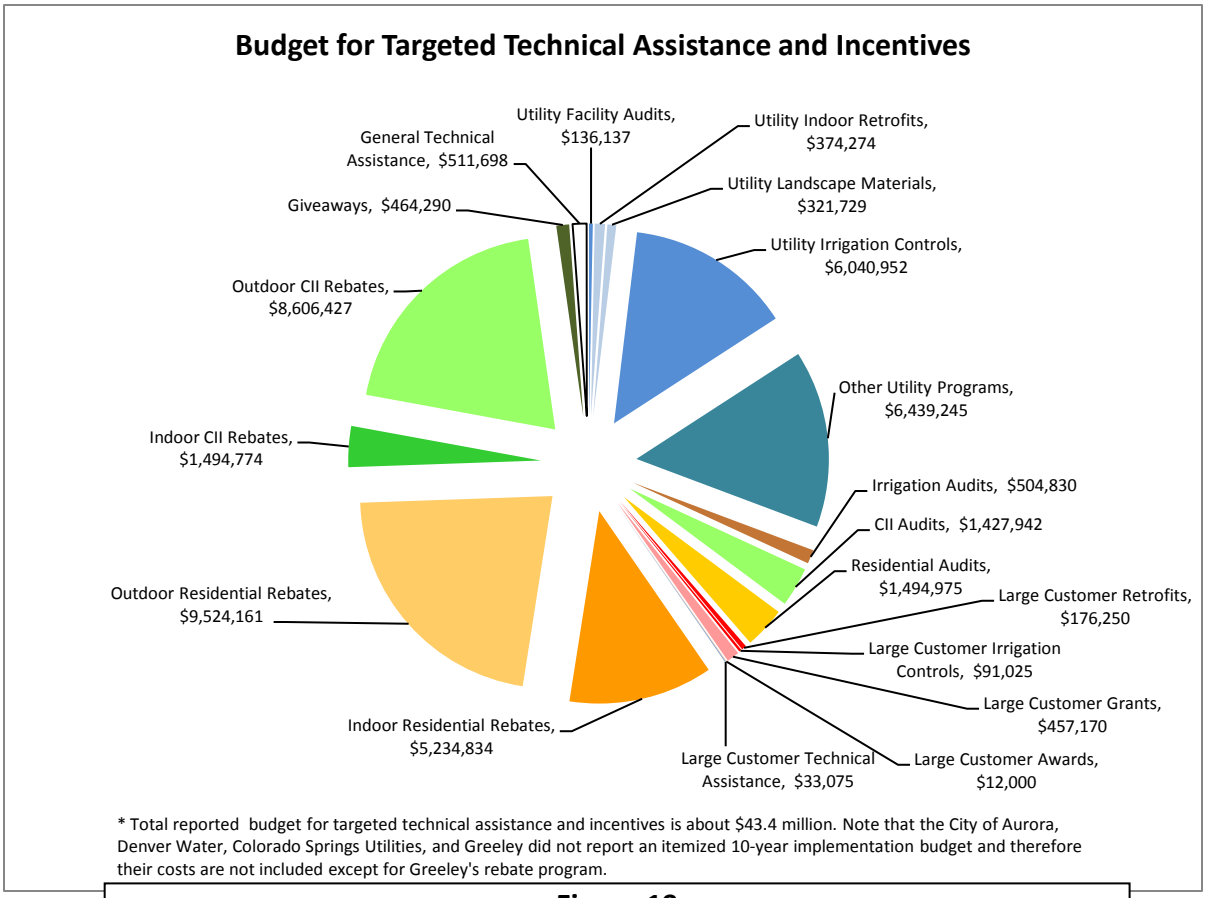

Budget for Targeted Technical Assistance and Incentives
Utility Facility Audits, $136,137
Utility Indoor Retrofits, $374,274
General Technical Assistance, $511,698
Utility Landscape Materials, $321,729
Giveaways, $464,290
Utility Irrigation Controls, $6,040,952
Outdoor CII Rebates, $8,606,427
Other Utility Programs, $6,439,245
Indoor CII Rebates, $1,494,774
Irrigation Audits, $504,830
CII Audits, $1,427,942
Residential Audits, $1,494,975
Large Customer Retrofits, $176,250
Outdoor Residential Rebates, $9,524,161
Large Customer Irrigation Controls, $91,025
Large Customer Grants, $457,170
Indoor Residential Rebates, $5,234,834
Large Customer Technical Assistance, $33,075
Large Customer Awards, $12,000
* Total reported budget for targeted technical assistance and incentives is about $43.4 million. Note that the City of Aurora, Denver Water, Colorado Springs Utilities, and Greeley did not report an itemized 10-year implementation budget and therefore their costs are not included except for Greeley's rebate program.

Figure 19

Section 5
Summary of Observations and Recommendations

Based on the review of all the Water Conservation Plans on file with the Office and the database that was developed using the SWSI Conservation Levels, the following observations and recommendations have been made relevant to the data, the Office and potential policies being developed by the Office and CWCB.

Relevant to the Guidelines

Length of Planning Horizon, Plan Updates and Annual Monitoring

Water providers should tend toward 10 to 20 year water conservation planning horizons to help identify mid- and long-term trends in water supply and water demand, and frame the goals and objectives of water conservation efforts. Within the 10 to 20 year planning horizon, the planning entity will need to submit a formal update to the CWCB of its plan – including monitoring data, analyses, and changes to the plan, as well as future expectations for program implementation – every 7 years, as per statute.

However, the planning entity should be collecting and analyzing data on at least an annual basis, if not a shorter term, given that the state of the science and the conditions of local water conservation efforts change rapidly, due to changes in technology, and customer water use behaviors. Therefore, it is recommended that planning entities collect and analyze relevant data on at least a yearly basis to track the effectiveness and cost of ongoing water conservation programs. This will help to support meaningful water conservation at the utility level, in that information regarding the successes and challenges of specific water conservation programs can be monitored and understood to inform future commitments and resource expenditures.

Incorporation of Passive Savings into Goal Setting and Data Tracking

Future CWCB guidance documents should refer all planning entities to the evaluations and calculations of passive savings, such that future planning efforts (including updates from those entities that have already submitted plans) can include passive savings evaluations and differentiate passive savings from expected active savings. This is a fundamental change that needs to be included into the local planning efforts; otherwise, local entities may confuse the impacts of local passive savings with the effectiveness and/or impact of active programs, causing an over-estimation of active program savings.

The CWCB should also consider providing guidance to planning entities such that they avoid miscalculations of future water savings by incorporating weather-related impacts into their Water Conservation Plan evaluations and assessments.

Documentation of Local Water Demand Forecasting

Overall, water use projections conducted at the local level involve more detailed analyses than are available to the CWCB and the SWSI team due to the differences in scale of the analyses. Therefore, it will be important for future water conservation planning to include the results of local demand forecasting with and without active water conservation impacts. Understanding and tracking predicted savings not only will inform local water conservation planning efforts but regional and statewide planning efforts as well.

Meter Types and Billing

The CWCB should provide guidance to planning entities such that they report on their meter types, meter reading interval and billing interval, and their efforts to modernize metering and billing to help support local water use efficiency data collection and customer communications, as well as state and regional planning efforts including informing the CWCB regarding the needs of utilities for AMR and AMI systems.

Rates

The CWCB should conduct a separate evaluation of current water rates used by those entities with plans on file with the state. This evaluation should include characterizing and analyzing current base rates and rate structures, determining the number of customers that fall within each rate tier, and the average cost of water being sold by utility. In addition, CWCB should consider characterizing sewer connection rates for wastewater disposal to better understand the true avoided costs of water conservation and demand reduction on customers.

For these evaluations to take place, it is recommended that CWCB request information from planning entities regarding their water rate structures, amount of water sold within each structure, and information on sewer rates.

Tracking Population and Taps (or Connections) Served

Although tracking per capita water use is a valuable metric for judging the impacts of active and passive water conservation (as well as the impacts of drought) at a local level, the broad-based use of the parameter(s) for comparison between water providers is not reliable and may create unrealistic understandings of local water conservation planning and implementation efforts. For these reasons, use of GPCD to compare water use from community to community is not suggested (based in part on Dziegielewski and Kiefer, 2010).

Nonetheless, it is recommended that water providers track population served, to the extent practical, as well as number of connections and taps served, as a way to support per capita water use calculations and support the measurement and verification of water conservation programs.

Reporting on Meter Testing and Replacement

Most water conservation plans lacked detail regarding the level of effort of the local meter testing and replacement programs, and the rate of testing and replacement. Future CWCB guidance should request information from planning entities regarding an inventory of their meter ages[44] and sizes and suggests that future meter testing and replacement programs focus on those large taps and therefore large water users as a first priority.

Reporting on Water Loss

Due to the fact that so few of the water providers have conducted system wide water audits to characterize non-revenue water, it is likely (based on the literature and the previous discussions) that some inaccuracy is included in the current water losses reported in the Water Conservation Plans on file with the CWCB. Future CWCB guidance documents should provide more support to water utilities that are attempting to quantify real and apparent water losses such that a more consistent level of reporting is developed and an overall improvement in the understanding of actual real and apparent losses can be established. Reference should be made to the AWWA M-36 Manual and related processes, as an important resource defining the scope, methods and analyses that can be used by local water providers.

Documentation of Data Tracking/Monitoring and Verification Efforts

Future CWCB guidance documents should include a listing of those key data tracking needs related to measuring and verifying meaningful water conservation savings. Data collection should include, but not be limited to: monthly billing and production data; metered, unbilled uses; water billings by customer categories; reporting of real and apparent water losses; number of connections serviced by customer category; and estimates of population served, if possible.

It is also recommended that the future CWCB guidance include some indication that ongoing monitoring and verification of water conservation plan implementation be assigned to dedicated staff to support and facilitate plan reporting and updating to the organization and to the State. It should be noted that smaller organizations and water providers may be challenged in dedicating resources to full-, or even part-time staff for tracking water conservation data.

Reporting on Foundational Programs Costs (including pro-active leak detection)

Future CWCB guidance documents should request CIP data related to water use efficiency improvements that planning entities are expecting to implement be included as one set of implementation programs contained in the water conservation plan (along with other active water conservation measures and programs). In addition, the CWCB may consider suggesting that water

[44] Given that meters can be rebuilt, it is suggested that the "effective age" of a meter be used in CWCB guidance – which refers to the age of the meter's key internal components and not necessarily the age of the casing or housing.

utilities specifically include and/or evaluate pro-active leak detection in their efforts to improve water utility water use efficiency.

Integrating Water Conservation Planning with Other Water Program Planning and Development at the Utility Level

Currently, less than 10% of the planning entities indicate that they utilize integrated resource planning (IRP) in their ongoing water conservation planning efforts. The CWCB should provide guidance to planning entities regarding the value of IRP and how water conservation planning can both inform and support utility planning and management. The CWCB should consider whether or not it would benefit from receiving integrated drought response and water supply plans from the planning entities as a standard course of Water Conservation Plan submittal.

Targeted Technical Assistance and Incentives

Utility/Municipal Facility Water Efficiency

Water savings at facilities that are operated or controlled in some manner by the water provider are the first priority for implementation of improved water use efficiency efforts, since these facilities can be readily accessed and have water use patterns that can be easily characterized and evaluated. By improving water use efficiency at the utility's own facilities, a utility can send a strong, consistent message to its customers – "we will not waste water." CWCB guidance should document these programs as priorities and support municipal water use efficiencies in plans and programs.

Utility/Municipal Facility Audits

It is recommended that any planning entity that does not have enough data to develop a cost-benefit analysis to evaluate specific water use efficiency improvements collect information on facility water use before deciding to complete retrofits. There is adequate data in the literature (Great Western Institute, 2009, Great Western Institute, 2011a) to show that retrofits in public facilities have a higher rate of return than do residential rebates and retrofits, due to the higher use of fixtures and appliance in these settings. Nonetheless, facility audits can help to uncover irregularities in water use, and have been successful in the past in identifying unknown leaks. Therefore, facility audits conducted to evaluate overall water use patterns and support cost benefit analyses are recommended as a top priority for water providers followed by the implementation of various water efficiency improvement for the remaining customers.

Largest Customers

The CWCB should include specific guidance in the future for planning entities to identify their largest water users and collect data regarding their specific water use behaviors and patterns, such that these data can be used to craft water conservation measures and programs that support the water utility and

its key customers. Large customer water use efficiency should become an essential part of most local water conservation programs.

Remaining Customer Water Conservation Programs

Water utilities can also support improved customer water use efficiencies through measures and programs that target water customers that are not their largest water users. Water use efficiency can be improved through various types of programs that provide technical assistance, education and more efficient hardware; however, it is incumbent on the water utility to determine which measures and programs will achieve water demand reductions that are measureable and cost effective. The CWCB should continue to fund implementation measures and programs that utilities deem cost effective. In addition, the CWCB should continue to collect data on the results of implementation efforts (including water audits programs, incentives, technical assistance programs, etc.) to document successes and challenges of different kinds of active water conservation measures and programs conducted by water providers in the State. In this way, the CWCB can provide support to water utilities as they plan and implement water conservation programs focused on improving water use efficiency for their customers.

Ordinances

Water Waste Ordinance

Based on the limited information provided in the water conservation plans regarding the enforcement components of local water waste ordinances, the CWCB should include a request for more detailed budget information and expected outcomes (in terms of water demand reductions and numbers of fines, etc.) in future guidance that is provided to the planning entities. This information would be helpful in informing local water conservation planning efforts throughout the state regarding the cost and potential water savings that may be available through water waste ordinances.

New Construction Ordinances

Given that new construction ordinances can be very effective in reducing forecasted water demands, the CWCB should provide guidance in the future to planning entities regarding the value and need for these types of water use controls in local and regional planning and the importance of field inspections as a means to verify that new development is complying with the requirements of the ordinance. Noteworthy is that some local water utilities have limited authority to review and inspect new construction, such that effective implementation of new construction ordinances may require the combined efforts of multiple jurisdictions working together to achieve stated goals.

Education

The CWCB recommends that messaging programs be a high priority for any local water conservation planning program. Local messaging programs should include examples of improvements to the planning

entity's water use efficiency – to show leadership and organizational commitment to water conservation. Messaging efforts are best when utility actions match the information that is being broadcast regarding the organizational commitment to water conservation. Therefore, it is suggested that water utilities develop messaging programs that are integrated with their own actions, as well as their water conservation programs.

Given that water conservation has long been known to be influenced by customer behaviors, it is vital that water utilities and planning entities encourage and value public input – which is something that CWCB should encourage in its guidance. Including meaningful two-way education into planning efforts may represent a cultural change from past organizational practices for some water utilities; however, it is valuable for this change to occur to better inform utility level decision-making. Without customer input, planning entities will be effectively working to impact customer behaviors and water uses in a vacuum, without understanding customer needs and perceptions.

House Bill 10-1051 Nexus

CWCB should consider endorsing the integration of the HB 10-1051 guideline development process[45], the new SWSI Conservation Levels Framework, and the water conservation database documented in this report into a new framework for water conservation in Colorado. The new framework would leverage the information that has and will continue to be collected and reported to the CWCB related to:

- Water conservation plans on file with the CWCB;
- Annual reporting of water conservation and water supply data to CWCB per HB 10-1051 guidelines;
- The results of water conservation implementation efforts in Colorado, supported in part by the CWCB's Water Efficiency Grant Fund; and
- The current literature.

Statewide Regulation on New Construction

Many local water providers do not have the authority or processes in place to develop and implement controls on the water demand created by new construction. In addition, some organizations are concerned that local controls on new construction may create inconsistencies between neighboring jurisdictions, generating unintended incongruities potentially impacting future business development. To address these issues, statewide regulations have gained favor with many organizations to promote improved water use efficiency in new construction without creating "unlevel" situations locally. Therefore the state may want to consider legislation that promotes new construction water use efficiency through building and plumbing codes, plan review and approval processes, construction inspections and approval, and issuance of certificate of occupancy. This report supports the

[45] See Appendix I for the HB 10-1051 water conservation and water supply data reporting form reviewed and approved by the CWCB in February of 2012.

recommendations of the IBCC Conservation Sub-Committee which recognizes the value of new construction regulations including:

- Requirements for soil amendments;
- Requirements for landscape and irrigation system installations (integrated with the principles of Xeriscape and EPA WaterSense specifications) (e.g., use of current technology and the use of certified irrigation design, installation, and auditing professional, etc.);
- Requirements for sub-metering of large irrigation systems connected to commercial, institutional and industrial facilities; and
- Requirements for indoor plumbing fixture and appliance efficiencies (e.g., new and/or retrofit construction would require the installation of water efficient fixtures and appliances that meet or exceed WaterSense specifications).

Additionally, this report supports that the IBCC Conservation Sub-Committee recommendation that the state conduct investigations into the efficacy of point-of-sale retrofits of high-efficiency dishwashers, clothes washers, and toilets in commercial and/or residential property transactions. One positive outcome of such a statewide regulation is that leaking and outdated fixtures would be required to be replaced before property could change hands. In addition, point-of-sale regulation is beyond the reach of most water utilities, so only a statewide program is implementable (if properly funded and supported).

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Appendix A

House Bill 10-1051

NOTE: This bill has been prepared for the signature of the appropriate legislative officers and the Governor. To determine whether the Governor has signed the bill or taken other action on it, please consult the legislative status sheet, the legislative history, or the Session Laws.

HOUSE BILL 10-1051

BY REPRESENTATIVE(S) Pommer, Fischer, Frangas, Hullinghorst, Labuda, Looper, Pace;
also SENATOR(S) Whitehead, Carroll M., Foster, Tochtrop.

CONCERNING ADDITIONAL INFORMATION REGARDING COVERED ENTITIES' WATER EFFICIENCY PLANS.

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

SECTION 1. 37-60-126 (4) (a) (I) and (9) (a), Colorado Revised Statutes, are amended, and the said 37-60-126 is further amended BY THE ADDITION OF A NEW SUBSECTION, to read:

37-60-126. Water conservation and drought mitigation planning - programs - relationship to state assistance for water facilities - guidelines - water efficiency grant program - repeal. (4) A plan developed by a covered entity pursuant to subsection (2) of this section shall, at a minimum, include a full evaluation of the following plan elements:

(a) The water-saving measures and programs to be used by the covered entity for water conservation. In developing these measures and programs, each covered entity shall, at a minimum, consider the following:

_____
Capital letters indicate new material added to existing statutes; dashes through words indicate deletions from existing statutes and such material not part of act.

(I) Water-efficient fixtures and appliances, including toilets, urinals, CLOTHES WASHERS, showerheads, and ~~faucets~~ FAUCET AERATORS;

(4.5) (a) ON AN ANNUAL BASIS STARTING NO LATER THAN JUNE 30, 2014, COVERED ENTITIES SHALL REPORT WATER USE AND CONSERVATION DATA, TO BE USED FOR STATEWIDE WATER SUPPLY PLANNING, FOLLOWING BOARD GUIDELINES PURSUANT TO PARAGRAPH (b) OF THIS SUBSECTION (4.5), TO THE BOARD BY THE END OF THE SECOND QUARTER OF EACH YEAR FOR THE PREVIOUS CALENDAR YEAR.

(b) NO LATER THAN FEBRUARY 1, 2012, THE BOARD SHALL ADOPT GUIDELINES REGARDING THE REPORTING OF WATER USE AND CONSERVATION DATA BY COVERED ENTITIES, AND SHALL PROVIDE A REPORT TO THE SENATE AGRICULTURE AND NATURAL RESOURCES COMMITTEE AND THE HOUSE OF REPRESENTATIVES AGRICULTURE, LIVESTOCK, AND NATURAL RESOURCES COMMITTEE, OR THEIR SUCCESSOR COMMITTEES, REGARDING THE GUIDELINES. THESE GUIDELINES SHALL:

(I) BE ADOPTED PURSUANT TO THE BOARD'S PUBLIC PARTICIPATION PROCESS AND SHALL INCLUDE OUTREACH TO STAKEHOLDERS FROM WATER PROVIDERS WITH GEOGRAPHIC AND DEMOGRAPHIC DIVERSITY, NONGOVERNMENTAL ORGANIZATIONS, AND WATER CONSERVATION PROFESSIONALS; AND

(II) INCLUDE CLEAR DESCRIPTIONS OF: CATEGORIES OF CUSTOMERS, USES, AND MEASUREMENTS; HOW GUIDELINES WILL BE IMPLEMENTED; AND HOW DATA WILL BE REPORTED TO THE BOARD.

(c) (I) NO LATER THAN FEBRUARY 1, 2019, THE BOARD SHALL REPORT TO THE SENATE AGRICULTURE AND NATURAL RESOURCES COMMITTEE AND THE HOUSE OF REPRESENTATIVES AGRICULTURE, LIVESTOCK, AND NATURAL RESOURCES COMMITTEE, OR THEIR SUCCESSOR COMMITTEES, ON THE GUIDELINES AND DATA COLLECTED BY THE BOARD UNDER THE GUIDELINES.

(II) THIS PARAGRAPH (c) IS REPEALED, EFFECTIVE JULY 1, 2020.

(9) (a) Neither the board nor the Colorado water resources and power development authority shall release grant or loan proceeds to a

covered entity unless ~~such~~ THE covered entity provides a copy of the water conservation plan adopted pursuant to this section; except that the board or the authority may release ~~such~~ THE grant or loan proceeds NOTWITHSTANDING A COVERED ENTITY'S FAILURE TO COMPLY WITH THE REPORTING REQUIREMENTS OF SUBSECTION (4.5) OF THIS SECTION OR if the board or the authority, as applicable, determines that an unforseen emergency exists in relation to the covered entity's loan application, in which case the board or the authority, as applicable, may impose a grant or loan surcharge upon the covered entity that may be rebated or reduced if the covered entity submits and adopts a plan in compliance with this section in a timely manner as determined by the board or the authority, as applicable.

SECTION 2. Applicability. This act shall apply to conduct occurring on or after the effective date of this act.

SECTION 3. Safety clause. The general assembly hereby finds,

determines, and declares that this act is necessary for the immediate preservation of the public peace, health, and safety.

Terrance D. Carroll SPEAKER OF THE HOUSE OF REPRESENTATIVES	Brandon C. Shaffer PRESIDENT OF THE SENATE
Marilyn Eddins CHIEF CLERK OF THE HOUSE OF REPRESENTATIVES	Karen Goldman SECRETARY OF THE SENATE

APPROVED_____

Bill Ritter, Jr.
GOVERNOR OF THE STATE OF COLORADO

Appendix B

State Statute CRS 37-60-126.5

37-60-126. Water conservation and drought mitigation planning - programs - relationship to state assistance for water facilities - guidelines - water efficiency grant program - repeal.

(1) As used in this section and section 37-60-126.5, unless the context otherwise requires:

(a) "Agency" means a public or private entity whose primary purpose includes the promotion of water resource conservation.

(b) "Covered entity" means each municipality, agency, utility, including any privately owned utility, or other publicly owned entity with a legal obligation to supply, distribute, or otherwise provide water at retail to domestic, commercial, industrial, or public facility customers, and that has a total demand for such customers of two thousand acre-feet or more.

(c) "Grant program" means the water efficiency grant program established pursuant to subsection (12) of this section.

(d) "Office" means the office of water conservation and drought planning created in section 37-60-124.

(e) "Plan elements" means those components of water conservation plans that address water-saving measures and programs, implementation review, water-saving goals, and the actions a covered entity shall take to develop, implement, monitor, review, and revise its water conservation plan.

(f) "Public facility" means any facility operated by an instrument of government for the benefit of the public, including, but not limited to, a government building; park or other recreational facility; school, college, university, or other educational institution; highway; hospital; or stadium.

(g) "Water conservation" means water use efficiency, wise water use, water transmission and distribution system efficiency, and supply substitution. The objective of water conservation is a long-term increase in the productive use of water supply in order to satisfy water supply needs without compromising desired water services.

(h) "Water conservation plan", "water use efficiency plan", or "plan" means a plan adopted in accordance with this section.

(i) "Water-saving measures and programs" includes a device, a practice, hardware, or equipment that reduces water demands and a program that uses a combination of measures and incentives that allow for an increase in the productive use of a local water supply.

(2) (a) Each covered entity shall, subject to section 37-60-127, develop, adopt, make publicly available, and implement a plan pursuant to which such covered entity shall encourage its domestic, commercial, industrial, and public facility customers to use water more efficiently. Any state or local governmental entity that is not a covered entity may develop, adopt, make publicly available, and implement such a plan.

(b) The office shall review previously submitted conservation plans to evaluate their consistency with the provisions of this section and the guidelines established pursuant to paragraph (a) of

subsection (7) of this section.

(c) On and after July 1, 2006, a covered entity that seeks financial assistance from either the board or the Colorado water resources and power development authority shall submit to the board a new or revised plan to meet water conservation goals adopted by the covered entity, in accordance with this section, for the board's approval prior to the release of new loan proceeds.

(3) The manner in which the covered entity develops, adopts, makes publicly available, and implements a plan established pursuant to subsection (2) of this section shall be determined by the covered entity in accordance with this section. The plan shall be accompanied by a schedule for its implementation. The plans and schedules shall be provided to the office within ninety days after their adoption. For those entities seeking financial assistance, the office shall then notify the covered entity and the appropriate financing authority that the plan has been reviewed and whether the plan has been approved in accordance with this section.

(4) A plan developed by a covered entity pursuant to subsection (2) of this section shall, at a minimum, include a full evaluation of the following plan elements:

(a) The water-saving measures and programs to be used by the covered entity for water conservation. In developing these measures and programs, each covered entity shall, at a minimum, consider the following:

(I) Water-efficient fixtures and appliances, including toilets, urinals, clothes washers, showerheads, and faucet aerators;

(II) Low water use landscapes, drought-resistant vegetation, removal of phreatophytes, and efficient irrigation;

(III) Water-efficient industrial and commercial water-using processes;

(IV) Water reuse systems;

(V) Distribution system leak identification and repair;

(VI) Dissemination of information regarding water use efficiency measures, including by public education, customer water use audits, and water-saving demonstrations;

(VII) (A) Water rate structures and billing systems designed to encourage water use efficiency in a fiscally responsible manner.

(B) The department of local affairs may provide technical assistance to covered entities that are local governments to implement water billing systems that show customer water usage and that implement tiered billing systems.

(VIII) Regulatory measures designed to encourage water conservation;

(IX) Incentives to implement water conservation techniques, including rebates to customers to encourage the installation of water conservation measures;

(b) A section stating the covered entity's best judgment of the role of water conservation plans in the covered entity's water supply planning;

(c) The steps the covered entity used to develop, and will use to implement, monitor, review, and revise, its water conservation plan;

(d) The time period, not to exceed seven years, after which the covered entity will review and update its adopted plan; and

(e) Either as a percentage or in acre-foot increments, an estimate of the amount of water that has been saved through a previously implemented conservation plan and an estimate of the amount of water that will be saved through conservation when the plan is implemented.

(4.5) (a) On an annual basis starting no later than June 30, 2014, covered entities shall report water use and conservation data, to be used for statewide water supply planning, following board guidelines pursuant to paragraph (b) of this subsection (4.5), to the board by the end of the second quarter of each year for the previous calendar year.

(b) No later than February 1, 2012, the board shall adopt guidelines regarding the reporting of water use and conservation data by covered entities and shall provide a report to the senate agriculture and natural resources committee and the house of representatives agriculture, livestock, and natural resources committee, or their successor committees, regarding the guidelines. These guidelines shall:

(I) Be adopted pursuant to the board's public participation process and shall include outreach to stakeholders from water providers with geographic and demographic diversity, nongovernmental organizations, and water conservation professionals; and

(II) Include clear descriptions of: Categories of customers, uses, and measurements; how guidelines will be implemented; and how data will be reported to the board.

(c) (I) No later than February 1, 2019, the board shall report to the senate agriculture and natural resources committee and the house of representatives agriculture, livestock, and natural resources committee, or their successor committees, on the guidelines and data collected by the board under the guidelines.

(II) This paragraph (c) is repealed, effective July 1, 2020.

(5) Each covered entity and other state or local governmental entity that adopts a plan shall follow the entity's rules, codes, or ordinances to make the draft plan available for public review and comment. If there are no rules, codes, or ordinances governing the entity's public planning process, then each entity shall publish a draft plan, give public notice of the plan, make such plan publicly available, and solicit comments from the public for a period of not less than sixty days after the date on which the draft plan is made publicly available. Reference shall be made in the public notice to the elements of a plan that have already been implemented.

(6) The board is hereby authorized to recommend the appropriation and expenditure of such revenues as are necessary from the unobligated balance of the five percent share of the operational account of the severance tax trust fund designated for use by the board for the purpose of the office providing assistance to covered entities to develop water conservation plans that meet the provisions of this section.

(7) (a) The board shall adopt guidelines for the office to review water conservation plans submitted by covered entities and other state or local governmental entities. The guidelines shall define the method for submitting plans to the office, the methods for office review and approval of the plans, and the interest rate surcharge provided for in paragraph (a) of subsection (9) of this section.

(b) If no other applicable guidelines exist as of June 1, 2007, the board shall adopt guidelines by July 31, 2007, for the office to use in reviewing applications submitted by covered entities, other state or local governmental entities, and agencies for grants from the grant program and from the grant program established in section 37-60-126.5 (3). The guidelines shall establish deadlines and procedures for covered entities, other state or local governmental entities, and agencies to follow in applying for grants and the criteria to be used by the office and the board in prioritizing and awarding grants.

(8) A covered entity may at any time adopt changes to an approved plan in accordance with this section after notifying and receiving concurrence from the office. If the proposed changes are major, the covered entity shall give public notice of the changes, make the changes available in draft form, and provide the public an opportunity to comment on such changes before adopting them in accordance with subsection (5) of this section.

(9) (a) Neither the board nor the Colorado water resources and power development authority shall release grant or loan proceeds to a covered entity unless the covered entity provides a copy of the water conservation plan adopted pursuant to this section; except that the board or the authority may release the grant or loan proceeds notwithstanding a covered entity's failure to comply with the reporting requirements of subsection (4.5) of this section or if the board or the authority, as applicable, determines that an unforseen emergency exists in relation to the covered entity's loan application, in which case the board or the authority, as applicable, may impose a grant or loan surcharge upon the covered entity that may be rebated or reduced if the covered entity submits and adopts a plan in compliance with this section in a timely manner as determined by the board or the authority, as applicable.

(b) The board and the Colorado water resources and power development authority, to which any covered entity has applied for financial assistance for the construction of a water diversion, storage, conveyance, water treatment, or wastewater treatment facility, shall consider any water conservation plan filed pursuant to this section in determining whether to render financial assistance to such entity. Such consideration shall be carried out within the discretion accorded the board and the Colorado water resources and power development authority pursuant to which such board and authority render such financial assistance to such covered entity.

(c) The board and the Colorado water resources and power development authority may enter into a memorandum of understanding with each other for the purposes of avoiding delay in the processing of applications for financial assistance covered by this section and avoiding duplication in the consideration required by this subsection (9).

(10) Repealed.

(11) (a) Any section of a restrictive covenant that prohibits or limits xeriscape, prohibits or limits the installation or use of drought-tolerant vegetative landscapes, or requires cultivated vegetation to consist exclusively or primarily of turf grass is hereby declared contrary to public policy and,

on that basis, that section of the covenant shall be unenforceable.

(b) As used in this subsection (11):

(I) "Executive board policy or practice" includes any additional procedural step or burden, financial or otherwise, placed on a unit owner who seeks approval for a landscaping change by the executive board of a unit owners' association, as defined in section 38-33.3-103, C.R.S., and not included in the existing declaration or bylaws of the association. An "executive board policy or practice" includes, without limitation, the requirement of:

(A) An architect's stamp;

(B) Preapproval by an architect or landscape architect retained by the executive board;

(C) An analysis of water usage under the proposed new landscape plan or a history of water usage under the unit owner's existing landscape plan; and

(D) The adoption of a landscaping change fee.

(II) "Restrictive covenant" means any covenant, restriction, bylaw, executive board policy or practice, or condition applicable to real property for the purpose of controlling land use, but does not include any covenant, restriction, or condition imposed on such real property by any governmental entity.

(III) "Turf grass" means continuous plant coverage consisting of hybridized grasses that, when regularly mowed, form a dense growth of leaf blades and roots.

(IV) "Xeriscape" means the application of the principles of landscape planning and design, soil analysis and improvement, appropriate plant selection, limitation of turf area, use of mulches, irrigation efficiency, and appropriate maintenance that results in water use efficiency and water-saving practices.

(c) Nothing in this subsection (11) shall preclude the executive board of a common interest community from taking enforcement action against a unit owner who allows his or her existing landscaping to die; except that:

(I) Such enforcement action shall be suspended during a period of water use restrictions declared by the jurisdiction in which the common interest community is located, in which case the unit owner shall comply with any watering restrictions imposed by the water provider for the common interest community;

(II) Enforcement shall be consistent within the community and not arbitrary or capricious; and

(III) Once the drought emergency is lifted, the unit owner shall be allowed a reasonable and practical opportunity, as defined by the association's executive board, with consideration of applicable local growing seasons or practical limitations, to reseed and revive turf grass before being required to replace it with new sod.

(12) (a) (I) There is hereby created the water efficiency grant program for purposes of providing state funding to aid in the planning and implementation of water conservation plans developed in accordance with the requirements of this section and to promote the benefits of water efficiency.

The board is authorized to distribute grants to covered entities, other state or local governmental entities, and agencies in accordance with its guidelines from the moneys transferred to and appropriated from the water efficiency grant program cash fund, which is hereby created in the state treasury.

(II) Moneys in the water efficiency grant program cash fund are hereby continuously appropriated to the board for the purposes of this subsection (12) and shall be available for use until the programs and projects financed using the grants have been completed.

(III) For each fiscal year beginning on or after July 1, 2010, the general assembly shall appropriate from the fund to the board up to five hundred thousand dollars annually for the purpose of providing grants to covered entities, other state and local governmental entities, and agencies in accordance with this subsection (12). Commencing July 1, 2008, the general assembly shall also appropriate from the fund to the board fifty thousand dollars each fiscal year to cover the costs associated with the administration of the grant program and the requirements of section 37-60-124. Moneys appropriated pursuant to this subparagraph (III) shall remain available until expended or until June 30, 2020, whichever occurs first.

(IV) Any moneys remaining in the fund on June 30, 2020, shall be transferred to the operational account of the severance tax trust fund described in section 39-29-109 (2) (b), C.R.S.

(b) Any covered entity or state or local governmental entity that has adopted a water conservation plan and that supplies, distributes, or otherwise provides water at retail to customers may apply for a grant to aid in the implementation of the water efficiency goals of the plan. Any agency may apply for a grant to fund outreach or education programs aimed at demonstrating the benefits of water efficiency. The office shall review the applications and make recommendations to the board regarding the awarding and distribution of grants to applicants who satisfy the criteria outlined in this subsection (12) and the guidelines developed pursuant to subsection (7) of this section.

(c) This subsection (12) is repealed, effective July 1, 2020.

Source: L. 91: Entire section added, p. 2023, § 4, effective June 4. **L. 99:** (10) repealed, p. 25, § 3, effective March 5. **L. 2003:** (4)(g) amended and (11) added, p. 1368, § 4, effective April 25. **L. 2004:** Entire section amended, p. 1779, § 3, effective August 4. **L. 2005:** (11) amended, p. 1372, § 1, effective June 6; (1), (2)(b), and (7) amended and (12) added, p. 1481, § 1, effective June 7. **L. 2007:** (1)(a), (2)(a), (5), (7), and (12) amended, p. 1890, § 1, effective June 1. **L. 2008:** IP(4) amended, p. 1575, § 30, effective May 29; (12)(a) amended, p. 1873, § 14, effective June 2. **L. 2009:** (12)(a) amended, (HB 09-1017), ch. 297, p. 1593, § 1, effective May 21; (9)(a) amended, (SB 09-106), ch. 386, p. 2091, § 3, effective July 1. **L. 2010:** (4)(a)(I) and (9)(a) amended and (4.5) added, (HB 10-1051), ch. 378, p. 1772, § 1, effective June 7; (12)(a)(III), (12)(a)(IV), and (12)(c) amended, (SB 10-025), ch. 379, p. 1774, § 1, effective June 7.

Editor's note: (1) Subsection (12) was originally enacted as subsection (13) in House Bill 05-1254 but was renumbered on revision for ease of location.

(2) Section 2 of chapter 378, Session Laws of Colorado 2010, provides that the act amending subsections (4)(a)(I) and (9)(a) and adding subsection (4.5) applies to conduct occurring on or after June 7, 2010.

Cross references: (1) In 1991, this entire section was added by the "Water Conservation Act of 1991". For the short title and the legislative declaration, see sections 1 and 2 of chapter 328, Session Laws of Colorado 1991.

(2) For the legislative declaration contained in the 2004 act amending this section, see section 1 of chapter 373, Session Laws of Colorado 2004.

Appendix C

Summary Data Worksheet

Appendix C - Summary Data Worksheet

Summary						Current Demand (at planning submittal)			Future Forecasted Demand w/o WC (in 2020)			Future Forecasted Demand w/ WC (in 2020)			
Location	Submittal Date (mon/yr)	Planning Horizon (yrs)	End of Planning Horizon	Stated Water Demand Reduction at End of Planning Horizon (AF/yr)	Current Number of Connections	Treated Water (AF)*	Other Water (AF)	Total (AF)	Treated Water (AF)*	Other Water (AF)	Total (AF)	Treated Water (AF)*	Other Water (AF)	Total (AF)	Projected Water Demand Reduction in 2020 (AF)
Alamosa, City of	May-07	10	2018	1,117	3,002	2,581	-	2,581	3,058	-	3,058	1,851	-	1,851	1,207
Arapahoe County Water and Wastewater Authority	Nov-06	10	2018	1,330	1,960	2,931	-	2,931	4,630	-	4,630	3,241	-	3,241	1,389
Arvada, City of	Jan-10	8	2018	1,205	34,275	16,670	-	16,670	18,899	-	18,899	17,671	-	17,671	1,228
Aurora, City of	Aug-07	25	2030	8,439	71,351	49,666	3,042	52,708	66,209	3,042	69,251	62,666	3,042	65,708	3,543
Boulder, City of	Aug-09	25	2035	5,320	28,582	18,616	-	18,616	24,159	-	24,159	22,031	-	22,031	2,128
Brighton, City of	Apr-08	10	2017	1,051	5,000	5,492	296	5,788	9,335	458	9,793	7,924	458	8,382	1,411
Castle Pines Metro District*	Jul-09	10	2019	168	1,669	1,219	634	1,853	1,146	634	1,780	978	634	1,612	168
Castle Pines North Metro District	Aug-06	10	2016	198	3,133	1,821	240	2,061	2,000	240	2,240	1,802	240	2,042	198
Castle Rock, Town of	Dec-06	25	2030	3,300	12,000	7,518	260	7,778	14,018	260	14,278	12,170	260	12,430	1,848
Centennial Water and Sanitation District	Apr-08	5	2013	384	28,528	14,658	281	14,939	18,650	281	18,931	18,266	281	18,547	384
Cherokee Water District	Sep-07	1	2008	NR	6,599	3,485	-	3,485	3,485	-	3,485	3,485	-	3,485	-
Colorado Springs Utilities	Dec-07	10	2016	6,911	129,365	98,200	-	98,200	138,100	-	138,100	128,400	-	128,400	9,700
Consolidated Mutual Water Company	Dec-11	1	2012	NR	20,965	12,862	-	12,862	13,511	-	13,511	13,511	-	13,511	-
Cortez, City of	Dec-10	7	2017	335	4,341	2,338	-	2,338	2,633	-	2,633	2,290	-	2,290	343
Denver Water*	Apr-07	10	2016	29,400	128,500	257,000	-	257,000	321,250	-	321,250	291,250	-	291,250	30,000
Durango, City of	Jun-11	10	2020	317	6,240	3,950	783	4,732	4,591	910	5,500	4,366	818	5,183	317
East Larimer County Water District	Jun-07	10	2016	572	5,508	3,620	-	3,620	9,000	-	9,000	8,199	-	8,199	801
Erie, Town of	Jul-08	7	2014	941	6,086	2,766	435	3,201	6,160	970	7,130	5,732	280	6,012	1,118
Evans, City of	May-09	10	2018	493	6,175	2,893	253	3,146	5,328	451	5,779	4,835	451	5,286	493
Firestone, Town of	Jun-07	10	2015	280	6,698	1,800	-	1,800	4,559	-	4,559	4,179	-	4,179	380
Fort Collins, City of	Feb-09	11	2020	2,300	33,521	27,190	-	27,190	31,800	-	31,800	29,500	-	29,500	2,300
Fort Collins-Loveland Water District	Sep-08	10	2018	119	13,704	8,308	-	8,308	11,668	-	11,668	10,200	-	10,200	1,468
Fort Lupton, City of	Aug-07	23	2030	354	1,908	3,000	-	3,000	4,248	-	4,248	4,050	-	4,050	198
Fort Morgan, City of	Jun-07	20	2025	560	4,030	4,021	636	4,657	5,400	1,010	6,410	4,860	1,010	5,870	540
Fountain, City of	Mar-09	5	2013	181	7,022	2,550	-	2,550	8,420	-	8,420	7,398	-	7,398	1,022
Grand Valley	Sep-10	15	2025	529											
Clifton Water District					11,000	3,947	-	3,947	5,251	-	5,251	4,760	-	4,760	492
Grand Junction, City of					9,646	5,705	-	5,705	6,137	-	6,137	6,124	-	6,124	14
Ute Water Conservancy District					30,214	9,757	-	9,757	12,271	-	12,271	12,253	-	12,253	18
Glenwood Springs, City of	Jun-09	20	2030	130	3,492	1,872	366	2,238	2,140	400	2,540	2,075	400	2,475	65
Greeley, City of*	Nov-08	20	2030	3,000	25,087	22,372	3,200	25,572	32,763	3,164	35,927	30,763	3,164	33,927	2,000
La Junta, City of	Jan-11	10	2020	385	3,240	3,022	-	3,022	3,086	-	3,086	2,702	-	2,702	384
Lafayette, City of	Apr-10	6	2016	597	8,212	4,510	-	4,510	7,105	-	7,105	5,641	-	5,641	1,464
Lamar, City of	Jun-10	10	2019	424	3,487	2,170	-	2,170	2,424	-	2,424	1,945	-	1,945	479
Left Hand Water District	Jun-08	10	2017	712	6,267	4,269	-	4,269	8,521	-	8,521	7,669	-	7,669	852
Longmont, City of	Sep-08	10	2017	1,825	24,387	18,134	-	18,134	21,828	-	21,828	19,463	-	19,463	2,365
Louisville, Town of	Jan-10	n/a	n/a	356	6,675	3,724		3,724	7,120	-	7,120	6,764	-	6,764	356
Meridian Metropolitan District	Jan-11	10	2020	135	630	666	959	1,625	1,148	1,578	2,726	1,013	1,578	2,591	135
North Table Mountain WSD	Jun-09	6	2015	678	4,004	2,394	-	2,394	4,143	-	4,143	3,438	-	3,438	705
North Weld County Water District	Jun-09	10	2018	382	3,474	4,555	-	4,555	5,668	-	5,668	5,268	-	5,268	400
Northglenn, City of	Jul-07	7	2013	489	10,334	5,763	-	5,763	6,250	-	6,250	5,650	-	5,650	600
Pagosa Area Water and Sanitation District	Oct-08	10	2018	448	5,300	1,926	275	2,200	4,158	899	5,057	3,630	899	4,529	528
Parker Water and Sanitation District	May-09	10	2020	1,582	15,643	7,389	-	7,389	10,573	-	10,573	8,991	-	8,991	1,582
Pinery Water and Wastewater District	Feb-10	8	2018	328	4,000	3,245	-	3,245	3,971	-	3,971	3,578	-	3,578	393
Pueblo Board of Water Works	May-10	40	2050	-	39,200	24,157	-	24,157	18,134	-	18,134	18,134	-	18,134	-
Rifle, City of	Jul-08	20	2027	398	3,191	1,582	-	1,582	2,873	-	2,873	2,586	-	2,586	287
Salida, City of	Jan-09	9	2017	274	2,776	1,640	-	1,640	2,469	-	2,469	2,155	-	2,155	314
Security Water District	Jan-10	10	2020	137	6,776	3,090	-	3,090	3,734	-	3,734	3,597	-	3,597	137
St Charles Mesa Water District	Nov-10	20	2030	357	4,042	2,245	-	2,245	2,461	-	2,461	2,283	-	2,283	179
Steamboat	Dec-10	25	2035	821	3,500	3,465	-	3,465	4,067	-	4,067	3,736	-	3,736	331
Mount Werner Water															
Steamboat Springs, City of															
Sterling, City of	Jan-10	12	2022	560	4,679	5,308	-	5,308	6,186	-	6,186	5,662	-	5,662	524
Thorton, City of	Jan-09	20	2027	2,838	23,805	20,901	-	20,901	25,781	-	25,781	23,891	-	23,891	1,890
Tri-County Water Conservancy District	Jan-10	15	2025	152	7,157	2,522	-	2,522	3,103	-	3,103	2,986	-	2,986	117
Widefield Water and Sanitation District	Aug-09	7	2016	124	5,900	2,850	-	2,850	3,500	-	3,500	3,360	-	3,360	140
Windsor, Town of	Jan-09	10	2017	276	4,583	2,317	-	2,317	3,830	-	3,830	3,554	-	3,554	276

Appendix C - Summary Data Worksheet

Population		GPCD			Water Demand Reductions	Expected Passive Savings 2008-2020		Expected Passive Savings 2010-2020	
current	Estimated 2020	current	Estimated 2020	% Reduction	2020 Reduction/Total Demand Water	Low	High	Low	High
8,745	10,360	263	160	39%	39%	4%	6%	3%	4%
6,000	9,630	436	300	31%	30%	2%	3%	2%	3%
107,050	120,289	139	131	6%	6%	7%	11%	6%	8%
306,580	387,726	153	151	1%	5%	6%	10%	5%	8%
113,000	124,338	147	158	-8%	9%	7%	10%	6%	8%
32,760	41,951	158	178	-13%	14%	6%	10%	5%	7%
4,600	5,460	360	264	27%	9%	3%	4%	2%	3%
8,914	9,392	206	194	6%	9%	5%	7%	4%	6%
39,263	74,436	177	149	16%	13%	6%	8%	5%	7%
91,506	100,000	146	166	-14%	2%	7%	10%	6%	8%
17,965	17,965	173	173	0%	0%	6%	9%	5%	7%
417,574	587,200	210	195	7%	7%	5%	7%	4%	6%
92,358	97,020	124	124	0%	0%	8%	12%	7%	9%
9,078	10,215	230	200	13%	13%	4%	7%	4%	5%
1,200,000	1,500,000	191	173	9%	9%	5%	8%	4%	6%
20,239	26,270	209	176	16%	6%	5%	7%	4%	6%
16,344	33,650	198	218	-10%	9%	5%	8%	4%	6%
16,640	27,680	172	194	-13%	16%	6%	9%	5%	7%
20,394	28,504	138	166	-20%	9%	7%	11%	6%	9%
6,564	17,774	245	210	14%	8%	4%	6%	3%	5%
128,400	148,500	189	177	6%	7%	5%	8%	4%	6%
38,850	54,130	191	168	12%	13%	5%	8%	4%	6%
7,200	10,891	372	332	11%	5%	3%	4%	2%	3%
10,700	14,600	389	359	8%	8%	3%	4%	2%	3%
20,278	42,000	112	157	-40%	12%	9%	13%	7%	10%
37,000	46,140	95	92	3%	9%	10%	16%	9%	12%
26,650	28,775	191	190	1%	0.2%	5%	8%	4%	6%
79,600	112,985	109	97	12%	0.1%	9%	14%	7%	11%
9,000	10,818	222	204	8%	3%	4%	7%	4%	5%
85,675	120,369	266	252	6%	6%	4%	6%	3%	4%
7,857	8,096	343	298	13%	12%	3%	4%	2%	3%
27,034	42,400	149	119	20%	21%	7%	10%	5%	8%
8,605	8,876	225	196	13%	20%	4%	7%	4%	5%
19,060	28,720	200	238	-19%	10%	5%	7%	4%	6%
86,522	97,817	187	178	5%	11%	5%	8%	4%	6%
19,000	23,000	175	263	-50%	5%	6%	9%	5%	7%
4,500	7,875	322	294	9%	5%	3%	5%	3%	4%
9,456	15,744	226	195	14%	17%	4%	7%	4%	5%
9,470	11,869	429	396	8%	7%	2%	3%	2%	3%
36,857	39,793	140	127	9%	10%	7%	11%	6%	8%
10,625	18,211	185	222	-20%	10%	5%	8%	4%	6%
41,000	57,000	161	141	12%	15%	6%	9%	5%	7%
10,319	12,200	281	262	7%	10%	3%	5%	3%	4%
108,000	122,925	200	132	34%	0%	5%	8%	4%	6%
8,800	17,305	161	133	17%	10%	6%	9%	5%	7%
5,399	8,069	271	238	12%	13%	4%	6%	3%	4%
17,620	22,000	157	146	7%	4%	6%	10%	5%	8%
10,921	12,197	184	167	9%	7%	5%	8%	4%	6%
12,170	15,564	254	214	16%	8%	4%	6%	3%	5%
13,900	18,876	341	268	21%	8%	3%	4%	2%	3%
129,130	155,192	144	137	5%	7%	7%	10%	6%	8%
18,000	23,394	125	114	9%	4%	8%	12%	6%	9%
16,000	20,286	159	148	7%	4%	6%	9%	5%	7%
14,915	26,273	139	121	13%	7%	7%	11%	6%	8%

Appendix D

Foundational Data Worksheet (including Unaccounted for Water and Customer Categories)

Appendix D - Foundational Data Worksheet

Foundational	Metering and Data Collection						
Location	Manual	AMR	AMI	Period of Readings	Testing and Replacement	Unmetered Uses	Unmetered Uses- Other
Alamosa, City of	✓			M		None	
Arapahoe County Water and Wastewater Authority	✓			M	✓	Some	Construction, Street Cleaning
Arvada, City of						NR	
Aurora, City of	✓	✓		M		NR	
Boulder, City of	✓			M		None	
Brighton, City of	✓			M	✓	Some	
Castle Pines Metro District	✓			M		Some	Firefighting, Street Cleaning
Castle Pines North Metro District		✓				NR	
Castle Rock, Town of	✓			M		Some	Fire
Centennial Water and Sanitation District	✓			BM	✓	Some	
Cherokee Water District					✓	None	
Colorado Springs Utilities		✓	Partial	D	✓	Some	Firefighting
Consolidated Mutual Water Company		✓	✓	D	✓	None	
Cortez, City of	✓	✓		M		Some	Irrigation, Street Cleaning
Denver Water						NR	
Durango, City of		✓	Partial	M,D, H	✓	Some	Unmetered Residential/ Commercial Taps, schools
East Larimer County Water District	✓			M	✓	NR	
Erie, Town of	✓			M	✓	Some	Street Cleaning
Evans, City of	✓			M	✓	NR	
Firestone, Town of	✓			M		None	
Fort Collins, City of						NR	
Fort Collins-Loveland Water District	✓	✓		M	✓	None	
Fort Lupton, City of	✓			M	✓	Some	Irrigation
Fort Morgan, City of		✓		M	✓	Some	Firefighting, Street Cleaning
Fountain, City of					✓	NR	
Grand Valley							
Clifton Water District		✓		M		NR	
Grand Junction, City of	✓	✓		M	✓	None	
Ute Water Conservancy District		✓		M		Some	Fire- unauthorized uses
Glenwood Springs, City of	✓	✓	✓	M		Some	aerial pipes
Greeley, City of	✓			M		NR	
La Junta, City of	✓	✓		M	✓	Some	Firefighting
Lafayette, City of	✓			M	✓	Some	Firefighting, Street Cleaning
Lamar, City of	✓	✓		M	✓	Some	Firefighting
Left Hand Water District	✓			M	✓	None	
Longmont, City of	✓	Some	250 Largest Commercial Users	M.D,H	✓	Some	Firefighting, Street Cleaning, Construction, Parks
Louisville, City of	✓	✓		M	✓	NR	
Meridian Metropolitan District	✓			M/BM		Some	Firefighting
North Table Mountain Water and Sanitation District		✓		M,Q	✓	Some	Firefighting
North Weld County Water District	✓			M	✓	Some	Construction, interconnections
Northglenn, City of		✓		M	✓	Some	Firefighting, Construction
Pagosa Area Water and Sanitation District		✓	✓	M,D,H	✓	Some	
Parker Water and Sanitation District	✓	✓		M	✓	Some	Firefighting, Construction, Municipal Buildings
Pinery Water and Wastewater District	✓	✓		BM	✓	None	
Pueblo, City of	✓	✓	✓	M,D	✓	Some	Street Cleaning
Rifle, City of	✓			M		None	
Salida, City of	✓	✓		Q	✓	Some	Construction
Security Water District	✓			M	✓	None	
St Charles Mesa Water District	✓	✓		M	✓	None	
Steamboat							
Mount Werner Water	✓	✓	✓	M, D	✓	Some	Street Cleaning, Park Irrigation
Steamboat Springs, City of	✓			M	✓	Some	Street Cleaning, Park Irrigation
Sterling, City of	✓			M	✓	Some	Municipal Buildings
Thorton, City of	✓			M	✓	Some	
Tri-County Water Conservancy District		✓		BM		NR	
Widefield Water and Sanitation District	✓	✓		M	✓	None	
Windsor, Town of	✓			M	✓	Some	
53	39	27	8	49	37	44	

Appendix D - Foundational Data Worksheet

Foundational	Type of Billing				Customer Categories (rates)	
Location	Monthly	Bi-Monthly	Other	Water Budgets	Residential (Inclining or Flat)	Commercial (Inclining or Flat)
Alamosa, City of	✓				I	I
Arapahoe County Water and Wastewater Authority	✓				I	I
Arvada, City of		✓			I	I
Aurora, City of	✓				I	I
Boulder, City of	✓			✓	I	I
Brighton, City of	✓			✓	I	I
Castle Pines Metro District	✓				I	I
Castle Pines North Metro District	✓			✓	I	I
Castle Rock, Town of	✓				I	F
Centennial Water and Sanitation District		✓		✓	I	I
Cherokee Water District					I	F
Colorado Springs Utilities					I	F
Consolidated Mutual Water Company		✓		✓	F	F
Cortez, City of					F	F
Denver Water	✓	✓			I	F
Durango, City of	✓				I	I
East Larimer County Water District	✓			✓	F	F
Erie, Town of	✓				I	F
Evans, City of	✓				I	F
Firestone, Town of	✓				I	F
Fort Collins, City of					I	I
Fort Collins-Loveland Water District	✓				I	I
Fort Lupton, City of	✓				I	I
Fort Morgan, City of	✓				F	F
Fountain, City of					I	I
Grand Valley						
Clifton Water District	✓				I	I
Grand Junction, City of	✓				I	I
Ute Water Conservancy District					I	I
Glenwood Springs, City of	✓				I	I
Greeley, City of	✓			✓	F	F
La Junta, City of	✓				F	F
Lafayette, City of	✓				I	I
Lamar, City of	✓				F	F
Left Hand Water District	✓				I	F
Longmont, City of	✓				I	F
Louisville, City of	✓				I	I
Meridian Metropolitan District	✓	✓		✓	I	I
North Table Mountain Water and Sanitation District	✓		Q		I	I
North Weld County Water District	✓				I	I
Northglenn, City of	✓				I	I/ F
Pagosa Area Water and Sanitation District					I	I
Parker Water and Sanitation District	✓				I	I
Pinery Water and Wastewater District	✓	✓		✓	I	I
Pueblo, City of	✓				F	F
Rifle, City of	✓				I	I
Salida, City of			Q		F	F
Security Water District	✓				I	NR
St Charles Mesa Water District	✓				I	I
Steamboat						
Mount Werner Water	✓				I	F
Steamboat Springs, City of	✓				I	F
Sterling, City of	✓				I	I
Thorton, City of	✓				I	I
Tri-County Water Conservancy District		✓			F	F
Widefield Water and Sanitation District	✓				I	F
Windsor, Town of	✓				I	I
53	43	7	2	9	55	55

Appendix D - Foundational Data Worksheet

Foundational	Demand Management with Tap Fees	Water Loss Management		
Location	Conservation Tap Fee Controls	System Wide Audits (Conducted or Planned)	Leak Detection and Repair	Water Line Replacement Program
Alamosa, City of			✓	✓
Arapahoe County Water and Wastewater Authority			✓	
Arvada, City of	✓		✓	✓
Aurora, City of			✓	✓
Boulder, City of			✓	✓
Brighton, City of			✓	
Castle Pines Metro District		Conducted	✓	
Castle Pines North Metro District			✓	
Castle Rock, Town of			✓	
Centennial Water and Sanitation District		Conducted	✓	
Cherokee Water District			✓	
Colorado Springs Utilities			✓	✓
Consolidated Mutual Water Company		Conducted/ Planned	✓	✓
Cortez, City of			✓	✓
Denver Water			✓	
Durango, City of	✓	Planned	✓	✓
East Larimer County Water District			✓	
Erie, Town of			✓	✓
Evans, City of			✓	
Firestone, Town of			✓	
Fort Collins, City of			✓	
Fort Collins-Loveland Water District			✓	✓
Fort Lupton, City of			✓	
Fort Morgan, City of			✓	✓
Fountain, City of			✓	✓
Grand Valley				
Clifton Water District			✓	
Grand Junction, City of			✓	✓
Ute Water Conservancy District			✓	
Glenwood Springs, City of			✓	✓
Greeley, City of			✓	✓
La Junta, City of			✓	✓
Lafayette, City of		Planned	✓	
Lamar, City of			✓	✓
Left Hand Water District			✓	✓
Longmont, City of			✓	
Louisville, City of			✓	
Meridian Metropolitan District				
North Table Mountain Water and Sanitation District		Planned	✓	✓
North Weld County Water District			✓	✓
Northglenn, City of			✓	✓
Pagosa Area Water and Sanitation District			✓	
Parker Water and Sanitation District			✓	
Pinery Water and Wastewater District			✓	✓
Pueblo, City of			✓	✓
Rifle, City of				
Salida, City of			✓	✓
Security Water District		Planned	✓	✓
St Charles Mesa Water District			✓	✓
Steamboat				
Mount Werner Water			✓	✓
Steamboat Springs, City of			✓	✓
Sterling, City of			✓	
Thorton, City of			✓	✓
Tri-County Water Conservancy District			✓	
Widefield Water and Sanitation District			✓	
Windsor, Town of			✓	✓
53	2	7	53	30

Appendix D - Foundational Data Worksheet

Foundational	Data Tracking	Planning											
			Monitor										
Location	Large Customers	IRP	Production Records	Billing Records	Costs	Annually	Seasonally/ Quarterly	Monthly	Bi-Monthly	Daily	Hourly	Staff
Alamosa, City of			✓	✓	✓	✓	✓	✓				
Arapahoe County Water and Wastewater Authority	✓				✓	✓						
Arvada, City of	✓											
Aurora, City of		✓				✓	✓	✓				
Boulder, City of	✓					✓						✓
Brighton, City of				✓		✓	✓					
Castle Pines Metro District	✓			✓	✓							✓
Castle Pines North Metro District		✓	✓	✓	✓	✓		✓		✓		
Castle Rock, Town of			✓	✓				✓		✓		
Centennial Water and Sanitation District			✓	✓	✓	✓		✓		✓		✓
Cherokee Water District	✓											
Colorado Springs Utilities				✓	✓	✓						
Consolidated Mutual Water Company	✓			✓		✓						
Cortez, City of			✓	✓	✓	✓						
Denver Water				✓	✓	✓	✓					✓
Durango, City of	✓		✓	✓	✓			✓				
East Larimer County Water District	✓			✓	✓							✓
Erie, Town of			✓	✓	✓	✓		✓		✓		
Evans, City of				✓	✓							✓
Firestone, Town of												
Fort Collins, City of				✓		✓						✓
Fort Collins-Loveland Water District				✓	✓							
Fort Lupton, City of	✓			✓	✓	✓						
Fort Morgan, City of	✓		✓	✓	✓	✓		✓				
Fountain, City of	✓			✓		✓						✓
Grand Valley												
Clifton Water District	✓		✓	✓		✓						✓
Grand Junction, City of	✓		✓	✓		✓						✓
Ute Water Conservancy District	✓		✓	✓		✓						✓
Glenwood Springs, City of			✓	✓		✓		✓				
Greeley, City of				✓		✓	✓					
La Junta, City of				✓		✓						
Lafayette, City of			✓	✓	✓		✓	✓		✓		
Lamar, City of			✓	✓	✓	✓						
Left Hand Water District				✓	✓							
Longmont, City of				✓								
Louisville, City of			✓	✓		✓		✓				
Meridian Metropolitan District	✓	✓	✓	✓		✓						✓
North Table Mountain Water and Sanitation District												
North Weld County Water District	✓			✓	✓							
Northglenn, City of		✓	✓	✓	✓	✓	✓	✓				✓
Pagosa Area Water and Sanitation District				✓		✓		✓				✓
Parker Water and Sanitation District												✓
Pinery Water and Wastewater District				✓		✓						
Pueblo, City of												
Rifle, City of	✓		✓	✓	✓	✓	✓	✓				
Salida, City of			✓	✓	✓	✓						
Security Water District	✓		✓	✓	✓					✓		✓
St Charles Mesa Water District	✓		✓	✓		✓						
Steamboat												
Mount Werner Water	✓		✓	✓	✓	✓						✓
Steamboat Springs, City of	✓		✓	✓	✓	✓						✓
Sterling, City of	✓		✓	✓	✓	✓						
Thorton, City of												✓
Tri-County Water Conservancy District	✓			✓		✓						✓
Widefield Water and Sanitation District												✓
Windsor, Town of				✓	✓	✓						
53	23	4										21

Appendix D - Non-Revenue Water (reported as Unaccounted for Water) and Reported Customer Categories

Water User Types			Residential								
Location	% Unaccounted for Water	Irrigation	General	Single Family	Multi-family	City/Municipal	CII	Non-potable	Raw	Reuse	Comments:
Alamosa, City of	18		✓				✓				
Arapahoe County Water and Wastewater Authority	9.9		✓			✓	✓				E,H,I,O
Arvada, City of	NR	✓		✓	✓	✓	✓				A,R
Aurora, City of	NR	✓		✓	✓	✓	✓		✓	✓	
Boulder, City of	3.4	✓		✓	✓		✓				
Brighton, City of	7.5	✓	✓			✓	✓	✓			
Castle Pines Metro District	8.3	✓		✓	✓	✓	✓	✓	✓	✓	E,J,N
Castle Pines North Metro District	Assumed 4	✓	✓			✓	✓				J,Q
Castle Rock, Town of	7	✓		✓	✓	✓	✓				C,O
Centennial Water and Sanitation District	7	✓		✓	✓		✓				E,O
Cherokee Water District	3			✓	✓		✓				D,K
Colorado Springs Utilities	8.6			✓	✓		✓				K
Consolidated Mutual Water Company	4	✓		✓	✓		✓*				B,I,O
Cortez, City of	5	✓		✓	✓	✓	✓				B,O
Denver Water	NR		✓			✓	✓				M
Durango, City of	21	✓		✓	✓	✓	✓		✓		E,O,R
East Larimer County Water District	12			✓	✓		✓				L
Erie, Town of	NR	✓	✓			✓	✓		✓	✓	D,R
Evans, City of	9	✓		✓	✓	✓	✓	✓			
Firestone, Town of	NR	✓		✓	✓		✓				
Fort Collins, City of	6	✓		✓	✓	✓	✓		✓		
Fort Collins-Loveland Water District	12	✓	✓				✓				
Fort Lupton, City of	7	✓		✓	✓		✓				I,O
Fort Morgan, City of	6			✓	✓	✓	✓*				I,N,O
Fountain, City of	NR			✓	✓	✓	✓				D
Grand Valley											
Clifton Water District	12.9	✓		✓	✓		✓				B,L,N,O
Grand Junction, City of	8.5	✓	✓			✓	✓				
Ute Water Conservancy District	6	✓		✓	✓		✓				B,L,N,O
Glenwood Springs, City of	Estimated 5-7	✓	✓				✓		✓		A,H,O
Greeley, City of	7.5			✓	✓		✓				
La Junta, City of	Authorized and Unauthorized 10	✓	✓			✓	✓				
Lafayette, City of	8.5	✓		✓	✓	✓	✓*				
Lamar, City of	Authorized and Unauthorized 20		✓			✓	✓				
Left Hand Water District	7.4	✓		✓	✓		✓			✓	
Longmont, City of	7.7	✓		✓	✓	✓	✓				J
Louisville, City of	NR	✓		✓	✓	✓	✓		✓	✓	
Meridian Metropolitan District	8.3	✓		✓	✓		✓	✓			
Northglenn, City of	10			✓	✓	✓	✓				
North Table Mountain Water and Sanitation District	6.6	✓	✓				✓*				G
North Weld County Water District	8.3		✓				✓				F,J
Pagosa Area Water and Sanitation District	20	✓	✓			✓	✓	✓			
Parker Water and Sanitation District	15	✓		✓	✓		✓				
Pinery Water and Wastewater District	3	✓	✓				✓				D,E
Pueblo, City of	7			✓	✓		✓				
Rifle, City of	6.6	✓		✓	✓	✓	✓*				A,C,L,O
Salida, City of	13	✓		✓	✓		✓*				
Security Water District	10.4	✓		✓	✓	✓	✓				O,R
St Charles Mesa Water District	19		✓				✓				
Steamboat											
Mount Werner Water	12	✓		✓	✓		✓				
Steamboat Springs, City of	19.9	✓		✓	✓		✓				
Sterling, City of	17	✓		✓	✓	✓	✓*				
Thorton, City of	9.5	✓		✓	✓	✓	✓				L
Tri-County Water Conservancy District	6.25	✓		✓	✓		✓*				
Widefield Water and Sanitation District	NR	✓	✓			✓	✓				B,H,N,O
Windsor, Town of	9		✓			✓	✓*				B,O
			18	37	37						

Notes:	Reference
Industrial Separate	*
Bulk	A
Church	B
CoGen Plant	C
Construction	D
Country Club/ Golf Course	E
Dairy	F
Greenhouse	G
Hospital	H
Hotel	I
Large Lot	J
Military	K
Mobile Homes	L
Multifamily Included	M
Restaurant/Retail/Office	N
School	O
Small Lot	P
Townhome	Q
Unbilled Water, Managed	R

Appendix E

Targeted Technical Assistance and Incentives Data Worksheet

Appendix E - Targeted Technical Assistance and Incentives Data Worksheet

	Management of Institutional Uses											Understanding of Largest Customers						
Ongoing Water Uses	Documented Unmetered Uses		Facility Audits		Indoor Retrofits		Xeriscape or Low Water Use Landscapes		Outdoor Irrigation Controllers		Alternative Water Sources	Meter Testing and Replacement for Largest Customers		Facility Audits			Focus on Largest Customers	Customer Surveyed on Needs and Uses
Location	Unmetered Uses	Unmetered Uses Reported		Date of Last Audit		Date of Installation		Date of Installation		Date of Installation			Annual T&R	Irrigation	CII	Residential		
Alamosa, City of	None Reported		Irrigation only		✓		✓		✓			✓	5%	✓	✓	✓	✓	
Arapahoe County Water and Wastewater Authority	Some Reported	Construction, Street Cleaning									NP				✓		✓	
Arvada, City of	Not Reported																	
Aurora, City of	Not Reported															✓		✓
Boulder, City of	None Reported													✓		Outdoor Only		
Brighton, City of	Some Reported		✓		✓				✓		NP	✓		✓	✓	✓		
Castle Pines Metro District	Some Reported	Firefighting, Street Cleaning			✓						RW				✓	Outdoor Only		
Castle Pines North Metro District	Not Reported		Irrigation only				✓		✓		RU			✓		✓	✓	
Castle Rock, Town of	None Reported						✓		✓					✓	✓	Outdoor Only		
Centennial Water and Sanitation District	Some Reported										RU	✓				Outdoor Only		
Cherokee Water District	None Reported						✓				RU							
Colorado Springs Utilities	Some Reported	Firefighting									RU			✓	✓	Outdoor Only	✓	
Consolidated Mutual Water Company	None Reported										NP					✓		
Cortez, City of	Some Reported														✓			
Denver Water	Not Reported						✓				RU			✓	✓	✓	✓	
Durango, City of	Some Reported	Unmetered Residential/ Commercial Taps, schools	✓		✓				✓					✓	✓	Outdoor Only	✓	
East Larimer County Water District	Not Reported										RU	✓		✓	✓	Outdoor Only		
Erie, Town of	Some Reported	Street Cleaning					✓		✓							Outdoor Only		
Evans, City of	Not Reported											✓			✓			
Firestone, Town of	None Reported								✓						✓			
Fort Collins, City of	Not Reported				✓				✓						✓	Outdoor Only		
Fort Collins-Loveland Water District	None Reported													✓	✓	✓		
Fort Lupton, City of	Some Reported	Irrigation							✓									
Fort Morgan, City of	Some Reported	Firefighting, Street Cleaning													✓	✓	✓	
Fountain, City of	Not Reported				✓		✓					✓	10-20 per year					
Grand Valley																		
Clifton Water District	Not Reported														✓			
Grand Junction, City of	None Reported								✓						✓	Outdoor Only	✓	
Ute Water Conservancy District	Some Reported	Fire- unauthorized uses													✓			
Glenwood Springs, City of	Some Reported	aerial pipes																
Greeley, City of	Not Reported													✓	✓	Outdoor Only		
La Junta, City of	Some Reported	Firefighting							✓							Outdoor Only	✓	
Lafayette, City of	Some Reported	Firefighting, Street Cleaning			✓		✓		✓					✓		Outdoor Only		
Lamar, City of	Some Reported	Firefighting							✓							Outdoor Only	✓	
Left Hand Water District	None Reported											✓	every 5 years	✓	✓		✓	
Longmont, City of	Some Reported	Firefighting, Street Cleaning, Construction, Parks			✓						RW,NP	✓	every 2 years	✓	✓	✓	✓	
Louisville, City of	None Reported				✓				✓		RU, RW							
Meridian Metropolitan District	Some Reported	Firefighting							✓		RU							✓
North Table Mountain Water and Sanitation District	Some Reported	Firefighting			✓											Outdoor Only	✓	
North Weld County Water District	Some Reported	Construction, interconnections													✓			
Northglenn, City of	Some Reported	Firefighting, Construction			✓		✓		✓					✓	✓	Outdoor Only	✓	
Paonia Area Water and Sanitation District	Some Reported											✓		✓	✓	✓	✓	
Parker Water and Sanitation District	Some Reported	Firefighting, Construction, Municipal Buildings									RU			✓			✓	
Piney Water and Wastewater District	None Reported											✓		✓		✓	✓	
Pueblo, City of	Some Reported	Street Cleaning							✓									
Rifle, City of	None Reported				✓		✓		✓					✓	✓		✓	
Salida, City of	Some Reported	Construction	✓				✓								✓			
Security Water District	None Reported														✓	✓	✓	
St Charles Mesa Water District	None Reported																	
Steamboat																		
Mount Werner Water	Some Reported	Street Cleaning, Park Irrigation													✓	✓		
Steamboat Springs, City of	Some Reported	Street Cleaning, Park Irrigation	✓								NP				✓	✓		
Sterling, City of	Some Reported	Municipal Buildings	Irrigation only						✓						✓	✓		
Thornton, City of	Some Reported													✓		✓	✓	
Tri-County Water Conservancy District	Not Reported													✓	✓	Outdoor Only	✓	
Widefield Water and Sanitation District	None Reported														✓	✓	✓	
Windsor, Town of	Some Reported														✓			

Appendix E - Targeted Technical Assistance and Incentives Data Worksheet

Ongoing Water Uses	Demand Reduction of Largest Customers												Indoor			
	Indoor Retrofits		Outdoor Controllers		Grants/Incentives		Awards and Recognition		Process Water Use		Focused Technical Assistance for Large Customers					
Location		Water Use/Customer Type		Water Use/Customer Type		Water Use/Customer Type		Water Use/Customer Type		Water Use/Customer Type		Method	Toilet	Clothes Washer	Dishwasher	Showerhead
Alamosa, City of			✓	Adams State	✓		✓						✓			
Arapahoe County Water and Wastewater Authority																
Arvada, City of									✓		✓	O				
Aurora, City of					✓						✓	FW,O	✓	✓		
Boulder, City of					✓		✓						✓	✓		
Brighton, City of													✓	✓		
Castle Pines Metro District																
Castle Pines North Metro District													✓	✓		✓
Castle Rock, Town of			✓		✓				✓		✓	CP		✓		
Centennial Water and Sanitation District													✓			
Cherokee Water District			✓						✓							
Colorado Springs Utilities					✓	CII							✓	✓		
Consolidated Mutual Water Company											✓	O	✓	✓		
Cortez, City of													✓	✓		
Denver Water	✓				✓	CII, irrigation only			✓				✓	✓		
Durango, City of	✓		✓													
East Larimer County Water District					✓								✓	✓		
Erie, Town of														✓		
Evans, City of											✓	FW	✓	✓		
Firestone, Town of													✓	✓		✓
Fort Collins, City of			✓		✓	CII, irrigation only	✓				✓	FE	✓	✓	✓	
Fort Collins-Loveland Water District																
Fort Lupton, City of													✓			✓
Fort Morgan, City of													✓			
Fountain, City of							✓				✓	E	✓			✓
Grand Valley																
Clifton Water District																
Grand Junction, City of													✓			
Ute Water Conservancy District																
Glenwood Springs, City of																
Greeley, City of					✓								✓	✓		
La Junta, City of													✓	✓		
Lafayette, City of																
Lamar, City of													✓	✓		
Left Hand Water District													✓	✓		
Longmont, City of											✓	LT	✓	✓	✓	
Louisville, City of											✓	E	✓	✓		
Meridian Metropolitan District																
North Table Mountain Water and Sanitation District											✓	E, O	✓			
North Weld County Water District																
Northglenn, City of													✓	✓		
Pagosa Area Water and Sanitation District	✓	hotels/restaurants									✓	FE,FW	✓	✓		
Parker Water and Sanitation District																
Pinery Water and Wastewater District											✓	FW	✓	✓		
Pueblo, City of																
Rifle, City of																
Salida, City of													✓	✓	✓	✓
Security Water District													✓	✓		
St Charles Mesa Water District													✓	✓		✓
Steamboat																
Mount Werner Water											✓	FE	✓	✓	✓	
Steamboat Springs, City of											✓	FE	✓	✓	✓	
Sterling, City of														✓		
Thorton, City of													✓	✓		
Tri-County Water Conservancy District																
Welefield Water and Sanitation District																
Windsor, Town of																

Appendix E - Targeted Technical Assistance and Incentives Data Worksheet

Ongoing Water Uses	Residential								Rebates/Giveaways					Commercia
			Outdoor						Indoor					
Location	Faucet Aerator	Other	Rain/Wind Sensors	Soil Moisture Sensor	ET/Smart Controllers	Landscape	Soil Amendments	Other	Toilets	Urinals	Clothes Washers	Showerheads	Faucet Aerators	Other
Alamosa, City of														
Arapahoe County Water and Wastewater Authority														
Arvada, City of														
Aurora, City of		customer meter reading device			✓	✓		Irrigation Timer	✓		✓			
Boulder, City of					✓		✓	Drip, Rotors						
Brighton, City of			✓		✓				✓	✓				
Castle Pines Metro District			✓		✓		✓	Repair						
Castle Pines North Metro District			✓		✓		✓	Irrigation Timer, Low Use Reward	✓		✓	✓		
Castle Rock, Town of					✓	✓		Irrigation Timer						
Centennial Water and Sanitation District			✓											
Cherokee Water District														
Colorado Springs Utilities			✓		✓				✓	✓				
Consolidated Mutual Water Company			✓		✓				✓		✓			
Cortez, City of														
Denver Water			✓		✓				✓					
Durango, City of														
East Larimer County Water District			✓		✓	✓			✓	✓				
Erie, Town of											✓			
Evans, City of					✓				✓					
Firestone, Town of	✓				✓									
Fort Collins, City of					✓				✓	✓	✓			
Fort Collins-Loveland Water District														
Fort Lupton, City of	✓		✓											
Fort Morgan, City of			✓		✓									
Fountain, City of	✓							Submeter						
Grand Valley														
Clifton Water District														
Grand Junction, City of														
Ute Water Conservancy District														
Glenwood Springs, City of														
Greeley, City of			✓		✓				✓	✓	✓			Ice Machines, Cololing Water Controller
La Junta, City of			✓	✓										
Lafayette, City of			✓	✓										
Lamar, City of			✓	✓										
Left Hand Water District	✓		✓		✓									
Longmont, City of			✓		✓		✓		✓	✓				
Louisville, City of					✓									
Meridian Metropolitan District														
North Table Mountain Water and Sanitation District			✓		✓				✓					
North Weld County Water District														
Northglenn, City of			✓		✓				✓					
Pagosa Area Water and Sanitation District			✓		✓				✓	✓				
Parker Water and Sanitation District														
Piney Water and Wastewater District			✓		✓					✓				
Pueblo, City of														
Rifle, City of					✓									
Salida, City of	✓								✓					
Security Water District			✓						✓		✓			
St Charles Mesa Water District	✓	Urinal	✓			✓			✓	✓	✓	✓	✓	
Steamboat														
Mount Werner Water					✓	✓			✓					
Steamboat Springs, City of					✓	✓			✓					
Sterling, City of					✓									
Thorton, City of			✓		✓				✓	✓				Hot Water
Tri-County Water Conservancy District														
Widefield Water and Sanitation District														
Windsor, Town of			✓		✓									

Appendix E - Targeted Technical Assistance and Incentives Data Worksheet

Ongoing Water Uses	Outdoor						Giveways				Technical Assistance
Location	Rain/Wind Sensors	Soil Moisture Sensors	ET/Smart Controllers	Landscape	Soil Amendments	Other	Showerheads	Aerators	Pre-Rinse Spray Nozzles	Other	Method
Alamosa, City of							✓				
Arapahoe County Water and Wastewater Authority							✓				
Arvada, City of											K
Aurora, City of			✓	✓		Irrigation Timer					FW
Boulder, City of											E, G, FW
Brighton, City of	✓		✓						✓		FW
Castle Pines Metro District	✓		✓		✓	Repair					ET
Castle Pines North Metro District					✓						H
Castle Rock, Town of			✓								
Centennial Water and Sanitation District	✓		✓	✓					✓		FW, K
Cherokee Water District											
Colorado Springs Utilities			✓				✓	✓	✓		
Consolidated Mutual Water Company	✓		✓								
Cortez, City of											K
Denver Water											FW, LIA
Durango, City of			✓								
East Larimer County Water District						submetering mobile homes			✓		K
Erie, Town of									✓		
Evans, City of			✓						✓		K
Firestone, Town of											
Fort Collins, City of			✓						✓		LIA
Fort Collins-Loveland Water District								✓			K
Fort Lupton, City of											
Fort Morgan, City of							✓	✓		toilet flappers	
Fountain, City of											FW
Grand Valley											
Clifton Water District											K
Grand Junction, City of											K
Ute Water Conservancy District											K
Glenwood Springs, City of											
Greeley, City of	✓		✓								K
La Junta, City of									✓		
Lafayette, City of	✓	✓	✓						✓		E, FW
Lamar, City of	✓	✓							✓		
Left Hand Water District			✓								K
Longmont, City of	✓		✓		✓				✓		H
Louisville, City of			✓								
Meridian Metropolitan District											
North Table Mountain Water and Sanitation District	✓		✓								FW, K
North Weld County Water District											E, FW, K
Northglenn, City of	✓		✓						✓	toilets, rain sensors	E, FW, K, O
Pagosa Area Water and Sanitation District	✓		✓				✓	✓	✓		
Parker Water and Sanitation District							✓	✓	✓		K
Pinery Water and Wastewater District	✓		✓								
Pueblo, City of											
Rifle, City of			✓								FW
Salida, City of									✓		K
Security Water District	✓										
St Charles Mesa Water District	✓			✓			✓				
Steamboat											
Mount Werner Water			✓								FW
Steamboat Springs, City of			✓								FW
Sterling, City of			✓				✓				
Thorton, City of	✓		✓				✓				K
Tri-County Water Conservancy District										toilets	FW
Widefield Water and Sanitation District							✓	✓			K
Windsor, Town of	✓		✓								FW, K

Notes:	Reference
Cooperative Programs and Demo Projects	CP
Clothes Washer	CW
Expert Consulting/Support	E
ET Controller Programming Education	ET
Focused Educational Materials (e.g., project planet)	FE
Focused Workshops	FW
Garden-in-a-box	G
Hotline	H
Hot Water Recirculation System	HW
Irrigation Efficiency Grant	IG
Home Audit Kit, Irrigation Kits	K
Low-Income Retrofit Program/Financial Assistance	LIA
Customer Monitoring Device	O
Non-Potable Projects	NP
Reuse	RU
Raw Water	RW
Submetering Rebate/Incentive	SB
Submetering	SM
Landscaper Training	LT

Appendix F

Ordinance Data Worksheet

Appendix F - Ordinance Data Worksheet

	Water Waste Ordinance (non-drought conditions)								
Ordinances	**Regulation**		**Enforcement**				**Time of Day Watering Restriction**		
Location	**In Place**	**Under Evaluation**	**Warnings**	**Fines**	**Shut-Off**	**Other**	**Voluntary**	**Manditory**	**Varies**
Alamosa, City of		✓					✓		
Arapahoe County Water and Wastewater Authority							✓		
Arvada, City of	✓		✓	✓					
Aurora, City of	✓						✓		
Boulder, City of									
Brighton, City of							✓		
Castle Pines Metro District									
Castle Pines North Metro District								✓	
Castle Rock, Town of									
Centennial Water and Sanitation District	✓		✓	✓				✓	
Cherokee Water District									
Colorado Springs Utilities		✓							
Consolidated Mutual Water Company									
Cortez, City of	✓		✓		✓			✓	
Denver Water									
Durango, City of	✓								
East Larimer County Water District									
Erie, Town of	✓		✓	✓	✓				
Evans, City of		✓							
Firestone, Town of	✓						✓		
Fort Collins, City of	✓		✓	✓					
Fort Collins-Loveland Water District		✓							
Fort Lupton, City of									
Fort Morgan, City of	✓								✓
Fountain, City of		✓							
Grand Valley									
Clifton Water District									
Grand Junction, City of									
Ute Water Conservancy District									
Glenwood Springs, City of									
Greeley, City of	✓			✓				✓	
La Junta, City of	✓			✓					✓
Lafayette, City of							✓		
Lamar, City of			✓	✓	✓				✓
Left Hand Water District									
Longmont, City of	✓			✓			✓		
Louisville, City of	✓								✓
Meridian Metropolitan District	✓								
North Table Mountain Water and Sanitation District			✓	✓				✓	
North Weld County Water District							✓		
Northglenn, City of	✓		✓	✓					✓
Pagosa Area Water and Sanitation District									
Parker Water and Sanitation District	✓								
Pinery Water and Wastewater District									
Pueblo, City of	✓		✓	✓	✓				✓
Rifle, City of		✓							
Salida, City of	✓								✓
Security Water District	✓								
St Charles Mesa Water District	✓								✓
Steamboat									
Mount Werner Water									
Steamboat Springs, City of									
Sterling, City of									
Thorton, City of	✓						✓		
Tri-County Water Conservancy District		✓							
Widefield Water and Sanitation District									
Windsor, Town of	✓							✓	
55	**22**	**7**	**9**	**11**	**4**	**0**	**9**	**6**	**8**

Appendix F - Ordinance Data Worksheet

				New Construction Regulations				
Ordinances	**Day of Week Watering Restriction**			**Green Building Construction**		**Landscape Re**		
Location	**Voluntary**	**Manditory**	**Varies**	**Residential**	**Non-Residential**	**Soil Amendment**	**Turf Restrictions**	**Landscape Design**
Alamosa, City of								E
Arapahoe County Water and Wastewater Authority								
Arvada, City of								
Aurora, City of						R		R
Boulder, City of								
Brighton, City of		✓				E		E
Castle Pines Metro District							R	R
Castle Pines North Metro District		✓					R	R
Castle Rock, Town of				✓			R	R
Centennial Water and Sanitation District								E
Cherokee Water District								
Colorado Springs Utilities						E		R
Consolidated Mutual Water Company						R		
Cortez, City of								
Denver Water								
Durango, City of								R
East Larimer County Water District						R		R
Erie, Town of						R		R
Evans, City of						E	E	E
Firestone, Town of	✓					E		E
Fort Collins, City of						R	E	R
Fort Collins-Loveland Water District								
Fort Lupton, City of								
Fort Morgan, City of			✓					
Fountain, City of								
Grand Valley								
Clifton Water District								
Grand Junction, City of								
Ute Water Conservancy District								
Glenwood Springs, City of								
Greeley, City of		✓				R		
La Junta, City of			✓					
Lafayette, City of	✓							E
Lamar, City of			✓					
Left Hand Water District								
Longmont, City of	✓					R		R
Louisville, City of			✓					R
Meridian Metropolitan District		✓						
North Table Mountain Water and Sanitation District		✓				E		E
North Weld County Water District	✓							
Northglenn, City of			✓					
Pagosa Area Water and Sanitation District								
Parker Water and Sanitation District								
Pinery Water and Wastewater District						E	E	E
Pueblo, City of			✓					
Rifle, City of								E
Salida, City of			✓					
Security Water District								
St Charles Mesa Water District			✓					E
Steamboat								
Mount Werner Water								
Steamboat Springs, City of								
Sterling, City of		✓						
Thorton, City of						R	R	R
Tri-County Water Conservancy District								
Widefield Water and Sanitation District								
Windsor, Town of								
55	**4**	**6**	**8**	**1**	**0**	**8**	**4**	**12**

Appendix F - Ordinance Data Worksheet

				Existing Construction Regulations			
Ordinances	**quirements**				**Commercial/ Industrial Process Water Controls**		
Location	**Irrigation Design**	**Customers Covered by Requirements**	**Plan Review and Approval**	**Point-of-Sale Ordinances**	**In Place**	**Under Evaluation**	**Soil Amendment**
Alamosa, City of							
Arapahoe County Water and Wastewater Authority							
Arvada, City of					✓		
Aurora, City of	R	All	✓		✓		R
Boulder, City of							
Brighton, City of	E						
Castle Pines Metro District	R	All	✓				
Castle Pines North Metro District		District Only					
Castle Rock, Town of	R	All					
Centennial Water and Sanitation District	E						
Cherokee Water District							
Colorado Springs Utilities	R	CII/MF	✓			✓	
Consolidated Mutual Water Company					✓		
Cortez, City of							
Denver Water					✓		
Durango, City of	R	CII/Irrigation Only	✓				
East Larimer County Water District	R	All	✓				
Erie, Town of	R	Irrigation Only	✓				
Evans, City of	E					✓	
Firestone, Town of	E						
Fort Collins, City of	R	All	✓				
Fort Collins-Loveland Water District							
Fort Lupton, City of							
Fort Morgan, City of							
Fountain, City of							
Grand Valley							
Clifton Water District							
Grand Junction, City of							
Ute Water Conservancy District							
Glenwood Springs, City of							
Greeley, City of		SF					
La Junta, City of							
Lafayette, City of	E						
Lamar, City of							
Left Hand Water District							
Longmont, City of	R	Irrigation Only	✓				
Louisville, City of	R	CII					
Meridian Metropolitan District	R	All	✓				
North Table Mountain Water and Sanitation District	E						
North Weld County Water District							
Northglenn, City of							
Pagosa Area Water and Sanitation District							
Parker Water and Sanitation District	R	CII/Irrigation Only					
Pinery Water and Wastewater District	E					✓	
Pueblo, City of							
Rifle, City of	E						
Salida, City of							
Security Water District							
St Charles Mesa Water District							
Steamboat							
Mount Werner Water							
Steamboat Springs, City of							
Sterling, City of							
Thorton, City of	R	All					
Tri-County Water Conservancy District							
Widefield Water and Sanitation District							
Windsor, Town of	E					✓	
55	**13**	**7**	**9**	**0**	**4**	**4**	**1**

Appendix F - Ordinance Data Worksheet

Ordinances	Landscape Requirements		
Location	**Turf Restrictions**	**Landscape Design**	**Irrigation Design**
Alamosa, City of			
Arapahoe County Water and Wastewater Authority			
Arvada, City of			
Aurora, City of		R	R
Boulder, City of			
Brighton, City of			
Castle Pines Metro District			
Castle Pines North Metro District			
Castle Rock, Town of			
Centennial Water and Sanitation District			
Cherokee Water District			
Colorado Springs Utilities			
Consolidated Mutual Water Company			
Cortez, City of			
Denver Water			
Durango, City of		R	R
East Larimer County Water District			
Erie, Town of			
Evans, City of			
Firestone, Town of			
Fort Collins, City of			
Fort Collins-Loveland Water District			
Fort Lupton, City of			
Fort Morgan, City of			
Fountain, City of			
Grand Valley			
Clifton Water District			
Grand Junction, City of			
Ute Water Conservancy District			
Glenwood Springs, City of			
Greeley, City of			
La Junta, City of			
Lafayette, City of			
Lamar, City of			
Left Hand Water District			
Longmont, City of			
Louisville, City of			
Meridian Metropolitan District			
North Table Mountain Water and Sanitation District			
North Weld County Water District			
Northglenn, City of			
Pagosa Area Water and Sanitation District			
Parker Water and Sanitation District			
Pinery Water and Wastewater District			
Pueblo, City of			
Rifle, City of			
Salida, City of			
Security Water District			
St Charles Mesa Water District			
Steamboat			
Mount Werner Water			
Steamboat Springs, City of			
Sterling, City of			
Thorton, City of			
Tri-County Water Conservancy District			
Widefield Water and Sanitation District			
Windsor, Town of			
55	**0**	**2**	**2**

Appendix G

Education Data Worksheet

Appendix G - Education Data Worksheet

Educational Location	One Way				One-Way with Feedback				
	General	Bill Stuffers/ Education Literature	Mass Mailings/ Newsletter	Xeriscape Demonstration Gardens	General	Water Fairs	Interactive Websites	K-12 Teacher and Classroom Education Programs	Homeowner Education and Training
Alamosa, City of	✓	✓	✓	✓	✓			✓	✓
Arapahoe County Water and Wastewater Authority	✓	✓		✓	✓		✓		✓
Arvada, City of	✓	✓	✓	✓	✓	✓	✓	✓	
Aurora, City of	✓			✓	✓				
Boulder, City of	✓	✓		✓	✓	✓		✓	
Brighton, City of	✓	✓	✓		✓			✓	✓
Castle Pines Metro District	✓	✓	✓	✓	✓		✓		✓
Castle Pines North Metro District	✓	✓	✓		✓		✓		✓
Castle Rock, Town of	✓	✓	✓	✓	✓		✓	✓	✓
Centennial Water and Sanitation District	✓			✓	✓		✓		✓
Cherokee Water District	✓		✓	✓	✓		✓	✓	✓
Colorado Springs Utilities	✓	✓	✓	✓	✓		✓	✓	✓
Consolidated Mutual Water Company	✓	✓		✓	✓		✓	✓	✓
Cortez, City of	✓	✓	✓	✓	✓		✓	✓	
Denver Water	✓	✓		✓	✓			✓	
Durango, City of									
East Larimer County Water District	✓	✓	✓	✓		✓		✓	
Erie, Town of	✓	✓	✓		✓		✓	✓	
Evans, City of	✓	✓		✓	✓	✓	✓	✓	
Firestone, Town of	✓	✓		✓	✓			✓	
Fort Collins, City of	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fort Collins-Loveland Water District	✓	✓	✓		✓	✓	✓		
Fort Lupton, City of	✓	✓		✓	✓			✓	
Fort Morgan, City of	✓	✓		✓	✓		✓	✓	
Fountain, City of	✓	✓	✓		✓		✓		
Clifton Water District					✓	✓		✓	
Grand Junction, City of	✓			✓	✓	✓	✓	✓	
Ute Water Conservancy District					✓	✓		✓	
Glenwood Springs, City of	✓	✓		✓	✓			✓	
Greeley, City of	✓	✓			✓	✓	✓	✓	
La Junta, City of	✓			✓					
Lafayette, City of	✓	✓	✓		✓		✓		
Lamar, City of	✓	✓			✓			✓	
Left Hand Water District	✓	✓	✓	✓	✓	✓	✓	✓	
Longmont, City of	✓	✓	✓	✓	✓	✓	✓	✓	✓
Louisville, City of	✓	✓	✓		✓		✓		
Meridian Metropolitan District	✓	✓			✓		✓	✓	
North Table Mountain Water and Sanitation District	✓	✓		✓	✓		✓	✓	
North Weld County Water District	✓	✓		✓	✓		✓		
Northglenn, City of	✓	✓	✓	✓	✓	✓	✓	✓	
Pagosa Area Water and Sanitation District	✓	✓		✓	✓	✓	✓	✓	✓
Parker Water and Sanitation District	✓	✓		✓	✓		✓	✓	
Pinery Water and Wastewater District	✓		✓	✓	✓			✓	✓
Pueblo, City of	✓	✓	✓	✓	✓	✓		✓	
Rifle, City of	✓	✓			✓		✓		
Salida, City of	✓	✓	✓	✓	✓		✓	✓	
Security Water District	✓			✓	✓		✓		
St Charles Mesa Water District									
Mount Werner Water	✓	✓	✓		✓		✓	✓	
Steamboat Springs, City of	✓	✓	✓		✓		✓	✓	
Sterling, City of	✓	✓			✓	✓			
Thorton, City of						✓			
Tri-County Water Conservancy District		✓		✓	✓		✓	✓	
Widefield Water and Sanitation District	✓	✓	✓		✓		✓		
Windsor, Town of	✓	✓		✓	✓		✓	✓	
55	49	43	25	35	50	17	36	37	14

Appendix G - Education Data Worksheet

Educational Location	Two Way					
	CII Education and Training	Irrigation Education and Training	General	Focus Groups and Customer Surveys	Messaging Campaigns (multi-media)	Public Meetings
Alamosa, City of						
Arapahoe County Water and Wastewater Authority						
Arvada, City of						
Aurora, City of	✓					
Boulder, City of						
Brighton, City of	✓	✓			✓	
Castle Pines Metro District		✓				
Castle Pines North Metro District			✓			✓
Castle Rock, Town of					✓	
Centennial Water and Sanitation District	✓	✓				
Cherokee Water District	✓		✓		✓	✓
Colorado Springs Utilities			✓		✓	
Consolidated Mutual Water Company	✓	✓				
Cortez, City of					✓	
Denver Water		✓	✓	✓	✓	
Durango, City of			✓			
East Larimer County Water District					✓	
Erie, Town of						
Evans, City of		✓				
Firestone, Town of						
Fort Collins, City of	✓				✓	
Fort Collins-Loveland Water District						
Fort Lupton, City of						
Fort Morgan, City of						
Fountain, City of			✓	✓		
Clifton Water District						
Grand Junction, City of						
Ute Water Conservancy District						
Glenwood Springs, City of						
Greeley, City of						✓
La Junta, City of						
Lafayette, City of		✓			✓	
Lamar, City of						
Left Hand Water District						
Longmont, City of	✓	✓			✓	
Louisville, City of					✓	✓
Meridian Metropolitan District		✓				
North Table Mountain Water and Sanitation District						
North Weld County Water District						
Northglenn, City of		✓			✓	
Pagosa Area Water and Sanitation District	✓	✓	✓	✓	✓	
Parker Water and Sanitation District		✓				
Pinery Water and Wastewater District			✓	✓		
Pueblo, City of					✓	
Rifle, City of		✓	✓			
Salida, City of						
Security Water District						
St Charles Mesa Water District						
Mount Werner Water						
Steamboat Springs, City of						
Sterling, City of						
Thorton, City of					✓	
Tri-County Water Conservancy District					✓	
Widefield Water and Sanitation District						
Windsor, Town of						
55	8	13	9	4	16	4

Appendix G - Education Data Worksheet

Educational Location	Citizen Advisory Boards	Not Reported
Alamosa, City of		
Arapahoe County Water and Wastewater Authority		
Arvada, City of		
Aurora, City of		
Boulder, City of		
Brighton, City of		
Castle Pines Metro District		
Castle Pines North Metro District		
Castle Rock, Town of		
Centennial Water and Sanitation District		
Cherokee Water District		
Colorado Springs Utilities	✓	
Consolidated Mutual Water Company		
Cortez, City of		
Denver Water	✓	
Durango, City of	✓	✓
East Larimer County Water District		
Erie, Town of		
Evans, City of		
Firestone, Town of		
Fort Collins, City of		
Fort Collins-Loveland Water District		
Fort Lupton, City of		
Fort Morgan, City of		
Fountain, City of	✓	
Clifton Water District		
Grand Junction, City of		
Ute Water Conservancy District		
Glenwood Springs, City of		
Greeley, City of		
La Junta, City of		
Lafayette, City of		
Lamar, City of		
Left Hand Water District		
Longmont, City of		
Louisville, City of		
Meridian Metropolitan District		
North Table Mountain Water and Sanitation District		
North Weld County Water District		
Northglenn, City of		
Pagosa Area Water and Sanitation District		
Parker Water and Sanitation District		
Pinery Water and Wastewater District		
Pueblo, City of		
Rifle, City of	✓	
Salida, City of		
Security Water District		
St Charles Mesa Water District		✓
Mount Werner Water		
Steamboat Springs, City of		
Sterling, City of		
Thorton, City of		
Tri-County Water Conservancy District		
Widefield Water and Sanitation District		
Windsor, Town of		
55	5	2

Appendix H

Costs Data Worksheet

Appendix H - Cost Data Worksheet

Water Conservation Budget	Facility Audits		Indoor Retrofits		Xeriscape or Low Water Use Landscapes		Outdoor Irrigation Improvements			Understanding of Largest Customers					
										Meter Testing and Replacement		Facility Audits			
Location		Date of Last Audit		Date of Installation		Date of Installation		Date of Installation	Other		Annual T&R	Irrigation	CII	Residential	Surveys
Alamosa, City of	$ 3,500.00		$ 1,500.00		$ 48,000.00		$ 292,000.00				Included in Foundational	$ 7,000.00	$ 47,500.00	$ 60,000.00	
Arapahoe County Water and Wastewater Authority									NR			NR	$ 90,500.00		
Arvada, City of															
Aurora, City of												NR		NR	NR
Boulder, City of	NR											NR	NR		
Brighton, City of							$ 250,000.00		$ 1,640,000.00	Included in Foundational		$ 79,375.00	$ 61,500.00	$ 32,500.00	
Castle Pines Metro District			$ 1,500.00									$ 66,000.00	$ 7,200.00	Included in CII Audit Costs	
Castle Pines North Metro District	Included in Outdoor Irrigation				Included in Outdoor Irrigation		$ 33,750.00					$ 17,400.00		$ 59,832.89	
Castle Rock, Town of					Included in Outdoor Irrigation		$ 2,000,000.00					Included in Retrofit	Included in Retrofit	Included in Retrofit	
Centennial Water and Sanitation District										NR		NR	NR	NR	
Cherokee Water District					NR										
Colorado Springs Utilities												NR	NR	NR	
Consolidated Mutual Water Company															
Cortez, City of					Included in Education								$ 14,000.00		
Denver Water	$ 26,929,000.00		$ 4,708,460.40		$ 56,752,712.80				$ 59,665,200.00			NR		NR	
Durango, City of															
East Larimer County Water District					$ 7,800.00							$ 39,700.00	$ 7,100.00		
Erie, Town of							NR					NR			
Evans, City of													$ 4,100.00		
Firestone, Town of							$ 322,975.00						$ 91,000.00		
Fort Collins, City of			$ 480,000.00				Included in Indoor Retrofits					NR	$ 120,000.00		
Fort Collins-Loveland Water District												$ 71,550.00	$ 22,800.00	$ 104,050.00	
Fort Lupton, City of							$ 2,608,142.00								
Fort Morgan, City of	Irrigation only				NR		NR						$ 100,100.00	$ 407,050.00	
Fountain, City of			NR		NR					NR	10-20 per year				
Grand Valley															
Clifton Water District	NR												$ 20,000.00		NR
Grand Junction, City of	NR						NR					$ 8,000.00	$ 6,000.00		NR
Ute Water Conservancy District	NR											NR	$ 6,000.00	NR	NR
Glenwood Springs, City of					NR		NR								
Greeley, City of			NR				NR					NR	NR		
La Junta, City of							$ 62,963.40					$ 16,248.59			
Lafayette, City of			NR		NR		NR					NR			
Lamar, City of							$ 69,250.06					$ 17,748.46			
Left Hand Water District										Included in foundational	every 5 years	$ 11,400.00	$ 31,200.00		
Longmont, City of			NR		NR		NR		$ 690,000.00	NR	every 2 years	$ 186,250.00	$ 42,523.00	$ 45,500.00	
Louisville, City of			NR		NR		NR		NR			NR	NR	NR	
Meridian Metropolitan District							NR						NR		NR
North Table Mountain Water and Sanitation District			$ 1,250.00									$ 7,560.00			
North Weld County Water District													$ 5,000.00		
Northglenn, City of			NR		NR		NR					$ 70,000.00	NR		
Pagosa Area Water and Sanitation District										NR		$ 43,625.00	$ 49,500.00	$ 57,483.00	
Parker Water and Sanitation District							$ 60,000.00					$	120,000.00		
Pinery Water and Wastewater District					NR					NR		$ 103,125.00		$ 65,250.00	
Pueblo, City of							NR								
Rifle, City of			$ 73,826.00		$ 229,229.00		$ 58,200.00					$		74,000.00	
Salida, City of					$ 44,500.00								$ 472,097.00		
Security Water District												$ 1,000.00		$ 7,200.00	
St Charles Mesa Water District															
Steamboat															
Mount Werner Water													Included in Rebates		
Steamboat Springs, City of	$ 16,125.00								$ 527,500.00				Included in Rebates		
Sterling, City of	Irrigation only						$ 33,280.00					$		198,000.00	
Thorton, City of												$ 142,815.00			
Tri-County Water Conservancy District												$ 7,500.00	$ 5,000.00		
Widefield Water and Sanitation District													NR	NR	
Windsor, Town of													$ 45,100.00		

Appendix H - Cost Data Worksheet

Water Conservation Budget	Reducing Large Uses												Rebates				
	Indoor Retrofits		Outdoor Controllers		Grants		Awards and Recognition		Process Water Use		Focused Technical Assistance		Residential		Commercial		
Location		Date of Installation		Date of Installation		Date of Implementation		Date of Implementation		Date of Implementation		Method	Indoor	Outdoor	Indoor	Outdoor	Giveaways
Alamosa, City of			Under Bid	Adams State	NR		NR				$ -	Included in Inst. Low water use	$ 84,000.00				$ 45,500.00
Arapahoe County Water and Wastewater Authority																	$ 1,200.00
Arvada, City of									NR								
Aurora, City of					NR						NR	FW,O	NR	NR	NR	NR	
Boulder, City of					NR		NR				NR	P	NR	NR			
Brighton, City of											$ 138,175.00	FW,P	$ 134,625.00	$ 54,700.00	$ 52,500.00	$ 28,250.00	
Castle Pines Metro District														Included in Commercial Outdoor		924100	
Castle Pines North Metro District													$ 166,976.17	$ 1,274,224.50	Included in Residential Indoor Costs	$ 1,052,628.00	$ 15,000.00
Castle Rock, Town of											Included in Education	CP	$			11,100,000.00	
Centennial Water and Sanitation District											$ 45,000.00	P	$ 200,000.00	$ 62,500.00		$ 3,050,000.00	
Cherokee Water District									NR								
Colorado Springs Utilities											NR	P	NR	NR	NR	NR	NR
Consolidated Mutual Water Company											$ 30,000.00	O	NR	NR	NR	NR	
Cortez, City of											Included in Education	E	$ 18,000.00				
Denver Water					$ 56,524,756.40	CIUI	NR						$ 21,229,712.00	$ 976,945.20	Included in Residential Indoor		
Durango, City of																	
East Larimer County Water District											$ 31,080.00	P,SM	$ 73,000.00	$ 94,160.00	$ 26,100.00	$ 76,770.00	
Erie, Town of											NR	O,P	NR		NR		
Evans, City of											$ 5,625.00	FW,P	$ 5,400.00	$ 4,200.00	$ 2,325.00	Included in Residential Outdoor	
Firestone, Town of													$ 79,434.55	$ 11,440.00			
Fort Collins, City of	$ 120,000.00	LI			$ 378,000.00	CIUG	$ 12,000.00		NR		$ 60,000.00	P	$ 600,000.00		$ 612,000.00	$ 178,500.00	
Fort Collins-Loveland Water District																	$ 7,600.00
Fort Lupton, City of													$ 142,800.00	$ 3,500.00			
Fort Morgan, City of									NR				$	98,000.00			$ 21,000.00
Fountain, City of			NR	School			NR				NR	E					
Grand Valley																	
Clifton Water District													NR				
Grand Junction, City of													$ 30,000.00				
Ute Water Conservancy District													NR				
Glenwood Springs, City of											NR	O					
Greeley, City of					NR				NR				$			975,000.00	
La Junta, City of											$ 4,607.10	P	$ 44,000.33	$ 5,311.79		Included in Residential Outdoor	
Lafayette, City of											$ 1,125.00	P		NR		NR	
Lamar, City of											$ 2,004.30	P	$ 47,989.44	$ 5,185.48		Included in Residential Outdoor	
Left Hand Water District													$ 55,200.00	$ 51,900.00			
Longmont, City of											$ 24,375.00	P	$ 183,000.00	$ 172,625.00	$ 117,500.00	$ 165,750.00	
Louisville, City of											NR	E,O	NR	NR	NR	NR	NR
Meridian Metropolitan District	NR																
North Table Mountain Water and Sanitation District											$ 3,450.00	E,O	$ 10,000.00	$ 2,250.00		Included in Residential Outdoor	
North Weld County Water District																	
Northglenn, City of											$ 2,820.00	O,P	$ 336,350.00	$ 7,000.00	Included in Residential Indoor	Included in Residential Outdoor	$ 40,000.00
Pagosa Area Water and Sanitation District											$ 10,800.00	FW,P	$ 49,875.00	$ 16,100.00	$ 41,250.00	$ 16,500.00	NR
Parker Water and Sanitation District											NR	FW,P					F,RG
Pinery Water and Wastewater District											NR	FW,P	$ 70,375.00	$ 43,725.00	$ 700.00	$ 13,500.00	
Pueblo, City of																	
Rifle, City of														$ 104,200.00		Included in Residential Outdoor	
Salida, City of											$ 19,779.00	P	Included in Commercial Indoor		$ 25,480.00		
Security Water District													$ 7,700.00	$ 22,500.00	Included in Residential Indoor	Included in Residential Outdoor	$ 4,000.00
St Charles Mesa Water District													$ 35,200.00	$ 118,800.00	Included in Residential Indoor	Included in Residential Outdoor	
Steamboat													$			281,304.00	
Mount Werner Water											Included in Education	CP,FW	CW,DW,T	SC	T	SC	
Steamboat Springs, City of											Included in Education	FW	CW,DW,T	SC	T	SC	
Sterling, City of													$ 7,133.00	$ 53,608.00		Included in Residential Outdoor	$ 23,659.40
Thorton, City of													$ 1,427,675.00	$ 57,550.00	$ 301,900.00	Included in Residential Outdoor	$ 6,912.00
Tri-County Water Conservancy District																	$ 125,000.00
Widefield Water and Sanitation District													NR		NR		NR
Windsor, Town of														$ 23,460.00		Included in Residential Outdoor	

Appendix H - Cost Data Worksheet

Water Conservation Budget	Technical Assistance						
Location	Method	Foundational	Ordinance	Education	Monitoring and Verification	Total Reported- Program	Total Reported- Personnel
Alamosa, City of		$ 38,300.00	$ 90,000.00	$ 39,000.00	NR	$ 756,300.00	
Arapahoe County Water and Wastewater Authority		$ 330,600.00	$ 7,200.00	$ 197,500.00	NR	$ 627,000.00	
Arvada, City of	$ 330,000.00	$ 3,800,000.00	NR	NR	NR	$ 4,130,000.00	
Aurora, City of		NR	NR	NR	NR	$ 14,420,000.00	$ 16,800,000.00
Boulder, City of	NR	NR	NR	NR	NR	$	
Brighton, City of		$ 2,119,000.00	NR	$ 340,650.00	$ 60,000.00	$ 4,991,275.00	
Castle Pines Metro District	$ 13,200.00	25000	NR	$ 26,455.00	NR	$ 1,063,455.00	
Castle Pines North Metro District	NR	$ 70,000.00	NR	$ 675,000.00	NR	$ 3,364,811.56	
Castle Rock, Town of		NR	NR	$ 1,500,000.00	NR	$ 14,600,000.00	$ 2,700,000.00
Centennial Water and Sanitation District		NR	NR	NR	NR	$ 3,357,500.00	
Cherokee Water District		NR	NR	NR	NR	$ -	
Colorado Springs Utilities		NR	NR	NR	NR	$ -	
Consolidated Mutual Water Company		$ 19,905,000.00	NR	NR	NR	$ 19,935,000.00	
Cortez, City of		$ 20,000.00	NR	$ 16,000.00	NR	$ 68,000.00	
Denver Water		NR	$ 39,063,927.00	NR	NR	$ 265,850,713.80	
Durango, City of		NR	NR	NR	NR	$ -	
East Larimer County Water District		$ 744,200.00	$ 44,000.00	$ 81,032.00	NR	$ 1,224,942.00	
Erie, Town of		NR	NR	NR	NR	$ -	
Evans, City of	$ 23,375.00	$ 321,750.00	$ 359,510.00	$ 108,382.25	NR	$ 834,667.25	
Firestone, Town of		$ 530,000.00	$ 34,400.00	$ 237,471.00	NR	$ 1,306,720.55	
Fort Collins, City of	$ -	$ 1,440,000.00	$ 120,000.00	$ 765,000.00	NR	$ 4,885,500.00	
Fort Collins-Loveland Water District	$ 10,800.00	$ 505,000.00	$ 11,600.00	$ 33,700.00	NR	$ 767,100.00	
Fort Lupton, City of	NR	$ 819,400.00	$ 140,000.00	$ 65,800.00	NR	$ 3,779,642.00	
Fort Morgan, City of		$ 2,800,000.00	NR	$ 14,000.00	NR	$ 3,440,150.00	
Fountain, City of	NR	NR	NR	NR	CSC	$ -	
Grand Valley		NR	NR	NR	NR	$ -	
Clifton Water District		NR	NR	NR	NR	$ 20,000.00	
Grand Junction, City of		NR	NR	NR	NR	$ 44,000.00	
Ute Water Conservancy District		NR	NR	NR	NR	$ 6,000.00	
Glenwood Springs, City of		NR	NR	NR	NR	$ -	
Greeley, City of		NR	NR	NR	NR	$ 5,950,000.00	
La Junta, City of		$ 265,000.00	NR	NR	NR	$ 398,131.21	
Lafayette, City of		NR	NR	NR	NR	$ 1,125.00	
Lamar, City of		$ 270,000.00	NR	NR	NR	$ 412,177.74	
Left Hand Water District	$ 15,468.00	$ 520,000.00	$ 19,200.00	$ 64,800.00	NR	$ 769,168.00	
Longmont, City of	$ 229,000.00	$ 1,237,230.00	$ 614,013.00	$ 564,100.00	$ 159,500.00	$ 4,431,366.00	
Louisville, City of		NR	NR	NR	NR		
Meridian Metropolitan District		NR	NR	NR	NR	$ -	
North Table Mountain Water and Sanitation District	$ 1,760.00	$ 159,500.00	$ 6,000.00	$ 67,500.00	NR	$ 259,270.00	
North Weld County Water District	$ 4,784.00	$ 1,494,272.00	NR	$ 63,259.00	NR	$ 1,567,315.00	
Northglenn, City of	$ 45,500.00	$ 1,390,000.00	NR	$ 5,400.00	NR	$ 1,897,070.00	
Pagosa Area Water and Sanitation District		$ 1,968,000.00	NR	$ 332,978.00	$ 57,500.00	$ 2,643,611.00	
Parker Water and Sanitation District	NR	$ 2,160,000.00	NR	$ 62,000.00		$ 2,402,000.00	
Pinery Water and Wastewater District		$ 168,000.00	NR	$ 173,480.00	$ 64,000.00	$ 702,155.00	
Pueblo, City of		NR	NR	NR	NR	$ -	
Rifle, City of		$ 65,640.00	$ 425,325.00	$ 139,150.00	NR	$ 1,169,570.00	
Salida, City of	$ 18,531.00	$ 2,455,300.00	$ 175,493.00	$ 168,770.00	NR	$ 3,379,950.00	
Security Water District		$ 10,000.00	NR	$ 267,300.00	NR	$ 319,700.00	
St Charles Mesa Water District		$ 3,820,000.00	NR	NR	NR	$ 3,974,000.00	
Steamboat		NR	$ 12,825.00	$ 39,300.00	NR	$ 333,429.00	
Mount Werner Water		$ 3,894,975.00	NR	$ 96,000.00	NR	$ 3,990,975.00	
Steamboat Springs, City of		$ 3,708,110.00	NR	$ 8,020.00	NR	$ 4,259,755.00	
Sterling, City of		$ 104,280.00	NR	NR	NR	$ 419,960.40	
Thorton, City of	$ 75,000.00	$ 7,224,000.00	NR	$ 1,061,535.00	NR	$ 10,297,387.00	
Tri-County Water Conservancy District		NR	NR	$ 600,000.00	NR	$ 737,500.00	
Widefield Water and Sanitation District		$ 900,000.00	NR	NR	NR	$ 900,000.00	
Windsor, Town of	$ 17,575.00	$ 462,800.00	$ 149,700.00	$ 110,120.00	NR	$ 808,755.00	

Appendix I

HB 10-1051 Draft Data Reporting Form

Contact & Submittal Information	
Utility Information	
Covered Entity Name	
Contact Name	
Contact Phone	
Contact Email	
Contact Address (Street or PO)	
Contact Address (City)	
Contact Address (State)	
Contact Address (Zip)	
Submittal Information	
Year of Data	
Report Date	

What customer categories do you have in your water distribution system(s)? (Check all that apply)

Residential	
OR	
Single Family	
Multi-Family	
Municipal	
CII	
Irrigation Only	
Other	

Water Use Data (Potable treated water only)

Enter Reporting Unit (e.g., AF, MG, thousands of gallons, etc.)	
Distributed Water (annual water production)	

Frequency of Billing		Monthly	Bi-Monthly	Quarterly	Other (specify)
Customer Category	Residential				
	Single Family				
	Multi-Family				
	Municipal				
	CII				
	Irrigation Only				
	Other				

Metered Water Use	Residential		Single Family	Multi-Family	Municipal	CII	Irrigation Only	Other
January								
February								
March								
April								
May								
June		**OR**						
July								
August								
September								
October								
November								
December								

Please select the most representative months to describe your Monthly Indoor Use (i.e. Dec., Jan., Feb.)	January	February	March	April	May	June	July	August	September	October	November	December

Normalizing Data

Population Served for Year of Reporting	
Source	

	Yes	No
Do you have a large transient population in your service area (i.e. tourism, second homes, students)?		
If yes, what is the estimate of this population?		
Source		

Number of Active Service Connections	Residential		Single Family	Multi-Family	Municipal	CII	Irrigation Only	Other
January								
February								
March								
April								
May								
June		**OR**						
July								
August								
September								
October								
November								
December								

	Residential		Single Family	Multi-Family	Municipal	CII	Irrigation Only	Other
Average Number of Inactive Accounts Annually		**OR**						

Annual Audit Report

System Water Audit (using 2009 AWWA M36 Manual of Practice-Water Audits and Loss Control Programs (3rd Edition))			
Billed Unmetered Water Use			
Unbilled Authorized Water Use		**OR**	Total Distributed/Produced Water
Apparent Losses			Total Metered Water Use
Real Losses			

Supplemental Information (Optional)

	Residential	**OR**	Single Family	Multi-Family	Municipal	CII	Irrigation Only	Other
Estimate of Irrigated Acres by Customer Category								

Average Annual Gross	
Average Annual Total Precipitation for Service Area (inches)	
Irrigation Application Rate for Service Area (gallons/square foot)	

Number of Housing Units	Residential		Single Family	Multi-Family
January				
February				
March				
April				
May				
June		**OR**		
July				
August				
September				
October				
November				
December				

Water Use Data (Non Potable raw water only)

Enter Reporting Unit (e.g., AF, MG, thousands of gallons, etc.)	
Distributed Water (annual water production)	

Frequency of Billing		Monthly	Bi-Monthly	Quarterly	Other (specify)
Customer Category	Residential				
	Single Family				
	Multi-Family				
	Municipal				
	CII				
	Irrigation Only				
	Other				

Metered Water Use	Residential		Single Family	Multi-Family	Municipal	CII	Irrigation Only	Other
January								
February								
March								
April								
May								
June		**OR**						
July								
August								
September								
October								
November								
December								

Please select the most representative months to describe your Monthly Indoor Use (i.e. Dec., Jan., Feb.)	January	February	March	April	May	June	July	August	September	October	November	December

Normalizing Data

			Yes	No
Population Served for Year of Reporting		**Do you have a large transient population in your service area (i.e. tourism, second homes, students)?**		
Source		**If yes, what is the estimate of this population?**		
		Source		

Number of Active Service Connections	Residential		Single Family	Multi-Family	Municipal	CII	Irrigation Only	Other
January								
February								
March								
April								
May								
June		**OR**						
July								
August								
September								
October								
November								
December								

	Residential		Single Family	Multi-Family	Municipal	CII	Irrigation Only	Other
Average Number of Inactive Accounts Annually		**OR**						

Annual Audit Report

System Water Audit (using 2009 AWWA M36 Manual of Practice-Water Audits and Loss Control Programs (3rd Edition))				
Billed Unmetered Water Use				
Unbilled Authorized Water Use		**OR**	Total Distributed/Produced Water	
Apparent Losses			Total Metered Water Use	
Real Losses				

Supplemental Information (Optional)

	Residential	**OR**	Single Family	Multi-Family	Municipal	CII	Irrigation Only	Other
Estimate of Irrigated Acres by Customer Category								

Average Annual Gross Evapotranspiration Rate for Service Area (inches)	
Average Annual Total Precipitation for Service Area (inches)	
Irrigation Application Rate for Service Area (gallons/square foot)	

Number of Housing Units	Residential		Single Family	Multi-Family
January				
February				
March				
April				
May				
June		**OR**		
July				
August				
September				
October				
November				
December				

Water Use Data (Non Potable reuse water only)

Enter Reporting Unit (e.g., AF, MG,

Distributed Water (annual water

Frequency of Billing		Monthly	Bi-Monthly	Quarterly	Other (specify)
Customer Category	Residential				
	Single Family				
	Multi-Family				
	Municipal				
	CII				
	Irrigation Only				
	Other				

Metered Water Use	Residential		Single Family	Multi-Family	Municipal	CII	Irrigation Only	Other
January								
February								
March								
April								
May								
June		**OR**						
July								
August								
September								
October								
November								
December								

Please select the most representative months to

January	February	March	April	May	June	July	August	September	October	November	December

Normalizing Data

Population Served for Year of Reporting	
Source	

	Yes	No
Do you have a large transient population in your service area (i.e. tourism, second homes, students)?		
If yes, what is the estimate of this population?		
Source		

Number of Active Service Connections	Residential		Single Family	Multi-Family	Municipal	CII	Irrigation Only	Other
January								
February								
March								
April								
May								
June		**OR**						
July								
August								
September								
October								
November								
December								

	Residential		Single Family	Multi-Family	Municipal	CII	Irrigation Only	Other
Average Number of Inactive Accounts Annually		**OR**						

Annual Audit Report

System Water Audit (using 2009 AWWA M36 Manual of Practice-Water Audits and Loss Control Programs (3rd Edition))

Billed Unmetered Water Use			
Unbilled Authorized Water Use		Total Distributed/Produced Water	
Apparent Losses	**OR**	Total Metered Water Use	
Real Losses			

Supplemental Information (Optional)

	Residential	**OR**	Single Family	Multi-Family	Municipal	CII	Irrigation Only	Other
Estimate of Irrigated Acres by Customer Category								

Average Annual Gross Evapotranspiration Rate for Service Area (inches)	
Average Annual Total Precipitation for Service Area (inches)	
Irrigation Application Rate for Service Area (gallons/square foot)	

Number of Housing Units	Residential		Single Family	Multi-Family
January				
February				
March				
April				
May				
June		**OR**		
July				
August				
September				
October				
November				
December				

Metering and Billing (Meter Types, Frequency of Meter Reading, Type of Rate Structures and Tap Fees)

Meter Types

Number of Each Type

Customer Category	Treated Water				Non-Potable Raw Water				Non-Potable Reuse Water			
	Manual Read	AMR	AMI	Unmetered	Manual Read	AMR	AMI	Unmetered	Manual Read	AMR	AMI	Unmetered
Residential												
Single Family												
Multi-Family												
Municipal												
CI												
Irrigation Only												
Other												

Frequency of Meter Reading

Customer Category	Treated Water			Non-Potable Raw Water			Non-Potable Reuse Water		
	Monthly	Bi-Monthly	Other (specify)	Monthly	Bi-Monthly	Other (specify)	Monthly	Bi-Monthly	Other (specify)
Residential									
Single Family									
Multi-Family									
Municipal									
CI									
Irrigation Only									
Other									

Rate Structure

Customer Category	Treated Water								Non-Potable Raw Water								Non-Potable Reuse Water							
	Declining Block Rates	Flat Rates	Uniform rates	Inclining Block Rates	Water Budgets	Seasonal	No charge	Other	Declining Block Rates	Flat Rates	Uniform rates	Inclining Block Rates	Water Budgets	Seasonal	No charge	Other	Declining Block Rates	Flat Rates	Uniform rates	Inclining Block Rates	Water Budgets	Seasonal	No Charge	Other
Residential																								
Single Family																								
Multi-Family																								
Municipal																								
CI																								
Irrigation Only																								
Other																								

Details of Rate Structure(s)

Tiers (number or name)						
Price/tier ($)						
Spread of tiers (gallons)						

Service charge/Base Rate	

Conservation Oriented Tap Fees

Does the square footage and type of landscaping affect you tap fee pricing or is tap size the basis for irrigation tap fees?

Check all that apply

Size and type of l	Tap Size	Both

What is your irrigation tap fee schedule? Choose one Category

Categories							
Landscape Irrigation Requirement Based Irrigation Tap Fees						Tap Size Based Irrigation Tap Fees	
Landscape type	Define Type (if needed)	Irrigation Requirement Tap Fee Unit	Cost per unit	Tap Size Component (if any) of Irrigation Requirement Tap Fee		Tap Size Based Irrigation Tap Fee	
low water, high water, permanent irrigation, establishment irrigation(EXAMPLE)		*Square Foot, Acre Foot, tap equivalent (define)*		*Tap Size*	*Cost*	*Tap Size*	*Cost*
				3/4"		3/4"	
				1"		1"	
				1.5"		1.5"	
				2"		2"	
				3"		3"	
				4"		4"	
				6"		6"	

Who calculated the tap size required? (check one)	Developer	Water Provider

Who calculates the irrigation requirement of the landscape? (check one)	Developer	Water Provider

Which are your non-residential indoor tap fees based on (check all that apply)

Tap size provided by developer	Tap size calculated by water provider	Water Demands Calculated by Developer	Water Demands calculated by water provider

If water demands are calculated what is the calculation method (check all that apply)	
Size of Building	
Calculated GPM building requirement	
Type of business	

Water Loss Characterization

Meter Age — **Number of Each Type**

Customer Category	Treated Water				Non-Potable Raw Water				Non-Potable Reuse Water			
	< 2 years	2 - 5 years	5 -10 years	> 10 years	< 2 years	2 - 5 years	5 -10 years	> 10 years	< 2 years	2 - 5 years	5 -10 years	> 10 years
Residential												
Single Family												
Multi-Family												
Municipal												
CII												
Irrigation Only												
Other												

	Yes	No
Do you have a meter testing program?		

Do you test your largest meters? (describe)

How often do you test your largest meters?

What % of total meters do you replace annually?

Status of Water Loss Characterization

(Check all that apply)	Yes	No	Date of Last Audit
Performed System Wide Audit (using AWWA M-36 Methodology)			

Nature of Leak Detection Program	Yes	No
Reactive approach to leak detection (when water is evident at surface corrective action is taken)		
Active Use of Accounting Methods to Find Leaks		
Active Use of Field Testing Methods to Find Leaks		

What type of technology is used in the field to find leaks (describe)?	
How much of system is inspected annually for leaks (%)?	
How much pipe is replaced annually in system (% of of total system)	

Integrated Water Planning and Staffing

"Integrated resources planning (IRP) is a comprehensive planning effort that incorporates both supply-side and demand-side managemetn options utilizing least-cost planning principles and an open, participatory process" (Guidebook fo Best Practices for Municipal Water conservation in Colorado, pg. 60).

Do you integrate water conservation planning with other planning efforts?

Yes	No

If No, why not? (drop down menu)

no resources available	
not applicable	
not possible	
not enough data to be confident	

Is There a Staff Person Assigned to Water Conservation Program Management? (check all that apply)

Type of Staffing	Yes	If Yes, how many ?	No
Full Time			
Part Time (if yes, provide estimated number of hours per week budgeted for water conservation program management)			
Contracted Labor			
Non-Profit Organization			
Other			

Incentives, Technical Assistance, and Technological Efficiencies (quantify efforts from reporting period)

Level 1-Management of Utility/Municipal Facility Water Efficiency(Check all that apply)

Technical Assistance	Yes	No	# performed during reporting period	Have you done this program prior to THIS reporting period?	If YES, Start date- end date	Additional Information
Specialty Trainings and Workshops						
Indoor Facility Audits						
Irrigation Efficiency Evaluations						
Landscape Design Assistance						
Process Water Efficiency Evaluations (i.e. COOLING TOWERS, CHIP MANUFACTURERS, etc.)						
Other (describe)						

Incentives **Indoor Fixtures/Appliances**	Yes	No	# performed during reporting period	What level of technology is incentivized? (i.e. gallons per flush, gallons per minute, etc.)	Have you done this program prior to THIS reporting period?	If YES, Start date-end date	Additional Information
Toilets							
Urinals							
Showerheads							
Faucet Aerators							
Clothes Washers							
Dish Washers							
Other (describe)							
Landscape Irrigation Equipment	**Yes**	**No**	**Number of each rebated/distributed in last reporting period**		**Have you done this program prior to THIS reporting period?**	**If YES, Start date-end date**	
Rain Sensors (including rain and wind sensors)							
Soil Moisture Sensors							
ET Controllers							
Other (describe)							
Landscape Installation	**Yes**	**No**	**Amount of square feet removed/converted in last reporting period**		**Have you done this program prior to THIS reporting period?**	**If YES, Start date-end date**	
Turf Replacement with low water use plant materials							
Soil Amendment							
Other (describe)							
Other (describe)	**Yes**	**No**	**# performed during reporting period**	**What level of technology is incentivized? (i.e. gallons per flush, gallons per minute, etc.)**	**Have you done this program prior to THIS reporting period?**	**If YES, Start date-end date**	

Level 2-Management of Largest Water Customers Demands (Check all that apply)

Technical Assistance	Residential	CII	Irrigation Only	Other	Number of each performed/distributed in last reporting period	Have you done this program prior to THIS reporting period?	If YES, Start date-end date	Additional Information
Specialty Trainings and Workshops								
Indoor Efficiency Audits								
Irrigation Efficiency Evaluations								
Landscape Design Assistance								

Process Water Efficiency Evaluations (i.e. COOLING TOWERS, CHIP MANUFACTURERS, etc.)									
Other (describe)									

Incentives

Indoor Fixtures/Appliances	**Residential**	**CII**	**Irrigation Only**	**Other**	**Number of each rebated/distributed in last reporting period**	**What level of technology is incentivized? (i.e. gallons per flush, gallons per minute, etc.)**	**Have you done this program prior to THIS reporting period?**	**If YES, Start date-end date**	**Additional Information**
Toilets									
Urinals									
Showerheads									
Faucet Aerators									
Clothes Washers									
Dish Washers									
Other (describe)									

Landscape Irrigation Equipment	**Residential**	**CII**	**Irrigation Only**	**Other**	**Number of each rebated/distributed in last reporting period**		**Have you done this program prior to THIS reporting period?**	**If YES, Start date-end date**	**Additional Information**
Rain Sensors (including rain and wind sensors)									
Soil Moisture Sensors									
ET Controllers									
Other (describe)									

Landscape Installation	**Residential**	**CII**	**Irrigation Only**	**Other**	**Amount of square feet removed/converted in last reporting period**		**Have you done this program prior to THIS reporting period?**	**If YES, Start date-end date**	**Additional Information**
Turf Replacement with low water use plant materials									
Soil Amendment									
Other (describe)									

Other (describe)	**Residential**	**CII**	**Irrigation Only**	**Other**	**Number of each rebated/distributed in last reporting period**	**What level of technology is incentivized? (i.e. gallons per flush, gallons per**	**Have you done this program prior to THIS reporting period?**	**If YES, Start date-end date**	

Technical Assistance, Incentives and Technological Efficiencies (quantify efforts from reporting period)

Level 3- Management of Remaining Customer Demands (Check all that apply)

Technical Assistance

	Residential	CII	Irrigation Only	Other	Number of each performed/distributed in last reporting period	Have you done this program prior to THIS reporting period?	If YES, Start date- end date	Additional Information
Specialty Trainings and Workshops								
Indoor Facility Audits								
Irrigation Efficiency Evaluations								
Landscape Design Assistance								
Process Water Efficiency Evaluations (i.e. COOLING TOWERS, CHIP MANUFACTURERS, etc.)								
Other (describe)								

Incentives

Indoor Fixtures/Appliances	Residential	CII	Irrigation Only	Other	Number of each rebated/distributed in last reporting period	What level of technology is incentivized? (i.e. gallons per flush, gallons per minute, etc.)	Have you done this program prior to THIS reporting period?	If YES, Start date- end date	Additional Information
Toilets									
Urinals									
Showerheads									
Faucet Aerators									
Clothes Washers									
Pre-rinse spray valves									
Dish Washers									
Customer Water Use Monitoring Device									
Indoor Water Audit Kits									
Other (describe)									

Landscape Irrigation Equipment	Residential	CII	Irrigation Only	Other	Number of each rebated/distributed in last reporting period		Have you done this program prior to THIS reporting period?	If YES, Start date- end date	Additional Information
Rain Sensors (including rain and wind sensors)									
Soil Moisture Sensors									
ET Controllers									
Other (describe)									

Landscape Installation	Residential	CII	Irrigation Only	Other	Amount of square feet removed/converted in last reporting period		Have you done this program prior to THIS reporting period?	If YES, Start date- end date	Additional Information
Turf Replacement with low water use plant materials									
Soil Amendment									
Other (describe)									

Other (describe)	Residential	CII	Irrigation Only	Other	Number of each rebated/distributed in last reporting period	What level of technology is incentivized? (i.e. gallons per flush, gallons per minute, etc.)	Have you done this program prior to THIS reporting period?	If YES, Start date- end date	Additional Information

Ordinances

Do you have authority over land use?	Yes	No	Other (describe)

Water Waste

Level 1-Water Waste Ordinance

check all that apply	Water Waste Ordinance/Regulation in place	Time of Day Restrictions	Limits to Irrigation Runoff	Limits on Car Washing (e.g., automatic shutoff on hose)	Limits on Power-Washing and Hosing Down Pavement, etc.	Failing to Repair Leaks	Day of Week Watering Restrictions	Other (describe)
Yes								
Voluntary								
Mandatory								
Variable*								

* dependant on determination of stage of water shortage or other utility/district action

Level1- Enforcement of Water Waste

check all that apply	Water Waste Ordinance/Regulation in place	Time of Day Restrictions	Limits to Irrigation Runoff	Limits on Car Washing (e.g., automatic shutoff on hose)	Limits on Power-Washing and Hosing Down Pavement, etc.	Failing to Repair Leaks	Day of Week Watering Restrictions	Other (describe)	Number of each performed in last reporting	Who controls enforcment for ordinance?
Warnings										
Fines										
Account Restrictions										
Account Shut-Offs										
Other (describe)										

New Construction

Level 2- New Construction Regulations

check all that apply	Residential	Municipal	CII	Irrigation Only
EPA Water Sense Specification				
Soil Amendments				
Turf Restrictions				
Landscape Design Requirements				
Landscape Installation Requirements				
Irrigation Design Requirements				
Process Water Design Requirements				
Other (describe)				

Level 2-Enforcement/Inspection of New Construction

check all that apply	Yes	Number of each performed in last reporting period	Who controls enforcment for ordinance?
Plan Reviews			
Field Inspections			
Other (describe)			

Existing Building Stock

Level 3-Existing/Retrofit Construction Regulations

check all that apply	Residential	Municipal	CII	Irrigation Only
EPA Water Sense Specification				
Soil Amendments				
Turf Restrictions				
Landscape Design Requirements				
Landscape Installation Requirements				

Irrigation Design Requirements				
Car Wash Certification/Requirements				
Process Water Design Requirements				
Point of Sale Controls				
Other (describe)				

Level 3-Enforcement/Inspection of Existing/Retrofit Construction Regulations

check all that apply	Yes	Number of each performed in last reporting period	Who controls enforcment for ordinance?
Plan Reviews			
Field Inspections			
Other (describe)			

Education

Level 1- One Way Educational Programs

check all that apply	Yes	Number of customers reached during reporting period
Bill Stuffers		
Newsletters		
Door Hangers		
Informational Website		
Mass Mailings		
Water Wise Demonstration Garden(s)		
Other (describe)		

Level 2-One Way with Feedback Educational Programs

check all that apply	Yes	Number of customers reached during reporting period
K-12 Classroom Programs		
Water Fairs		
Interactive Websites		
Customer Informational Workshops		
Organizational Messaging Programs		
Customer Surveys		
Other (describe)		

Level 3-Two Way Educational Programs

check all that apply	Yes	Number of customers reached during reporting period
Community Working Groups		
Focus Groups		
Citizen Advisory Boards		
Organizational Messaging Campaigns (multi-media)		
Other (describe)		

Costs Incurred Over Last Reporting Period

Costs Incurred Only by the Utility/District over Last Reporting Period

	Staff	Other Costs*	Total
Total Annual Cost of Water Conservation Program (only dedicated staff and budget)			
Broken down by individual program			
Program A			
Program B			
Program C			
Program D			
Program E			
Program F			

* Costs of incentives such as rebates or audit kits, supplies to carry out programs and measures, costs of equipment to carry out programs and measures.

Customer Costs (optional)

	Total
Total Annual Customer Costs of Water Conservation Program	