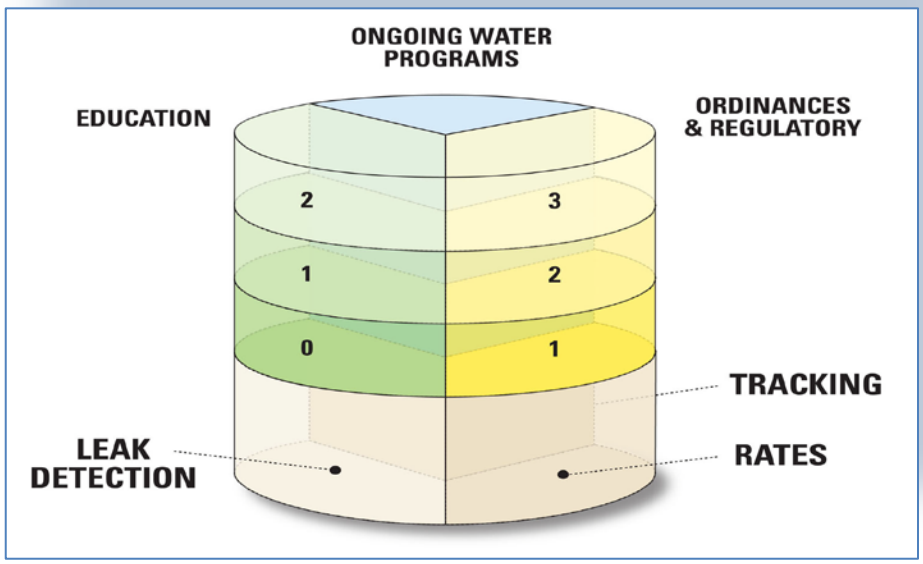
SWSI Conservation Levels Analysis
Final Report



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Section 1
Project Background and Goals

Background

In September of 2009, the Colorado Water Conservation Board (CWCB) and the Office of Water Conservation and Drought Planning (OWCDP) agreed to implement a series of projects (AKA – Approach to a Water Conservation Strategy) to "develop a comprehensive water conservation technical platform that would support the CWCB in its continuing efforts to develop strategies to meet Colorado's future water supply needs," (Reidy and Deheza, 2009).

The proposed projects were conceived to achieve four specific goals:

- Identify and analyze the water conservation savings from the year 2000 to present that are permanent versus temporary.
- Identify current penetration rates for the best practice water conservation measures identified in the Best Practices Guide for Water Conservation in Colorado and forecast what they are expected to be through 2050.
- Analyze and reevaluate the conservation levels included in Statewide Water Supply Initiative Phase I (SWSI I).
- Create a Best Practices Guide for Water Conservation in Colorado.

The OWCDP expects that achieving these goals will provide a more scientifically valid foundation to determine future municipal demand levels. Furthermore, by completing the series of projects, the roles of water conservation and demand management in the context of future water resource management will be better defined (Reidy and Deheza, 2009). To this point, the Water Conservation Strategy was conceived by the OWCDP to support efforts being conducted by the CWCB Water Supply Planning Section, the Interbasin Compact Committee (IBCC) and the various Basin Round Tables (BRT) to understand and characterize the role of water conservation in filling the water supply "gap," where the gap is defined as the difference between the combination of current water supplies and identified projects and processes (IPPs), and future statewide water demand.

Project Goals and Approach

This specific project – SWSI Conservation Levels Analysis – focused on achieving the third goal of the proposed Water Conservation Strategy. The overall goal of this project was to re-assess the water conservation classification "levels" developed and used in the SWSI I to estimate future water demand

reductions associated with passive and active water conservation savings[1] based on a review and evaluation of the best available data collected by the CWCB over the past eight years.

As part of this project, a quantitative re-assessment was made of potential future water demand reductions associated with the "passive" water conservation predicted in SWSI I. Follow-up projects to be conducted by CWCB will re-assess and perform quantitative assessments to characterize potential "active" water conservation savings predicted and/or discussed in both phases of SWSI (i.e., SWSI I and II).

To achieve the goals of this project, the following tasks were performed:

- Collect and analyze data from past CWCB projects (including the Drought and Water Supply Assessment (DWSA) of 2004, the Colorado Drought and Water Supply Update (CDWSU) of 2007, and SWSI I and II) and from those Water Conservation Plans currently approved and on file with the OWCDP;
- Analyze SWSI I water conservation level evaluations; and
- Develop a new framework for evaluating and characterizing ongoing water conservation conducted by Colorado's water utilities and special districts.

In addition, analyses were performed to estimate the likely range of municipal water demand reductions expected as a result of current and future passive water conservation.

The analyses that result from the data review will address the following key issues from the perspective of the State's water utilities and special districts[2] that provide municipal and industrial (M&I) water supply (including municipal, industrial, commercial and institutional water use):

- Do water utilities have meaningful water conservation programs;
- How do water utilities best support meaningful customer water conservation;
- What are the costs to utilities to support water conservation measures and programs;
- What was the influence of the 2002 drought on water demand, independent of ongoing water conservation efforts; and
- What is the potential for future water conservation savings (based on those Water Conservation Plans submitted to the OWCDP)?

It is important to note that for the purposes of this project and related reports, water conservation is viewed as those measures and programs, and related actions and activities, that permanently reduce M&I water demand.

[1] Water conservation in SWSI I was defined as those future demand reductions associated with "passive" and "active" water savings. These terms are defined in the footnote on page 18 of this report.

[2] 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.

This remaining portion of the report is organized as follows:

Section 2 – reviews the data sources available from past CWCB projects.

Section 3 – presents the analyses of the CWCB data sources.

Section 4 – reviews the SWSI I water conservation levels and presents the new framework proposed to characterize water provider water conservation efforts.

Section 5 – presents a revised estimate of potential passive water conservation savings expected in Colorado by 2050.

Section 2
Background and Review of Data Sources

This section provides a discussion of the nature of each of the data sources used in the project, including the similarities and differences between the data collected and uses of that data. The specific data sources are as follows:

- Drought and Water Supply Assessment (Bouvette Consulting, 2004)
- Statewide Water Supply Initiative Phase I (CDM, 2004)
- Colorado Drought and Water Supply Update (Aquacraft, Inc., 2007)
- Statewide Water Supply Initiative Phase II (CDM, 2007)
- Water Conservation Plans submitted to the OWCDP after July 2006 (various dates by various authors)

Drought and Water Supply Assessment (DWSA)

The DWSA was the first project of its kind conducted by the CWCB. It was performed to engage Colorado water users and water interests from all the major river basins to:

- Determine how Colorado prepared for drought, and
- Identify limitations, and related measures, to better prepare Colorado for future droughts.

The DWSA involved the collection and evaluation of water use and opinion data from 537 water providers and water interests from across the state in 2003, including municipal, agricultural, industrial, recreational, and environmental users. The opinion data focused on characterizing how prepared Colorado was for drought and identifying drought mitigation measures that may help the state, its citizenry and its businesses better prepared for future droughts. The opinion data characterized those key issues that water managers and planners throughout the state faced with respect to the short- and long-term management of local water resources such as:

- Limitations to current water supply;
- Current status of water supply, drought and water conservation planning and implementation within each water user organization;
- Impacts observed from the most recent drought by the different water user segments.
- Limitations to planning for future water supply;
- Water user needs for structural and non-structural projects to mitigate drought;
- Use of cooperative agreements to manage drought now and into the future; and
- State role in future drought planning and mitigation efforts.

Based on the results of the survey, water user responses were summarized, and issues related to current and future state water policy were identified.

SWSI Phase I

The Executive Director of the Department of Natural Resources Russell George wrote the following regarding the importance and use of SWSI I (George and Catlin, 2004):

> *"The CWCB's overarching goal for SWSI was to help water providers and state policy makers ensure an adequate water supply for Colorado's citizens and the environment. Resolving Colorado's water supply and water needs required the development and implementation of a complex process that took a sustained and long-term effort. During the execution of SWSI it was apparent that developing trust and open communication would take time. To this point, SWSI has been conducted in phases such that information collection and analyses could be honed as new and better data becomes available.*
>
> *The first phase of SWSI (i.e., SWSI I) occurred as the result of the 2003 Colorado General Assembly authorizing the CWCB to implement SWSI, an 18-month basin by basin investigation of our existing and future water needs. This was an unprecedented effort. Never before in the history of the state had we developed such a comprehensive picture of our water future. Never before has the state assembled all water users – farmers, ranchers, municipalities, industrial users, recreationalists, and environmentalists – to look at our future. Never before have we gone to each of Colorado's eight major river basins to explore how much water they use today, how much water they need in the future, and how local water providers are planning to meet that need.*
>
> *Conducting this study was no easy task. Water is controversial and contentious, and the tensions and conflicts at times have spanned generations. Water is an issue that goes to the core of who we are and what we can be as a state. As a result, this study needed to proceed thoughtfully and strategically, always in respect of the role and jurisdiction of local water providers.*
>
> *With the help of hundreds of Coloradans, that is what the SWSI I did. For the first time, we had estimates for:*
>
> - *How much water Colorado will need in 2030, basin by basin;*
> - *What is being done to address our water needs, statewide and by basin;*
> - *How much we are short (i.e., what is the gap), and where we are short; and*
> - *What is being done, and what more can be done, about the shortfall.*
>
> *This information has provided a critical foundation for local water providers and other decision-makers to take the necessary steps to provide Coloradans with a safe and reliable water supply.*
>
> *Critical to the overall outcomes provided by the SWSI I effort was the identification of processes and projects (IPPs) that can potentially meet 80 percent of those municipal and industrial water demands expected to occur in 2030; however, some water suppliers may need help building infrastructure,*

> *mitigating and permitting projects, enhancing and improving the environment, and conserving water."*

SWSI I catalogued the specific projects, plans, and processes that local water suppliers have identified and are performing, or are planning to implement, to meet expected future water demands that they have predicted. As a whole, if all these projects are implemented as planned, 80 percent of the state's 2030 M&I water needs would be met. This is the most optimistic scenario; but there is uncertainty and hurdles to overcome. SWSI II, which was completed about three years after SWSI I, was designed in part to better characterize the nature of the 20 percent "gap" and how the IPPs will (or will not) fill the gap.

Colorado Drought and Water Supply Update (CDWSU)

The authors of the CDWSU wrote (Aquacraft, Inc., 2007):

> *"The CDWSU was conducted in 2007 to obtain new information on the current status of drought planning and preparedness, water conservation planning and programs, and water supply. This study was conducted for the Colorado Water Conservation Board with the assistance of the Southeastern Colorado Water Conservancy District. The research team included Aquacraft, Inc., National Research Center Inc. (NRC) and Aspen Media and Market Research.*
>
> *Focused on municipal and urban water providers in Colorado, the CDWSU implemented a detailed telephone survey to evaluate key components of water supply planning. A similar study, the DWSA conducted in 2004, had a much broader focus that included agriculture and other water use sectors in the state. By necessity, CDWSU had a more limited schedule and budget; hence the opinion data collection was restricted to municipal and urban water providers."*

Data collected during the CDWSU was used to characterize:

- Drought status and preparedness
- Water conservation planning and programs
- Climate change and long-term planning
- Needs assessment from Colorado's water providers (related to the need for state assistance in future water supply planning and project implementation)

SWSI Phase II

Based on the finding of SWSI I, CWCB identified several recommendations that could lead to the better characterization and quantification of Colorado's future water needs, issues, and opportunities. One of the recommendations involved the formation of Technical Roundtables (TRTs) to continue the work of characterizing the nature and issues related to the IPPs and the 20 percent gap identified in SWSI I.

The specific TRTs formed to support the SWSI II effort were associated with four key areas:

- Water Conservation and Efficiency;
- Alternative Agricultural Water Transfer Methods to Traditional Purchase and Transfer;
- Delineating and Prioritizing Colorado's Environmental and Recreational Resources and Needs; and
- Addressing the Water Supply Gap (between Current Supply and Current and Future Water Needs)

According to the authors of SWSI II (CDM, 2007):

> *"SWSI II's overall goal was to develop reconnaissance level concepts to address the 20 percent M&I gap, agricultural shortages, and environmental and recreational enhancements. To the extent possible, multi-objective concepts were considered. Developing a range of potential solutions were expected to assist water providers, policymakers, and stakeholders gain a deeper understanding of the relative role that water efficiency, agricultural transfers, and new water development can play in meeting future needs and the trade-offs associated with these concepts. These concepts can then be considered in the context of meeting human needs for water and providing for the needs of Colorado's natural environment and recreation."*

Water Conservation Plans on File with the OWCDP

Water conservation planning has long been required by state statute. Beginning with the Water Conservation Act of 1991, M&I water providers that had retail sales of greater than 2,000 acre-feet per year were required to have water conservation plan approved by the CWCB by 1996. M&I water providers that met this retail sales requirement were considered to be "covered entities". A covered entity that did not have a CWCB approved plan could not receive loan proceeds from either the CWCB or the Colorado Water Resources and Power Development Authority.

The 1991 Act did not require the reporting of any data by the planning entity – so no information regarding population served, number of connections, water use and/or delivery data, or information regarding the costs and benefits of local water conservation efforts were included in the plans that the CWCB was bound by statute to approve. The plans did not include any information regarding the goals of future water conservation efforts or the manner by which water conservation savings would be measured and verified. The contents of a state required water conservation plan created by a covered entity and approved before July 2006 (which is when new legislation passed during the 2004 legislative session took effect) provided minimal information relevant to characterizing active water conservation efforts.

This seeming oversight was not surprising given the state of the science regarding water conservation planning at that time. It was not until Colorado's drought in 2002, and other regional droughts in various locations in the United States, did water conservation planning become more robust and data intensive.

Given the broad impacts of the 2002 drought, a bill was passed in 2004 requiring water conservation plans to include more detailed analyses and information. Specifically, the 2004 legislation required that water conservation plans submitted after July 2006 contains:

- Goals for future water conservation efforts;

- Defined monitoring and verification efforts; and
- Scheduled updates for the plans, not to exceed seven years.

The CWCB added policies between 2004 and 2006 to further define the reporting requirements for covered entities to include the identification of water use, both as a total and by customer class for the past five years; the population served during each of these years; the benefits of past water conservation efforts, in terms of water saved; and the identification and evaluation of costs and water savings associated with various water conservation measures and programs that a covered entity may select for implementation. The CWCB also requires that an implementation plan be included in the water conservation plan submitted for approval.

Note that SWSI I only had the pre-2006 water conservation plans to draw upon for data and evaluation of ongoing water conservation in the state. SWSI II had less than a half dozen water conservation plans available for review in 2007. To this point, this project was scoped to review all the 30 water conservation plans on file with the CWCB as of January 2010, thereby increasing the amount of relevant data used to support the goals of the Water Conservation Strategy developed by the OWCDP. A listing of those covered entities with CWCB approved water conservation plans as of January 2010 is provided in Table 1.

Table 1 – List of Water Conservation Plans on File with the CWCB

Alamosa, City of	Fort Collins-Loveland Water District
Arapahoe County WWA	Fort Lupton, City of
Aurora, City of	Fort Morgan, City of
Boulder, City of	Fountain, City of
Brighton, City of	Greeley, City of
Castle Pines North	Left Hand Water District
Castle Rock, Town of	Longmont, City of
Centennial Water and Sanitation	Northglenn, City of
Cherokee Metro District	North Table Mountain
Colorado Springs Utilities	North Weld County
Denver Water	Pagosa Area Water and Sanitation
East Larimer County	Parker Water and Sanitation
Erie, Town of	Rifle, City of
Evans, City of	Salida, City of
Firestone	Windsor, Town of

Discussion

Since 2000, the CWCB and the OWCDP have collected and analyzed an unprecedented amount of data characterizing current and future water supply and demand; water supply, drought and water conservation planning in the State; and future water resource management projects and project needs. In conjunction

with these efforts, substantial resources have been committed by individual water providers to characterize local and regional M&I water supply needs and limitations as additional data has become available and the state of the science has improved. This project utilized the data made available through both the state and the local planning efforts to support the development of updated analyses that characterize the manner in which covered entities plan for and implement meaningful water conservation programs. This project also used data that has become available since 2007 from studies conducted locally and nationally to estimate passive water conservation savings.

Given the quantitative nature of analyses presented herein, the opinion data collected as part of the DWSA and CDWSU had value in some respects for identifying trends and perceptions held by the water community; however, these projects collected limited quantitative data which prohibited the extent to which the information could be used to inform future demand projections and related water conservation program analyses.

On the other hand, SWSI I and II did not have the benefit of substantial information regarding water provider conservation efforts, since the vast majority of the plans on file with the CWCB were created after SWSI II was completed. This project's review of SWSI I and II therefore focused on determining which data were used to characterize current and future Colorado water conservation efforts and evaluating how those data were used to estimate the impact of water conservation measures and programs on future water demands.

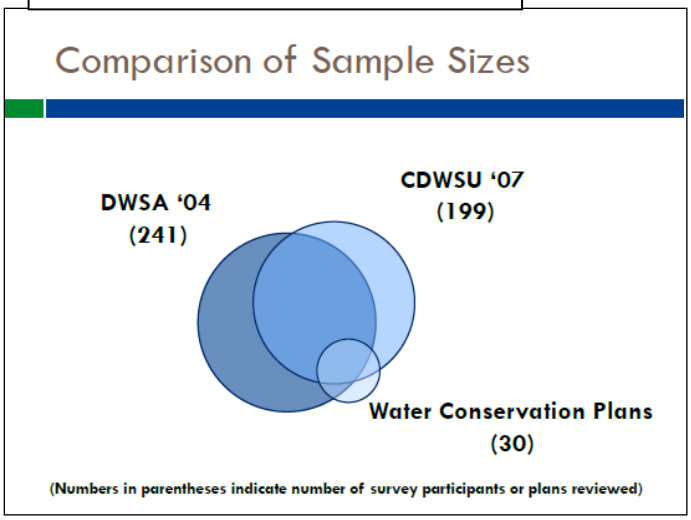
The most robust data available to support this project came from the Water Conservation Plans on file with the OWCDP obtained since July 2006. These plans included data characterizing annual water demands since 2000 by water use customer type, water conservation goals, and cost-benefit analyses. Developing a new framework for characterizing water conservation in Colorado in lieu of the SWSI I conservation levels, and estimating the amount of future water demand reductions related to passive water conservation relied heavily upon those data contained in the Water Conservation Plans on file with the CWCB, supplemented with data available in the relevant literature.

Section 3
Data Analyses

The data analyses presented in this section focus upon a review of the status of water conservation in the state. Specifically, the review characterized the nature and reliability of the available information that may be used to support the overall Water Conservation Strategy being developed by the CWCB. Of particular interest are those issues that would support the quantification of active water conservation in the state, including:

- Do water utilities and special districts have meaningful water conservation plans?
- What are the best water conservation programs that water providers can implement?
- What are the costs for these measures and programs?
- What was the influence of the 2002 drought on customer water demand?
- What is the potential for water demand reductions through utility sponsored water conservation programs?

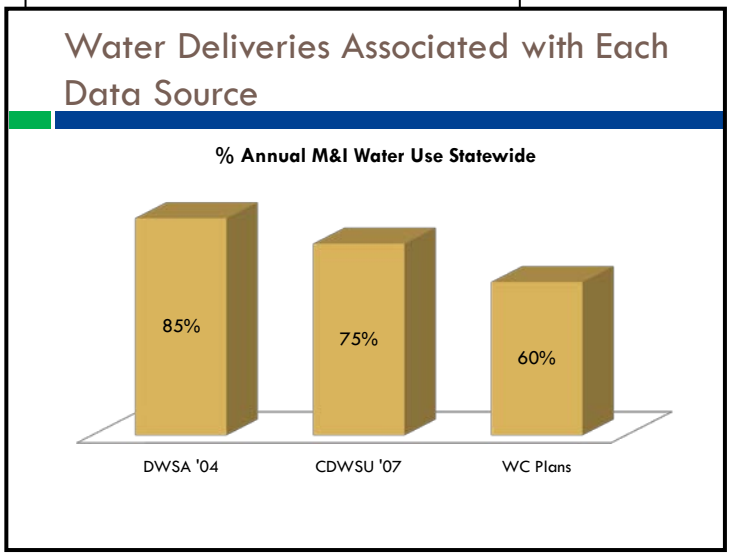
Figure 1



Each of these topics is discussed in light of the data collected in the past by the CWCB, using the data sources presented in Section 2.

Prior to presenting the analyses, it is important to compare and characterize the data in these reports. For example, Figure 1 presents the number of municipal water providers represented in three sets of data – the DWSA, the CDWSU, and the Water Conservation Plans on file with the CWCB. Note that sixteen of those covered entities with approved Water Conservation Plans also participated in both the DWSA and the CDWSU, which is just over 50 percent of those with plans on file with the CWCB. One hundred and thirty two M&I water providers participated in both the DWSA and the CDWSU (or about 2/3 of all the CDWSU participants also participated in the DWSA). Generally, these overlaps suggest that the responses from these three data sources represent a similar population of M&I water users.

Figure 2



To further illustrate this point, Figure 2 presents the portion of total M&I water use represented by the participants from these three projects. As shown in

Figure 2, the three data sources – the DWSA, the CDWSU and the Water Conservation Plans on file with the CWCB – represent 60 percent or more of the all the State's M&I water use[3]. For each case, the percentage of M&I water use is considered representative of trends and conditions statewide.

Do Water Utilities and Special Districts Have Meaningful Water Conservation Programs?

It is clear from the three data sources that water providers across the state have been and continue to conduct water conservation planning. According to the DWSA, about 48 percent of surveyed water providers had water conservation plans. Four years later, about 43 percent of surveyed water providers had water conservation plans. These two numbers are essentially the same, given the error introduced by sample and population size.

However, only a fraction of those claiming to have water conservation plans in 2007 (approximately 40 percent), have approved plans on file with the CWCB. In addition, less than half of the water conservation plans reported to the CDWSU included information on specific measures and programs that would be used by the water provider to reduce customer water demand. To these points, it is unclear if the majority of the water conservation plans that have been created by water providers meet the basic state requirements.

In addition, less than half of the water conservation plans identified by the CDWSU include budgets to implement the plans. Another CDWSU observation was that only 11 percent of the 2007 CDWSU respondents indicated that they collect data to track water savings related to water conservation efforts.

Based on these observations, it is unclear as to the extent of meaningful water conservation[4] that is occurring within the State since most plans that have been created are not on file with the CWCB; do not include specifics regarding water conservation measures and programs; and/or do not indicate that tracking data are collected to characterize the effectiveness of implemented water conservation measures and programs. In addition, the majority of the surveyed water providers do not appear to have budgets specified for implementation of their water conservation programs. Although most of the major water providers in the state have water conservation plans, and many are implementing meaningful water conservation programs; the majority of the providers that are large enough for the CWCB to require water conservation plans from them have yet to implement meaningful water conservation programs.

Some of the lack of clarity related to the extent to which meaningful water conservation is occurring in Colorado as of 2007 may relate to the overall role of water conservation in utility operations. Water utilities and special districts were created to provide safe, reliable potable (and in some cases non-potable) water to their customers. It is no surprise that Colorado's utilities and special districts excel in meeting this need and fulfilling this role. Water conservation can be a distraction for some organizations that lack staff and

[3] Water conservation plans on file with the CWCB include 23 from the South Platte River basin, four from the Arkansas River basin, and one each from the Rio Grande, Colorado and San Juan/Dolores River basins.

[4] 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.

resources to plan and implement meaningful water conservation. Water conservation can also be considered counter-productive for organizations whose revenue is either solely or chiefly produced through water sales.

Water conservation can also be considered by some utilities to have negative impacts on return flows, downstream water rights holders, and overall supply reliability (depending on what the saved water is used to support[5]). Only recently have rigorous cost-benefit analyses been available to help water utilities evaluate the value of water conservation with respect to ongoing operational and budgetary issues. Without reliable, tested cost/benefit data and analyses related to market penetration and permanent water savings, and information on the impacts of changing technology, water utilities can have difficulty performing rigorous water conservation planning.

The state of the science of water conservation in Colorado and the United States has greatly improved in the past three to five years, such that more meaningful planning can now occur at the utility and district level – better than at any time before. This is in part due to the efforts of those covered entities with approved Water Conservation Plans on file with the CWCB, since they are currently implementing local water conservation measures and programs, and are collecting data associated with costs, water savings and penetration rates. To this end, more meaningful water conservation is becoming more accessible than ever before for water utilities in Colorado.

It is becoming increasingly important for water utilities to integrate water conservation planning into water resource and financial planning, such that water conservation programs support system reliability; reduce costs for future water projects; reduce ongoing operational costs; and reduce or postpone costs related to future infrastructure projects. In addition, utilities must collect data as water conservation programs are implemented to measure and verify the program effectiveness and appropriateness.

The new framework described later in this report will discuss some of the advancements that have been made regarding water conservation planning and implementation, specifically from the view point of water utilities and districts.

What are the Best Measures and Programs that Utilities and Special Districts have to Reduce Customer Demand?

The nature of water conservation from the point of view of a water provider has been evolving in Colorado and across the United States since the turn of the century. As indicated earlier, this is due to changes in the state of the science, various federal and state regulations, advancements in technology and improved data collection and management efforts. Noteworthy is that State of California regulations and energy policies must be counted in the mix of new developments that influence water conservation opportunities in Colorado, given the size and influence of California and its regulations on the marketplace. California laws can drive the supply chain to get improved water conservation technology to the market, thus impacting Colorado.

[5] Water conservation can be used to improve overall water supply reliability if planning entities can store and carryover saved water. Some planning entities; however, are planning on using saved water to support future population growth, which may reduce water supply reliability.

Since the marketplace has changed, along with an understanding of what works best and what doesn't, it is not surprising to see that opinions of Colorado's water providers have changed regarding the most effective water conservation measures with each new survey or study. Table 2 presents the top five water conservation measures and programs based on M&I water provider opinion data collected in 2003 and 2007. The table also identifies the most popular measures and programs included in the 30 water conservation plans that are currently on file with the CWCB. Note that the table includes two categories from the DWSA completed in 2004 – one category for those measures and programs in use at the time and one category for the measures and programs considered to be the most effective at saving water.

Table 2 – Summary of the Most Effective Water Conservation Measures and Programs based on M&I Water Provider Opinions and Plans

Study	Most Effective Measures and Programs (top five)				
DWSA	**1**	**2**	**3**	**4**	**5**
In Use	Metering	Public Information and Education	Leak Detection	Water Conservation Pricing	
Most Effective (as indicated by survey participants)	Public Information and Education	Metering	Water Conservation Pricing	Leak Detection	New Development Standards
CDWSU					
In Use	Public Information and Education	Water Conservation Pricing	Water Waste Ordinances	New Development Standards	Leak Detection
WC Plans					
In Use	Public Information and Education	Water Conservation Pricing	Customer Water Audits	Customer Rebates and Incentives	Leak Detection

By comparing opinions over this time span (2003 to 2007 to present), it is interesting to see that some of the "favorite" measures and programs persist (e.g., water conservation pricing), while others come and go (e.g., new development standards). It is also interesting to note that public information and education, which have not been shown to create water savings when conducted by themselves (Artz and Cook, 2007; Chestnut,

2000) are identified as the most valuable measure and program (noting that none of the opinion data is supported by actual water savings data except in very rare instances). This observation meshes with previous observations that the majority of the water conservation plans being created and used in Colorado may not be producing meaningful results.

Based on the current state of the science, the most effective water conservation measures and programs for any utility or district are dependent on a number of factors (Vickers, 2001; Bouvette and Gardener, 2005; Maddaus and Maddaus, 2007; Bouvette, 2010) including:

- The size of the district or utility;
- The types and numbers of customers that are served;
- The age of the infrastructure maintained by the utility and/or district; and
- The nature of the water provider's water rights (e.g., direct surface diversion versus transmountain diversions versus storage).

One size does not fit all; when it comes to water conservation planning and implementation. However, there are important commonalities that can be identified to help focus and manage the costs and benefits of water conservation programs being planned and implemented by Colorado's utilities and water districts. Those water conservation measures and programs that are well suited for all utilities and districts are called "foundational measures and programs." These measures and programs are being documented by the Colorado WaterWise in its upcoming Water Conservation Best Practices manual. More information regarding the foundational measures and programs, as well as discussion of the new framework that has been developed to focus utility water conservation programs, is provided in the next section.

Water conservation currently being implemented by Colorado's covered entities includes a wide range of measures and programs. A table summarizing those measures and programs that have been selected for implementation by Colorado's covered entities is provided in Appendix A. This table which was developed based on a review of the 30 Plans on file with the CWCB provides a list of the measures and programs currently being implemented within the following categories:

- Education
- Rebates and Incentives
- Leak Detection
- Water Rate Structures
- Audits
- Restrictions and Requirements
- Ordinances and Regulations
- Other

Note that water reuse and recycling was not included in this list. Although water reuse and recycling may be a component of a meaningful water conservation program, these activities are not used to reduce overall water demand, but are instead methods to create new, or stretch current, water supplies. An inefficient irrigation system is still inefficient whether it is using reuse water or not. This project is focused on

identifying how water providers can improve water use efficiency as a means to create permanent water demand reductions.

What are the Costs to Implement a Water Conservation Program for a Water Provider?

Data associated with the actual costs incurred by water providers to reduce customer water demand are not readily available. Some water providers across the state have committed funds and resources to reduce customer water demands since the mid-1990s[6] based on the pre-2006 Water Conservation Plans on file with the CWCB. However, some of the past expenditures by water providers did not necessarily translate to water savings or reduced customer water demands. Based on a review of Water Conservation Plans provided to the CWCB since 1996, it appears that for many water providers, customer education and information programs consisting of creating and sending out mailers, newsletters and bill stuffers to customers; along with other one-way[7] informational programs, were the sole component of their water conservation programs prior to the drought. As reported in various Water Conservation Plans (e.g., Alamosa, Longmont, Ft. Lupton, Brighton and Pagosa Area Water and Sanitation Water Conservation Plans), and in the literature (Artz and Cook, 2007), one-way educational programs have not been shown to be effective in changing customer behaviors or reducing water demand unless they support other active water conservation measures and programs (e.g., audits, rebates, etc.).

Data included in the 30 plans currently on file with the State submitted since 2006, have greatly improved the statewide understanding of potential costs related to water conservation planning and implementation. For example, most covered entities that submitted Plans, included costs related to the different measures and programs that they selected for implementation. However, data associated with actual water demand reductions measured during Plan implementation have not yet been widely shared with the CWCB. It is anticipated that in the future, when Water Conservation Plans are updated or when grants utilized to implement specific water conserving measures and programs have been completed, cost and water savings data will become more readily available.

Nonetheless, there is a growing amount of data in the literature, and in Colorado, regarding costs and related demand reductions. A few examples include: improved and automated meter reading technology by Castle Pines North and Pagosa Area Water and Sanitation District; commercial water audits by the Town of Castle Rock, Denver Water, Douglas County Government, City of Brighton, and Pagosa Area Water and Sanitation District; industrial process changes by Denver Water and Fort Lupton; faucet and showerhead replacement programs in the City of Brighton and Pagosa Area Water and Sanitation District; high-efficiency toilet replacement programs in the City of Northglenn.

Table 3 summarizes the costs committed to water conservation over the next ten years by the 30 covered entities with Plans on file with the CWCB. Note that the majority of the funding listed in Table 3 relates to

[6] A few Colorado water utilities such as Denver Water began funding water conservation as early as the 1970s, but these efforts which have helped create information valuable to current planning and implementation efforts were not particularly effective in permanently reducing customer demand system wide until after the 2002 drought – at which time data collection related to the effectiveness of specific implemented measures and programs improved.

[7] One-way educational programs include those that do not provide for customer interaction and feedback (e.g., bill stuffers); two-way education includes deliberate and measurable customer feedback mechanisms.

those programs being implemented by Denver Water, Colorado Springs and Aurora Water. These three water utilities, which provide water to about 40 percent of the State's population, are spending just over 75 percent of the total water conservation program funding reported to the CWCB.

Table 3 – Summary of Water Conservation Plan Implementation Costs for the 30 Planning Entities with Plans on File with the CWCB (in millions $)

	Indoor Rebates	Landscape Programs	Audits	Education	Leak Detection	Water Rates	Regulatory	Meter Testing and Replacement	Other[2]	Total
10-Year Total	$ 49.2	71.9	6.4	41.6	2.6	6.4	47.2	6.4	14.3	246.0
% of total[1]	(20%)	(29)	(3)	(17)	(1)	(3)	(19)	(3)	(6)	
Adjusted 10-Year Total[3]	$ 1.4	21.6	1.4	7.1	2.6	5.9	1.2	6.4	3.4	51.0
% of total[1,3]	(3%)	(40)	(3)	(14)	(5)	(11)	(2)	(12)	(7)	

[1] Percentages may not add to 100% due to rounding error
[2] Includes the cost to collect data and track the effectiveness of selected water conservation measures and programs.
[3] 10-year total and percent without the program costs for Denver Water, Colorado Springs and Aurora Water.

The data included in the 30 Plans on file with the CWCB can also be used to estimate the cost of water conservation measures and programs selected by the planning entities on the basis of expected per acre-feet of water demand reduction. Table 4 includes the average, maximum and minimum cost of water conservation per acre-foot as estimated by the water providers with Plans on file at the CWCB.

Noteworthy is that most covered entities continue to fund one-way education and information programs that will not necessarily influence customer water use; however, most water providers have integrated their education and information programs with other water conservation measures and programs, thus improving the overall balance and reach of their water conservation efforts. To this point, the costs provided in the Table 4 include a combination of measures and programs that the water providers have selected to implement including public education and information efforts. Costs for implementing individual measures and programs are not consistently reported by the planning entities, so that data has not been included here.

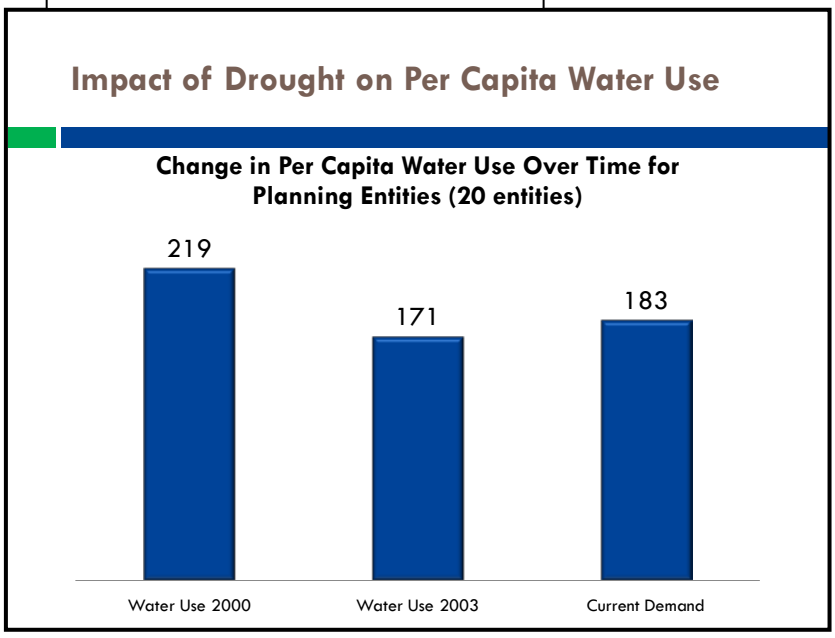
Table 4 – Cost of Water Conservation Programs Per Acre-foot of Expected Demand Reduction[1]	
Minimum	$ 245
Average	$ 6,327
Maximum	$ 37,387

[1] based on Water Conservation Plans on file with the CWCB in 2010

What Was the Influence of the 2002[8] Drought on Water Demand?

One issue of vital interest to many water providers, both with and without water conservation plans, is "what was the impact of the 2002 drought on water demands in Colorado?" Obviously, the impact of the drought on any individual jurisdiction or water provider's service area is influenced by both regional and local conditions. However, the drought of 2002 was of sufficient scale that it can be characterized on a statewide basis using data contained in the Water Conservation Plans on file with the CWCB. This is due, in part, to the State's requirement that covered entities submitting water conservation plans to the CWCB for approval include, at a minimum, 5 years of past water delivery data. Information regarding population served, number of taps, and types of customer classes served is also required.

Figure 3



Of the 30 plans on file, 20 have per capita water use data from 2000, 2003 and the planning year (AKA, some year after the drought (typically 2006, 2007 or 2008)). Twenty six plans contain per capita water use for 2003 and the planning year. Figure 3 presents the average system-wide per capita water use measured by the planning entities prior to, during and after the drought as indicated in their Water Conservation Plans.

This figure indicates that on average a 22% drop in system wide per capita water use was observed in Colorado due to the drought, noting that every one of the planning entities observed a decrease in per capita water use from

[8] The drought of in the first few years of this century was varied in time depending on location within the State. For example, many Front Range utilities define the drought as a 2002 to 2004 event. We have used "the 2002 Drought" as shorthand to describe the drought that was experienced over various durations during this period.

2000 to 2003. This figure also indicates that on average, there has been a 7% increase in per capita water use since 2003. More than half of the planning entities have observed an increase in per capita water use over this time. Those entities that witnessed a decrease in per capita water use since the drought include communities that had diversified water conservation programs dating from either before the drought or shortly thereafter.

Additional information exists to characterize the impact of the drought on customer water demands. Both the Denver Water Department and Colorado Springs Utilities describe the nature of the drought and its lasting impact on their community's future water demand in their Water Conservation Plans. Denver Water indicates that they observed a 20% decrease in customer demand associated with the drought. In addition, they indicate that a permanent per capita reduction of about one quarter of the drought demand reduction (or 5%) will be maintained through implementation of their selected water conservation measures and programs. Colorado Springs on the other hand observed a 17% decrease in water demand, and they are planning to implement water conservation measures and programs to offset any increases in customer demand as the drought impact fades into the future.

Other Colorado communities such as Brighton, Pagosa Springs, Highlands Ranch, Pueblo and Greeley observed similar customer demand reductions associated with the drought. And all of these communities plus others in Douglas County (Great Western Institute, 2007) have seen increases in per capita water use since 2003 despite various levels of water conservation planning and implementation.

It is unclear as to the long-term persistence of the drought demand reduction on customer water use. Some local water experts (water resource managers, water utility financial managers, water utility general managers) have indicated that the impact of the drought will persist at some discernable level for years to decades (Joint Technical Activities Committee, 2010). Consistent messaging and customer education campaigns may also be effective in maintaining behaviors that have in part caused the "drought shadow." Denver Water has opined that their "Use Only What You Need" campaign may have slowed the expected increase in customer demand as the impact of the drought grows fainter (Elliott, 2010). Whatever the future impact of drought on customer demand, it is clear that the 2002 drought impacted customer water demand in locations all across the state and that the overall water demands have not rebounded to pre-drought levels, even in locations without ongoing water conservation programs.

What is the Potential for Water Demand Reductions in Colorado?

Permanent water demand reduction in Colorado will occur in the future due to any number of influences (e.g., passive water conservation savings, drought, active water conservation programs conducted by utilities, etc.). Due to the 2004 legislation, water providers that submit Water Conservation Plans to the CWCB are required to identify the measures and programs that they intend to implement and the overall goal (in percent or in acre-feet of water to be saved) associated with the implementation of their Plan. A review of those Plans that were submitted to the CWCB after July 2006 made it possible to quantify the total reduction of current per capita water demand intended as an outcome of implementing the 30 water conservation plans on file with the CWCB. The results of this data review are discussed below.

Noteworthy is that the CWCB is currently unable to track successes and challenges associated with ongoing implementation efforts since data reporting to the OWCDP from the covered entities with Plans only occurs

at five to seven year intervals. To fully and comprehensively determine actual water demand reductions associated with ongoing active water conservation programs will require additional data collection and analysis, which the OWCDP will conduct in the near future.

It is important to note that SWSI I included an estimate for per capita demand reduction through 2030 based on the data available at the time. The analyses presented in SWSI I were based chiefly on a selected group of reports describing passive water savings[9] (i.e., Florida, California, Oregon, Alabama, and North Carolina) and potential savings from water conserving homes described in two reports (Western Resource Advocates, 2003; Gleick, et. al., 2003) using the assumption that 100% market penetration of selected measures and programs would occur. SWSI I also utilized the information contained in the Water Conservation Plans on file with the CWCB prior to 2006; however, these older water conservation plans generally did not contain information regarding water use or the expected future water savings associated with implementation of the selected water conservation programs.

Mindful of the data challenges, SWSI I estimated that water providers and customers statewide would reduce 2000 per capita water demand by about 12% by 2030, which results in a estimated savings of about 231,700 acre-feet of water. SWSI I indicated that the **passive** savings associated with implementation of the 1992 National Energy Policy Act would be 6% statewide, and that **active** water conservation[10] would contribute an additional 6% (or about 115,850 acre-feet) to the overall water demand reduction predicted for 2030. Given the impact of the drought discussed above, it is unclear if this 12% is in addition to the 22% demand reduction observed in the state in 2003, or if the drought shadow would persist through 2030 impacting the estimated acre-feet of savings[11].

The covered entities with approved Water Conservation Plans filed with the CWCB since 2006 have identified their active conservation goals. The goals stated by the covered entities were generally defined based on a specific planning period selected by each utility – noting that the planning periods varied from 5 to 30 years. A metric of water conservation savings was estimated for each utility using information contained within the Plans on file for the ten-year period from 2008 to 2017. Since the Plans do not consistently report expected future water savings in acre-feet, estimates were developed using stated goals, expected water conservation savings and/or forecasted future water use with and without water conservation. A summary of the active water conservation saving estimates for each Plan are presented in Appendix B.

Based on the analyses in Appendix B, an average water demand reduction of 11.3% over 10 years (or 1.13% per year) was expected for the 30 covered entities. The total cumulative active water savings for the 30 covered entities was therefore expected to be about 68,500 acre-feet by the end of 2017. Note that about 70% of the ten-year water savings are associated with the Denver Water and Colorado Springs Utilities programs.

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[9] 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)).

[10] See footnote 9.

[11] A further discussion of the conservation savings presented in SWSI I is provided in the next section of this report.

Extrapolating demand reductions from these proposed water savings to other water utilities and districts or past 2017 can be problematic for the following reasons:

- Proposed water savings may not be realized by the implementing entity;
- Water conservation measures and programs that will be cost effective and implementable for large utilities, may or may not be applicable to smaller utilities;
- The value and applicability of water conservation measures and programs is dependent to some extent on the nature of a water providers water rights portfolio, which may change depending on water availability;
- Expected future infrastructure improvements may impact the value of water conservation to a specific water provider;
- Future opportunities for water conservation savings may not be available once a selected measure and/or program has(ve) been implemented and permanent water savings related to these actions are realized (e.g., indoor fixture replacement); and
- Future water conservation savings will likely require the design and implementation of a new suite of measures and programs as market penetration rates change and the market matures.

It is clear that additional active water conservation savings will occur after 2017 in response to the collective efforts of Colorado's water utilities; however, predicting these future active savings is beyond the scope of this project.

To better estimate post-2017 active savings, the CWCB will need to better understand achievements and successes of those measures and programs implemented over the next 5 to 7 years. The data that will be reported to the CWCB through Water Conservation Plan updates and implementation reports (associated with Water Efficiency Grant supported projects) will help to characterize costs and water saved for measures and programs currently being implemented by water utilities across the state. Specific data that the CWCB will need to estimate current, as well as future active savings, will include, but not be limited to, type and timing of implemented measures and programs, water deliveries per customer, customer type and number of connections over time versus the specific timing of implemented measures and programs.

Passive demand reductions may also differ from those estimated in SWSI I. For example, the state or federal government may implement ordinances or regulations designing water efficiency requirements in new and/or existing construction. New ordinances and/or regulations could substantially impact the potential for future water demand reduction independent of the efforts conducted by water utilities. Expected future passive water savings are further discussed in Section 5 of this report.

Section 4
Levels of Active Conservation

One of the key goals of this project was to review and update the "Levels of M&I Active Conservation" described in Appendix E of the SWSI I Report (CDM, 2004). As defined in SWSI I, M&I "active" conservation savings are water savings that result from utility-sponsored water conservation measures and programs. Such measures and programs may include education programs, incentives and rebates, fixture replacement programs, audits and conservation rates and surcharges.

A review of the SWSI I Levels of Conservation[12] was conducted using the following approach.

- Review the specific assumptions and data utilized during the SWSI I study to identify and develop the levels of conservation;
- Identify areas of potential improvement to the SWSI levels;
- Propose a new framework for characterizing meaningful water conservation at the water utility level; and
- Utilize the proposed framework to compare and contrast representative Water Conservation Plan programs proposed since 2006 by local water providers.

Overview of the SWSI I Active Water Conservation Levels

SWSI I was conducted when data collection and reporting of water conservation activities in Colorado had not yet matured since the July 2006 deadline for new water conservation plan submittals to the CWCB had not yet occurred. Additionally, SWSI I developed its analysis of potential water conservation savings at the county level; and admittedly more data was available at the provider-level than at the county-level. Therefore, the assessment performed in SWSI at the county-level was self-proclaimed to be "subjective" (CDM, 2004).

Each county was assigned with one of five levels of water conservation, based on the SWSI I subjective analyses and the limited information contained in those Water Conservation Plans on file with the CWCB at the time (i.e., 2004). The levels were assigned based on assumptions made regarding which measures and programs had been implemented within each county in 2000. For example, Level I conservation related to only passive conservation savings where presumably no active water conservation programs were being conducted by water utilities. Since many counties in Colorado do not contain covered entities, it was reasonable to assume that no active water conservation was occurring in those counties with a population of 8,000 or less.

[12] SWSI I Report included five levels of conservation; however, the first level of conservation, Level I, related solely to passive water conservation savings and not to water provider sponsored measures and programs. As defined in SWSI, passive savings defined for water conservation Level I chiefly relate to the water demand reductions associated with the impact of the 1992 National Energy Policy Act. The other four levels of conservation – II through V – relate to active water conservation.

Level II water conservation was assumed to occur in counties with metering programs for all water customers and leak detection programs in place for all water utilities, in addition to the passive savings expected due to the national plumbing code. Level III water conservation included passive savings, implementation of metering for all customers and leak detection programs plus all nine water conservation measures and programs listed in Colorado Revised Statute (CRS) 37-60-126. Level IV water conservation included all Level III programs plus an aggressive combination of ordinances, water pricing, and additional rebates and incentive programs. Level V water conservation included all of Level IV plus the elimination of all leaks, use of high-water using landscapes, and the replacement of all non-high efficiency water using fixtures and appliances statewide.

Water demand reductions for each of these levels were not readily available from the literature or the water conservation plans on file with the CWCB in 2003. To fill this knowledge gap, SWSI I utilized two 2003 studies to characterize maximum potential water demand reductions (associated with the Level V) as follows:

> Smart Water: A Comparative Study of Urban Water Use Efficiency across the Southwest, 2003, Western Resource Advocates (Western Resource Advocates, 2003) – which estimates hypothetical single-family sector water savings for six cities if they could achieve levels of water use efficiency in a model community.
>
> Waste Not, Want Not: The Potential for Urban Water Conservation in California, 2003, Pacific Institute (Gleick, et. al., 2003) – which estimates a statewide reduction in urban water demand given complete implementation of current technology and a reduction of leakage.

Based on these studies, SWSI I estimated maximum water demand reductions to be 35 percent by 2030[13] (from a baseline date of 2000). To achieve these reductions, SWSI I assumed that that there would be 100 percent participation by residential customers to create permanent water use reductions through improved indoor water use (via more efficiency toilets, showerheads, faucets, dishwashers, clothes washers, and leak reduction). Assumptions for water demand reductions at the other three levels of water conservation (II through IV) were "generalized estimates" based on the potential maximum reduction (CDM, 2004).

Various issues arise out of the SWSI I approach to estimating the potential for future water conservation savings in Colorado. To begin with, SWSI I appears to make assumptions that indoor residential water savings would translate to consistent demand reductions in all customer water use classes. However, SWSI I did not appear to include a quantitative assessment of demand reductions associated with any of the following viable use reductions:

- Outdoor residential
- Indoor commercial, industrial or institutional
- Outdoor commercial, industrial or institutional
- Impacts of the 2002 drought

[13] The Smart Water Report by Western Resource Advocates indicates that a "conserving" household could reduce indoor per capita water use from 69.3 to 45 gpcd (a 35% reduction). It also indicates that western cities could conserve from 28 to 67% of residential water use by reducing water demand to the equivalent of a Smart Development in Arizona, which includes both indoor and outdoor efficiencies.

- Increased population density

In addition, SWSI I appears to base its estimate of Level V water savings on the assumption that 100 % of all residential customers would implement improved leak repair and the complete replacement of clothes washers, faucets, showerheads, dishwashers, and toilets by 2030. Consequently, the maximum water savings quantified in SWSI I includes the implementation of measures and programs that are not under the control of Colorado's water providers.

Another concern with the SWSI I approach is that it assumed water providers had substantially more water conservation efforts in place in 2000 than they actually had. As discussed previously, the majority of water providers lacked meaningful water conservation programs in 2000, due in part to the lack of maturity of water conservation planning and implementation at the time. As Western Resource Advocates stated in their 2003 report:

> *"Water users [providers] are just beginning to learn how to conserve water. How best to motivate them is not yet broadly understood. In many respects, in our region we are at the same stage in water efficiency as we were with energy efficiency two decades ago. Water efficiency is a new frontier for many water providers."*

The assumption that water providers were conducting water conservation programs that included all the nine water conservation measures and programs listed in CRS 37-60-126 in 2000, lead SWSI I to substantially over estimate future water use reductions created by water provider sponsored programs in nearly every county in Colorado that was characterized as having a Level II or III conservation program.

Overall, SWSI I did not have consistent and reliable data upon which it could develop accurate estimates of county-level water conservation savings. It is therefore appropriate and timely for the SWSI Level Analyses and related OWCDP projects to be conducted such that the SWSI I estimates of future water conservation savings can be revised and updated.

Developing an estimate for statewide water conservation savings today continues to be a challenge. However, work has been done by various organizations, including some of those entities with water conservation plans on file with the CWCB, the Colorado WaterWise, and other contributing non-profits and consulting organizations that have substantially improved the collective understanding of:

- What constitutes meaningful water conservation for water providers; and
- What types of measures and programs are most effective for water utilities to implement to create permanent water demand reductions?

The results of some of the research and studies were used to develop a new framework that is presented below.

Proposed New Water Conservation Framework

Key improvements to the SWSI l conservation levels focus on water provider operations and infrastructure efficiencies. For this reason, the new framework begins by defining foundational measures and programs that

all water utilities should have in place before embarking on more sophisticated water conservation efforts. These foundational measures and programs involve metering and billing (including water rate structures), leak detection, and water use tracking. Once these measures and programs are in place, then a water utility can begin to support demand reductions based on business decisions that improve their own and their customer's water use efficiency.

The newly proposed framework differentiates education from improving ongoing water use (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 potential to penetrate 100 percent of the market; however, education by itself has not been shown to permanently reduce customer water demand.

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

- Foundational
- Ongoing Water Use Programs
- Ordinances and Regulation
- Education

The components of each of these four categories are described in the following sub-sections.

Foundational Measures and Programs

The foundational measures and programs are those that all water utilities and districts should have in place to support their operations by maintaining positive cash flow, limiting system wide leaks, and tracking those data that will allow the organization to understand and predict trends in customer water use[14]. Having these foundational measures and programs in-place, and integrated with other foundational processes, water utilities will be in position to implement some of the most basic and cost-effective water conservation programs. Without these foundational measures and programs in place, water utilities may struggle to make business decisions regarding which water conservation measures and programs best suit their specific situation. Water conservation is after all focused on identifying and evaluating those methods that will reduce costs or improve cash flow for water utilities related to:

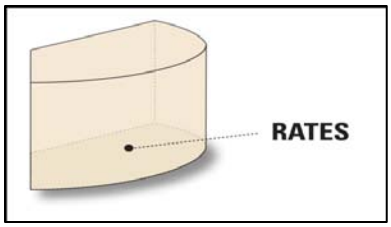
- Reducing utility water use and waste;

[14] One important reason to track customer water use relates to pricing water at a rate or rates that cover utility costs to obtain, transmit, treat, distribute, track and bill for its water uses. It is important for each water utility to be aware of changes to customer water use behaviors given the impact of changing water use on sales revenue. The need to follow and incorporate customer behaviors into water rates and structures points to the value of two-way educational programs and customer water audits described later in this section.

- Postponing and/or reducing capital projects;
- Reducing replacement water needs; and
- Pricing water at rates consistent with the fiscal needs and obligations of the utility, as dictated by customer use, the cost of securing new water supplies, etc.

It is also expected that through the implementation of appropriate water conservation programs, water utilities will improve the reliably of their water supply systems. Achieving these overall goals starts with better operational programs that are under control of the utility.

Rates



Each utility has a water billing system that effects the collection of revenue from its customers. Accurate billing starts with the installation of meters that collect water use data. Water utilities should be moving toward metering that allows for the accurate monthly billing of water deliveries to each customer. Metering should also be conducted to differentiate large indoor and outdoor water use for individual customers. Called sub-metering; large commercial, industrial and institutional users that have both indoor and outdoor water uses should have taps that are specific to each use (to help the utility better understand the water use of these types of customers, which in turn helps utilities identify potential measures and programs that would benefit them and their customers). Utilities should also maintain meter testing and replacement programs such that the impact of under reading meters, which tend to occur more often on large taps, are minimized. Ultimately, water utilities will be reliant on metered water use to track and characterize customer water use and identify the impact(s) of any specific water conservation measure and program that is implemented. New technologies in meter reading using automated meter reading (AMR) and advanced metering infrastructure (AMI) will becoming increasingly valuable to utilities as they and their customers become more water efficient (Lovely, 2010).

Utilities should also develop monthly meter reading programs such that customers can be billed on a monthly basis, which in turn reduces the period of time that utilities need to carry debt related to fixed and variable costs. Beyond improving cash flow, monthly billing helps the water utility and its customers to identify customer side leaks and inappropriate water use, especially during the summer irrigation season. Finally, monthly data helps the water utility better understand customer demands.

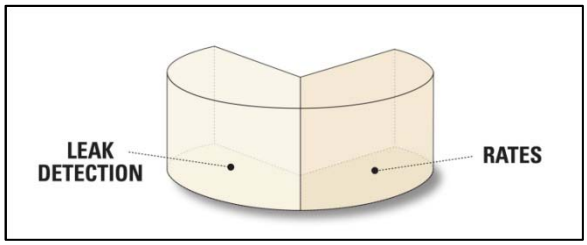
Water conservation pricing has been used effectively by water utilities to improve customer water use efficiency. For this reason, utilities should consider developing inclining block rate structures for water billing to discourage excessive customer water use; however, utilities need to take care to design block rate structures that maintain an average price curve that has a positive slope resulting in customers getting charged more money per gallon as they use more water[15]. Water rate increases can also reduce customer

[15] Some utilities currently have inclining block rate structures that do not encourage water savings due to blocks either being too large or not effectively tied to excessive water use (Western Resource Advocates, 2007). In addition, some water utility bills only include a small percentage for water use (bills can include costs for new infrastructure, debt service and costs for securing new water supplies). For some of these utilities, inclining block rates can be inconsequential in comparison to other water bill costs – such that inclining block rates do not influence customer water use behaviors.

water use (Howe and Goemans, 1998; Howe and Goemans, 2007); however, the utility will need to have customer and customer class data to support any future water rate planning and changes. Water budgets unique for each customer are also effective in promoting customer water demand reductions.

Finally, water customers have begun to demonstrate an interest in real time water use data that can be accessed in a home or business (Lovely, 2010). Real time data can help homeowners and businesses better manage their water use as it occurs. Water utilities that institute AMR and AMI can create a more sophisticated customer base that will support the implementation of more advanced water conservation measures and programs while considering the business needs of the utility.

Leak Detection



Any compromise in a utility's water transmission and delivery system reduces its effectiveness and impacts the utility's overall profitability. An effective leak detection and repair program is therefore integral to a utility's overall water resource management program. Unfortunately, the average water utility nationally loses more than 15% of its transmitted and distributed water (Beecher, 2002), with some utilities and districts losing as much as 30% of their water after treatment. In Colorado, non-revenue utility water loses have been reported to average about 9-10% by Denver Water in their IRP; however some small utilities and water companies have reported losses as high as 50%. These losses are a combination of apparent and real losses (termed non-revenue water). Some of the apparent losses that occur relate to water that is delivered but not billed to customers due to inaccurate meters. Other apparent loses include treated water that is used without tracking or billing (e.g., backwash water, flushing water, etc.). Real system losses occur due to leaking pipes, treatment plants and appurtenances.

Older systems tend to leak as pipes and junctions age. Newer systems may leak, or may appear to leak due to meters not being accurate enough to balance water discharged from the treatment plant with water delivered to customers. In some cases, utilities do not collect adequate data to track the difference between treated versus delivered water (which requires the tracking of flushing flows from fire hydrants, backwash flows, emergency water use, etc.). Water utilities may also be losing water from their transmission and distribution system that they may otherwise be able to sell. Either way losses due to leaks directly impact the bottom line of any water utility.

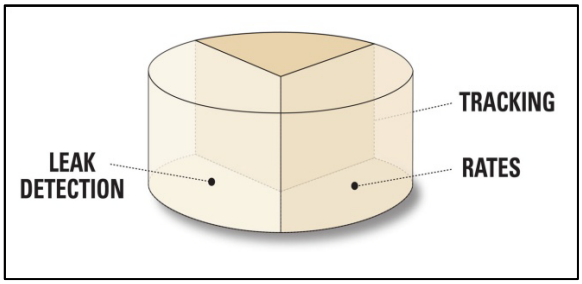
The Water Conservation Plans on file with the CWCB inconsistently reported non-revenue water – some reported these losses, others did not. Without an accurate characterization of non-revenue water, utilities may not have an accurate picture of losses within their system. For this reason, utilities must maintain a rigorous leak detection program that proactively identifies system transmission and distribution inefficiencies. Of course, all utilities need to have strong leak repair programs; however, a leak repair program does not replace the need for a strong leak detection program.

The most effective leak detection programs couple accurate and regular metering with rigorous meter testing and replacement programs. System wide leak detection programs based on zonal testing, ultrasonic testing, and/or other methods are also helpful. For example, the City of Durango is conducting a zonal metering

program that isolates flows and water deliveries into and out of older sections of town to identify leaks if they occur within selected sections of its water distribution system. The Town of Castle Rock regularly utilizes ultrasonic testing of its water distribution piping to identify and proactively repair leaks before they become significant. These tools are available to all utilities.

Tracking

Water utilities should also develop rigorous tracking of customer water use data since it is these data that will help the water provider best understand its customers and help the utility focus its resources on effective and meaningful water conservation, as well as other business operations. Specific data that water utilities should be tracking, at a minimum (Dziegielewski, 2010), include:



- Total annual and monthly production
- Total annual and monthly retail sales
- Monthly tabulation of number of connections and/or customer accounts
- Annual and monthly water use by customer and customer type (e.g., residential, non-residential)
- Monthly non-revenue water use by utility (e.g., filter backwash water, flushing flows, water deliveries to nonpaying entities, construction water, known meter inaccuracies, etc.)

In addition, water utilities should consider collecting data to differentiate customer types (e.g., multifamily versus single family, industrial versus institutional, etc.) and indoor versus outdoor water use (through sub-metering). Water providers should also compile monthly listings of what and how many customers are paying for water under each of the tiers of the utility's water rate structure. These data will help the water utility develop targeted water conservation measures and programs for high water use customers.

Note that the calculation of both system-wide and sector-specific water use metrics are best developed using available water production and sales records coupled with the number of connections or customer accounts, which are precisely recorded by water providers. Other measures of system size such as population served, number of housing units, or the number of employees are typically not precisely defined and at best are updated annually. For this reason, the commonly used metric of annual production per capita, or GPCD, should not be used as a benchmark for utility decision making (Dziegielewski, 2010).[16]

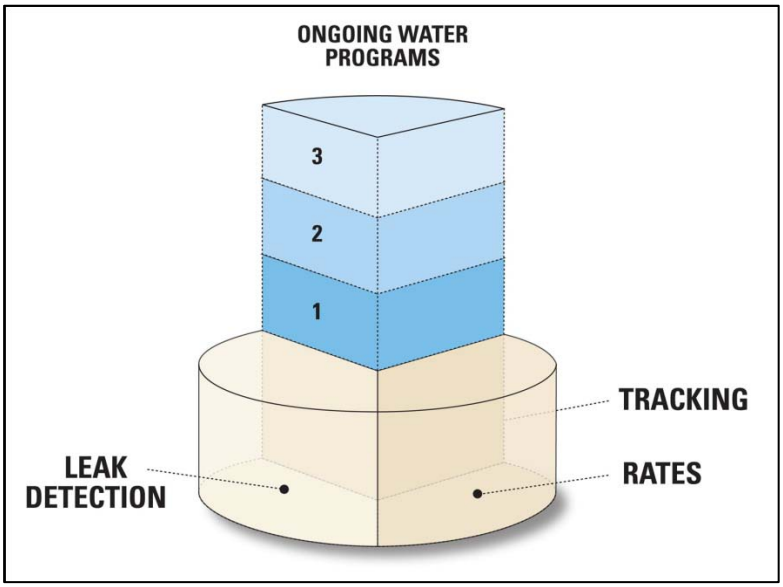
Ongoing Water Use Measures and Programs

Management of ongoing water uses are one of the most important areas that a water utility can influence. Of course, the water utility receives its revenue from this group, so it must determine what its goals are

[16] Author's note- GPCD is used in this project, in part due to the prevalent use of population and water use data in SWSI and other planning efforts. The AWWA report simply has indicated that for individual utilities to best understand their customer's water use, and understand the impact of their water conservation efforts on demand reduction, it should track metrics based on data that is regularly collected and can be precisely measure by each utility.

regarding reducing customer water demand before it commits any resources. Most water providers will find that there are benefits in reducing customer demands as previously discussed in this report (e.g., reduced future water supply needs, improved system reliability, delaying capital projects). However, it is recommended that water providers consider the following hierarchy when developing a water conservation program.

First, the utility should consider finding ways to improve its own water use (this is Level 1). For a municipal utility this includes improving water use efficiency in administration buildings, parks and recreation centers, and other municipal facilities. For special districts, this includes improving water use efficiency in those facilities it controls (e.g., administration building, maintenance shops, golf course, etc.). Implementing these types of water efficiency improvements help to lead the community by example, and create additional treated (and in some cases raw) water supply that can be sold to customers. In addition, most municipalities and special districts are large water users – including both indoor and outdoor uses –where water use efficiencies can be improved through high-efficiency fixtures, appliances and efficient outdoor management strategies



Second, water providers should focus on collecting information to characterize the water use of their largest customers (Level 2). Data collection can best be performed by reviewing water use of individual customers and customer types; and developing audit programs specific to the uses and needs of these customers. Onsite audits can then be used to understand on-the-ground uses and behaviors, spurring analyses that can identify potential water efficiency upgrades that could reduce water and energy related operating costs. Not only can an effort to partner with an utility's large customers create a positive, collaborative business relationship, but improved water use efficiency for the utility's largest water users can reap some of the largest demand reductions – saving the customer operational costs and the utility "real water" in a predictable and cost effective manner.

Third, once data has been collected regarding individual customer and customer type water use, water providers can establish business analyses that support committing resources to customer rebate and incentive programs, as well as different types of technical support for targeted groups and populations (Level 3). It is difficult for utilities to accurately predict the cost and benefit of rebate and incentive programs without customer specific data regarding customer water use, efficiency of existing fixtures and appliances, and customer water use behaviors.

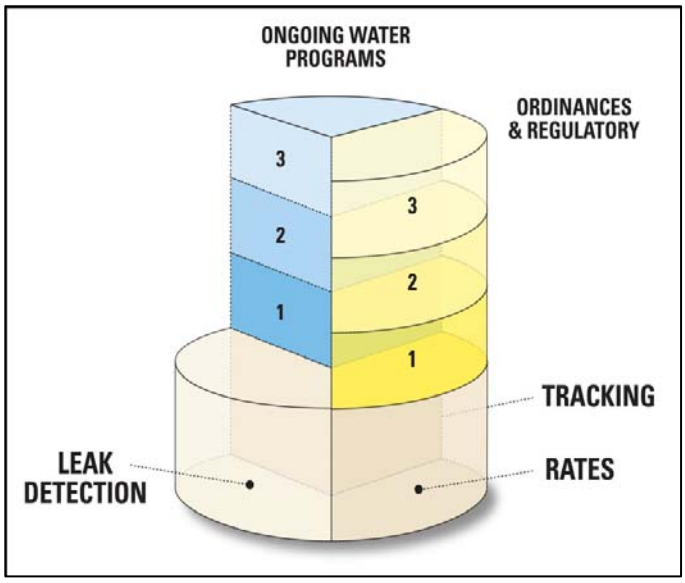
The three hierarchical levels for ongoing water use programs are therefore:

- Level 1 – Water demand reductions by the water utility at its own facilities.
- Level 2 – Collect information characterizing customer water use – focusing on the utility's largest water users.
- Level 3 – Commit resources to assist customers in their water demand management.

Ordinances and Regulations

Ordinances and regulations have the advantage of potentially applying to a large percentage, if not all, of a water provider's customers, depending on the nature and reach of any specific set of rules. For example, new construction building requirements can be created to apply to 100% of all new construction dictating fixture and appliance efficiency, as well as outdoor watering (or landscape material) requirements. There are distinct challenges that some water providers face in creating and establishing ordinances and regulations, due to jurisdictional and other limitations. However, all water providers have the ability to establish and/or influence the development of local ordinances and regulations that would help to improve water use efficiency in their individual service area – albeit that some water companies, special districts and water departments only have a small amount of influence in some circumstances.

For example, most water providers in Colorado have water waste ordinances that vary from location to location. The intent of any effective water waste ordinance (RE: non-volunteer) is to give the water utility the right to fine inappropriate or wasteful watering practices – such as time of day watering, watering pavement, etc. Although water waste ordinances are intended to reduce wasteful water practices by a utility's customers, the effectiveness of this or any other local ordinance or regulation depends on the amount of enforcement that occurs – which in turn is dependent on the amount of resources committed to the effort. For many water providers in Colorado, water waste programs are not adequately funded to consistently identify and engage customers that have wasteful practices; therefore, the effectiveness of these kinds of practices can be spotty. Nonetheless, ordinances and regulations can be very effective if properly crafted and funded.

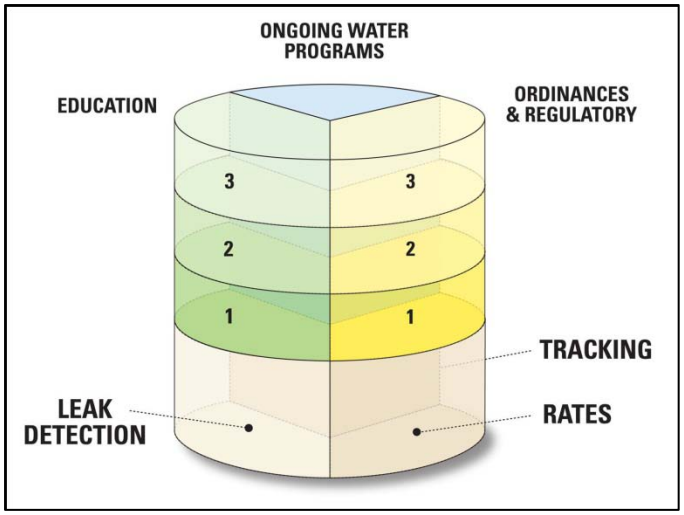


As with ongoing water use programs, there is a logical hierarchy associated with developing ordinances and regulations that pertain to water. To begin with, water providers should focus their efforts on those ordinances and/or regulations that they can actually create and enforce. For some water providers, they can only develop ordinances to control ongoing water waste. For others, they may be able to create ordinances and regulations in all three of the hierarchical levels.

The three hierarchical levels are:

- Level 1 – Water waste ordinances, cooling tower single use prohibitions
- Level 2 – New construction controls related to obtaining water taps (e.g., landscaper certification requirements, soil amendment requirements, irrigated turf restrictions, indoor fixture and appliance requirements, etc.)
- Level 3 – Existing construction controls related to point of sales compliance (through bank loan programs)

Educational Measures and Programs



How educational measures and programs support meaningful water conservation is highly dependent on the suite of measures and programs that a water provider chooses to implement and track. As indicated earlier, meaningful water conservation cannot be accomplished through simple educational efforts alone. For example, most one-way education does not influence customer water use behavior without the implementation of other measures and programs (see page 13). For example bill-stuffers or mass mailings of CDs on water conservation practices will not create measurable water demand reductions. However, if a utility is creating a targeted customer audit and rebate program, one-way educational efforts can help to publicize the effort and create customer engagement and interest. In addition, comprehensive marketing and advertizing campaigns (which are one-way communication efforts) can be highly effective in influencing customer water use behavior when conducted in conjunction with more engaging educational programs (e.g., focus groups), as well as comprehensive water conservation programs. For these reasons, educational programs can be complicated to plan and implement, and can require a substantial investment of resources when correctly conducted.

For purposes of this framework, one-way education is Level 1, one-way education with some feedback mechanisms is Level 2 and educational programs with two-way communications are Level 3. Examples of educational measures and programs for each level are provided below:

- Level 1 – bill stuffers, mass mailings, web pages, Xeriscape demonstration gardens
- Level 2 – water fairs, interactive websites, K-12 teacher and classroom education programs
- Level 3 – focus groups, customer surveys, citizen advisory boards

Consistent messaging is vital to any educational program that a water provider funds. Consistent messaging - one that is authentic and guided by the principles that drive and shape the utility - represents to the community that water conservation and water use efficiency is important and respected. This kind of messaging can be very powerful and create substantial impact. However, if the community observes inefficient watering behaviors in the public space (i.e. municipal or utility properties), most often associated with poor or wasteful irrigation practices, then any messaging from the utility may not be taken seriously.

Therefore, whenever a utility decides to invest in educational measures and programs, it is recommended that it have established foundational programs and rudimentary water conservation practices itself to lead by example; otherwise, the resources expended may not produce the desired outcomes, negating the benefit of the investment.

Discussion

The new framework presented herein helps focus and, more importantly, prioritize water conservation measures and programs that will support the efforts of Colorado's water providers. Of course, each provider will have to craft programs that best suit its individual customer base and financial situation. However, the hierarchy integral to each of the four categories of measures and programs is designed to help individual utilities collect and leverage those data that will support utility operations and decision-making.

Currently, Plans on file with the state typically lack some of the foundational measures and programs, and in some cases have proposed to implement ongoing water use or educational efforts without fully characterizing their customer base or targeting their biggest water users. To illustrative this point, Appendix C presents a comparison of those measures and programs selected for implementation by a group of water utilities with Plans on file with the CWCB with the new framework. The Plans included in Appendix C were chosen to represent different service populations, customer types and geographies in the state.

Although the CWCB will approve water conservation plans that are not constructed in a manner that is consistent with the new framework, the CWCB will be able to use the new framework to make recommendations to planning entities that may help them be more cost effective and successful in their efforts to reduce future water demand and track changes in customer water use.

Section 5
Passive Water Savings

Passive savings, as defined in SWSI I, are those 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 and implement programs that produce these savings. (CDM, 2004). In practice, SWSI I estimated passive savings based chiefly upon the expected impact of the 1992 National Energy Policy Act. **For the analyses presented herein, the analysis of passive savings was expanded to include those water savings related to retrofitting homes and businesses with high efficiency fixtures and appliances that are subject to not only the 1992 Act, but to the other relevant regulations and market influences not actively funded or implemented by water utilities as presented later in this section. To this point, passive water savings are calculated to occur as a result of retrofitting housing stock and businesses that exist prior to 2016** (this date is explained further in the following text)**.**

Passive savings could also occur as a result of local, state or federal regulations or requirements not currently "on the books"; however, no attempt was made to predict the effect of potential regulations or requirements on future water use demand given the amount of speculation necessary to conduct such analyses. Additional discussions of what is and is not considered passive savings for purpose of the analyses presented herein are presented below.

Customer Behavioral Changes

Customer behavioral changes are also excluded from the calculation of potential passive savings. There are a number of reasons for this. First and foremost, there is limited data quantifying the nature and permanency of customer behavior change. For example, Colorado witnessed substantial customer water use behavior change in response to the 2002 drought, which was in fact a response to enforced watering restrictions, mass media messaging, and other drought response measures. As a result of the drought and all the lifestyle change implications that accompanied it, water providers in Colorado experienced on average more than a 20% drop in per capita water use. What water providers do not know is when, if ever, this observed drop in customer water use will rebound to pre-drought levels.

Second, although many entities in Colorado believe that a full rebound will never occur, as time passes and new citizens move into the region, our collective memory of the drought and its related challenges will likely fade. In addition, the penalties for excessive water use, which are stiffer now than at any time before the drought, embodied by more aggressive pricing of water and the enforcement of water waste ordinances, do not impact the behavior of all residents and businesses. In fact, previous studies indicate that wealthier individuals have more access to water and therefore consume more water (Corral-Verdugo, et. al., 2003). They may not feel the need to conserve because what they do not have, they can buy. Ilanit, et.al. (2006) suggest that it may also be true that the lower-income individuals know that other groups have virtually unlimited access to water and therefore they do not feel the need to conserve because their water use is

already rationed[17]. It is a classic tragedy of the commons dilemma (Hardin, 1968) because there is no immediate or long-term perceived pay off for conserving by either party. Because of these points, assuming that permanent savings will occur as a result of all of the drought-associated water demand reductions is not necessarily reliable.

The estimation of passive water savings is based on permanent savings. Therefore, any current behavioral changes that have been observed as a result of the 2002 drought were not included in the calculation. This is in part due to not having data to suggest the permanency of the change. It is also due to the fact that Colorado's largest water providers are implementing active water conservation efforts to prolong the behavior changes that occurred as a result of the drought (Denver Water, 2007, Colorado Springs Utilities, 2007). Behavioral changes are considered to be either not permanent or a component of active water conservation conducted by water utilities; and therefore, are not included in estimates of future passive savings.

Changes in Population Density

Another factor that will undoubtedly impact future water demand in Colorado will be the increased density of new construction as urban infill development continues. Increased density of housing associated with infill construction will reduce outdoor water use as development go "up" rather than "out." Given that outdoor water use is over 50% of current M&I demand, changes in housing density will decrease per capita water use as outdoor demand decreases.

Water utilities do not control future construction trends such that changes in housing density are not currently considered to be a result of active water conservation programs. Reductions in per capita water use associated with changes in density are not considered passive savings either, under the definitions provided herein. Therefore, per capita water demand reductions associated with increased housing density are considered to fall into a fourth category of future water savings – one which is not drought related, nor passive or active.

Customer Physical Changes

Passive water savings are directly linked to the replacement of older, inefficient water using fixtures and appliances with high efficiency fixtures and appliances. There are a number of key legislative acts that have or will influence the rate and type of fixtures and appliances that will be replaced. These include the following:

> **1992 – National Energy Policy Act** - this Federal act required uniform water efficiency standards on nearly all toilets, urinals, showerheads, and faucets manufactured after January 1994; and included efficiency standards for toilets used in commercial installations by 1997.

[17] Rationing is used in this article by Ilanit, et.al. as a means to indicate that low income water customers can not afford as much water as high income water customers, which is considered to be a form of rationing. This reference to rationing is not related to outdoor watering restrictions or government imposed restrictions.

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 (ECPA) 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[18].

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).

The specific impacts of these acts on Colorado's urban water demand have been mixed. For example, no appreciable water demand reductions were seen in association with the 1992 National Energy Policy Act, even though many Colorado water providers pointed to this piece of legislation as a firm part of their water conservation programs, helping reduce urban water demand in customer's homes and businesses. The lack of observed water savings from the 1992 Act is due to technology challenges before 2002, and that water conservation savings associated with the 1992 Act were small enough to not necessarily be measurable versus other water demand impacts. For example, the technology of low flow toilets produced before 2002 did not necessarily reduce flushing flows, since prior to that time toilet performance which was previously thought to be homogeneous showed a wide variation.

> "With utility funding, the National Association of Home Builders (NAHB) Research Center put 49 popular toilets through a battery of tests and reported in 2002 that nearly three-quarters of them performed unsatisfactorily. In October 2002, Consumer Reports published an article on toilet performance that used very different testing methods and produced strikingly different results. Consumers and builders were left frustrated and without a place to turn for toilet performance information they could trust.

[18] 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.

> In response, more than a dozen municipal water utilities in the United States and Canada—including agencies that were actively promoting water conservation—funded projects to develop a comprehensive testing protocol that would accurately measure toilet flush was the Maximum Performance (MaP) testing. MaP measures how much mass of a standardized testing media (cultured soy encased in latex sleeves) a toilet will flush successfully in two out of three tries" (Wilson, 2006).

The Maximum Performance testing program provided an objective standard by which to compare toilet flush performance thus leveling the toilet industry. Along with the MaP testing, EPA's WaterSense program (launched in June 2006) has substantially improved toilet reliability, and therefore, efficiency of high-efficiency toilets. However, water savings associated with the 1992 Federal act were difficult to ascertain prior to this time.

In addition, new construction has been found to utilize about the same amount of water as older homes (Mayer, 2010). This is presumably due to the fact that while indoor water use in toilets and other appliances has been reduced, outdoor water use has increased in association with the installation of automated irrigation systems (versus older homes without automated systems). Although more data is needed to better clarify residential and commercial "end use", analyses conducted have not verified the savings expected at the time the California 2007 legislation was enacted.

In fact, the legislation in California has arguably had a greater impact on Colorado's urban water use than the 1992 Federal Act. This is primarily due to the size and power of California's economy. Creating and satisfying demand in California dominates the manner in which manufacturers and suppliers operate in the western US. Thus, California's actions have dominated the clothes washer and dishwasher markets in recent years, in combination with actions by the California Energy Commission and the US EPA (through their Energy Star and WaterSense programs). It is becoming increasingly difficult for consumers in Colorado to purchase clothes washers that are not substantially more water efficient than those produced before 2005. Commercially available top loaders are 24% more water efficient and front loader are 40% more water efficient than their predecessors. Similarly, dishwashers have become 25% more water efficient when compared to those available prior to 2005.

No other type of indoor or outdoor water use was included in the passive saving estimates since other domestic and commercial water uses are subject to potential quality of life issues. For example, low flow showerheads could save considerable water, not to mention energy; however, customers have the propensity to not select high efficiency showerheads for reasons that are not entirely clear. Faucet aerators could easily be downsized to 0.5 gallon per minute (gpm) flow rates in bathrooms. However, many newer faucet and lavatory configurations require special hardware configurations for the aerator to attach to the spigot which do not lend themselves to the 0.5 gpm option. Hot water on demand may or may not reduce water use in a home or business depending on the configuration of the system and its use.

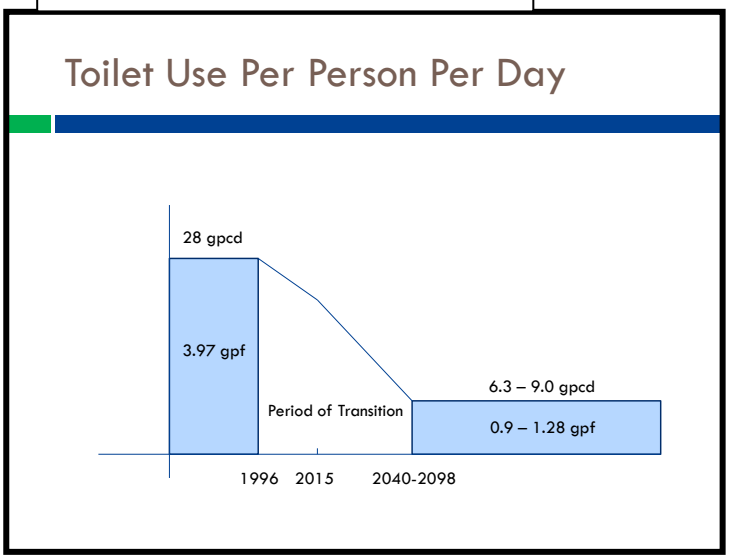
As previously indicated, outdoor water use has increased with new construction. For those entities willing to remove current landscape in favor of native plantings and Xeriscape material, water use reductions can be substantial for existing construction. However, there are a substantial number of home and business owners that are installing automated irrigation systems to maintain turf each year. For this reason, there does not appear to be adequate data to support passive calculations that extend beyond toilets, clothes washing machines and dishwashers.

Passive Savings Calculations

Based on these observations, future water demand reductions associated with passive savings were calculated for each year beginning in 1996, which is when benchmark toilet flushing volume data from Denver was available. The calculations used to estimate future demand reductions were developed for reasonable minimum and maximum scenarios based on the assumptions related to the retrofit of existing housing and commercial construction with high-efficiency toilets, clothes washers and dishwashers as indicated below. The calculations based on these assumptions were used to estimate a range of future passive water savings for each year starting in 2000 and continuing until 2050. Limitations related to the use of these assumptions are discussed at the end of this section.

Toilets – Beginning in 1994, homes and businesses were required to replace older, inefficient toilets with 1.6 gallons per flush (gpf) toilets at the time that toilet replacement was needed (e.g., remodeling, replacement of broken equipment). The first Colorado specific data that was available to characterize average toilet use from this period was from 1996, which indicated that the average flushing volume per toilet in Denver was 3.96 gpf (Aquacraft, Inc., 2006). This average flush volume (which was in the range of other average flush volumes in the literature (SFPUC, 2004)) and the average number of flushes per person per day (which includes both residential (5.05) (Mayer, et. al., 1999) and commercial (2) uses (Vickers, 2001)) of seven was used to calculate the average per capita daily toilet water use in 1996[19]. Future year per capita demand reductions were calculated based on these data and the following assumptions:

Figure 4



- Range for toilet replacement rates - 1.2% (Google, 2010) (minimum) to 4% per year (Alliance for Water Efficiency, 2009) (maximum).
- For pre-1994 construction, toilet retrofits include 1.6 gpf toilets until 2015 at which point all toilets are replaced with 1.28 gpf toilets.
- For pre-2016 construction, all toilets including those replaced since 1996 will be replaced with 1.28 gpf toilets.
- Minimum passive savings are calculated using 1.28 gpf toilets, where as maximum passive savings are calculated using dual flush 1.28 gpf toilets (which average 0.9 gpf) (Caroma, 2009).

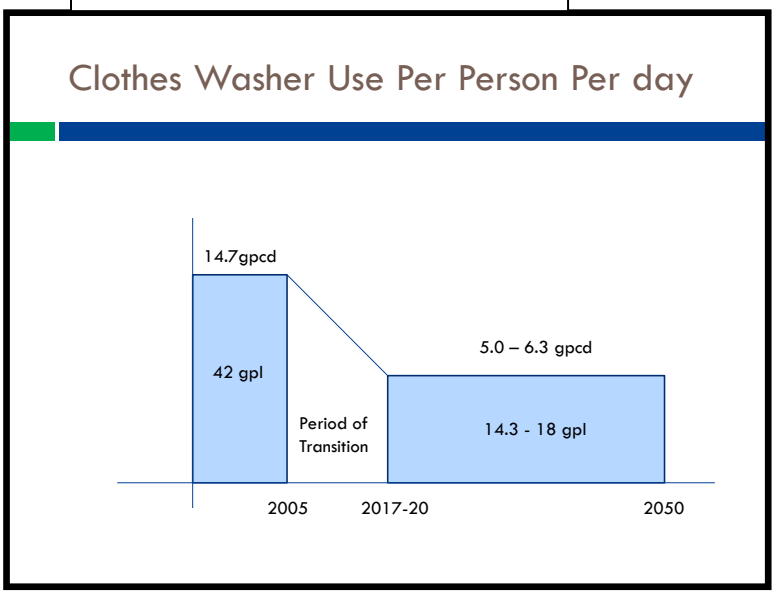
Clothes Washers – The typical top loading washing machine in service in homes and apartments in 2000 used approximately 40 to 45 gallons of water per load (Alliance for Water Efficiency, 2009). Today's high-efficiency

[19] Water savings from the period 1994 to 1996 are assumed to be included in the per capita toilet use data reported for 1996 by Aquacraft, Inc., 2006.

horizontal axis washing machines with a 3 cubic foot capacity can use as little as 12 gallons of water per load, with a typical range of between 15 and 30 gpl (Alliance for Water Efficiency, 2009). Future year per capita demand reductions were calculated based on these data and the following assumptions:

- The replacement rate for clothes washer was estimated to range from every 12 years (8.3% per year) (Alliance for Water Efficiency, 2009) to every 15 years (6.7% per year) (SFPUC, 2004).
- It was further assumed that 42 gallon per load (gpl) clothes washers would be replaced with a combination of HE horizontal axis washing machines and HE vertical axis machines. Project calculations used 14.3 gpl for maximum savings and 18 gpl for minimum savings based on the characteristics of EPA's Energy Star listed clothes washers (see Appendix D).
- Finally, it was assumed that the number of loads of wash per day per person would be 0.35 based on the likely range identified by the Chestnut (2004).

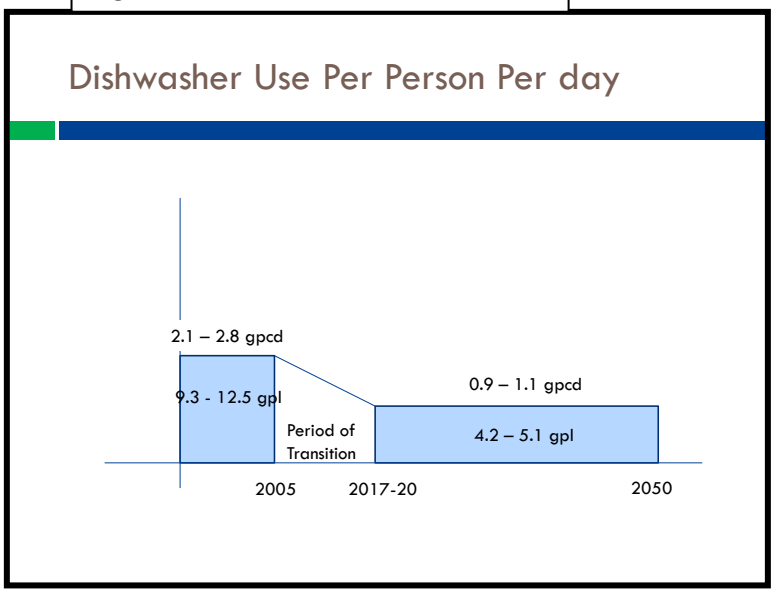
Figure 5



Dishwashers - In 2000, the average gallons of water used per load of dishes was about 6 to 10 (Soap and Detergent Organization, 2000), although the SFPUC estimated its customer's average dishwasher use to be 12.5 gpl in 2000. US EPA indicated that prior to 1994, dishwashers used on average 13 gpl or more, whereas new Energy Star dishwashers use less than 5 gpl (US Environmental Protection Agency and US Department of Energy, 2010). The typical number of loads washed per person per day was estimated to range between 0.1 and 0.3 (Mayer, et. al., 1999). Future year per capita demand reductions were calculated based on these data and the following assumptions:

- The replacement rate for dishwashers was estimated to range every 12 years (8.3% per year) (Alliance for Water Efficiency, 2009) to every 15 years (6.7% per year) (SFPUC, 2004).
- It was also assumed that 9.3 to 12.5 gallon per load (gpl) dishwashers would be replaced with EPA Energy Star dishwashers. Project calculations used 4.2

Figure 6



gpl for maximum savings and 5 gpl for minimum savings based on the characteristics of EPA's Energy Star listed dishwashers (see Appendix D).

- Finally, it was assumed that the number of loads of wash per day per person would be 0.225 based the likely range identified by the Chestnut (2004).

The passive saving calculations were made by calculating the adjustment to per capita water use for each fixture/appliance for each year in the planning period (i.e., 2000 to 2050) in accordance with the reduction that occurs as the market penetration rate shifts from inefficient to high efficiency fixtures and appliances. The market penetration shift occurs over the periods indicated in each of the figures shown previously. This calculation is represented by the equation below.

$$\Delta\ GPCD^{yr}_{fix/app} = \%\ Old\ GPCD^{yr}_{fix/app} * Old\ GPCD_{fix/app} + \%\ New\ GPCD^{yr}_{fix/app} * New\ GPCD_{fix/app}$$

$Old\ GPCD_{fix/app}$ = gallons per capita per day for use of inefficient fixture or appliance

$New\ GPCD_{fix/app}$ = gallons per capita per day for use of high-efficiency fixture or appliance

$\%\ Old\ GPCD^{yr}_{fix/app}$ = percent of inefficient fixtures or appliances remaining in use versus total number of fixtures or appliances in use for target population in target year (see Table 5)

$\%\ New\ GPCD^{yr}_{fix/app}$ = percent of high-efficiency fixtures or appliances in use versus total number of fixtures or appliances in use for target population in target year (see Table 5)

The change in per capita water use by county from the baseline demands of 2000 defined in SWSI I for any given year thereafter is the sum of the individual savings related to the replacement of toilets, clothes washing machines, and dishwashers. This sum is calculated for each year in the planning horizon for both the minimum and maximum savings scenarios.

The total water use for each county was then calculated for each year using the following equation:

$$WU^{yr}_{County} = (GPCD_{County} * POP^{yr}_{County}) - (\sum_{fix/app}(\Delta\ GPCD^{yr}_{fix/app} * POP^{fix/app}_{County}))$$

WU^{yr}_{County} = Total water use per county for each year[20] (gallons per day)

$GPCD_{County}$ = Gallons per capita per day for each county in the baseline year of 2000 (from SWSI I, see Appendix E)

POP^{yr}_{County} = Population of each county for each year (from SDO, 2010; CDM, 2004, 2010, see Appendix F)

$POP^{fix/app}_{County}$ = Population relevant to each type of retrofit for each county (see Table 5)

[20] Total Water Use for each county was calculated using this equation for those counties that are predicted to grow. For those counties that are not predicted to grow, or do not grow during any single year, the Total Water Use for that county was calculated as $(GPCD_{County} - \sum_{fix/app}(\Delta\ GPCD^{yr}_{fix/app})) * Pop^{yr}_{County}$. Counties with which did not have some growth in every year of the planning period included Baca, Bent, Cheyenne, Clear Creek, Conejos, Costilla, Jackson, Kiowa, Lincoln, Otero, Phillips, Prowers, Rio Blanco, Rio Grande, San Juan, Sedgewick, and Washington. All population in Broomfield County was treated as new growth.

Table 5 – Summary of Years Relevant to Fixture and Appliance Retrofits	
1.6 gpf Toilets	All pre-1994 construction (beginning the transition in 1996)[1]
1.28 gpf Toilets	All pre-2016 construction with 1.6 gpf or greater toilets
Clothes Washers	All pre-2006 construction
Dishwashers	All pre-2006 construction

[1] passive savings prior to 1996 were assumed to be included in the per capita toilet use reported in the literature for 1996 (Aquacraft, Inc., 2006).

Separate calculations were made using the minimum and maximum scenario values presented included in Table 6. **Note that the minimum and maximum passive savings scenarios were developed using only the "middle" population projects developed by CDM for 2050 as reported in Appendix F.**

Table 6 – Summary of Passive Saving Calculation Assumptions						
	Per Use[1]		Rate of Use (daily)		Replacement Rate	
	Min	Max	Min	Max	Min	Max
Toilets						
Average Pre-1996 Toilet	3.97 gpf	3.97 gpf	7	7	25 years	83 years
1.6 gpf Toilet	1.6 gpf	1.6 gpf	7	7	25 years	83 years
1.28 gpf Toilet	0.9 gpf	1.28 gpf	7	7	25 years	83 years
Clothes Washers						
Pre-2005	42 gpl	42 gpl	0.35	0.35	12 years	15 years
Post-2005	14.3 gpl	18 gpl	0.35	0.35	12 years	15 years
Dishwashers						
Pre-2005	9.3 gpl	12.5 gpl	0.225	0.225	12 years	15 years
Post-2005	4.2 gpl	5.1 gpl	0.225	0.225	12 years	15 years

[1] gpf – gallons per flush; gpl – gallons per load

Results

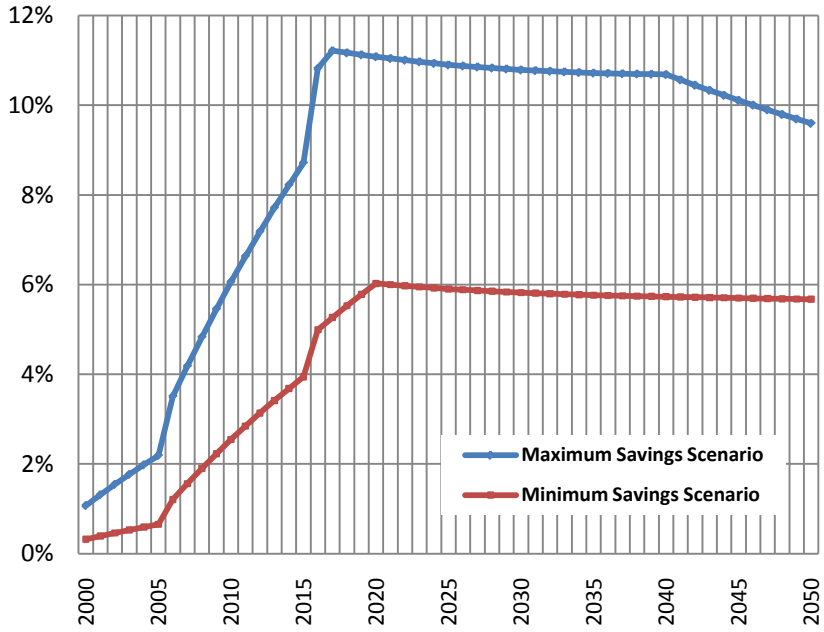
The results of the passive savings analyses indicate that future demand reductions, measured as a percentage of future statewide or basin wide M&I water demand[21], are dependent on both location and time. This is due to the fact that passive savings (measured as a percent of total M&I demand) are dependent on the age of the housing stock, the rate of population growth, current and future per capita water use, and the timing of fixture and appliance replacement. This observation is illustrated by the graph presented in Figure 7. Figure

[21] The method that was used by SWSI I involved developing percent saving estimates to predict passive water savings by basin and statewide. This report presents a similar analysis for comparison purposes.

7 presents the percent of passive savings versus the State's total M&I water demand for each year from 2000 to 2050 using the SWSI I defined baseline (i.e., 2000) gpcd demands by county (see Appendix E) using those assumptions listed in this section of the report.

From this figure, it can be seen that the percent of passive savings relative to statewide M&I demand changes each year. To begin with, a small amount of passive savings is shown to occur as a result of fixture replacements that occur from 1996 to 2000. For the period from 2005 to 2017 (or 2020, depending on the scenario), the percent of passive savings increases rapidly due to the replacement of clothes washers and dishwashers. It can further be seen that once the clothes washers and dishwashers have been replaced by either 2017 or 2020, the percent of passive savings relative to the statewide M&I demand decreases. This observed decrease results from the population increase generating additional demand which out paces the passive savings associated with the installation of high efficiency toilets. After 2017 or 2020, the percent of passive savings are expected to decrease statewide until the end of the planning period.

Figure 7 - Percent Statewide Demand Reduction From Passive Savings



Two key points of interest should be noted by the reader. First, the observed decrease in the percent of passive savings after 2017 (or 2020) may be offset or reversed in the future if technology enhancements or new regulations are developed to improve residential and/or business water use efficiency beyond that represented in the analyses conducted herein. Technologies may be developed to reduce any number of domestic or commercial water uses that would positively impact passive saving estimates after 2020. New ordinances and/or regulations dictating water use efficiency could also be established at the local, regional, state or federal level penetrating 100% of the targeted market, thus allowing for significant increases in passive water savings not included in the current analyses.

Table 7 brings into sharp focus the potential savings that could be realized by statewide legislation, new ordinances or regulations that effect new construction such as those that have been created in California. This table, which summarizes the number of new homes that will exist in Colorado over the coming decades, as compared to those that exist in 2010, provides some insight into the size of the new construction market and therefore the potential impact of new construction ordinances and/or regulations.

Table 7 – Estimated Percent Change in New Housing Stock in Colorado

	2020	2030	2040	2050
% Increase from 2010	20%	40%	57%	75%

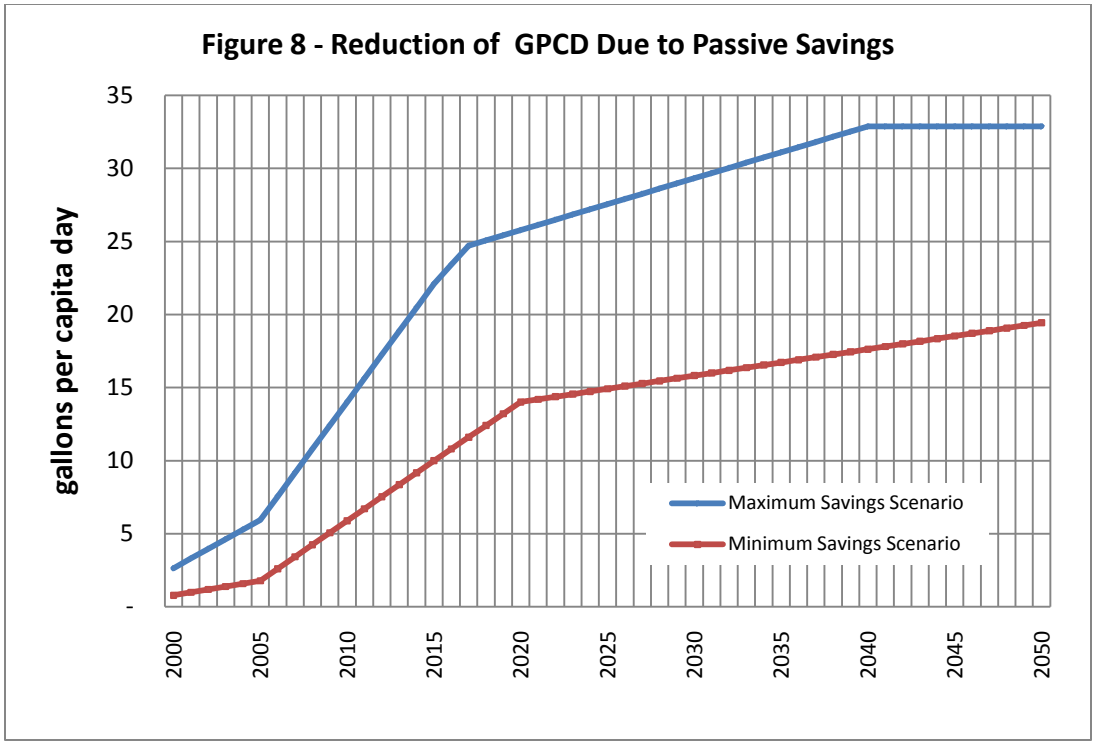
Second, the percentages of passive savings as presented in Figure 7 are impacted by the lasting effect of the 2002 drought on current and future water demand in the state[22]. Any lasting drought-related demand reduction that is not considered to be a component of future active water conservation would effectively decrease the State's total M&I demand, and result in an increase in the relative percentage of passive savings. The analyses presented in this report did not discount future M&I demand by any lasting impact of the 2002 drought.

Importantly, the impact of the passive savings on daily per capita water use is not affected by population growth, or the lasting impact of the drought. Figure 8 presents the reduction of daily per capita water use as natural toilet, clothes washer and dishwasher replacement occurs in the State. This figure exhibits the same general trends indicated in Figure 7 – namely the change of savings related to when clothes washers and dishwashers are replaced; however, Figure 8 shows only the change to daily per capita water use, which does not decrease at any point in time, but rather flattens out once maximum passive savings have been realized.

Based on the analyses presented in Figure 8, passive savings are expected to reduce system wide daily per capita water use by between 19 and 33 gpcd by 2050. These savings, which are chiefly associated with residential indoor water use, represent a reduction of between 23% and 39% of the average indoor water use reported by Western Resource Advocates (2003) of 69.3 gpcd[23].

[22] A 22% reduction in M&I demand that was observed in 2003 as a result of the 2002 drought – based on the impact of media messaging, watering restrictions, and other customer behavioral changes. Many water providers in Colorado (Joint Technical Activities Committee, 2010) have indicated that pre-drought water demands may not be observed for many years. If water demand does not fully rebound to pre-drought levels, then passive savings will be greater as a percentage of the reduced M&I demand. Note that in some cases, (e.g., Denver Water and Colorado Springs), local Water Conservation Plans call for the implementation of specific measures and programs that will extend the effects of the drought on customer water use. In these cases, prolonging the drought impact is considered to be active water conservation. In cases where the impacts of the drought extend beyond active water conservation practices, the percentage of passive water savings relative to total &I demand would need to be revised accordingly.

[23] The maximum and minimum savings for residential indoor water use were estimated to be about 17 and 27 gpcd, respectively. The remaining passive water savings relate to water use at businesses associated with increased toilet efficiency.



Another important aspect of passive savings is the predicted water demand reduction by river basin. Passive savings vary by major river basin in Colorado due to differences in housing stock, current system wide per capita water use and expected rates of population growth. Table 8 presents the passive savings estimated for each major river basin in 2030 (to allow for a ready comparison between the 6% passive savings used for passive savings in SWSI I and the results of the analyses performed as a result if this project) and 2050, as a percentage of total M&I demand. Based on the information contained in Table 8, it can be seen that the percent of passive conservation ranges from a low of 4.0% to a high of 11.1% in 2030, with a statewide average of between 5.8% and 10.8% in 2030. These percentages of passive savings decrease over time from 2030 to 2050 as presented in Table 8.

An estimate of the acre-feet of passive savings is a better metric to support planning efforts (e.g., the SWSI update) than the percentage of passive savings, since the acre-feet of savings do not vary by time, per capita water use, changes in future population estimates (after current projections for the years 2010 through 2015), or the lasting impact of drought on future M&I water demand. This is due to the fact that total acre feet of passive savings are only a function of per capita water use caused by the impact of retrofits and /or fixture replacement and the population of each county in 1994, 2005 and 2015 (based on the assumptions provided herein). Population projections changes for the years after 2015 will not change the total acre feet of passive savings estimated using the methodologies presented in this report. Table 9 presents the acre-feet of passive water savings calculated based on the assumptions presented in this section.

Table 8 – Percent of Passive Savings by Major River Basin and Statewide[1]				
	2030 (%)		2050 (%)	
	Minimum	Maximum	Minimum	Maximum
Arkansas	5.9	11.0	5.9	9.9
Colorado	4.7	8.7	4.0	6.8
Dolores/San Juan	5.6	10.3	5.2	8.7
Gunnison	5.6	10.4	5.4	9.1
North Platte	5.5	10.2	5.4	9.2
Rio Grande	4.0	7.5	4.1	6.9
South Platte	6.0	11.2	6.0	10.2
Yampa/White	4.8	9.0	3.7	6.2
Statewide	**5.9**	**10.9**	**5.7**	**9.7**

[1] As a percentage of total M&I demand without including self-supplied water supplies.

Table 9 – Acre Feet of Passive Savings by Major River Basin and Statewide				
	2030		2050	
	Minimum	Maximum	Minimum	Maximum
Arkansas	18,900	35,100	23,200	39,400
Colorado	6,500	12,000	8,000	13,500
Dolores/San Juan	2,200	4,000	2,700	4,500
Gunnison	2,200	4,100	2,700	4,600
North Platte	30	50	40	60
Rio Grande	1,000	1,800	1,200	2,000
South Platte	70,000	130,000	86,000	146,000
Yampa/White	1,000	1,700	1,200	2,000
Statewide[1]	**102,000**	**189,000**	**125,000**	**212,000**

[1] Statewide totals have been rounded to three significant digits.

Discussion and Recommendations

In practice, it is expected that actual passive savings that will be realized over the coming decades will trend toward the maximum savings estimates presented in Table 9 for a number of reasons. To begin with, water and energy savings will become increasingly important to water customers as water and fuel costs rise. As water customers seek more efficiency in their homes and businesses, high efficiency fixtures and appliances will become increasingly efficient as technology improves and customers strive to reduce their variable costs related to water and energy.

In addition, the potential exists to realize substantial permanent water demand reductions in the future if appropriate regulations and ordinances are developed to address water use in existing and new construction.

Regulation of existing construction can be developed using the California models, to require and inspect for the installation of high-efficiency toilets, shower heads, faucet aerators, dishwashers, and clothes washers as real estate is bought and sold. Regulation of new construction can be even more far-reaching and substantial with respect to future per capita water use demand reductions – since both indoor and outdoor water use can be addressed for all customer types (i.e., residential, commercial, industrial, etc.). Table 7 provides insight into how many new homes will be created in Colorado overtime, as an indication of the potential breadth and relevance of new construction regulations.

Finally, the impact of commercial retrofits (e.g., restaurants, motels, ski area condominiums, centralized laundries, commercial laundries, bars, etc.), is not well captured in the passive savings analyses since information regarding numbers of and ages of individual types of commercial properties were not available. Passive savings estimates will increase as more commercial, industrial and/or institutional water customers install retrofits.

For all these reasons, it is more realistic to expect 200,000 plus acre-feet of passive water savings statewide by the year 2050, than less than 200,000 acre-feet.

There are of course limitations related to the analyses presented in this section. It is vital for any entity or individual that chooses to use the data presented in the passive analyses to understand these limitations. To begin with, total water use adjustments using percentages have limited accuracy. Although information associated with water use by individuals using toilets, clothes washers and dish washer can be estimated on average, substantial differences may exist between counties and river basins due to the age and nature of housing stock and commercial water uses. It is more accurate to utilize estimated reductions in per capita water use for housing stock that is a candidate for retrofits, as opposed to percentages, since percentages change both spatially and temporally.

The impact of passive savings on future M&I water use demand is only one part of the overall puzzle related to predicting future water demands in Colorado. Water use demand reductions in the future may result from any one of the following impacts, in addition to passive water savings:

- Drought related (either related to lasting impacts of the 2002 drought in locations that have not implemented active conservation efforts to prolong drought water use behaviors, or the impacts of future droughts)
- Active savings (related to measures and programs implemented directly by water providers to reduce customer water demand and improve customer water use efficiency)
- Other savings (e.g., increases in density of new construction)

As water demand reductions occur in the future, it will be difficult to discern which of these categories of factors create the observed changes in water use, especially in locations with multi-faceted water conservation programs. Therefore, passive savings may be lumped into other categories of future water savings observed by utilities, such that it may be difficult to measure the exact impact of passive savings within any specific utility's service area without a focused data collection and related customer evaluation program. To this point, verifying passive savings in the future will require coordinated data collection efforts

conducted by water utilities and the state taking into consideration the effects of ongoing water conservation programs.

Data collection efforts by water utilities and the State will need to include tracking water use and water savings by individual water customers and customer classes related to specific measures and programs that a utility chooses to implement. The water utilities should also track dollars spent per water conservation measure and program, timing of program implementation, and market penetration rates. More information regarding the data collection efforts that are most valuable will be developed by the Office and the Water Conservation Technical Advisory Group.

Section 6
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Appendix A

Listing of Measures and Programs Selected by Planning Entities

This appendix presents a tabulation of the measures and programs that were selected for implementation by those entities that had approved Water Conservation Plans on file with the CWCB in January 2010. The tabulation summarizes the selected measures and programs into the following categories:

- Education
- Leak Detection
- Audits
- Rebates and Incentives
- Certifications
- Restrictions and Requirements
- Ordinances and Regulations
- Other (which includes grant programs, water reuse, water rate studies, billing software upgrades, etc.)

Note that the tabulation indicates the measures and programs selected for implementation by the planning entities; however, there are no data currently available to indicate whether or not the planning entities have implemented these measures and programs. Nor are there any data currently on file with the state indicating what water savings may have been realized as a result of implementing the selected measures and programs. Information related to actual implementation and related water savings will be provided to the CWCB at such time as the planning entities submit updates to their water conservation plans in accordance with state statute.

Table A-1
Summary of Measures and Programs from the Water Conservation Plans on File with the CWCB

Location	Education	Leak Detection	Audits	Rebates/Incentives	Certifications
Alamosa, City of	•Quarterly newsletters •Public Service Announcements •Billing modifications •Demonstration garden	•Leak detection	•Alamosa School District •Restaurants •City Parks •Residential	•Fixtures •Appliances	
Arapahoe County Water and Wastewater Authority	•Informative water bills •Website conservation page •Public workshops •Showerhead give aways •Demonstration garden	•Leak detection •Repair by consultants	•Commercial •Residential		
Aurora, City of	•Bill stuffers •Campaigns •Water Festival •Classroom education - Forests to Faucets training •Demonstration garden	•Water loss reduction program •Customers reporting leaks		•Toilet •Washing machine •Smart water readers •Smart irrigation controllers •Xeriscape 1$/square foot •Turf removal •Car wash reclamation	
Boulder, City of	•Annual Water News insert; newsletters •Surveys •Meetings •Water Festivals, kid placemats •Water Rangers Classroom Program •Annual Teacher workshop Project WET •Landscape consultants •Xeriscape seminars		•Commercial •Water providers	•Toilet •Washing machine •Smart irrigation controllers •Drip irrigation systems •Buffalo grass sod •Soil amendments •Compost tea	
Brighton, City of	•Public relations program •ET Controller, rain sensor giveaways	•Leak detection/repair •Meter testing/ replacement	•Commercial •Irrigation customers •Existing parks •Residential/irrigation	•Toilets (commercial) •Urinals •Indoor appliances •Rain sensors	
Castle Pines North Metropolitan District	•Bill inserts, newsletters (rate structure explanation) •Website; web based water audit program •Annual public meeting •Water Wasting Hotline •Waterwise program	•Sonic leak detection	•Residential indoor/outdoor (built before 1994) •Residential exceeding "Tier 4" •Ridge Golf Course	•Toilets •Washing machines •Showerheads •Irrigation clock •ET Controller •Soil replacement •Rain sensors	

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Summary of Measures and Programs from the Water Conservation Plans on File with the CWCB

Location	Education	Leak Detection	Audits	Rebates/Incentives	Certifications
Castle Rock, Town of	•Newsletter, Waterwiser •Website •Customer service •Workshops/Public Events/displays •Cooperative organizations •Adult education •School education •Waterwise model home		•Irrigation •Facility	•Washing machines •Irrigation timers •ET controllers •Landscape	•Landscape installer certification
Centennial Water and Sanitation District	•Bill inserts •Website •Full time water conservation coordinator •Lunch and learn workshops/irrigation troubleshooting •Home water kits •Xeriscape DVD to all residents •Demonstration garden	•Sonic leak detection •Work orders for high meter read locations	•Distribution system •Irrigation systems •Residential (voluntary)	•Toilets (residential) •Pre-rinse spray •ET Controllers (non-residential) •Turf replacement (non-residential) •Rain sensors	
Cherokee Metropolitan District	•Quarterly newsletter •Website •Informational meetings •Workshops for interior/exterior practices •Elementary education •Xeriscape highly visible areas	•Leak detection/repair •Replacing meters installed before 1999		•Plan mentions starting program	
Colorado Springs Utilities	•Newsletters, printed materials •Online water efficiency profile •Home efficiency assistance program •General conservation education •School education program •Speakers and tours •Xeriscape class •Demonstration garden	•Leak detection	•Commercial indoor/outdoor	•Toilets •Urinals •Washing machines •Pre rinse spray nozzle •Builder Incentive Program 2010 •Commercial outdoor efficiency incentive/irrigation equipment •Smart ET controller (commercial) •Residential smart irrigation	•Commercial car wash 2012
Denver Water	•School education program •Cooling tower monitoring program •Irrigation class, xeriscape clinic •Outdoor xeriscape kiosks •Indoor conservation kiosks •Demonstration garden		•Commercial •Governmental •Residential indoor/outdoor	•Toilet •Washing machines •Irrigation efficiency incentive program •C/I incentive program •ET controller •Rain sensors	•Car wash

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Summary of Measures and Programs from the Water Conservation Plans on File with the CWCB

Location	Education	Leak Detection	Audits	Rebates/Incentives	Certifications
East Larimer County Water District	•Bill stuffers •Newsletter •ET irrigation scheduling in May water bill •New customer package •Pre rinse spray to restaurants •Water conservation officer •Xeriscape program •Demonstration garden	•Detection/repair (whole system every 5 years) •Meter testing/ replacement •Program for mobile home parks	•Commercial •Residential irrigation •Open space •Home Owner Associations	•Toilets •Urinals •Washing machines •Xeriscape (residential) •ET controllers (residential) •Sub-meters in existing mobile home parks •Wind/rain sensors	
Erie, Town of	•Understandable water bill •Website •Conservation pamphlets •Newspaper •Give away pre rinse spray nozzles •School programs	•Leak detection/ repair •Meter replacement	•Customer irrigation	•Washing machine	
Evans, City of	•Website upgrades •Water conservation officer •Property manager/Home Owner Association education and training •Distribute pre rinse spray heads •Water Festival •School education programs •Xeriscape programs	•Leak detection/repair •Meter testing/ replacement		•Toilets •Washing machines •Irrigation system efficiency devices	
Firestone, Town of	•Bill revisions •Water saving demonstrations •School education program •Water saving DVDs to customers	•Leak detection/repair	•Commercial	•Toilets •Showerheads •Faucets •Washing machines	
Fort Collins-Loveland Water District	•Bill stuffers •Website (list of BMPs) •Faucet aerator distribution •Water Festival		•Commercial •Residential •Online residential •Irrigation system		
Fort Lupton, City of	•Water bill inserts •Demonstrations •School programs •Water facility tours	•Leak detection/ repair		•Toilets •Faucets •Showerheads •Rain/wind sensors	

Table A-1
Summary of Measures and Programs from the Water Conservation Plans on File with the CWCB

Location	Education	Leak Detection	Audits	Rebates/Incentives	Certifications
Fort Morgan, City of	•Bill inserts •Website •Water conservation kits •Demonstration garden	•Leak detection/repair	•Commercial •Residential •Industrial •Park irrigation efficiency	•Rebate program	
Fountain, City of	•UtilitNews newsletters •Website •Attend HBA of Colorado Springs regularly with water updates •Demonstration garden	•Leak detection •Replace older mains once per year •Replace fire hydrants (ongoing) •Replace commercial water meters (ongoing)		•Incentive program to begin 2010	
Greeley, City of	•Bill stuffers •Website •Informational literature •Informational hotline •Neighborhood meetings •Conservation fairs •Water Festival •Indoor/outdoor ed program •Conservation kit distribution		•Indoor commercial •Irrigation efficiency	•Toilets (residential) •Washing machines •Irrigation efficiency appliances	
Left Hand Water District	•Bill stuffers, ET irrigation schedule •Improved website, BMPs on website •Written material •School programs •Radio-meter reader checkout •Water Treatment Plant tours •Water Festival	•Leak detection/repair •Leak detection in mobile home parks •Leak detection for master meter communities	•Commercial •Residential classes and kits •Industrial •Irrigation systems	•Toilets •Washing machines •Faucets •ET Smart controllers •Wind/rain sensors for residential	
Longmont, City of	•Pre-rinse spray nozzle giveaway •Commercial/residential general education •Project WET teacher training •Landscaper irrigation contractor training	•Meter testing/ replacement	•Commercial indoor/irrigation •Non-potable irrigation audits/upgrades •Residential house/irrigation	•Toilets •Urinals •Washing machines •Dish washers •ET Controllers •Soil amendment rebate •Rain sensors	

Table A-1
Summary of Measures and Programs from the Water Conservation Plans on File with the CWCB

Location	Education	Leak Detection	Audits	Rebates/Incentives	Certifications
North Table Mountain Water and Sanitation District	•Water conservation kits •Water efficient irrigation ed materials •Greenhouse Industry ed •School education program •Demonstration garden	•Leak detection/repair •Meter replacement •System maintenance •Individual account leak detection program •Sonic leak detection	•Irrigation pilot program •Parks •Home Owners Association •System wide audit 2010	•Toilets •Smart controller •Rain sensors	
North Weld County Water District	•Bill stuffers •BMPs posted on website •Water use calculator •Public education at libraries •Xeriscape garden class	•Meter installation •Meter testing/ replacement	•Commercial •Industrial •Residential audit kit •Residential landscape audit kit		
Northglenn, City of	•Website, 24 hour water hotlines •"Conservation Corner" newsletter •Conservation kits •Irrigation design and adjustment class •Rain gage give away •Commercial pre rinse spray giveaway •Water Wise school program •Water Festival •Local television program •Demonstration garden	•Meter replacements	•Commercial •Irrigation	•Appliances •ET Controller •Moisture sensors	
Pagosa Area Water and Sanitation District	•Low flow showerhead/faucet giveaways •Pre rinse spray nozzle giveaways •Customer workshops •General customer education	•Leak detection/repair •Automatic meter reading installations	•Commercial •Residential	•Indoor appliances •ET Controller •Rain sensors	
Parker Water and Sanitation District	•Informative and understandable water bills •Water conservation expert available •General public education •Water saving demonstrations •School programs •Giveaways: home water audit kits, low flow shower heads, water restricting faucet aerators	•Leak detection/repair •Meter testing/ replacement (meter service connections, meter source water)	•Customer (target large users)		

Table A-1
Summary of Measures and Programs from the Water Conservation Plans on File with the CWCB

Location	Education	Leak Detection	Audits	Rebates/Incentives	Certifications
Rifle, City of	•Bills include conservation tips •Water conservation website •Brochures on water efficient landscape and irrigation practices •Xeriscape workshop		•Free audits for top 10 water users	•Smart irrigation controllers	
Salida, City of	•Bill stuffers/website include BMPs •Newsletter •Pre rinse spray heads to restaurants and institutions •Chisholm Park Xeriscape •School education program	•Leak detection/repair •Meter testing	•Commercial •Industrial •Residential water audit kits •Park irrigation efficiency	•Toilets •Washing machines •High efficiency dishwashers •Faucets •Showerhead	
Windsor, Town of	•Bill stuffers, including ET irrigation scheduling •Website water use calculator •School education program •Distribute toilet retrofit devices •Pre rinse spray heads •Xeriscape class •Demonstration garden	•Leak detection/repair •Meter testing/ replacement	•Business •Industrial •Residential water audit kits	•Irrigation system efficiency devices	

Table A-1
Summary of Measures and Programs from the Water Conservation Plans on File with the CWCB

Location	Restrictions/Requirements	Ordinances/Regulations	Other
Alamosa, City of	•Voluntary irrigation restricitons	•"Waste Water"	•City owned facility modifications •Lawn and garden low water tests •Grant program for large irrigation users to modify and increase efficiency
Arapahoe County Water and Wastewater Authority	•Voluntary watering schedules	•Water Turn Off Policy	•Improved water accounting spreadsheets •Annual water audits to quantify non-account water •Arapahoe County Water and Wastewater Authority rules and regulations •Water reuse system
Aurora, City of		•Lawn permit •Irrigation standards •Water Waste landscape •Car wash reclamation	•Large scale utility reuse facility
Boulder, City of			•Soil moisture sensor study •Treated water master plan •Garden in a Box program •Water efficiency fund •Slow the Flow •Farmers market outreach booth •CSU short course
Brighton, City of		•Commercial landscape	•Continue with non-potable water conservation projects
Castle Pines North Metropolitan District	•Irrigation •Turf/landscape design		•Reuse for Ridge Golf Course •Meter source water •Meter service connections •Metering of district irrigation

Table A-1
Summary of Measures and Programs from the Water Conservation Plans on File with the CWCB

Location	Restrictions/Requirements	Ordinances/Regulations	Other
Castle Rock, Town of	•Watering restrictions	•Interior BMPs •Landscape BMPs for new construction	•Inclining rates
Centennial Water and Sanitation District	•Daytime watering	•Water Waste	•Reclaimed water for irrigation •Recapture of reusable water discharged from south platte •Slow the Flow •Hosted certified landscape irrigation auditor class
Cherokee Metropolitan District	•Water efficient fixture requirements/plumbing codes •Outdoor watering restrictions/schedule		•Non-potable water to irrigate golf course (use moisture sensors) •Cherokee Ridge Golf Course required to establish new watering program to reduce irrigation by 25% •Water reuse systems/replacement facilities •New water rate structure
Colorado Springs Utilities		•Commercial landscape code and policy •Water Waste	•Residential block rates •Commercial seasonal rates •2012: Landscape establishment permits •Residential sprinkler check program
Denver Water	•Require irrigation meters, 3 days/week	•New development urinal requirement •Toilet retrofit •Showerheads/ faucets at time of sale •Five acre rule •New home regulations •Soil amendment rule	•Public housing retrofit •Irrigation check ups for large accounts

Table A-1
Summary of Measures and Programs from the Water Conservation Plans on File with the CWCB

Location	Restrictions/Requirements	Ordinances/Regulations	Other
East Larimer County Water District		•Soil amendment rule •Sprinkler system review ordinance (new commercial) •Drought restriction ordinance	•Recycling filter backwash •Water reuse system •Additional conservation charge tiers to rate structure
Erie, Town of	•Parks - Drought resistant vegetation, irrigation schedule, moisture sensors, ET Controllers •New parks - Soil preparations, irrigation equipment, Voluntary/mandatory water restrictions	•Water Waste	•Use of non potable/reclaimed water •Volume billing metering of source water •Improved water accounting •Analysis of non account water •Remote reader program
Evans, City of	•Irrigation restrictions •10% of lot irrigation restriction	•Water Waste •Soil amendment rule for new landscapes	•Water rate structure changes
Firestone, Town of	•Town wide watering •Home Owner Associations must adhere to town restrictions		•Rate structure changes •Installing rain/wind sensors in commercial and parks/open space •Use of wetting agent at parks
Fort Collins-Loveland Water District		•Water Waste	•Improve billing software •Recycling water treatment plant filter backwash •Installing radio telemetry on existing meters •Changes to water rates to encourage conservation
Fort Lupton, City of	•Watering restrictions •Rate structure changes		•Increase water treatment plant efficiency •Improve billing meters •Parks/open spaces: rain/wind sensors; Irrigation improvement; Injecting wetting agent; replace turf with concrete and native grass

Table A-1
Summary of Measures and Programs from the Water Conservation Plans on File with the CWCB

Location	Restrictions/Requirements	Ordinances/Regulations	Other
Fort Morgan, City of		•Water Waste •Ordinance if shortage occurs •Landscape guidelines •Landscape design - no more that 15% planted grasses	•Water accounting •Volume billing •Monitor pressure in water distribution system •Encoder-Receiver-Transmitter (ERT) automatic meter reading
Fountain, City of		•Water Waste •Low water use landscapes and efficient Irrigation regulator measures •Design/construction codes	•Reuse of surplus return flows from pipeline deliveries •Review water rate structures and billing systems •Water efficient fixtures and appliances in all new buildings and City buildings over next 5 years
Greeley, City of	•Mandatory 3 days/week, not between 12-5pm	•Water Waste •Soil amendment •Planting ordinance	•New water rate structure •In next 5 years: clearer landscape codes, water wise landscape incentives, implement a Water Budget, "WaterSense" pilot program
Left Hand Water District	•Wind/rain sensors for open space irrigation	•Landscape/irrigation standards for new development •Soil amendment •Restrictive covenants ordinance	
Longmont, City of		•Water Waste •Soil amendment	•Raw water conversion projects •Water rate studies

Table A-1
Summary of Measures and Programs from the Water Conservation Plans on File with the CWCB

Location	Restrictions/Requirements	Ordinances/Regulations	Other
North Table Mountain Water and Sanitation District	•Drought Mitigation measures	•"Waste of Water" •New development soil amendment regulation •New development common area landscape regulations	•Upgrade North Table Mountain office and treatment plant fixtures and appliances •Raw water irrigation •Water treatment plant backwash/wastewater reuse •New development closed loop cooling system regulation •Water meter monitor loan program •Tiered rate structure modifications •High volume customer criteria updated monthly
North Weld County Water District			•Billing software upgrades •Online access to water bill history •Temporary irrigation taps for native landscaping
Northglenn, City of	•Outdoor watering schedule •Drought mitigation measures implemented at times of shortage	•"Waste of Water"	•Replacement of municipal high use toilets •Low flow toilet giveaway •Replace municipal landscape and irrigation •Backwash and waste water reuse •Customer meter replacement •Water meter monitor loan program • Tiered water rate structure w/ surcharges
Pagosa Area Water and Sanitation District			•Raw water conversion project •Water rate increases
Parker Water and Sanitation District	•Turf restrictions	•Water Waste Prohibition •Low water use landscapes •Require existing homes to use rain sensors and Home owner associations and commercial to use ET controllers 2012	•Low water use requirements for new fixtures •Drought resistant vegetation, efficient irrigation •Conservation tiered rate structure, increased (monthly) billing frequency •Soil preparation •Improved water accounting •Analysis of non-account water •Removal of phreatophytes •Reuse of tertiary treated reclaimed water

Table A-1
Summary of Measures and Programs from the Water Conservation Plans on File with the CWCB

Location	Restrictions/Requirements	Ordinances/Regulations	Other
Rifle, City of	•High efficiency indoor plumbing fixture requirements for new development •Landscape and irrigation design requirements and restrictions	•Water Waste •City facility water efficient plumbing fixture and appliance policy •City facility xeriscape policy	•Develop tiered rate structure •Improve system wide water accounting •Water conservation taskforce •City facility water efficient appliances and Xeriscape landscaping •Restrict city use of water features/fountains
Salida, City of			•Billing software upgrades •Rate structure changes
Windsor, Town of	•Watering restrictions •Require wind/rain sensors business /open spaces	•Water Waste •Irrigation standards for new development •New car wash standards	•Non-potable park well meters •Water rate structure changes

Appendix B

Summary of Proposed Water Savings by Covered Entities

This appendix is a summary of the proposed water savings by the covered entities. The Water Conservation Plans on file with the CWCB were reviewed in order to find the estimated water savings. The goals stated in the Plans were defined either as the percent savings for the selected conservation measures and programs, or a comparison of the demand forecast with and without conservation. The goals of several entities were found by comparing average day demand with and without conservation, whereas annual forecasts with and without conservation were used for other entities dependent upon the plan contents. Several goals were determined based on the cost benefit analyses of the selected measures and programs in order to determine the cumulative water savings in acre feet for the length of the planning period.

Few plans actually state their estimated percent savings for their planning period after the goals are modified and integrated with the selected measures and programs. Additionally, a number of plans did not directly state their goal and therefore percent goals were estimated based on information provided. In most cases, water savings goals resulted after the entities revised the amount of water savings anticipated from the selected measures and programs as compared to their original goals. This information, as well as the acre feet saving amounts were determined from the Integrated Resources and Modified Forecast section of the plans, whenever possible.

Table B-1 presents the water conservation goal for each covered entity, an estimate of the acre-feet savings that each covered entity expects in 2017 (unless otherwise noted), an estimate of the 2017 demand for each entity without conservation, the year the water conservation plan was submitted for each entity, and the length of the planning period. Information regarding the location of data used to estimate future water conservation savings and water demands are also listed in the table.

Table B-1

Summary of Proposed Water Savings by Covered Entities

Water Conseration Plans on File with the CWCB in January 2010	Goal Stated in Plan	Water Saved by 2017[1] (Acre Feet)		2017 Demand Without Conservation (Acre Feet)		Year Plan Submitted	End of Planning Period	Goal Time Frame	Location of Information Used to Calculate Goal and/or Water Savings
Alamosa, City of	30% by 2018	1,073		2,930		2007	2018	10	Appendix B
Arapahoe County WWA	5% by 2017	214		4,300		2006	2017	10	Worksheet 7-1
Aurora	10% by 2032	2,507		62,940		2007	2032	25	Appendix A
Boulder	19% by Build-out	2,240		23,953		2009	Build-out (2035)	Build-out	Table 3.3, Table 3.7
Brighton	10% by 2017	1,051		10,050		2008	2017	10	Table 9
Castle Pines North	10% by Build-out	221	[a]	2,210		2006	Build-out (2015)	Build-out	Table 8-1
Castle Rock	18% by 2030	969		12,386		2006	2030	25	Pg. 23
Centennial Water and Sanitation	5% by Build-out	933		18,266		2007	Build-out (2013)	Build-out	Table 5
Cherokee Metro District	NA[2]								
Colorado Springs Utilities	7.6% by 2017	8,505		94,123		2008	2017	10	Table 3
Denver Water	39,000 AF by 2016	39,400	[b]	225,000	*	2007	2016	10	Pg. 9, Figure 1
East Laramier County	7.2% by 2016	572		8,005		2007	2016	10	Pg. 48, Table 6.1
Erie	17% by 2014	960	[c]	6,340		2008	2014	5	Section 5-1
Evans	13% by 2018	493		4,871		2009	2018	10	Table 6.4
Fort Collins-Loveland	12% by 2017	1,158		10,853		2008	2017	10	Pg. 32, Table 6.1
Firestone	7.2% by 2017	280	[a]	3,890		2007	2017	10	Pg. 44, Table 4.8
Fort Lupton	3.9% by 2030	156		3,992		2007	2016	10	Pg. 35-36, Table 4.8
Fort Morgan, City of	10% by 2030	149		2,980		2009	2030	20	Table 2:/7a
Fountain, City of	3% by 2013	181	[d]	7,214		2009	2013	5	Pg. 72
Greeley, City of	8.2% by 2030	1,155		33,819		2008	2030	21	Figure 7
Left Hand Water District	10% by 2017	712		7,200		2008	2017	10	Table 8.4
Longmont	7.7% by 2017	1,825		23,000		2008	2017	10	Pg. 35
North Table Mountain	10% by 2015	350	[a]	3,400		2009	2015	5	Figure 7
North Weld County	7.9% by 2018	400		4,800		2009	2018	10	Figure 8.1
Northglenn	6.4% by Build-out	382		4,946		2007	Build-out (2030)	Build-out	Table 16, Table 15
Pagosa Area Water and Sanitation	9.47% by 2018	409		4,750		2008	2018	10	Table 8, Table 4
Parker Water and Sanitation	15% by 2018	1,583		1,024		2009	2018	10	Table 7-1
Rifle, City of	5% by 2015	162	[a]	3,237		2008	2015	6	Table 7-1
Salida, City of	13% by 2017	274		2,600		2008	2017	10	Figure 8-1
Windsor, Town of	11.5% by 2017	276		2,661		2008	2017	10	Figure 7-1
Total		**68,590**		**595,740**					

[1] Water saved by 2017 through implementation of the Water Conservation Plans on file with the CWCB. Note that stated goals may not match projected water use savings.

[2] Information not stated in water conservation plan.

*Estimated; not provided

[a] - 2015 Goal

[b] - 2016 Goal

[c] - 2014 Goal

[d] - 2013 Goal

Appendix C

Comparison of Selected Water Conservation Programs using the New Framework

This appendix presents a comparison of those measures and programs selected for implementation by a selected group of water utilities with plans on file with the CWCB with the new water conservation framework developed within this report. The group of selected water utilities represents different service populations, customer types and geographies in the state. The water utilities include the following:

Type of Water Provider	Approximate Population Served
Municipality A	8,500
Municipality B	5,400
Special District C	100,000
Municipality D	17,500
Municipality E	88,000
Municipality F	8,800

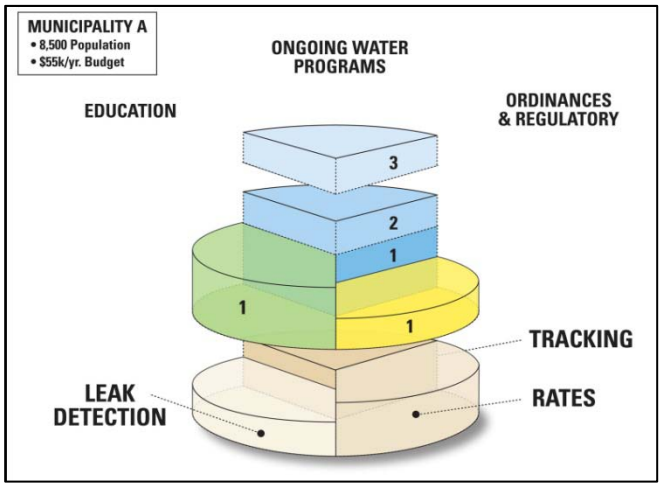
The comparison has been prepared to illustrate how these various programs relate to the specific components of the new framework - identifying coverages and gaps in the six proposed water conservation programs. As can be seen from the Figure C, none of the six examples have fully developed foundational measures and programs proposed in their water conservation plans; in that each planning entity has some gap in their identified foundational commitments. In addition, each plan has some gaps between the programs that they have chosen to implement and some of the basic data collection activities (e.g., data tracking and auditing) that are recommended. Another observation is that all the example plans have one-way educational programs (Level 0), but most lack more sophisticated two-way educational programs (Level 2).

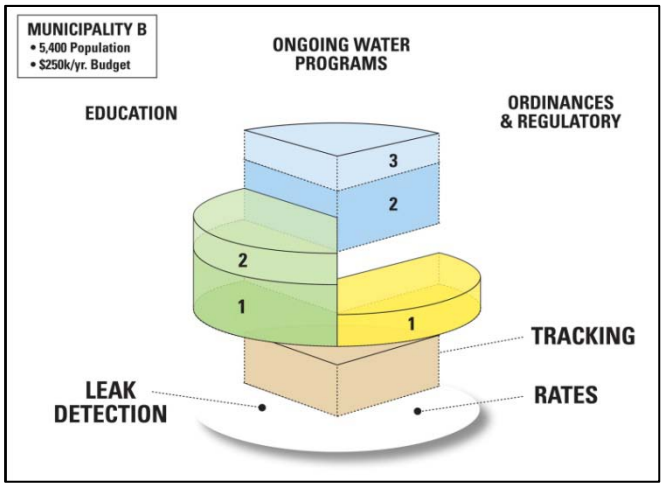
The figure and the discussion presented above illustrates how the new framework can be used to help characterize the continuity and completeness of any specific plan submitted for review and approval.

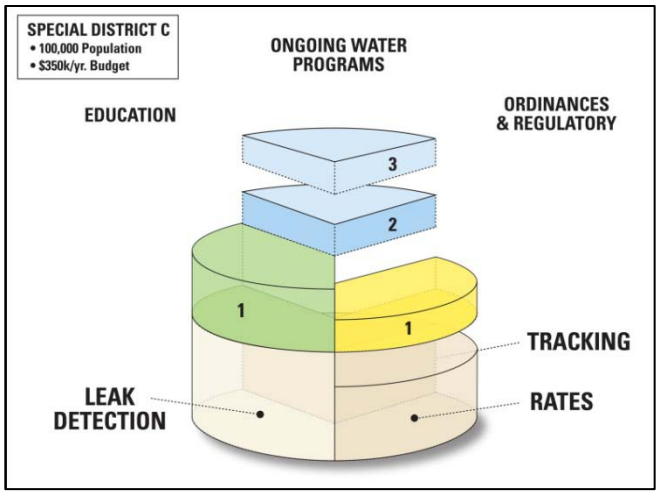
The gaps identified in the example water conservation plans are important to note for a number of reasons:

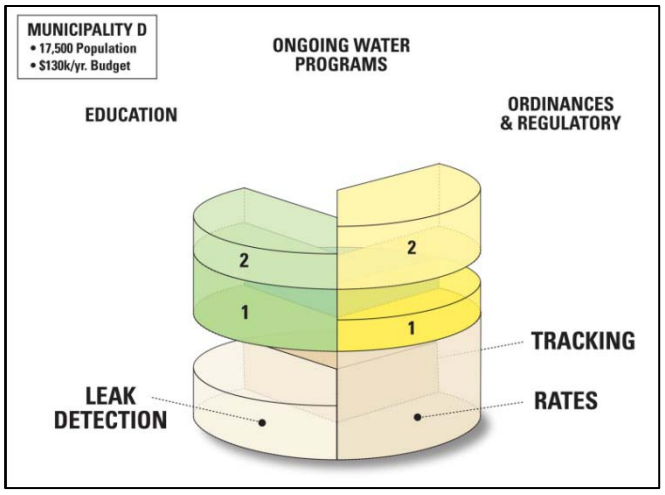
- First, these plans are representative of all the plans submitted to the CWCB for approval. These plans have not been singled out as unique examples; they are instead representative of the entire body of work indicating that all plans on file with the CWCB have some gaps with respect to the three foundational elements, as well as some data collection and two-way educational activities.
- Second, these plans indicate a substantial improvement over those plans that were submitted to the CWCB in 1996, since substantially more sophisticated implementation efforts are happening today than were happening at the time of the 2002 drought. For example, some of the 1996 vintage era plans were no more than a few pages of text in total, without data or any clear indication of what water conservation efforts would be implemented in the future.
- Finally, the new framework that has been proposed is useful in helping to visualize where potential gaps may exist with regard to selected measures and programs in plans submitted to the state for review and approval. To this point, the new framework should help CWCB staff perform more rigorous analyses of water conservation plans submitted for review and approval, and guide covered entities toward more robust planning efforts.

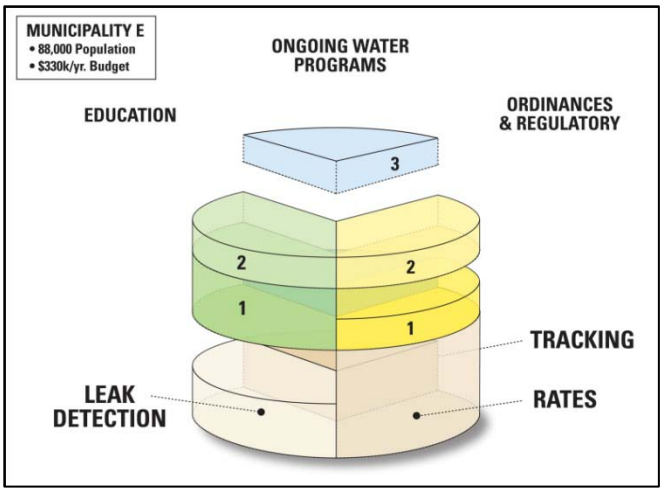
Figure C-1 Comparison of Selected Water Conservation Programs Using the New Water Conservation Framework

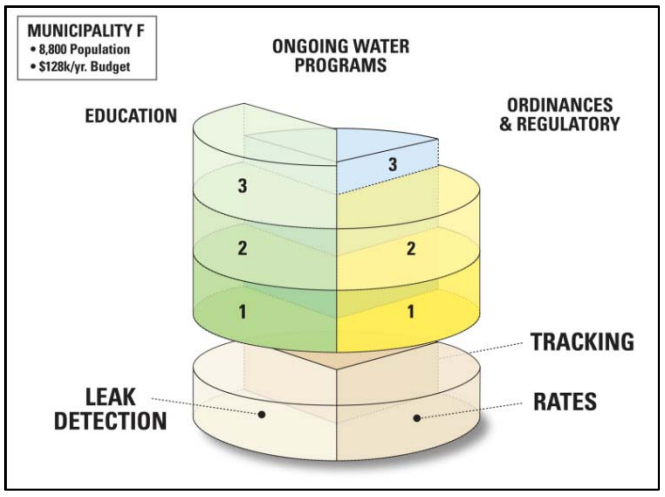












Appendix D

Summary of EPA's Energy Star Clothes Washer and Dishwater Programs

The data found in Appendix D has been provided by the U.S. Environmental Protection Agency and the U.S. Department of Energy's Energy Star website, http://www.energystar.gov/, for both clothes washers and dishwashers. The information in tables D-1 and D-2 includes model, type and data related to water use per machine. Located at the end of the tables, are the conclusion statistics related to the maximum, minimum and average gallons per cycle as well as the standard deviation calculation. The passive water savings model developed for this project utilized the average gallons per load for the maximum water savings estimate (representing the maximum water savings for all retrofits in Colorado), the average gallons per load plus one standard deviation for the minimum water savings (representing the minimum water savings for all retrofits in Colorado.) Tables D-3 and D-4 include the terms and definitions used in Tables D-1 and D-2.

Table D-1
ENERGY STAR Qualified Clothes Washers

ENERGY STAR Qualified Clothes Washers

Last Modified: 04/19/2010

Brand	Model	Product Name	Volume (cubic Feet)	KWh/year	Modified Energy Factor	Federal Standard (MEF)	Percent Better	Water Factor	Annual Water Use	Active	Active Date	Water Use Per Load[1]
Amana	*NAH6800*		*2.9*	*243*	*1.9*	*1.26*	*51%*	*7.2*	*8,185*	*No*	*11/30/2006*	20.88
Amana	NFW7200TW		3.11	216	1.93	1.26	53%	4.5	5,486	Yes	9/22/2008	14.00
Amana	NFW7300W*+		3.46	162	2.39	1.26	90%	3.9	5,263	Yes	3/16/2010	13.49
Amana	*NFW7400V*+*		*3.18*	*150*	*2.58*	*1.26*	*105%*	*4.0*	*5,011*	*No*	*1/27/2009*	12.72
Amana	NFW7500V*+		3.51	187	2.22	1.26	76%	4.2	5,751	Yes	1/27/2009	14.74
Appliance Desk	AD 1720		1.9	141	1.89	1.26	50%	7.1	5,288	Yes	2/21/2008	13.49
Appliance Desk	AD 3720		1.9	141	1.89	1.26	50%	7.1	5,288	Yes	2/21/2008	13.49
Appliance Desk	ADW 620		1.9	141	1.89	1.26	50%	7.1	5,288	Yes	2/21/2008	13.49
Ariston	AW120		1.92	143	1.92	1.26	52%	5.0	3,763	Yes	8/4/2004	9.60
Ariston	AW129		1.9	190	2.09	1.26	66%	6.4	4,737	Yes	5/29/2006	12.16
Ariston	AW149		1.9	190	2.09	1.26	66%	6.4	4,744	Yes	5/29/2006	12.16
Ariston	AWD120		1.92	143	1.92	1.26	52%	5.0	3,763	Yes	8/4/2004	9.60
Ariston	AWD129		1.6	168	1.83	1.26	45%	7.1	4,453	Yes	5/29/2006	11.36
Asko	W6022		1.96	100	2.3	1.26	83%	3.4	2,612	Yes	6/30/2006	6.66
Asko	W6222*		1.96	100	2.3	1.26	83%	3.4	2,612	Yes	6/30/2006	6.66
Asko	W6461		2.04	127	2.5	1.26	98%	6.9	5,486	Yes	1/26/2005	14.08
Asko	W6761		1.96	189	1.84	1.26	46%	7.5	5,749	Yes	1/29/2003	14.70
Asko	W6863**		1.96	130	2.4	1.26	90%	4.2	3,227	Yes	3/25/2010	8.23
Asko	W6903FI		1.96	130	2.4	1.26	90%	4.2	3,196	Yes	3/25/2008	8.23
Asko	W6903SS		1.96	130	2.4	1.26	90%	4.2	3,227	Yes	12/22/2009	8.23
Asko	W6903W		1.96	130	2.4	1.26	90%	4.2	3,196	Yes	3/25/2008	8.23
Asko	WCAM1812		2.46	217	2.5	1.26	98%	7.5	7,213	Yes	7/22/2003	18.45
Asko	WL6511		3.29	185	2.04	1.26	62%	4.0	5,159	Yes	3/17/2008	13.16
Asko	WL6532XXLPP		3.96	138	2.76	1.26	119%	3.4	5,278	Yes	12/22/2009	13.46
Asko	WL6532XXLRHW		3.96	138	2.76	1.26	119%	3.4	5,278	Yes	12/22/2009	13.46
Asko	WL6532XXLRR		3.96	138	2.76	1.26	119%	3.4	5,278	Yes	12/22/2009	13.46
Asko	WL6532XXLW		3.96	138	2.76	1.26	119%	3.4	5,278	Yes	12/22/2009	13.46
Blomberg	WM 67121 NBL00		1.88	149	2.25	1.26	79%	4.8	3,537	Yes	7/17/2009	9.02
Blomberg	WM 87120 NBL00		2.15	173	2.35	1.26	87%	4.2	3,573	Yes	3/26/2010	9.03
Bosch	WAE20060UC	Axxis One	1.85	105	2.19	1.26	74%	5.6	4,054	Yes	8/27/2009	10.36
Bosch	WAS20160UC		2.2	125	2.14	1.26	70%	4.5	3,907	Yes	1/15/2008	9.90
Bosch	WAS24460UC		2.2	130	2.22	1.26	76%	4.5	3,907	Yes	1/15/2008	9.90
Bosch	WFL2090UC	Axxis	1.85	121	2.03	1.26	61%	6.5	4,692	Yes	11/6/2006	12.03
Bosch	*WFMC220*UC*		*3.31*	*165*	*2.43*	*1.26*	*93%*	*4.3*	*5,631*	*No*	*4/5/2006*	14.23
Bosch	*WFMC4301UC*		*3.31*	*182*	*2.4*	*1.26*	*90%*	*4.2*	*5,501*	*No*	*4/5/2006*	13.90
Bosch	*WFMC5301UC*		*3.31*	*151*	*2.47*	*1.26*	*96%*	*4.5*	*5,800*	*No*	*8/10/2007*	14.90
Bosch	*WFMC530CUC*		*3.31*	*151*	*2.47*	*1.26*	*96%*	*4.5*	*5,800*	*No*	*8/10/2007*	14.90
Bosch	*WFMC530SUC*		*3.31*	*151*	*2.47*	*1.26*	*96%*	*4.5*	*5,800*	*No*	*8/10/2007*	14.90
Bosch	*WFMC5440UC*		*3.31*	*150*	*2.52*	*1.26*	*100%*	*4.5*	*5,787*	*No*	*7/2/2008*	14.90
Bosch	*WFMC544SUC*		*3.31*	*150*	*2.52*	*1.26*	*100%*	*4.5*	*5,787*	*No*	*7/2/2008*	14.90
Bosch	*WFMC5801UC*		*3.31*	*150*	*2.52*	*1.26*	*100%*	*4.5*	*5,787*	*No*	*8/12/2008*	14.90
Bosch	*WFMC8400UC*		*3.31*	*151*	*2.55*	*1.26*	*102%*	*4.1*	*5,359*	*No*	*10/18/2007*	13.57
Bosch	*WFMC8401UC*		*3.31*	*151*	*2.55*	*1.26*	*102%*	*4.1*	*5,359*	*No*	*8/10/2007*	13.57
Bosch	*WFMC8440UC*		*3.31*	*150*	*2.52*	*1.26*	*100%*	*4.5*	*5,787*	*No*	*7/2/2008*	14.90
Bosch	WFVC3300UC		3.31	130	2.55	1.26	102%	3.5	4,541	Yes	7/13/2009	11.59
Bosch	WFVC4400UC		3.31	120	2.5	1.26	98%	3.5	4,541	Yes	3/8/2010	11.59
Bosch	WFVC5400UC		3.31	130	2.55	1.26	102%	3.5	4,541	Yes	7/13/2009	11.59
Bosch	WFVC540SUC		3.31	130	2.55	1.26	102%	3.5	4,541	Yes	7/13/2009	11.59
Bosch	WFVC544*UC		3.31	130	2.55	1.26	102%	3.5	4,541	Yes	7/13/2009	11.59
Bosch	WFVC6450UC		3.31	130	2.55	1.26	102%	3.5	4,541	Yes	7/13/2009	11.59
Bosch	WFVC844*UC		3.31	130	2.55	1.26	102%	3.5	4,541	Yes	7/13/2009	11.59
Conserv	CS 1720		1.9	141	1.89	1.26	50%	7.1	5,288	Yes	2/21/2008	13.49
Conserv	CS 3720		1.9	141	1.89	1.26	50%	7.1	5,288	Yes	2/21/2008	13.49
Conserv	CSW 620		1.9	141	1.89	1.26	50%	7.1	5,288	Yes	2/21/2008	13.49
Crosley	*CAH4205*		*2.9*	*243*	*1.9*	*1.26*	*51%*	*7.2*	*8,185*	*No*	*10/11/2005*	20.88
Crosley	CFW2000F		2.65	126	1.97	1.26	57%	7.0	7,272	Yes	3/26/2007	18.55
Crosley	*CFW4000F*		*3*	*202*	*2.01*	*1.26*	*60%*	*4.1*	*4,845*	*No*	*3/26/2007*	12.30
Crosley	CFW4500K**		3	196	2.22	1.26	76%	4.2	4,951	Yes	9/14/2009	12.60
Crosley	*CFW5000F*		*3*	*179*	*2.29*	*1.26*	*82%*	*4.4*	*5,139*	*No*	*3/26/2007*	13.20
Crosley	CFW7500K**		3	203	2.22	1.26	76%	4.4	5,139	Yes	9/14/2009	13.20
Crosley	CFW8000		4	185	2.04	1.26	62%	4.0	6,272	Yes	4/18/2008	16.00
Crosley	*CLCE900F*		*2.65*	*165*	*2.09*	*1.26*	*66%*	*5.2*	*5,412*	*No*	*3/26/2007*	13.78
Crosley	*CLCG900F*		*2.65*	*165*	*2.09*	*1.26*	*66%*	*5.2*	*5,412*	*No*	*3/26/2007*	13.78
Daewoo	DWD-WD1353RC		3.92	138	2.75	1.26	118%	3.4	5,271	Yes	2/12/2010	13.33

Table D-1
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ENERGY STAR Qualified Clothes Washers

Last Modified: 04/19/2010

Brand	Model	Product Name	Volume (cubic Feet)	KWh/year	Modified Energy Factor	Federal Standard (MEF)	Percent Better	Water Factor	Annual Water Use	Active	Active Date	Water Use Per Load[1]
Daewoo	DWD-WD1353SC		3.92	138	2.75	1.26	118%	3.4	5,271	Yes	2/12/2010	13.33
Daewoo	DWD-WD1353WC		3.92	138	2.75	1.26	118%	3.4	5,271	Yes	2/12/2010	13.33
Daewoo	DWD-WD31WW		3.85	134	2.65	1.26	110%	3.5	5,343	Yes	2/12/2010	13.48
Daewoo	DWD-WD32WS		3.85	147	2.6	1.26	106%	3.3	5,041	Yes	2/12/2010	12.71
Daewoo	DWD-WD33**		3.85	138	2.6	1.26	106%	3.3	5,041	Yes	2/12/2010	12.71
Danby Designer	DWM5500W-1		1.7	154	1.8	1.26	43%	6.6	4,418	Yes	11/6/2003	11.22
Deco	DC 1720		1.9	141	1.89	1.26	50%	7.1	5,288	Yes	2/21/2008	13.49
Deco	DC 3720		1.9	141	1.89	1.26	50%	7.1	5,288	Yes	2/21/2008	13.49
Deco	DCW 620		1.9	141	1.89	1.26	50%	7.1	5,288	Yes	2/21/2008	13.49
Elba	WA37T26EW2		3	198	2.07	1.26	64%	6.0	7,009	Yes	4/21/2009	18.00
Electrolux	EIFLS55I***		4.05	233	2.22	1.26	76%	3.6	5,715	Yes	9/14/2009	14.58
Electrolux	EIFLW55H**		4.05	243	2.23	1.26	77%	3.6	5,731	Yes	8/19/2008	14.58
Electrolux	EIFLW55I		4.05	243	2.23	1.26	77%	3.6	5,731	Yes	2/25/2009	14.58
Electrolux	EWFLS65I***		4.05	256	2.34	1.26	85%	3.6	5,699	Yes	9/14/2009	14.58
Electrolux	EWFLW65H		4.05	256	2.31	1.26	83%	3.8	5,985	Yes	8/19/2008	15.39
Electrolux	EWFLW65I		4.05	256	2.31	1.26	83%	3.8	5,985	Yes	2/25/2009	15.39
Equator	EW 620		1.9	141	1.89	1.26	50%	7.1	5,288	Yes	11/10/2006	13.49
Equator	*EZ 1612 V*		*1.92*	*135*	*2.04*	*1.26*	*62%*	*4.9*	*3,650*	*No*	*12/16/2002*	9.41
Equator	EZ 1720 V		1.9	141	1.89	1.26	50%	7.1	5,288	Yes	11/10/2006	13.49
Equator	EZ 2512 CEE		1.6	125	1.83	1.26	45%	6.0	3,763	Yes	11/7/2005	9.60
Equator	EZ 3612 CEE		1.92	143	1.92	1.26	52%	5.0	3,763	Yes	11/7/2005	9.60
Equator	EZ 3720 CEE		1.9	141	1.89	1.26	50%	7.1	5,288	Yes	11/10/2006	13.49
Eurotech	EWC177		2.46	217	2.5	1.26	98%	7.5	7,213	Yes	7/22/2003	18.45
Eurotech	EWF272EL		2.4	212	2.66	1.26	111%	7.3	6,868	Yes	3/25/2004	17.52
Fagor	FA-5812		1.97	193	2.07	1.26	64%	6.7	5,174	Yes	8/28/2007	13.20
Fagor	FA-5812 X		1.97	193	2.07	1.26	64%	6.7	5,174	Yes	8/28/2007	13.20
Fisher & Paykel	GWL15		3	198	2.07	1.26	64%	6.0	7,009	Yes	4/21/2009	18.00
Fisher & Paykel	IWL16	Intuitive	3	219	2	1.26	59%	6.9	8,067	Yes	2/1/2006	20.70
Fisher & Paykel	WA37T26G		3	220	2	1.26	59%	7.2	8,455	Yes	7/16/2008	21.60
Fisher & Paykel	WA37T26GW2		3	198	2.07	1.26	64%	6.0	7,009	Yes	4/21/2009	18.00
Fisher & Paykel	WA37TG1	Ecosmart	3	220	2	1.26	59%	7.2	8,455	Yes	3/18/2008	21.60
Fisher & Paykel	WA42T26GW*		3	198	2.07	1.26	64%	6.0	7,056	Yes	3/12/2010	18.00
Fisher & Paykel	WL26CW1	AquaSmart	3.1	211	2	1.26	59%	6.0	7,291	Yes	4/10/2007	18.60
Fisher & Paykel	WL26CW2		3.13	199	2.15	1.26	71%	5.8	7,104	Yes	9/11/2007	18.15
Fisher & Paykel	WL37T26*W2		3.1	175	2.25	1.26	79%	4.3	5,213	Yes	2/18/2009	13.33
Fisher & Paykel	WL37T26C		3.1	199	2.15	1.26	71%	5.8	7,036	Yes	8/6/2007	17.98
Fisher & Paykel	WL37T26D		3.1	199	2.15	1.26	71%	5.8	7,036	Yes	8/6/2007	17.98
Fisher & Paykel	WL37TD1		3.1	199	2.15	1.26	71%	5.8	7,036	Yes	7/30/2008	17.98
Fisher & Paykel	WL42T26*W*		3.1	198	2.25	1.26	79%	4.3	5,225	Yes	3/12/2010	13.33
Frigidaire	ATF6000F		3	179	2.29	1.26	82%	4.4	5,139	Yes	3/26/2007	13.20
Frigidaire	*ATF6500G*		*3*	*179*	*2.29*	*1.26*	*82%*	*4.4*	*5,139*	*No*	*3/26/2007*	13.20
Frigidaire	ATF6700F		3	179	2.29	1.26	82%	4.4	5,139	Yes	6/20/2007	13.20
Frigidaire	ATF8000F		3	203	2.22	1.26	76%	4.4	5,139	Yes	6/20/2007	13.20
Frigidaire	ATFB6000F		3	179	2.29	1.26	82%	4.4	5,139	Yes	3/26/2007	13.20
Frigidaire	*ATFB6700F*		*3*	*179*	*2.29*	*1.26*	*82%*	*4.4*	*5,139*	*No*	*10/4/2007*	13.20
Frigidaire	BAFW3574K**		3	210	2.22	1.26	76%	4.4	5,174	Yes	9/14/2009	13.20
Frigidaire	BAFW3577K**		3	175	2.31	1.26	83%	3.8	4,481	Yes	9/14/2009	11.40
Frigidaire	BLTF2940F**		3	196	2.22	1.26	76%	4.2	4,951	Yes	9/14/2009	12.60
Frigidaire	DAFW3577K**		3	175	2.31	1.26	83%	3.8	4,481	Yes	9/14/2009	11.40
Frigidaire	FAFW3511K		3	171	2.21	1.26	75%	4.3	5,045	Yes	2/26/2009	12.90
Frigidaire	FAFW3514K**		3	171	2.21	1.26	75%	4.3	5,045	Yes	9/14/2009	12.90
Frigidaire	FAFW3517K**		3	182	2.26	1.26	80%	3.7	4,398	Yes	6/9/2009	11.10
Frigidaire	FAFW3574K		3	210	2.22	1.26	76%	4.4	5,174	Yes	2/26/2009	13.20
Frigidaire	FAFW3577K**		3	175	2.31	1.26	83%	3.8	4,481	Yes	2/26/2009	11.40
Frigidaire	FTF1240F**		2.65	210	2	1.26	59%	5.4	5,589	Yes	9/11/2009	14.31
Frigidaire	FTF2140F**		3	202	2.01	1.26	60%	4.1	4,845	Yes	3/26/2007	12.30
Frigidaire	FTF530F		2.65	126	1.97	1.26	57%	7.0	7,272	Yes	8/2/2006	18.55
Frigidaire	*FTFB4000G*		*3*	*202*	*2.01*	*1.26*	*60%*	*4.1*	*4,845*	*No*	*3/26/2007*	12.30
Frigidaire	GLEH1642F		2.65	165	2.09	1.26	66%	5.2	5,412	Yes	1/2/2007	13.78
Frigidaire	GLGH1642F		2.65	165	2.09	1.26	66%	5.2	5,412	Yes	1/2/2007	13.78
Frigidaire	GLTF1570F		2.65	210	2	1.26	59%	5.4	5,589	Yes	2/26/2009	14.31
Frigidaire	GLTF2940F		3	196	2.22	1.26	76%	4.2	4,951	Yes	3/26/2007	12.60
Frigidaire	*GLTF2940K*		*3*	*196*	*2.22*	*1.26*	*76%*	*4.2*	*4,951*	*No*	*2/26/2009*	12.60
Frigidaire	LAFW3511K		3	171	2.21	1.26	75%	4.3	5,045	Yes	2/26/2009	12.90

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Last Modified: 04/19/2010

Brand	Model	Product Name	Volume (cubic Feet)	KWh/year	Modified Energy Factor	Federal Standard (MEF)	Percent Better	Water Factor	Annual Water Use	Active	Active Date	Water Use Per Load[1]
Frigidaire	LAFW3511K**		3	171	2.21	1.26	75%	4.3	5,045	Yes	9/14/2009	12.90
Frigidaire	*LAFW3574K*		*3*	*210*	*2.22*	*1.26*	*76%*	*4.4*	*5,174*	*No*	*2/26/2009*	13.20
Frigidaire	LAFW3577K**		3	175	2.31	1.26	83%	3.8	4,481	Yes	9/14/2009	11.40
Frigidaire	LTF2140F		3	202	2.01	1.26	60%	4.1	4,845	Yes	3/26/2007	12.30
Frigidaire	*LTF2140H*		*3*	*202*	*2.01*	*1.26*	*60%*	*4.1*	*4,845*	*No*	*2/26/2009*	12.30
Frigidaire	LTF2940F		3	196	2.22	1.26	76%	4.2	4,951	Yes	3/26/2007	12.60
Frigidaire	*LTF6700F*		*3*	*179*	*2.29*	*1.26*	*82%*	*4.4*	*5,139*	*No*	*10/4/2007*	13.20
Galaxy	GX 1720		1.9	141	1.89	1.26	50%	7.1	5,288	Yes	2/21/2008	13.49
Galaxy	GX 3720		1.9	141	1.89	1.26	50%	7.1	5,288	Yes	2/21/2008	13.49
Galaxy	GXW 620		1.9	141	1.89	1.26	50%	7.1	5,288	Yes	2/21/2008	13.49
General Electric	EWA5600K		3.58	229	1.93	1.26	53%	6.0	8,406	Yes	2/26/2009	21.48
General Electric	GFWN1000L		3.35	142	2.22	1.26	76%	4.0	5,250	Yes	12/29/2009	13.40
General Electric	GFWN1100L		3.56	151	2.2	1.26	75%	4.0	5,585	Yes	2/17/2010	14.24
General Electric	WBVH5200J		3.35	142	2.22	1.26	76%	4.0	5,250	Yes	11/27/2007	13.40
General Electric	WBVH5300K		3.53	131	2.32	1.26	84%	3.8	5,183	Yes	1/7/2009	13.41
General Electric	WBVH6240F		3.21	239	1.82	1.26	44%	4.6	5,785	Yes	9/1/2005	14.77
General Electric	WCRE6270K		3.58	221	1.94	1.26	54%	6.5	9,094	Yes	12/22/2008	23.27
General Electric	WCVH4800****		2.22	122	2.3	1.26	83%	4.3	3,768	Yes	5/28/2009	9.55
General Electric	WCVH4815****		2.22	122	2.3	1.26	83%	4.3	3,768	Yes	5/28/2009	9.55
General Electric	*WCVH6260F*		*3.21*	*239*	*1.82*	*1.26*	*44%*	*4.6*	*5,785*	*No*	*9/1/2005*	14.77
General Electric	WCVH6400J		3.35	142	2.2	1.26	75%	4.0	5,250	Yes	11/27/2007	13.40
General Electric	WCVH6800J		3.51	142	2.2	1.26	75%	4.0	5,496	Yes	11/27/2007	14.04
General Electric	*WCVH6800K*		*3.51*	*142*	*2.2*	*1.26*	*75%*	*4.0*	*5,496*	*No*	*5/11/2009*	14.04
General Electric	WHDVH626F		3.21	239	1.82	1.26	44%	4.6	5,785	Yes	9/1/2005	14.77
General Electric	*WHDVH680J*		*3.51*	*142*	*2.2*	*1.26*	*75%*	*4.0*	*5,496*	*No*	*11/27/2007*	14.04
General Electric	WHRE5550K		3.58	221	1.94	1.26	54%	6.5	9,094	Yes	12/22/2008	23.27
General Electric	WJRE5550K		3.58	221	1.94	1.26	54%	6.5	9,094	Yes	12/22/2008	23.27
General Electric	WPDH8800J		3.61	191	2.23	1.26	77%	4.0	5,665	Yes	4/17/2008	14.44
General Electric	*WPDH8850J*		*3.61*	*191*	*2.23*	*1.26*	*77%*	*4.0*	*5,665*	*No*	*7/7/2008*	14.44
General Electric	WPDH8900J		3.61	191	2.23	1.26	77%	4.0	5,665	Yes	7/7/2008	14.44
General Electric	WPDH8910K		3.61	191	2.23	1.26	77%	4.0	5,665	Yes	5/11/2009	14.44
General Electric	WPGT9150H***		3.53	350	1.83	1.26	45%	7.1	9,880	Yes	11/2/2007	25.06
General Electric	WPGT9360E**	Harmony	3.53	269	1.98	1.26	57%	7.1	9,797	Yes	12/6/2004	25.06
General Electric	WPRE6150K		3.58	199	2.02	1.26	60%	5.4	7,634	Yes	2/26/2009	19.33
General Electric	WPRE8150K		3.58	199	2.02	1.26	60%	5.4	7,634	Yes	2/26/2009	19.33
General Electric	WSSH300G		3	247	1.82	1.26	44%	5.6	6,633	Yes	10/2/2006	16.80
General Electric	WSXH208H		2.65	201	1.86	1.26	47%	7.2	7,511	Yes	1/2/2007	19.08
Haier	GWT750AW		3.54	309	1.86	1.26	48%	6.8	9,436	Yes	1/14/2009	24.07
Haier	GWT950AW		3.54	243	1.8	1.26	43%	6.0	8,326	Yes	6/2/2008	21.24
Inglis	IFW7300W*+		3.46	162	2.39	1.26	90%	3.9	5,263	Yes	3/16/2010	13.49
Kenmore	2508*80+		4.08	259	2.26	1.26	79%	4.5	7,165	Yes	7/16/2008	18.36
Kenmore	*2706*60+*	*Oasis*	*3.89*	*330*	*2*	*1.26*	*59%*	*6.8*	*10,323*	*No*	*10/19/2005*	26.45
Kenmore	*2707*60+*	*Oasis*	*4.02*	*330*	*2*	*1.26*	*59%*	*6.8*	*10,668*	*No*	*10/19/2005*	27.34
Kenmore	*2708*60+*	*Oasis*	*4.02*	*330*	*2*	*1.26*	*59%*	*6.8*	*10,668*	*No*	*10/19/2005*	27.34
Kenmore	*2709*60+*	*Oasis*	*4.02*	*330*	*2*	*1.26*	*59%*	*6.8*	*10,668*	*No*	*10/19/2005*	27.34
Kenmore	2803*70+		3.94	381	1.84	1.26	46%	7.5	11,564	Yes	8/21/2007	29.55
Kenmore	2804*70+		3.94	381	1.84	1.26	46%	7.5	11,564	Yes	8/21/2007	29.55
Kenmore	2806*80+		4.08	252	2.23	1.26	77%	4.4	7,101	Yes	7/16/2008	17.95
Kenmore	2807*80+		4.08	252	2.23	1.26	77%	4.4	7,101	Yes	7/16/2008	17.95
Kenmore	*2808*70+*		*4.02*	*265*	*2.19*	*1.26*	*74%*	*5.4*	*8,447*	*No*	*1/9/2008*	21.71
Kenmore	2808*80+		4.08	259	2.26	1.26	79%	4.5	7,165	Yes	7/16/2008	18.36
Kenmore	2808170*+		4.08	259	2.26	1.26	79%	4.5	7,165	Yes	12/9/2009	18.36
Kenmore	2808770*+		4.08	259	2.26	1.26	79%	4.5	7,165	Yes	12/9/2009	18.36
Kenmore	*2809*70+*		*4.02*	*265*	*2.19*	*1.26*	*74%*	*5.4*	*8,447*	*No*	*1/9/2008*	21.71
Kenmore	2809*80+		4.08	259	2.26	1.26	79%	4.5	7,165	Yes	7/16/2008	18.36
Kenmore	2809170*+		4.08	259	2.26	1.26	79%	4.5	7,165	Yes	12/9/2009	18.36
Kenmore	2809770*+		4.08	259	2.26	1.26	79%	4.5	7,165	Yes	12/9/2009	18.36
Kenmore	2982*80+		3.46	211	1.86	1.26	48%	7.2	9,698	Yes	10/15/2008	24.91
Kenmore	2983*80+		3.46	211	1.86	1.26	48%	7.2	9,698	Yes	10/15/2008	24.91
Kenmore	400##90#		3.16	119	2.6	1.26	106%	3.6	4,459	Yes	12/2/2009	11.38
Kenmore	402##90#		3.52	126	2.77	1.26	120%	3.4	4,747	Yes	8/28/2009	11.97
Kenmore	402.4903*01*		3.44	130	2.69	1.26	113%	3.3	4,423	Yes	3/8/2010	11.35
Kenmore	403##90#		3.63	119	2.88	1.26	129%	3.4	4,838	Yes	8/28/2009	12.34
Kenmore	404##90#		3.63	119	2.88	1.26	129%	3.4	4,838	Yes	8/28/2009	12.34

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Last Modified: 04/19/2010

Brand	Model	Product Name	Volume (cubic Feet)	KWh/year	Modified Energy Factor	Federal Standard (MEF)	Percent Better	Water Factor	Annual Water Use	Active	Active Date	Water Use Per Load[1]
Kenmore	4041*		2.65	224	1.83	1.26	45%	7.3	7,542	Yes	10/4/2007	19.35
Kenmore	405##90#		3.87	112	2.85	1.26	126%	3.4	5,082	Yes	12/2/2009	13.16
Kenmore	410##90#		3.87	110	2.9	1.26	130%	3.4	5,203	Yes	12/2/2009	13.16
Kenmore	421##90#		3.87	110	2.9	1.26	130%	3.4	5,203	Yes	12/2/2009	13.16
Kenmore	4282*20+	HE3	3.18	268	1.81	1.26	44%	4.4	5,435	Yes	9/28/2001	13.99
Kenmore	4292*20+	HE3t	3.18	278	1.96	1.26	56%	4.4	5,522	Yes	6/14/2001	13.99
Kenmore	4390*20+		3.18	278	1.96	1.26	56%	4.4	5,522	Yes	1/23/2003	13.99
Kenmore	4482*30+	HE3	3.18	268	1.81	1.26	44%	4.4	5,435	Yes	8/29/2003	13.99
Kenmore	4483*20+	HE3	3.18	268	1.81	1.26	44%	4.3	5,323	Yes	8/29/2003	13.67
Kenmore	4483*30+	HE3	3.18	268	1.81	1.26	44%	4.4	5,435	Yes	1/23/2003	13.99
Kenmore	4492*20+	HE3t	3.18	278	1.96	1.26	56%	4.4	5,522	Yes	1/23/2003	13.99
Kenmore	4492*30+		3.18	278	1.96	1.26	56%	4.1	5,111	Yes	10/8/2004	13.04
Kenmore	4493*20+	HE3t	3.18	278	1.96	1.26	56%	4.4	5,522	Yes	1/23/2003	13.99
Kenmore	4493*30+	HE3t	3.18	278	1.96	1.26	56%	4.1	5,111	Yes	1/23/2003	13.04
Kenmore	*4508*40+*	*HE4t*	*3.3*	*241*	*2.1*	*1.26*	*67%*	*4.3*	*5,588*	*No*	*1/18/2005*	14.19
Kenmore	*4509*40+*	*HE4t*	*3.3*	*241*	*2.1*	*1.26*	*67%*	*4.3*	*5,588*	*No*	*1/18/2005*	14.19
Kenmore	4580*40+		3.3	195	2.07	1.26	64%	4.5	5,808	Yes	2/27/2007	14.85
Kenmore	4580*50+		3.3	195	2.07	1.26	64%	4.5	5,808	Yes	8/15/2005	14.85
Kenmore	4586#40**	HE3	3.3	195	2.07	1.26	64%	4.5	5,808	Yes	8/23/2004	14.85
Kenmore	4586*50+		3.3	195	2.07	1.26	64%	4.5	5,808	Yes	8/15/2005	14.85
Kenmore	4587#40**		3.3	195	2.07	1.26	64%	4.5	5,808	Yes	8/23/2004	14.85
Kenmore	4587*50+		3.3	195	2.07	1.26	64%	4.5	5,808	Yes	8/15/2005	14.85
Kenmore	*4596*40+*	*HE3t*	*3.3*	*195*	*2.07*	*1.26*	*64%*	*4.5*	*5,808*	*No*	*10/2/2004*	14.85
Kenmore	*4596*50+*		*3.3*	*188*	*2.08*	*1.26*	*65%*	*4.5*	*5,808*	*No*	*8/11/2005*	14.85
Kenmore	*4597*40+*		*3.3*	*195*	*2.07*	*1.26*	*64%*	*4.5*	*5,808*	*No*	*2/27/2007*	14.85
Kenmore	*4597*50+*	*HE3*	*3.3*	*188*	*2.08*	*1.26*	*65%*	*4.5*	*5,808*	*No*	*10/2/2004*	14.85
Kenmore	*4598#40**	*HE4t*	*3.3*	*241*	*2.1*	*1.26*	*67%*	*4.3*	*5,588*	*No*	*8/23/2004*	14.19
Kenmore	*4599#40**	*HE4t*	*3.3*	*241*	*2.1*	*1.26*	*67%*	*4.3*	*5,588*	*No*	*8/23/2004*	14.19
Kenmore	4646*50+	HE2	2.88	170	2.1	1.26	67%	4.8	5,408	Yes	8/15/2005	13.82
Kenmore	4647*50+	HE2	2.88	170	2.1	1.26	67%	4.8	5,408	Yes	8/15/2005	13.82
Kenmore	4650*70+		2.99	165	2.22	1.26	76%	4.7	5,497	Yes	4/6/2007	14.05
Kenmore	4651*70+		2.99	165	2.22	1.26	76%	4.7	5,497	Yes	4/6/2007	14.05
Kenmore	4674*70+		3.51	140	2.38	1.26	89%	3.8	5,187	Yes	7/24/2007	13.34
Kenmore	4674*80+		3.51	133	2.28	1.26	81%	3.8	5,215	Yes	7/24/2007	13.34
Kenmore	4675*70+		3.51	140	2.38	1.26	89%	3.8	5,187	Yes	7/24/2007	13.34
Kenmore	4708*60+	HE5t	3.51	202	2.36	1.26	87%	4.0	5,476	Yes	12/21/2006	14.04
Kenmore	4709*60+	HE5t	3.51	202	2.36	1.26	87%	4.0	5,476	Yes	12/21/2006	14.04
Kenmore	4751****	HE2	3.18	150	2.58	1.26	105%	4.0	5,011	Yes	5/2/2006	12.72
Kenmore	4753****	HE2	3.18	150	2.58	1.26	105%	4.0	5,011	Yes	5/2/2006	12.72
Kenmore	4754****		3.18	150	2.58	1.26	105%	4.0	5,011	Yes	5/2/2006	12.72
Kenmore	*4756*60+*	*HE 2T*	*3.1*	*156*	*2.28*	*1.26*	*81%*	*4.4*	*5,310*	*No*	*8/24/2006*	13.64
Kenmore	4756*70+		3.26	145	2.6	1.26	106%	3.7	4,690	Yes	8/21/2007	12.06
Kenmore	*4757*60+*	*HE 2T*	*3.1*	*156*	*2.28*	*1.26*	*81%*	*4.4*	*5,310*	*No*	*8/24/2006*	13.64
Kenmore	4757*70+		3.26	145	2.6	1.26	106%	3.7	4,690	Yes	9/11/2007	12.06
Kenmore	4758****		3.26	145	2.6	1.26	106%	3.7	4,690	Yes	8/24/2006	12.06
Kenmore	4770****		3.79	136	2.64	1.26	110%	3.4	5,066	Yes	8/22/2008	12.89
Kenmore	4771****		3.79	136	2.64	1.26	110%	3.4	5,066	Yes	8/22/2008	12.89
Kenmore	4775****		3.79	136	2.64	1.26	110%	3.4	5,066	Yes	8/22/2008	12.89
Kenmore	4776****		3.79	136	2.64	1.26	110%	3.4	5,066	Yes	8/22/2008	12.89
Kenmore	4778****		3.51	151	2.59	1.26	106%	3.8	5,187	Yes	8/22/2008	13.34
Kenmore	*4778*70+*		*3.51*	*132*	*2.46*	*1.26*	*95%*	*3.8*	*5,173*	*No*	*1/27/2009*	13.34
Kenmore	4778*80+		3.79	136	2.64	1.26	110%	3.4	5,066	Yes	1/27/2010	12.89
Kenmore	47781702		3.51	132	2.46	1.26	95%	3.8	5,173	Yes	1/27/2010	13.34
Kenmore	4779****		3.51	151	2.59	1.26	106%	3.8	5,187	Yes	8/22/2008	13.34
Kenmore	4779*70+		3.51	132	2.46	1.26	95%	3.8	5,173	Yes	1/27/2009	13.34
Kenmore	4779*80+		3.79	136	2.64	1.26	110%	3.4	5,066	Yes	1/27/2010	12.89
Kenmore	4785*60+		3.51	187	2.22	1.26	76%	4.2	5,751	Yes	4/6/2007	14.74
Kenmore	4788*60+		3.51	187	2.22	1.26	76%	4.2	5,751	Yes	4/6/2007	14.74
Kenmore	4789*60+		3.51	187	2.22	1.26	76%	4.2	5,751	Yes	4/6/2007	14.74
Kenmore	4810*		3	202	2.01	1.26	60%	4.1	4,845	Yes	6/20/2007	12.30
Kenmore	*4811**		*3*	*202*	*2.01*	*1.26*	*60%*	*4.1*	*4,845*	*No*	*6/20/2007*	12.30
Kenmore	488##80#		3.16	152	2.24	1.26	78%	3.4	4,224	Yes	8/12/2008	10.74
Kenmore	4996#60**	HE3t	3.51	187	2.22	1.26	76%	4.2	5,751	Yes	12/21/2006	14.74
Kenmore	4997#60**	HE3t	3.51	187	2.22	1.26	76%	4.2	5,751	Yes	12/21/2006	14.74

Table D-1
ENERGY STAR Qualified Clothes Washers

ENERGY STAR Qualified Clothes Washers

Last Modified: 04/19/2010

Brand	Model	Product Name	Volume (cubic Feet)	KWh/year	Modified Energy Factor	Federal Standard (MEF)	Percent Better	Water Factor	Annual Water Use	Active	Active Date	Water Use Per Load[1]
Kenmore	592-4905*		3.43	140	2.6	1.26	106%	3.6	4,814	Yes	4/17/2010	12.35
Kenmore	592-4906*		3.44	130	2.69	1.26	113%	3.3	4,423	Yes	3/8/2010	11.35
Kenmore	592-4908*		3.69	120	2.75	1.26	118%	3.3	4,773	Yes	4/17/2010	12.18
KitchenAid	*KHWS01P#***	*Superba*	*3.3*	*311*	*1.85*	*1.26*	*47%*	*4.3*	*5,524*	*No*	*1/21/2004*	14.19
KitchenAid	*KHWV01R*+*		*3.3*	*214*	*2.09*	*1.26*	*66%*	*4.2*	*5,485*	*No*	*8/24/2006*	13.86
LG	LSWF388H**		4.17	108	3	1.26	138%	3.2	5,296	Yes	3/15/2010	13.34
LG	WM1355H*		2.34	108	2.4	1.26	90%	3.8	3,504	Yes	1/11/2010	8.89
LG	WM2020C*		3.16	130	2.52	1.26	100%	3.7	4,608	Yes	3/15/2010	11.69
LG	WM2050C*		3.52	126	2.77	1.26	120%	3.4	4,747	Yes	12/2/2009	11.97
LG	WM2150H**		3.52	117	2.77	1.26	120%	3.4	4,747	Yes	8/23/2009	11.97
LG	WM2501H**		3.63	124	2.87	1.26	128%	3.4	4,881	Yes	8/28/2009	12.34
LG	WM3875H***		4.17	108	3	1.26	138%	3.2	5,296	Yes	3/15/2010	13.34
LG	WM3885H***		4.17	108	3	1.26	138%	3.2	5,296	Yes	3/15/2010	13.34
LG	WM3987H**		3.63	128	2.76	1.26	119%	3.5	5,009	Yes	3/15/2010	12.71
LG Electronics	WD-324*RHD		1.96	298	2.1	1.26	67%	5.0	3,872	Yes	7/26/2001	9.80
LG Electronics	WD-327*RHD		1.95	140	1.86	1.26	47%	6.4	4,854	Yes	9/19/2002	12.48
LG Electronics	WM0001H***		3.63	143	2.65	1.26	110%	3.4	4,824	Yes	11/2/2007	12.34
LG Electronics	WM0532H*		3.22	191	2.01	1.26	60%	4.2	5,238	Yes	4/2/2003	13.52
LG Electronics	WM064#H*		3.5	135	2.4	1.26	90%	3.5	4,802	Yes	6/13/2005	12.25
LG Electronics	WM0742H**		3.63	130	2.61	1.26	107%	3.4	4,810	Yes	4/10/2008	12.34
LG Electronics	WM1812C*		2.96	184	1.89	1.26	50%	4.5	5,163	Yes	4/13/2004	13.32
LG Electronics	WM1814C*	controls)	2.96	184	1.89	1.26	50%	4.5	5,163	Yes	4/13/2004	13.32
LG Electronics	WM1815C*		2.96	184	1.89	1.26	50%	4.5	5,163	Yes	10/13/2005	13.32
LG Electronics	WM1832C*	controls)	3.22	184	2.09	1.26	66%	4.0	5,074	Yes	12/17/2002	12.88
LG Electronics	WM2000C*		3.14	148	2.21	1.26	75%	3.2	3,890	Yes	4/10/2008	10.05
LG Electronics	WM2010C*		3.14	148	2.21	1.26	75%	3.2	3,890	Yes	9/3/2008	10.05
LG Electronics	WM2011H*		3.22	191	1.83	1.26	45%	4.0	5,048	Yes	12/17/2002	12.88
LG Electronics	WM2016C*		3.2	160	2.2	1.26	75%	3.9	4,892	Yes	2/8/2008	12.48
LG Electronics	WM2016CW		3.03	152	2.25	1.26	79%	3.6	4,323	Yes	3/9/2007	10.91
LG Electronics	WM2032H*		3.22	191	2.04	1.26	62%	4.2	5,238	Yes	12/17/2002	13.52
LG Electronics	WM204#C*		3.5	143	2.5	1.26	98%	3.7	5,076	Yes	6/13/2005	12.95
LG Electronics	WM207#C*	controls)	3.32	159	2.35	1.26	87%	3.8	4,919	Yes	3/22/2004	12.62
LG Electronics	WM2101H*		3.52	127	2.46	1.26	95%	3.5	4,816	Yes	5/8/2009	12.32
LG Electronics	WM2177H*		3.21	253	1.96	1.26	56%	4.2	5,285	Yes	2/4/2005	13.48
LG Electronics	WM2233H*		3.5	133	2.3	1.26	83%	3.3	4,528	Yes	4/3/2007	11.55
LG Electronics	WM2277H*	controls)	3.32	171	2.42	1.26	92%	3.6	4,724	Yes	1/15/2004	11.95
LG Electronics	WM2301H*		3.63	119	2.89	1.26	129%	3.4	4,781	Yes	4/1/2009	12.34
LG Electronics	WM2355C*		3.6	134	2.4	1.26	90%	3.2	4,516	Yes	2/8/2008	11.52
LG Electronics	WM2411H*		3.22	199	1.87	1.26	48%	4.0	5,039	Yes	12/17/2002	12.88
LG Electronics	WM2432H*	controls)	3.22	199	2.08	1.26	65%	4.1	5,213	Yes	12/17/2002	13.20
LG Electronics	WM244#H*		3.32	167	2.38	1.26	89%	3.8	4,948	Yes	6/13/2005	12.62
LG Electronics	WM2455H*		3.6	140	2.4	1.26	90%	3.4	4,798	Yes	4/3/2007	12.24
LG Electronics	WM248#H***		3.63	137	2.65	1.26	110%	3.6	5,066	Yes	7/5/2006	13.07
LG Electronics	WM249#H**		3.6	143	2.4	1.26	90%	3.3	4,657	Yes	2/8/2008	11.88
LG Electronics	WM2496H**		3.47	167	2.44	1.26	94%	3.4	4,557	Yes	12/1/2006	11.80
LG Electronics	WM2601H*		3.87	141	2.57	1.26	104%	3.4	5,158	Yes	4/1/2009	13.16
LG Electronics	WM2677H**		3.32	176	2.34	1.26	86%	3.6	4,731	Yes	2/1/2005	11.95
LG Electronics	WM268#H***		3.6	130	2.65	1.26	110%	3.3	4,657	Yes	2/8/2008	11.88
LG Electronics	WM2701H*		3.87	141	2.57	1.26	104%	3.4	5,158	Yes	4/1/2009	13.16
LG Electronics	WM2801H***		3.87	139	2.7	1.26	114%	3.4	5,158	Yes	2/9/2009	13.16
LG Electronics	WM2901H***		3.87	141	2.87	1.26	128%	3.4	5,128	Yes	5/8/2009	13.16
LG Electronics	WM3001H***		3.87	139	2.71	1.26	115%	3.4	5,082	Yes	8/12/2008	13.16
LG Electronics	WM3431H*		2.11	197	1.96	1.26	56%	5.2	4,260	Yes	2/16/2005	10.97
LG Electronics	WM3611H*		3.22	199	1.87	1.26	48%	4.0	5,039	Yes	5/20/2003	12.88
LG Electronics	WM3632H*		3.22	199	2.08	1.26	65%	4.1	5,213	Yes	5/20/2003	13.20
LG Electronics	WM3677H*		3.22	253	1.96	1.26	56%	4.2	5,301	Yes	4/13/2004	13.52
LG Electronics	WM398#H***		3.63	154	2.54	1.26	102%	3.4	4,881	Yes	11/2/2007	12.34
Maytag	MAH2400***		2.15	191	1.8	1.26	43%	5.9	4,964	Yes	7/12/2004	12.69
Maytag	*MAH5500B*	*Neptune*	*2.9*	*243*	*1.9*	*1.26*	*51%*	*7.2*	*8,185*	*No*	*10/27/2000*	20.88
Maytag	*MAH55FLB*	*Neptune*	*2.9*	*243*	*1.9*	*1.26*	*51%*	*7.2*	*8,185*	*No*	*3/24/2003*	20.88
Maytag	*MAH6500*	*Neptune*	*2.9*	*243*	*1.9*	*1.26*	*51%*	*7.2*	*8,185*	*No*	*6/19/2002*	20.88
Maytag	*MAH6700*	*Neptune*	*2.82*	*214*	*1.81*	*1.26*	*44%*	*4.7*	*5,173*	*No*	*5/18/2005*	13.25
Maytag	*MAH8700*	*Neptune*	*3.31*	*250*	*1.83*	*1.26*	*45%*	*4.1*	*5,281*	*No*	*2/11/2005*	13.57
Maytag	*MAH9700*	*Neptune*	*3.31*	*270*	*1.84*	*1.26*	*46%*	*4.0*	*5,151*	*No*	*12/13/2004*	13.24

Table D-1
ENERGY STAR Qualified Clothes Washers

ENERGY STAR Qualified Clothes Washers

Last Modified: 04/19/2010

Brand	Model	Product Name	Volume (cubic Feet)	KWh/year	Modified Energy Factor	Federal Standard (MEF)	Percent Better	Water Factor	Annual Water Use	Active	Active Date	Water Use Per Load[1]
Maytag	*MFW9600S*+*	*Epic*	*3.29*	*218*	*1.95*	*1.26*	*55%*	*4.5*	*5,855*	*No*	*8/24/2006*	14.81
Maytag	*MFW9700S*+*	*Epic*	*3.5*	*227*	*2.15*	*1.26*	*71%*	*4.3*	*5,872*	*No*	*8/24/2006*	15.05
Maytag	*MFW9700T*+*		*3.5*	*227*	*2.15*	*1.26*	*71%*	*4.3*	*5,872*	*No*	*8/21/2007*	15.05
Maytag	*MFW9800T*+*		*3.5*	*227*	*2.15*	*1.26*	*71%*	*4.3*	*5,872*	*No*	*8/21/2007*	15.05
Maytag	MHWE300V*+		3.47	160	2.18	1.26	73%	4.3	5,822	Yes	8/12/2008	14.92
Maytag	MHWE300W#**		3.51	161	2.31	1.26	83%	4.1	5,696	Yes	7/20/2009	14.39
Maytag	MHWE400W#**		3.86	165	2.59	1.26	106%	3.8	5,765	Yes	7/20/2009	14.67
Maytag	MHWE450W#**		3.86	165	2.59	1.26	106%	3.8	5,765	Yes	7/20/2009	14.67
Maytag	MHWE500V*+		3.47	138	2.35	1.26	87%	3.8	5,210	Yes	8/12/2008	13.19
Maytag	MHWE550W#**		3.86	147	2.66	1.26	111%	3.6	5,462	Yes	7/20/2009	13.90
Maytag	MHWE900V*+		3.79	141	2.58	1.26	105%	3.6	5,274	Yes	1/27/2009	13.64
Maytag	MHWE950W#**		3.86	141	2.58	1.26	105%	3.5	5,251	Yes	7/20/2009	13.51
Maytag	MHWE950W*+		3.86	136	2.63	1.26	109%	3.4	5,190	Yes	12/9/2009	13.12
Maytag	MHWZ400T*+		3.46	139	2.45	1.26	94%	3.9	5,222	Yes	8/21/2007	13.49
Maytag	MHWZ600T*+		3.46	139	2.45	1.26	94%	3.9	5,222	Yes	8/21/2007	13.49
Maytag	MHWZ600W8+		3.46	139	2.45	1.26	94%	3.9	5,222	Yes	12/9/2009	13.49
Maytag	*MTW6500T*+*		*3.98*	*330*	*1.98*	*1.26*	*57%*	*6.9*	*10,781*	*No*	*4/6/2007*	27.46
Maytag	*MTW6600T*+*		*3.98*	*330*	*1.98*	*1.26*	*57%*	*6.9*	*10,781*	*No*	*4/6/2007*	27.46
Maytag	*MTW6700T*		*4.02*	*274*	*2.11*	*1.26*	*67%*	*5.6*	*8,746*	*No*	*2/19/2008*	22.51
Maytag	MVWB300W#**		4.08	264	2.22	1.26	76%	4.3	6,861	Yes	7/20/2009	17.54
Maytag	MVWB400V*+		4.08	252	2.23	1.26	77%	4.4	7,101	Yes	7/16/2008	17.95
Maytag	MVWB450W#**		4.31	282	2.21	1.26	75%	4.2	7,062	Yes	7/1/2009	18.10
Maytag	MVWB700V*+		4.08	252	2.23	1.26	77%	4.4	7,101	Yes	7/16/2008	17.95
Maytag	MVWB750W#**		4.31	282	2.21	1.26	75%	4.2	7,062	Yes	7/1/2009	18.10
Maytag	MVWB800V*+		4.08	249	2.25	1.26	79%	4.5	7,117	Yes	7/16/2008	18.36
Maytag	MVWB850W#**		4.34	277	2.25	1.26	79%	4.3	7,384	Yes	7/1/2009	18.66
Maytag	MVWC6ESW*+		3.43	211	1.85	1.26	47%	7.1	9,506	Yes	3/5/2009	24.35
Maytag	MVWC7ESW#**		3.43	212	1.85	1.26	47%	7.1	9,506	Yes	7/20/2009	24.35
Meridian	MD 1720		1.9	141	1.89	1.26	50%	7.1	5,288	Yes	2/21/2008	13.49
Meridian	MD 3720		1.9	141	1.89	1.26	50%	7.1	5,288	Yes	2/21/2008	13.49
Meridian	MDW 620		1.9	141	1.89	1.26	50%	7.1	5,288	Yes	2/21/2008	13.49
Miele	PW6065		2.08	133	2.22	1.26	76%	4.6	3,710	Yes	10/4/2007	9.57
Miele	*W1113*	*Series*	*1.73*	*113*	*2.11*	*1.26*	*67%*	*4.5*	*3,045*	*No*	*5/19/2004*	7.79
Miele	*W1119i*		*1.73*	*113*	*2.11*	*1.26*	*67%*	*4.5*	*3,045*	*No*	*5/19/2004*	7.79
Miele	*W1203*		*2.08*	*127*	*2.04*	*1.26*	*62%*	*4.4*	*3,547*	*No*	*5/19/2004*	9.15
Miele	*W1213*		*2.08*	*127*	*2.04*	*1.26*	*62%*	*4.4*	*3,547*	*No*	*5/19/2004*	9.15
Miele	*W1215*		*2.08*	*127*	*2.04*	*1.26*	*62%*	*4.4*	*3,547*	*No*	*5/19/2004*	9.15
Miele	W3033		1.97	138	2.31	1.26	83%	4.4	3,406	Yes	10/4/2007	8.67
Miele	W3035		1.97	138	2.31	1.26	83%	4.4	3,406	Yes	10/4/2007	8.67
Miele	W3039		1.76	128	2.24	1.26	78%	4.4	3,043	Yes	10/4/2007	7.74
Miele	W4800		3.07	186	2.4	1.26	90%	4.2	5,091	Yes	1/4/2007	12.89
Miele	W4802		3.07	186	2.4	1.26	90%	4.2	5,091	Yes	1/4/2007	12.89
Miele	W4840		3.07	186	2.4	1.26	90%	4.2	5,091	Yes	1/4/2007	12.89
Miele	W4842		3.07	186	2.4	1.26	90%	4.2	5,091	Yes	1/4/2007	12.89
Pinnacle	17-2010		1.9	141	1.89	1.26	50%	7.1	5,288	Yes	9/23/2008	13.49
Pinnacle	17-2012		1.9	141	1.89	1.26	50%	7.1	5,288	Yes	9/23/2008	13.49
Pinnacle	17-2015		1.9	141	1.89	1.26	50%	7.1	5,288	Yes	9/23/2008	13.49
Samsung	WF-J1254		1.8	156	1.81	1.26	44%	6.3	4,445	Yes	2/22/2008	11.34
Samsung	WF203***		3.11	216	2.04	1.26	62%	4.0	4,876	Yes	2/23/2007	12.44
Samsung	*WF206****		*3.29*	*210*	*2.01*	*1.26*	*60%*	*3.9*	*5,017*	*No*	*10/10/2006*	12.83
Samsung	WF209***		3.47	146	2.61	1.26	107%	3.8	5,169	Yes	1/5/2009	13.19
Samsung	WF210***		3.44	130	2.69	1.26	113%	3.3	4,423	Yes	3/8/2010	11.35
Samsung	WF218***		3.43	130	2.65	1.26	110%	3.2	4,329	Yes	3/24/2008	10.98
Samsung	WF219***		3.43	130	2.65	1.26	110%	3.2	4,303	Yes	4/27/2009	10.98
Samsung	WF220***		3.44	132	2.68	1.26	113%	3.3	4,504	Yes	3/8/2010	11.35
Samsung	WF229***		3.43	130	2.65	1.26	110%	3.2	4,303	Yes	5/18/2009	10.98
Samsung	*WF306*A**		*3.3*	*210*	*2.01*	*1.26*	*60%*	*3.9*	*5,045*	*No*	*8/21/2007*	12.87
Samsung	*WF306BHW*		*3.29*	*210*	*2.01*	*1.26*	*60%*	*3.9*	*5,017*	*No*	*2/15/2006*	12.83
Samsung	*WF306LAW*		*3.29*	*210*	*2.01*	*1.26*	*60%*	*3.9*	*5,017*	*No*	*1/20/2006*	12.83
Samsung	*WF316****		*3.29*	*220*	*2.01*	*1.26*	*60%*	*3.9*	*5,017*	*No*	*12/21/2005*	12.83
Samsung	*WF317****		*3.29*	*220*	*2.01*	*1.26*	*60%*	*3.9*	*5,017*	*No*	*5/24/2007*	12.83
Samsung	*WF326LAS*		*3.29*	*220*	*2.06*	*1.26*	*63%*	*3.9*	*4,978*	*No*	*12/1/2005*	12.83
Samsung	*WF326LAW*		*3.29*	*220*	*2.06*	*1.26*	*63%*	*3.9*	*4,978*	*No*	*12/1/2005*	12.83
Samsung	WF328***		3.43	161	2.3	1.26	83%	3.7	4,975	Yes	7/17/2007	12.69

Table D-1
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ENERGY STAR Qualified Clothes Washers

Last Modified: 04/19/2010

Brand	Model	Product Name	Volume (cubic Feet)	KWh/year	Modified Energy Factor	Federal Standard (MEF)	Percent Better	Water Factor	Annual Water Use	Active	Active Date	Water Use Per Load[1]
Samsung	WF330***		3.69	107	2.91	1.26	131%	3.1	4,484	Yes	3/10/2010	11.44
Samsung	WF337***		3.43	210	2.4	1.26	90%	3.6	4,840	Yes	3/23/2007	12.35
Samsung	WF338***		3.43	153	2.59	1.26	106%	3.6	4,840	Yes	3/17/2008	12.35
Samsung	WF339***		3.43	153	2.59	1.26	106%	3.6	4,787	Yes	2/3/2010	12.35
Samsung	WF350***		3.69	107	2.9	1.26	130%	3.1	4,484	Yes	3/10/2010	11.44
Samsung	WF407***		3.47	114	2.82	1.26	124%	3.2	4,285	Yes	9/24/2009	11.10
Samsung	WF409***		3.69	109	2.86	1.26	127%	3.1	4,499	Yes	2/10/2009	11.44
Samsung	WF410***		3.69	109	2.86	1.26	127%	3.1	4,499	Yes	3/8/2010	11.44
Samsung	WF419***		3.69	109	2.86	1.26	127%	3.1	4,499	Yes	2/10/2009	11.44
Samsung	WF428***		3.86	120	2.82	1.26	124%	3.2	4,842	Yes	7/21/2008	12.35
Samsung	*WF438****		*3.86*	*120*	*2.82*	*1.26*	*124%*	*3.2*	*4,842*	*No*	*6/2/2008*	12.35
Samsung	WF448***		3.86	108	2.82	1.26	124%	3.2	4,842	Yes	4/2/2008	12.35
Samsung	WF520***		4.3	107	3.02	1.26	140%	3.3	5,562	Yes	4/17/2010	14.19
Siemens	*WFXD5200UC*		*3.31*	*186*	*2.1*	*1.26*	*67%*	*5.3*	*6,877*	*No*	*5/4/2004*	17.54
Siemens	*WFXD5201UC*		*3.31*	*182*	*2.57*	*1.26*	*104%*	*4.3*	*5,514*	*No*	*4/5/2006*	14.23
Siemens	WFXD5202UC		3.31	161	2.57	1.26	104%	4.3	5,514	Yes	8/10/2007	14.23
Siemens	*WFXD8400UC*		*3.31*	*178*	*2.2*	*1.26*	*75%*	*4.5*	*5,839*	*No*	*5/4/2004*	14.90
Siemens	*WFXD840AUC*		*3.31*	*176*	*2.43*	*1.26*	*93%*	*4.1*	*5,268*	*No*	*10/3/2005*	13.57
Siemens	WM10S160UC		2.2	125	2.14	1.26	70%	4.5	3,907	Yes	1/15/2008	9.90
Speed Queen	AFB50+		2.84	211	1.96	1.26	56%	4.9	5,455	Yes	9/25/2008	13.92
Speed Queen	AFN50+		2.84	184	2.04	1.26	62%	4.9	5,455	Yes	9/25/2008	13.92
Speed Queen	AFN51+		2.84	184	2.04	1.26	62%	4.9	5,455	Yes	9/25/2008	13.92
Speed Queen	ATE50+		2.84	184	2.04	1.26	62%	4.9	5,455	Yes	9/25/2008	13.92
Speed Queen	ATG50+		2.84	184	2.04	1.26	62%	4.9	5,455	Yes	9/25/2008	13.92
Speed Queen	*ATSA0****		*2.84*	*184*	*2.04*	*1.26*	*62%*	*4.9*	*5,455*	*No*	*12/14/2006*	13.92
Speed Queen	*ATSA5****		*2.84*	*211*	*1.96*	*1.26*	*56%*	*4.9*	*5,455*	*No*	*12/14/2006*	13.92
Speed Queen	*CTSA0****		*2.84*	*184*	*2.04*	*1.26*	*62%*	*4.9*	*5,455*	*No*	*12/14/2006*	13.92
Speed Queen	*CTSA7****		*2.84*	*184*	*2.04*	*1.26*	*62%*	*4.9*	*5,455*	*No*	*12/14/2006*	13.92
Speed Queen	*CTSA9****		*2.84*	*184*	*2.04*	*1.26*	*62%*	*4.9*	*5,455*	*No*	*12/14/2006*	13.92
Splendide	WD2100XC		1.82	153	1.96	1.26	56%	6.4	4,552	Yes	10/23/2007	11.65
Splendide	WD2100XCP		1.82	153	1.96	1.26	56%	6.4	4,552	Yes	10/23/2007	11.65
Splendide	WDC7100XC		1.82	153	1.96	1.26	56%	6.4	4,552	Yes	10/23/2007	11.65
Staber	HXW2303		2	168	1.85	1.26	47%	6.8	5,292	Yes	10/22/2009	13.60
Staber	HXW2304		2	168	1.85	1.26	47%	6.8	5,292	Yes	10/22/2009	13.60
Staber	HXW2305		2	168	1.85	1.26	47%	6.8	5,292	Yes	10/22/2009	13.60
Staber	HXW2404		2	168	1.85	1.26	47%	6.8	5,292	Yes	3/7/2001	13.60
Staber	HXW2504		2	168	1.85	1.26	47%	6.8	5,292	Yes	3/7/2001	13.60
Summit	SPW1102		1.7	154	1.8	1.26	43%	6.6	4,418	Yes	11/6/2003	11.22
Thor	XQG65-11	Softline	2.01	203	1.85	1.26	47%	5.7	4,491	Yes	5/22/2002	11.46
Triton	TR 1720		1.9	141	1.89	1.26	50%	7.1	5,288	Yes	2/21/2008	13.49
Triton	TR 3720		1.9	141	1.89	1.26	50%	7.1	5,288	Yes	2/21/2008	13.49
Triton	TRW 620		1.9	141	1.89	1.26	50%	7.1	5,288	Yes	2/21/2008	13.49
Whirlpool	1CWTW57ESV*+		3.46	224	1.81	1.26	44%	7.1	9,589	Yes	12/9/2009	24.57
Whirlpool	*GHW9160P*+*		*3.3*	*190*	*1.98*	*1.26*	*57%*	*4.6*	*5,899*	*No*	*8/18/2004*	15.18
Whirlpool	*GHW9250M*+*	*Duet HT*	*3.18*	*285*	*1.92*	*1.26*	*52%*	*4.3*	*5,410*	*No*	*7/21/2003*	13.67
Whirlpool	*GHW9400S*+*		*3.3*	*227*	*2.04*	*1.26*	*62%*	*4.3*	*5,511*	*No*	*1/12/2007*	14.19
Whirlpool	*LHW0050***		*2.46*	*212*	*2.79*	*1.26*	*121%*	*6.0*	*5,796*	*No*	*10/19/2004*	14.76
Whirlpool	MHWE200X*+		3.46	161	2.35	1.26	87%	3.8	5,154	Yes	3/16/2010	13.15
Whirlpool	WFC7500V*+		1.97	152	2.05	1.26	63%	5.8	4,456	Yes	1/9/2008	11.43
Whirlpool	*WFW8200T*+*		*2.99*	*169*	*2.24*	*1.26*	*78%*	*4.5*	*5,251*	*No*	*8/21/2007*	13.46
Whirlpool	WFW8300S*+	Duet Sport	2.99	169	2.24	1.26	78%	4.5	5,251	Yes	3/1/2006	13.46
Whirlpool	WFW8400T*+		3.26	156	2.44	1.26	94%	4.0	5,061	Yes	7/24/2007	13.04
Whirlpool	WFW8410S*+		3.26	185	2.37	1.26	88%	4.5	5,763	Yes	8/24/2006	14.67
Whirlpool	*WFW8500S*+*	*Duet Sport HT*	*3.1*	*152*	*2.26*	*1.26*	*79%*	*4.4*	*5,286*	*No*	*5/25/2006*	13.64
Whirlpool	WFW9050X*+		3.46	162	2.39	1.26	90%	3.9	5,263	Yes	3/16/2010	13.49
Whirlpool	WFW9150W#**		3.46	139	2.45	1.26	94%	3.9	5,222	Yes	7/20/2009	13.49
Whirlpool	WFW9200S*+		3.51	186	2.16	1.26	71%	4.1	5,661	Yes	4/3/2007	14.39
Whirlpool	WFW9250W#**		3.46	139	2.45	1.26	94%	3.9	5,222	Yes	7/20/2009	13.49
Whirlpool	WFW9300V*+		3.51	186	2.29	1.26	82%	3.9	5,325	Yes	8/12/2008	13.69
Whirlpool	WFW9400S*#**		3.51	186	2.29	1.26	82%	3.9	5,325	Yes	4/3/2007	13.69
Whirlpool	WFW9400V*+		3.51	186	2.29	1.26	82%	3.9	5,325	Yes	1/21/2009	13.69
Whirlpool	WFW9450W*+		3.79	150	2.46	1.26	95%	3.8	5,675	Yes	4/29/2009	14.40
Whirlpool	WFW9470W#**		3.86	177	2.35	1.26	87%	4.1	6,143	Yes	7/20/2009	15.83
Whirlpool	WFW9500T*+		3.51	119	2.26	1.26	79%	3.6	4,967	Yes	8/21/2007	12.64

Table D-1
ENERGY STAR Qualified Clothes Washers

ENERGY STAR Qualified Clothes Washers

Last Modified: 04/19/2010

Brand	Model	Product Name	Volume (cubic Feet)	KWh/year	Modified Energy Factor	Federal Standard (MEF)	Percent Better	Water Factor	Annual Water Use	Active	Active Date	Water Use Per Load[1]
Whirlpool	WFW9550W*+		3.79	138	2.52	1.26	100%	3.5	5,259	Yes	4/29/2009	13.27
Whirlpool	WFW9600S*+		3.51	186	2.29	1.26	82%	3.9	5,325	Yes	4/23/2008	13.69
Whirlpool	WFW9600T*+		3.51	122	2.42	1.26	92%	3.7	5,050	Yes	7/24/2007	12.99
Whirlpool	WFW9700V*+		3.79	144	2.41	1.26	91%	3.8	5,705	Yes	7/16/2008	14.40
Whirlpool	WFW9750W#**		3.86	136	2.63	1.26	109%	3.4	5,190	Yes	7/20/2009	13.12
Whirlpool	WTW57ESV*+		3.46	224	1.81	1.26	44%	7.1	9,589	Yes	7/16/2008	24.57
Whirlpool	WTW57ESVW1		3.46	224	1.81	1.26	44%	7.1	9,589	Yes	7/1/2009	24.57
Whirlpool	WTW58ESVW1		3.46	224	1.81	1.26	44%	7.1	9,589	Yes	7/1/2009	24.57
Whirlpool	WTW6200V#**		3.94	381	1.82	1.26	44%	7.4	11,352	Yes	8/22/2008	29.16
Whirlpool	WTW6300W#**		4.08	264	2.22	1.26	76%	4.3	6,861	Yes	7/1/2009	17.54
Whirlpool	WTW6340W*+		4.08	264	2.22	1.26	76%	4.3	6,861	Yes	12/9/2009	17.54
Whirlpool	*WTW6400S*+*	*Cabrio*	*3.98*	*330*	*1.98*	*1.26*	*57%*	*6.9*	*10,781*	*No*	*5/25/2006*	27.46
Whirlpool	WTW6500V*+		4.31	252	2.29	1.26	82%	4.2	7,079	Yes	1/27/2009	18.10
Whirlpool	WTW6500W*+		4.31	252	2.29	1.26	82%	4.2	7,079	Yes	1/27/2009	18.10
Whirlpool	WTW6600S*+	Cabrio	3.98	330	1.98	1.26	57%	6.9	10,781	Yes	5/25/2006	27.46
Whirlpool	WTW6700T*+		4.08	252	2.23	1.26	77%	4.4	7,101	Yes	8/21/2007	17.95
Whirlpool	WTW6800W*+		4.31	252	2.29	1.26	82%	4.2	7,079	Yes	1/27/2009	18.10
Whirlpool	WTW7300X*+		4.31	186	2.52	1.26	100%	3.6	6,099	Yes	3/16/2010	15.52
Whirlpool	WTW7340X*+		4.31	186	2.52	1.26	100%	3.6	6,099	Yes	3/16/2010	15.52
White-Westinghouse	WTF330H**		2.65	126	1.97	1.26	57%	7.0	7,272	Yes	9/11/2009	18.55

[1]Product of volume and water factor

Average Gallons Per Cycle	14.32
Minimum Gallons Per Cycle	6.66
Maximum Gallons Per Cycle	29.55
Standard Deviation	3.72

Table D-2
ENERGY STAR Qualified Dishwashers

ENERGY STAR Qualified Dishwashers

Last Modified: 04/20/2010

Brand	Model	Size	kWh/Year	Gallons/Cycle	Energy Factor (EF)	Federal Standard (EF)	Percent Better	Active	Active Date
AEG-Electrolux	F45078I-M	Standard	320	4.12	0.67	0.46	46%	Yes	12/12/2008
AEG-Electrolux	F65478VI-S	Standard	316	4.35	0.68	0.46	48%	Yes	12/12/2008
AEG-Electrolux	F89078VI-M	Standard	321	3.96	0.67	0.46	46%	Yes	12/12/2008
AEG-Electrolux	F89078VI-S	Standard	321	3.96	0.67	0.46	46%	Yes	12/12/2008
Aga	ADW-24***	Standard	315	4.15	0.69	0.46	50%	Yes	4/13/2009
Aga	APRODW-***	Standard	315	4.15	0.69	0.46	50%	Yes	3/3/2010
Amana	ADB1000AW**	Standard	310	4.5	0.69	0.46	50%	Yes	6/1/2009
Amana	ADB1600AW**	Standard	317	4.37	0.68	0.46	48%	Yes	12/9/2009
Ariston	L63*	Standard	270	5	0.80	0.46	74%	Yes	8/4/2004
Ariston	LI640*	Standard	270	5	0.80	0.46	74%	Yes	8/4/2004
Ariston	LI670*	Standard	270	5	0.80	0.46	74%	Yes	8/4/2004
Ariston	LI700*	Standard	270	5	0.80	0.46	74%	Yes	8/4/2004
Ariston	LL64*	Standard	270	5	0.80	0.46	74%	Yes	8/4/2004
Ariston	LL65*	Standard	270	5	0.80	0.46	74%	Yes	8/4/2004
Asko	D3112	Standard	278	3.82	0.85	0.46	85%	Yes	7/21/2005
Asko	D3122**	Standard	247	3.82	0.87	0.46	89%	Yes	7/21/2005
Asko	D3152	Standard	242	3.8	0.89	0.46	93%	Yes	6/11/2007
Asko	D3232	Standard	278	3.82	0.85	0.46	85%	Yes	4/5/2006
Asko	D3232 Encore	Standard	247	3.82	0.87	0.46	89%	Yes	8/5/2009
Asko	D3251	Standard	242	3.8	0.89	0.46	93%	Yes	6/11/2007
Asko	D3531	Standard	194	3.8	1.19	0.46	159%	Yes	6/11/2007
Asko	D3731	Standard	247	3.82	0.87	0.46	89%	Yes	4/5/2006
Asko	D5110XXLB	Standard	252	3.82	0.85	0.46	85%	Yes	8/5/2009
Asko	D5110XXLQ	Standard	252	3.82	0.85	0.46	85%	Yes	8/5/2009
Asko	D5110XXLS	Standard	252	3.82	0.85	0.46	85%	Yes	8/5/2009
Asko	D5110XXLW	Standard	252	3.82	0.85	0.46	85%	Yes	8/5/2009
Asko	D5122ADA	Standard	258	3.82	0.83	0.46	80%	Yes	2/16/2010
Asko	D5122XXLB	Standard	259	3.82	0.83	0.46	80%	Yes	8/5/2009
Asko	D5122XXLS	Standard	259	3.82	0.83	0.46	80%	Yes	8/5/2009
Asko	D5122XXLW	Standard	259	3.82	0.83	0.46	80%	Yes	8/5/2009
Asko	D5152XXLB	Standard	257	3.8	0.83	0.46	80%	Yes	8/5/2009
Asko	D5152XXLS	Standard	257	3.8	0.83	0.46	80%	Yes	8/5/2009
Asko	D5152XXLW	Standard	257	3.8	0.83	0.46	80%	Yes	8/5/2009
Asko	D5220XXLFI	Standard	252	3.82	0.85	0.46	85%	Yes	8/5/2009
Asko	D5220XXLS	Standard	252	3.82	0.85	0.46	85%	Yes	8/5/2009
Asko	D5223XXLCS	Standard	259	3.82	0.83	0.46	80%	Yes	8/5/2009
Asko	D5223XXLFI	Standard	259	3.82	0.83	0.46	80%	Yes	8/5/2009
Asko	D5223XXLIS	Standard	259	3.82	0.83	0.46	80%	Yes	8/5/2009
Asko	D5233ADAFI	Standard	259	3.82	0.83	0.46	80%	Yes	2/16/2010
Asko	D5233ADAHS	Standard	259	3.82	0.83	0.46	80%	Yes	2/16/2010
Asko	D5233XXLCS	Standard	259	3.82	0.83	0.46	80%	Yes	8/5/2009
Asko	D5233XXLFI	Standard	259	3.82	0.83	0.46	80%	Yes	8/5/2009
Asko	D5233XXLFIENC	Standard	259	3.82	0.83	0.46	80%	Yes	8/5/2009
Asko	D5233XXLS	Standard	259	3.82	0.83	0.46	80%	Yes	8/5/2009
Asko	D5253XXLFI	Standard	257	3.8	0.83	0.46	80%	Yes	8/5/2009
Asko	D5253XXLHS	Standard	257	3.8	0.83	0.46	80%	Yes	8/5/2009
Asko	D5883XXLFIENC	Standard	259	3.82	0.83	0.46	80%	Yes	8/5/2009
Asko	D5883XXLHSENC	Standard	259	3.82	0.83	0.46	80%	Yes	8/5/2009
Asko	D5893XXLFI	Standard	187	3.8	1.16	0.46	152%	Yes	8/5/2009
Asko	D5893XXLHS	Standard	187	3.8	1.16	0.46	152%	Yes	8/5/2009
Avanti	DW18	Standard	280	3.96	0.77	0.46	67%	Yes	3/27/2009
Avanti	DW181SS	Standard	280	3.96	0.77	0.46	67%	Yes	3/27/2009
Blomberg	DW14110NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
Blomberg	DW14120NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
Blomberg	DW14140NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
Blomberg	DW15110NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
Blomberg	DW15111NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
Blomberg	DW15120NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
Blomberg	DW15121NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
Blomberg	DW15140NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
Blomberg	DW15141NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
Blomberg	DW34100NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
Blomberg	DW34110NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
Blomberg	DW34120NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
Blomberg	DW34140NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
Blomberg	DW35100NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
Blomberg	DW35110NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
Blomberg	DW35120NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
Blomberg	DW35140NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
Blomberg	DW36100NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
Blomberg	DW36101NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
Blomberg	DW36110NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
Blomberg	DW36111NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
Blomberg	DW36120NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
Blomberg	DW36121NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
Blomberg	DW36140NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
Blomberg	DW36141NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
Blomberg	DWT 14410 ULTRA	Standard	303	5.2	0.71	0.46	54%	Yes	7/29/2008
Blomberg	DWT 14420 ULTRA	Standard	303	5.2	0.71	0.46	54%	Yes	7/29/2008

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Brand	Model	Size	kWh/Year	Gallons/Cycle	Energy Factor (EF)	Federal Standard (EF)	Percent Better	Active	Active Date
Blomberg	DWT 14440 ULTRA	Standard	303	5.2	0.71	0.46	54%	Yes	7/29/2008
Blomberg	DWT 34400 ULTRA	Standard	303	5.2	0.71	0.46	54%	Yes	7/29/2008
Blomberg	DWT 34410 ULTRA	Standard	303	5.2	0.71	0.46	54%	Yes	7/29/2008
Blomberg	DWT 34420 ULTRA	Standard	303	5.2	0.71	0.46	54%	Yes	7/29/2008
Blomberg	DWT 34440 ULTRA	Standard	303	5.2	0.71	0.46	54%	Yes	7/29/2008
Blomberg	DWT 37200 NBL00	Standard	290	4.8	0.74	0.46	61%	Yes	7/29/2008
Blomberg	DWT 37210 NBL00	Standard	290	4.8	0.74	0.46	61%	Yes	7/29/2008
Blomberg	DWT 37220 NBL00	Standard	290	4.8	0.74	0.46	61%	Yes	7/29/2008
Blomberg	DWT 37240 NBL00	Standard	290	4.8	0.74	0.46	61%	Yes	7/29/2008
Blomberg	DWT14210NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	7/30/2007
Blomberg	DWT14220NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	7/30/2007
Blomberg	DWT14240NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	7/30/2007
Blomberg	DWT15210NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	7/30/2007
Blomberg	DWT15211NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	7/30/2007
Blomberg	DWT15220NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	7/30/2007
Blomberg	DWT15221NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	7/30/2007
Blomberg	DWT15240NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	7/30/2007
Blomberg	DWT15241NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	7/30/2007
Blomberg	DWT34200NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	7/30/2007
Blomberg	DWT34210NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	7/30/2007
Blomberg	DWT34220NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	7/30/2007
Blomberg	DWT34240NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	7/30/2007
Blomberg	DWT34500 CARRERA	Standard	303	5.2	0.71	0.46	54%	Yes	4/13/2009
Blomberg	DWT34510 CARRERA	Standard	303	5.2	0.71	0.46	54%	Yes	4/13/2009
Blomberg	DWT34520 CARRERA	Standard	303	5.2	0.71	0.46	54%	Yes	4/13/2009
Blomberg	DWT34540 CARRERA	Standard	303	5.2	0.71	0.46	54%	Yes	4/13/2009
Blomberg	DWT35200NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	7/30/2007
Blomberg	DWT35210NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	7/30/2007
Blomberg	DWT35220NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	7/30/2007
Blomberg	DWT35240NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	7/30/2007
Blomberg	DWT36200NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	7/30/2007
Blomberg	DWT36201NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	7/30/2007
Blomberg	DWT36210NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	7/30/2007
Blomberg	DWT36211NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	7/30/2007
Blomberg	DWT36220NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	7/30/2007
Blomberg	DWT36221NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	7/30/2007
Blomberg	DWT36240NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	7/30/2007
Blomberg	DWT36241NBL00	Standard	303	5.2	0.71	0.46	54%	Yes	7/30/2007
Bosch	SGE63E0#UC	Standard	234	1.56	0.92	0.46	100%	Yes	3/26/2009
Bosch	*SGV45E03UC*	*Standard*	*290*	*2.58*	*0.74*	*0.46*	*61%*	*No*	*5/31/2007*
Bosch	*SGX58E05UC*	*Standard*	*234*	*1.57*	*0.94*	*0.46*	*104%*	*No*	*7/7/2009*
Bosch	*SHE33M0#UC*	*Standard*	*259*	*2.86*	*0.83*	*0.46*	*80%*	*No*	*5/31/2007*
Bosch	SHE33P0#UC	Standard	259	2.86	0.83	0.46	80%	Yes	6/15/2009
Bosch	*SHE42L1#UC*	*Standard*	*315*	*2.89*	*0.68*	*0.46*	*48%*	*No*	*8/19/2005*
Bosch	*SHE43F0#UC*	*Standard*	*315*	*2.89*	*0.68*	*0.46*	*48%*	*No*	*5/31/2007*
Bosch	SHE43F1#UC	Standard	259	2.86	0.83	0.46	80%	Yes	6/15/2009
Bosch	*SHE43M0#UC*	*Standard*	*259*	*2.86*	*0.83*	*0.46*	*80%*	*No*	*5/31/2007*
Bosch	SHE43P0#UC	Standard	259	2.86	0.83	0.46	80%	Yes	6/15/2009
Bosch	SHE43P1#UC	Standard	259	2.86	0.83	0.46	80%	Yes	6/15/2009
Bosch	*SHE45C0#UC*	*Standard*	*315*	*2.89*	*0.68*	*0.46*	*48%*	*No*	*11/21/2006*
Bosch	*SHE45M0#UC*	*Standard*	*259*	*2.86*	*0.83*	*0.46*	*80%*	*No*	*5/31/2007*
Bosch	*SHE4AM0#UC*	*Standard*	*300*	*2.38*	*0.72*	*0.46*	*57%*	*No*	*4/2/2008*
Bosch	SHE4AM1#UC	Standard	300	2.38	0.72	0.46	57%	Yes	4/2/2008
Bosch	*SHE53L0#UC*	*Standard*	*315*	*2.89*	*0.68*	*0.46*	*48%*	*No*	*7/24/2007*
Bosch	SHE55C0#UC	Standard	307	2.89	0.70	0.46	52%	Yes	4/2/2008
Bosch	*SHE55M0#UC*	*Standard*	*259*	*2.86*	*0.83*	*0.46*	*80%*	*No*	*5/31/2007*
Bosch	SHE55M1#UC	Standard	259	2.86	0.83	0.46	80%	Yes	10/29/2008
Bosch	SHE55P0#UC	Standard	259	2.86	0.83	0.46	80%	Yes	6/15/2009
Bosch	*SHE58C0#UC*	*Standard*	*290*	*2.58*	*0.74*	*0.46*	*61%*	*No*	*5/4/2006*
Bosch	SHE5AL0#UC	Standard	300	2.38	0.72	0.46	57%	Yes	3/26/2009
Bosch	*SHE5AM0#UC*	*Standard*	*300*	*2.38*	*0.72*	*0.46*	*57%*	*No*	*4/2/2008*
Bosch	SHE65P0#UC	Standard	259	2.21	0.83	0.46	80%	Yes	6/15/2009
Bosch	SHE68E05UC	Standard	180	1.56	1.19	0.46	159%	Yes	3/26/2009
Bosch	SHE68E15UC	Standard	180	1.56	1.19	0.46	159%	Yes	3/26/2009
Bosch	*SHE68M0#UC*	*Standard*	*234*	*2.21*	*0.92*	*0.46*	*100%*	*No*	*7/24/2007*
Bosch	SHE68P0#UC	Standard	234	2.21	0.92	0.46	100%	Yes	6/15/2009
Bosch	SHE6AF0#UC	Standard	300	2.38	0.72	0.46	57%	Yes	6/15/2009
Bosch	SHE6AP0#UC	Standard	300	2.38	0.72	0.46	57%	Yes	3/26/2009
Bosch	*SHE98M05UC*	*Standard*	*190*	*2.05*	*1.13*	*0.46*	*146%*	*No*	
Bosch	SHV43P13UC	Standard	259	2.86	0.83	0.46	80%	Yes	6/15/2009
Bosch	*SHV45M03UC*	*Standard*	*259*	*2.86*	*0.83*	*0.46*	*80%*	*No*	*5/31/2007*
Bosch	SHV65P03UC	Standard	259	2.21	0.83	0.46	80%	Yes	6/15/2009
Bosch	SHV68E13UC	Standard	180	1.56	1.19	0.46	159%	Yes	3/26/2009
Bosch	*SHV68M03UC*	*Standard*	*234*	*2.21*	*0.92*	*0.46*	*100%*	*No*	*7/24/2007*
Bosch	SHV68P03UC	Standard	234	2.21	0.92	0.46	100%	Yes	6/15/2009
Bosch	*SHV98M03UC*	*Standard*	*190*	*2.05*	*1.13*	*0.46*	*146%*	*No*	*5/31/2007*
Bosch	*SHX33M0#UC*	*Standard*	*259*	*2.86*	*0.83*	*0.46*	*80%*	*No*	*5/31/2007*
Bosch	*SHX36L15UC*	*Standard*	*315*	*2.89*	*0.68*	*0.46*	*48%*	*No*	*6/15/2009*
Bosch	*SHX3AM0#UC*	*Standard*	*300*	*2.38*	*0.72*	*0.46*	*57%*	*No*	*4/2/2008*

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Brand	Model	Size	kWh/Year	Gallons/Cycle	Energy Factor (EF)	Federal Standard (EF)	Percent Better	Active	Active Date
Bosch	*SHX43M0#UC*	*Standard*	*259*	*2.86*	*0.83*	*0.46*	*80%*	*No*	*5/31/2007*
Bosch	SHX43P1#UC	Standard	259	2.86	0.83	0.46	80%	Yes	6/15/2009
Bosch	SHX45L05UC	Standard	259	2.86	0.83	0.46	80%	Yes	6/15/2009
Bosch	*SHX45M0#UC*	*Standard*	*259*	*2.86*	*0.83*	*0.46*	*80%*	*No*	*5/31/2007*
Bosch	SHX45P0#UC	Standard	259	2.86	0.83	0.46	80%	Yes	6/15/2009
Bosch	SHX4AP0#UC	Standard	300	2.38	0.72	0.46	57%	Yes	3/26/2009
Bosch	*SHX55M0#UC*	*Standard*	*259*	*2.86*	*0.83*	*0.46*	*80%*	*No*	*5/31/2007*
Bosch	SHX5AL0#UC	Standard	300	2.38	0.72	0.46	57%	Yes	3/26/2009
Bosch	SHX65P0#UC	Standard	259	2.21	0.83	0.46	80%	Yes	6/15/2009
Bosch	SHX68E05UC	Standard	180	1.56	1.19	0.46	159%	Yes	3/26/2009
Bosch	SHX68E15UC	Standard	180	1.56	1.19	0.46	159%	Yes	3/26/2009
Bosch	*SHX68M0#UC*	*Standard*	*234*	*2.21*	*0.92*	*0.46*	*100%*	*No*	*7/24/2007*
Bosch	SHX68P05UC	Standard	234	2.21	0.92	0.46	100%	Yes	6/15/2009
Bosch	SHX6AP0#UC	Standard	300	2.38	0.72	0.46	57%	Yes	3/26/2009
Bosch	*SHX98M0#UC*	*Standard*	*190*	*2.05*	*1.13*	*0.46*	*146%*	*No*	*5/31/2007*
Bosch	SRV53C03UC	Standard	315	2.89	0.68	0.46	48%	Yes	3/16/2006
Crosley	CUD4700W**	Standard	310	4.5	0.69	0.46	50%	Yes	6/1/2009
Crosley	CUD6710W**	Standard	312	4.83	0.69	0.46	50%	Yes	6/1/2009
Crosley	CUD6710X**	Standard	300	4.08	0.72	0.46	57%	Yes	10/30/2009
DCS	DD124	Compact	157	2.9	1.39	0.62	124%	Yes	5/12/2005
DCS	DD224	Standard	308	5.8	0.72	0.46	57%	Yes	5/12/2005
Dacor	ED24	Standard	314	3.4	0.75	0.46	63%	Yes	9/12/2007
Dacor	ID24	Standard	314	3.4	0.75	0.46	63%	Yes	9/12/2007
Dacor	MD24	Standard	314	3.4	0.75	0.46	63%	Yes	9/12/2007
Dacor	PD24	Standard	314	3.4	0.75	0.46	63%	Yes	9/12/2007
Danby	DDW1809W	Standard	285	3.38	0.78	0.46	70%	Yes	7/7/2009
Danby	DDW1899WP	Standard	285	3.38	0.78	0.46	70%	Yes	7/7/2009
Danby	DDW497*	Compact	200	2.8	1.07	0.62	73%	Yes	10/4/2007
Danby Designer	DDW1899BLS	Standard	285	3.38	0.78	0.46	70%	Yes	7/7/2009
EdgeStar	DWP45ES	Compact	200	2.64	1.07	0.62	73%	Yes	12/12/2008
EdgeStar	DWP60ES	Compact	220	3.83	1.02	0.62	65%	Yes	8/12/2009
Electrolux	EDW7505***A	Standard	299	3.08	0.75	0.46	63%	Yes	12/1/2008
Electrolux	EIDW6105***	Standard	324	4.35	0.70	0.46	52%	Yes	1/7/2008
Electrolux	EIDW6105***A	Standard	299	3.08	0.75	0.46	63%	Yes	1/7/2008
Electrolux	EIDW6305***	Standard	324	4.35	0.70	0.46	52%	Yes	1/7/2008
Electrolux	EIDW6305***A	Standard	299	3.08	0.75	0.46	63%	Yes	1/7/2008
Electrolux	EIDW6405***	Standard	324	4.35	0.70	0.46	52%	Yes	1/7/2008
Electrolux	EIDW6405***A	Standard	299	3.08	0.75	0.46	63%	Yes	1/7/2008
Electrolux	*EIDW7505*	*Standard*	*324*	*4.35*	*0.70*	*0.46*	*52%*	*No*	*7/13/2009*
Electrolux	EWDW6505***	Standard	324	4.35	0.70	0.46	52%	Yes	1/7/2008
Electrolux	EWDW6505***B	Standard	303	3.08	0.75	0.46	63%	Yes	1/7/2008
Estate	TUD4700W**	Standard	310	4.5	0.69	0.46	50%	Yes	6/1/2009
Estate	TUD6710W**	Standard	312	4.83	0.69	0.46	50%	Yes	6/1/2009
Estate	TUD8700W***	Standard	320	4.15	0.68	0.46	48%	Yes	5/6/2009
Estate	TUD8700X**	Standard	300	4.08	0.72	0.46	57%	Yes	10/30/2009
EuroDesign	EDDW4BL	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
EuroDesign	EDDW4SS	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
EuroDesign	EDDW4WH	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
EuroDesign	EDDW61IT	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
EuroDesign	EDDW6BL	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
EuroDesign	EDDW6SS	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
EuroDesign	EDDW6WH	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
Fagor	LFA-013 IX	Standard	301	3.35	0.74	0.46	62%	Yes	2/1/2006
Fagor	LFA-013 SS	Standard	301	3.35	0.74	0.46	62%	Yes	2/1/2006
Fagor	LFA-073 IT	Standard	297	3.2	0.77	0.46	68%	Yes	2/1/2006
Fagor	LFA-073 SS	Standard	297	3.2	0.77	0.46	68%	Yes	2/1/2006
Fagor	LFA-086XL	Standard	321	3.96	0.67	0.46	46%	Yes	12/12/2008
Fagor	LFA-086XLIT	Standard	321	3.96	0.67	0.46	46%	Yes	12/12/2008
Fagor	LFA-65 IT	Standard	301	3.35	0.74	0.46	62%	Yes	2/1/2006
Fagor	LFA-65 ITX	Standard	301	3.35	0.74	0.46	62%	Yes	2/1/2006
Fagor	LFA-65 SS	Standard	301	3.35	0.74	0.46	62%	Yes	2/1/2006
Fisher & Paykel	DD24D**	Standard	314	5.8	0.72	0.46	57%	Yes	3/23/2009
Fisher & Paykel	DD24S**	Compact	160	2.9	1.39	0.62	124%	Yes	3/23/2009
Fisher & Paykel	DD605	Standard	308	5.8	0.72	0.46	57%	Yes	7/24/2007
Fisher & Paykel	DS605	Compact	157	2.9	1.39	0.62	124%	Yes	7/24/2007
Frigidaire	BBBD2432K*	Standard	316	4.73	0.69	0.46	50%	Yes	2/4/2010
Frigidaire	BGBD2432***	Standard	316	4.73	0.69	0.46	50%	Yes	7/13/2009
Frigidaire	BGHD2433***	Standard	283	3.68	0.79	0.46	72%	Yes	7/13/2009
Frigidaire	CBD400 * * * *	Standard	303	4.87	0.73	0.46	59%	Yes	9/11/2009
Frigidaire	CBD600****	Standard	309	4.86	0.71	0.46	54%	Yes	8/14/2009
Frigidaire	CDB400****	Standard	303	4.87	0.73	0.46	59%	Yes	8/14/2009
Frigidaire	DGBD2432***	Standard	316	4.73	0.69	0.46	50%	Yes	7/13/2009
Frigidaire	DGHD2433	Standard	283	3.68	0.79	0.46	72%	Yes	7/13/2009
Frigidaire	EDB145XAK**	Standard	283	3.68	0.79	0.46	72%	Yes	3/24/2010
Frigidaire	FDB1100RH**	Standard	309	4.86	0.71	0.46	54%	Yes	7/22/2009
Frigidaire	FDB1450****	Standard	318	5.15	0.69	0.46	50%	Yes	3/19/2008
Frigidaire	FDB1500LF**	Standard	318	5.15	0.69	0.46	50%	Yes	12/28/2006
Frigidaire	*FDB1500RH**	*Standard*	*318*	*5.15*	*0.69*	*0.46*	*50%*	*No*	*8/14/2009*
Frigidaire	FDB1502***	Standard	318	5.15	0.69	0.46	50%	Yes	7/24/2009

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Brand	Model	Size	kWh/Year	Gallons/Cycle	Energy Factor (EF)	Federal Standard (EF)	Percent Better	Active	Active Date
Frigidaire	FDB1502RH**	Standard	318	5.15	0.69	0.46	50%	Yes	7/24/2009
Frigidaire	FDB2410***1	Standard	320	5.02	0.69	0.46	50%	Yes	9/30/2009
Frigidaire	*FDB2415****	*Standard*	*315*	*4.62*	*0.69*	*0.46*	*50%*	*No*	*9/19/2006*
Frigidaire	*FDB4315****	*Standard*	*309*	*3.88*	*0.72*	*0.46*	*57%*	*No*	*7/18/2006*
Frigidaire	FDB520****	Standard	303	4.87	0.73	0.46	59%	Yes	9/17/2008
Frigidaire	FDBB1502****	Standard	318	5.15	0.69	0.46	50%	Yes	9/11/2009
Frigidaire	*FDBB2455****	*Standard*	*315*	*4.62*	*0.69*	*0.46*	*50%*	*No*	*9/19/2006*
Frigidaire	*FDBB2865****	*Standard*	*315*	*4.62*	*0.69*	*0.46*	*50%*	*No*	*9/19/2006*
Frigidaire	*FDBB4365****	*Standard*	*309*	*3.88*	*0.72*	*0.46*	*57%*	*No*	*7/18/2006*
Frigidaire	FFBD2403L**A	Standard	303	4.87	0.73	0.46	59%	Yes	2/4/2010
Frigidaire	FFBD2405****	Standard	303	4.87	0.73	0.46	59%	Yes	8/14/2009
Frigidaire	FFBD2407***A	Standard	309	4.86	0.71	0.46	54%	Yes	3/24/2010
Frigidaire	FFBD2409***A	Standard	318	5.15	0.69	0.46	50%	Yes	3/24/2010
Frigidaire	FGBD2431***	Standard	320	5.31	0.68	0.46	48%	Yes	5/11/2009
Frigidaire	FGBD2432***	Standard	316	4.73	0.69	0.46	50%	Yes	5/27/2009
Frigidaire	FGBD2451***	Standard	316	4.73	0.69	0.46	50%	Yes	5/27/2009
Frigidaire	FGHD2433***	Standard	283	3.68	0.79	0.46	72%	Yes	6/30/2009
Frigidaire	FGHD2461***	Standard	283	3.68	0.79	0.46	72%	Yes	6/30/2009
Frigidaire	FGHD2471***	Standard	283	3.68	0.79	0.46	72%	Yes	6/30/2009
Frigidaire	*FGHD2491LB**	*Standard*	*280*	*4.3*	*0.74*	*0.46*	*61%*	*No*	*12/16/2009*
Frigidaire	*FGHD2491LW**	*Standard*	*280*	*4.3*	*0.74*	*0.46*	*61%*	*No*	*12/16/2009*
Frigidaire	*FMB330****	*Standard*	*300*	*4.81*	*0.72*	*0.46*	*57%*	*No*	*4/3/2007*
Frigidaire	*FMP330****	*Standard*	*300*	*4.81*	*0.72*	*0.46*	*57%*	*No*	*4/3/2007*
Frigidaire	FPHD2481***	Standard	283	3.68	0.79	0.46	72%	Yes	6/30/2009
Frigidaire	*FPHD2482****	*Standard*	*283*	*3.68*	*0.79*	*0.46*	*72%*	*No*	*6/30/2009*
Frigidaire	FPHD2491KF*	Standard	280	4.3	0.74	0.46	61%	Yes	9/3/2009
Frigidaire	*GLD2445****	*Standard*	*315*	*4.62*	*0.69*	*0.46*	*50%*	*No*	*9/19/2006*
Frigidaire	*GLD4355****	*Standard*	*309*	*3.88*	*0.72*	*0.46*	*57%*	*No*	*6/29/2006*
Frigidaire	LFBD2409***A	Standard	318	5.15	0.69	0.46	50%	Yes	3/24/2010
Frigidaire	LGBD2431***A	Standard	320	5.31	0.68	0.46	48%	Yes	3/24/2010
Frigidaire	LGBD2432***A	Standard	316	4.73	0.69	0.46	50%	Yes	3/24/2010
Frigidaire	LGHD2433***	Standard	283	3.68	0.79	0.46	72%	Yes	7/13/2009
Frigidaire	*PLD2855****	*Standard*	*315*	*4.62*	*0.69*	*0.46*	*50%*	*No*	*9/19/2006*
Frigidaire	*PLD4375****	*Standard*	*309*	*3.88*	*0.72*	*0.46*	*57%*	*No*	*6/29/2006*
Frigidaire	*PLD4555****	*Standard*	*309*	*3.88*	*0.72*	*0.46*	*57%*	*No*	*6/29/2006*
Fulgor	DW324K1***	Standard	313	4	0.68	0.46	48%	Yes	2/18/2009
Fulgor	DW524L1***	Standard	313	4	0.68	0.46	48%	Yes	2/18/2009
Fulgor	DW524M1***	Standard	313	4	0.68	0.46	48%	Yes	2/18/2009
Fulgor	DW724M1***	Standard	313	4	0.68	0.46	48%	Yes	2/18/2009
GE	GDWF1**R	Standard	322	5.6	0.69	0.46	50%	Yes	7/27/2009
GE	GDWT1**R	Standard	322	5.1	0.68	0.46	48%	Yes	7/27/2009
GE	GDWT2**R	Standard	322	5.6	0.69	0.46	50%	Yes	7/27/2009
GE	GDWT3**R	Standard	322	5.6	0.69	0.46	50%	Yes	7/27/2009
GE	GHDF3**R	Standard	322	5.6	0.69	0.46	50%	Yes	7/27/2009
GE	GLD4***R	Standard	324	5.5	0.73	0.46	59%	Yes	7/27/2009
GE	GLD5***P	Standard	324	5.4	0.74	0.46	61%	Yes	7/27/2009
GE	GLD5***R	Standard	324	5.5	0.73	0.46	59%	Yes	7/27/2009
GE	GLD6***R	Standard	324	5.6	0.69	0.46	50%	Yes	7/27/2009
GE	GLD7***R	Standard	324	5.6	0.69	0.46	50%	Yes	7/27/2009
GE	GSC3***R	Standard	324	5.3	0.71	0.46	54%	Yes	9/17/2009
GE	GSD2***R	Standard	324	5.3	0.70	0.46	52%	Yes	7/27/2009
GE	GSD3***R	Standard	324	5.3	0.71	0.46	54%	Yes	7/27/2009
GE	GSD4***R	Standard	324	5.6	0.70	0.46	52%	Yes	7/27/2009
GE Cafe	CDW9***N**	Standard	322	5.1	0.69	0.46	50%	Yes	11/2/2007
GE Cafe	CDWT9**R	Standard	322	5.6	0.69	0.46	50%	Yes	7/27/2009
GE Eterna	EDWF***P	Standard	322	5.1	0.68	0.46	48%	Yes	1/8/2009
GE Monogram	ZBD****P	Standard	322	5.5	0.72	0.46	57%	Yes	7/27/2009
GE Monogram	ZBD18**N	Standard	305	5.4	0.73	0.46	59%	Yes	5/28/2008
GE Monogram	ZBD69**P10	Standard	322	5.5	0.72	0.46	57%	Yes	1/8/2009
GE Monogram	ZBD79**P10	Standard	322	5.5	0.72	0.46	57%	Yes	11/10/2008
GE Monogram	ZBD89**P10	Standard	322	5.5	0.72	0.46	57%	Yes	1/8/2009
GE Profile	PDW18**N	Standard	305	5.4	0.73	0.46	59%	Yes	5/28/2008
GE Profile	PDW7***P00	Standard	324	5.1	0.68	0.46	48%	Yes	5/11/2009
GE Profile	PDWF2**P00	Standard	322	5.1	0.68	0.46	48%	Yes	11/10/2008
GE Profile	PDWF4**P00	Standard	322	5.1	0.68	0.46	48%	Yes	11/10/2008
GE Profile	PDWF5**P00	Standard	322	5.1	0.69	0.46	50%	Yes	11/10/2008
GE Profile	PDWF6**R	Standard	322	5.6	0.69	0.46	50%	Yes	7/27/2009
GE Profile	PDWF7**P	Standard	324	5.4	0.74	0.46	61%	Yes	7/27/2009
GE Profile	PDWF7**P10	Standard	324	5.4	0.74	0.46	61%	Yes	11/10/2008
GE Profile	PDWF8**R	Standard	322	5.6	0.69	0.46	50%	Yes	7/27/2009
GE Profile	PDWT1**R	Standard	322	5.6	0.69	0.46	50%	Yes	7/27/2009
GE Profile	PDWT2**P00	Standard	322	5.1	0.69	0.46	50%	Yes	11/10/2008
GE Profile	PDWT3**R	Standard	322	5.6	0.69	0.46	50%	Yes	7/27/2009
GE Profile	PDWT4**P00	Standard	322	5.1	0.69	0.46	50%	Yes	11/10/2008
GE Profile	PDWT4**R	Standard	322	5.6	0.69	0.46	50%	Yes	7/27/2009
GE Profile	PDWT5**R	Standard	322	5.6	0.69	0.46	50%	Yes	7/27/2009
GE Profile	PDWT5**T	Standard	322	5.6	0.69	0.46	50%	Yes	7/27/2009
GE Profile	PDWT50*P	Standard	318	5.1	0.69	0.46	50%	Yes	7/27/2009
GE Profile	PDWT50*P00	Standard	322	5.1	0.69	0.46	50%	Yes	11/10/2008

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GE Profile	PDWT51*P	Standard	322	5.5	0.72	0.46	57%	Yes	7/27/2009
GE Profile	PDWT51*P10	Standard	322	5.5	0.72	0.46	57%	Yes	11/10/2008
GE Profile	PDWT58*P00	Standard	322	5.1	0.69	0.46	50%	Yes	11/10/2008
Gaggeneau	DF 251 760	Standard	290	2.58	0.74	0.46	61%	Yes	10/29/2008
Gaggeneau	DF 251 760	Standard	290	2.58	0.74	0.46	61%	Yes	7/7/2009
Gaggeneau	*DF241760*	*Standard*	*290*	*2.58*	*0.74*	*0.46*	*61%*	*No*	*10/31/2005*
Gaggeneau	DF260760	Standard	180	1.56	1.19	0.46	159%	Yes	3/26/2009
Gaggeneau	DF261760	Standard	180	1.56	1.19	0.46	159%	Yes	3/26/2009
Gaggeneau	*DF290760*	*Standard*	*290*	*2.49*	*0.74*	*0.46*	*61%*	*No*	*10/31/2005*
Gaggeneau	*DF291760*	*Standard*	*290*	*2.49*	*0.74*	*0.46*	*61%*	*No*	*10/31/2005*
Gaggeneau	*DI291730*	*Standard*	*290*	*2.49*	*0.74*	*0.46*	*61%*	*No*	*10/31/2005*
General Electric	GHDA69*P	Standard	302	5.2	0.74	0.46	61%	Yes	2/18/2009
General Electric	GLD58**P10	Standard	324	5.4	0.74	0.46	61%	Yes	11/10/2008
General Electric	*GLD6***N*	*Standard*	*322*	*5.1*	*0.68*	*0.46*	*48%*	*No*	*12/13/2006*
General Electric	GLD8***N	Standard	322	5.1	0.68	0.46	48%	Yes	2/26/2008
General Electric	GLDA69*P	Standard	302	5.2	0.74	0.46	61%	Yes	11/26/2008
General Electric	GSM18**N	Standard	281	5.8	0.76	0.46	65%	Yes	2/26/2008
Heartland	HCDWI-***	Standard	315	4.15	0.69	0.46	50%	Yes	4/13/2009
Heartland	HLDWI-***	Standard	315	4.15	0.69	0.46	50%	Yes	4/13/2009
Heartland	HLPDW-SS	Standard	315	4.15	0.69	0.46	50%	Yes	5/6/2009
Heartland	HLTXTDW-***	Standard	315	4.15	0.69	0.46	50%	Yes	5/6/2009
Hotpoint	HDA2***R	Standard	324	5.3	0.70	0.46	52%	Yes	7/27/2009
Hotpoint	HDA3***R	Standard	324	5.3	0.71	0.46	54%	Yes	7/27/2009
Ikea	IUD4000R	Standard	306	4.26	0.70	0.46	52%	Yes	6/15/2005
Ikea	IUD4000W**	Standard	306	4.26	0.70	0.46	52%	Yes	5/6/2009
Ikea	IUD4000W**	Standard	306	4.26	0.70	0.46	52%	Yes	5/6/2009
Ikea	IUD6000R**	Standard	306	4.26	0.70	0.46	52%	Yes	12/4/2008
Ikea	IUD6000W**	Standard	306	4.26	0.70	0.46	52%	Yes	5/6/2009
Ikea	IUD8000W**	Standard	320	4.15	0.68	0.46	48%	Yes	5/6/2009
Ikea	IUD9500V	Standard	313	4	0.70	0.46	52%	Yes	10/9/2008
Ikea	IUD9500W**	Standard	288	4.15	0.75	0.46	63%	Yes	5/6/2009
Ikea	IUD9750V	Standard	313	4	0.70	0.46	52%	Yes	10/9/2008
Ikea	IUD9750W**	Standard	288	4.15	0.75	0.46	63%	Yes	5/6/2009
Inglis	IPC2505*	Standard	316	4.58	0.68	0.46	48%	Yes	6/17/2008
Inglis	IWU2236*	Standard	310	4.5	0.69	0.46	50%	Yes	6/1/2009
Inglis	IWU9866**	Standard	320	4.15	0.68	0.46	48%	Yes	5/6/2009
Jenn-Air	JDB3000AW**	Standard	307	4.12	0.72	0.46	57%	Yes	5/4/2009
Jenn-Air	JDB3200AW**	Standard	279	4.27	0.77	0.46	67%	Yes	5/4/2009
Jenn-Air	JDB3600AW**	Standard	292	4.18	0.75	0.46	63%	Yes	5/4/2009
Jenn-Air	JDB3650AW**	Standard	292	4.18	0.75	0.46	63%	Yes	5/4/2009
Jenn-Air	JDD4000	Standard	321	5.42	0.69	0.46	50%	Yes	6/30/2009
Kenmore	1310*K***	Standard	301	4.19	0.72	0.46	57%	Yes	5/6/2009
Kenmore	1312*K***	Standard	312	4.17	0.70	0.46	52%	Yes	10/25/2007
Kenmore	*1313*K****	*Standard*	*312*	*4.17*	*0.70*	*0.46*	*52%*	*No*	*10/25/2007*
Kenmore	*1314*K****	*Standard*	*312*	*4.17*	*0.70*	*0.46*	*52%*	*No*	*10/25/2007*
Kenmore	1315*K	Standard	305	4.21	0.71	0.46	54%	Yes	6/19/2008
Kenmore	1316*K***	Standard	313	4.18	0.69	0.46	50%	Yes	6/13/2008
Kenmore	1317*K***	Standard	313	4.18	0.69	0.46	50%	Yes	5/6/2008
Kenmore	1318*	Standard	300	4.18	0.72	0.46	57%	Yes	6/30/2008
Kenmore	1319*K***	Standard	305	4.21	0.71	0.46	54%	Yes	4/7/2009
Kenmore	1320*K***	Standard	305	4.21	0.71	0.46	54%	Yes	5/6/2009
Kenmore	1321*K***	Standard	315	4.15	0.69	0.46	50%	Yes	9/30/2009
Kenmore	*1322*K601*	*Standard*	*320*	*4.03*	*0.68*	*0.46*	*48%*	*No*	*11/6/2006*
Kenmore	*1322*K602*	*Standard*	*320*	*4.03*	*0.68*	*0.46*	*48%*	*No*	*4/7/2009*
Kenmore	1322*K603	Standard	320	4.03	0.68	0.46	48%	Yes	3/16/2010
Kenmore	1324*K***	Standard	315	4.15	0.69	0.46	50%	Yes	9/30/2009
Kenmore	1332	Compact	174	2.7	1.30	0.62	110%	Yes	11/3/2006
Kenmore	1340*K***	Standard	312	4.83	0.69	0.46	50%	Yes	6/1/2009
Kenmore	*1342*K****	*Standard*	*312*	*4.17*	*0.70*	*0.46*	*52%*	*No*	*10/25/2007*
Kenmore	1344*K***	Standard	312	4.83	0.69	0.46	50%	Yes	6/1/2009
Kenmore	1345*K***	Standard	306	4.15	0.72	0.46	57%	Yes	5/6/2009
Kenmore	1346*K***	Standard	320	4.03	0.68	0.46	48%	Yes	4/7/2009
Kenmore	1347*K***	Standard	320	4.03	0.68	0.46	48%	Yes	4/7/2009
Kenmore	1348*K***	Standard	320	4.03	0.68	0.46	48%	Yes	4/7/2009
Kenmore	1357*K***	Standard	320	4.03	0.68	0.46	48%	Yes	6/19/2008
Kenmore	*1358*K****	*Standard*	*320*	*4.03*	*0.68*	*0.46*	*48%*	*No*	*1/24/2008*
Kenmore	1363*K***	Standard	320	4.03	0.68	0.46	48%	Yes	4/7/2009
Kenmore	*1371*K601*	*Standard*	*320*	*4.03*	*0.68*	*0.46*	*48%*	*No*	*11/6/2006*
Kenmore	*1372*K601*	*Standard*	*320*	*4.03*	*0.68*	*0.46*	*48%*	*No*	*11/6/2006*
Kenmore	*1373*K601*	*Standard*	*320*	*4.03*	*0.68*	*0.46*	*48%*	*No*	*11/6/2006*
Kenmore	*1373*K602*	*Standard*	*320*	*4.03*	*0.68*	*0.46*	*48%*	*No*	*4/7/2009*
Kenmore	1373*K603	Standard	320	4.03	0.68	0.46	48%	Yes	3/16/2010
Kenmore	*1374*K601*	*Standard*	*320*	*4.03*	*0.68*	*0.46*	*48%*	*No*	*11/6/2006*
Kenmore	*1374*K602*	*Standard*	*320*	*4.03*	*0.68*	*0.46*	*48%*	*No*	*4/7/2009*
Kenmore	1374*K603	Standard	320	4.03	0.68	0.46	48%	Yes	3/16/2010
Kenmore	*1378*K603*	*Standard*	*317*	*4.03*	*0.68*	*0.46*	*48%*	*No*	*10/25/2007*
Kenmore	*1379*K604*	*Standard*	*317*	*4.03*	*0.68*	*0.46*	*48%*	*No*	*10/25/2007*
Kenmore	*1381*K601*	*Standard*	*320*	*4.03*	*0.68*	*0.46*	*48%*	*No*	*11/6/2006*
Kenmore	*1382*K601*	*Standard*	*320*	*4.03*	*0.68*	*0.46*	*48%*	*No*	*11/6/2006*

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Brand	Model	Size	kWh/Year	Gallons/Cycle	Energy Factor (EF)	Federal Standard (EF)	Percent Better	Active	Active Date
Kenmore	*1383*K601*	*Standard*	*320*	*4.03*	*0.68*	*0.46*	*48%*	*No*	*11/6/2006*
Kenmore	*1383*K602*	*Standard*	*320*	*4.03*	*0.68*	*0.46*	*48%*	*No*	*4/7/2009*
Kenmore	1383*K603	Standard	320	4.03	0.68	0.46	48%	Yes	3/16/2010
Kenmore	*1384*K601*	*Standard*	*320*	*4.03*	*0.68*	*0.46*	*48%*	*No*	*11/6/2006*
Kenmore	*1384*K602*	*Standard*	*320*	*4.03*	*0.68*	*0.46*	*48%*	*No*	*4/7/2009*
Kenmore	1384*K603	Standard	320	4.03	0.68	0.46	48%	Yes	3/16/2010
Kenmore	*1387*K603*	*Standard*	*317*	*4.03*	*0.68*	*0.46*	*48%*	*No*	*10/25/2007*
Kenmore	1388*	Standard	304	4.29	0.72	0.46	57%	Yes	5/6/2008
Kenmore	1389*	Standard	320	4.03	0.68	0.46	48%	Yes	6/30/2008
Kenmore	*1398**	*Standard*	*304*	*4.29*	*0.72*	*0.46*	*57%*	*No*	*5/6/2008*
Kenmore	1421*K***	Standard	306	4.26	0.70	0.46	52%	Yes	9/30/2009
Kenmore	*14402400*	*Standard*	*300*	*4.81*	*0.72*	*0.46*	*57%*	*No*	*9/14/2007*
Kenmore	*14403400*	*Standard*	*300*	*4.81*	*0.72*	*0.46*	*57%*	*No*	*9/14/2007*
Kenmore	*14409400*	*Standard*	*300*	*4.81*	*0.72*	*0.46*	*57%*	*No*	*9/14/2007*
Kenmore	*1441*40**	*Standard*	*300*	*4.81*	*0.72*	*0.46*	*57%*	*No*	*4/3/2007*
Kenmore	1520****	Standard	309	3.88	0.72	0.46	57%	Yes	7/13/2009
Kenmore	1520****A	Standard	283	3.68	0.79	0.46	72%	Yes	7/13/2009
Kenmore	1521****	Standard	318	5.15	0.69	0.46	50%	Yes	7/28/2009
Kenmore	1523****	Standard	309	4.86	0.71	0.46	54%	Yes	7/22/2009
Kenmore	1526****	Standard	318	5.15	0.69	0.46	50%	Yes	7/28/2009
Kenmore	1528****	Standard	318	5.15	0.69	0.46	50%	Yes	7/28/2009
Kenmore	1623****	Standard	309	4.86	0.71	0.46	54%	Yes	7/22/2009
Kenmore	1772*K***	Standard	310	4.5	0.69	0.46	50%	Yes	6/1/2009
Kenmore	1773*K***	Standard	312	4.83	0.69	0.46	50%	Yes	6/1/2009
Kenmore	1774*K***	Standard	296	3.96	0.73	0.46	59%	Yes	10/30/2009
Kenmore	1824****	Standard	309	4.86	0.71	0.46	54%	Yes	7/22/2009
Kenmore	587.1521****	Standard	318	5.15	0.69	0.46	50%	Yes	7/28/2009
Kenmore	587.1526****	Standard	318	5.15	0.69	0.46	50%	Yes	7/28/2009
Kenmore	587.1528****	Standard	318	5.15	0.69	0.46	50%	Yes	7/28/2009
Kenmore	7792*K***	Standard	320	4.03	0.68	0.46	48%	Yes	5/6/2008
Kenmore	7796*K***	Standard	312	4.18	0.70	0.46	52%	Yes	5/6/2008
Kenmore	7797*K***	Standard	312	4.18	0.70	0.46	52%	Yes	5/6/2008
Kenmore	7798*K***	Standard	313	4.18	0.69	0.46	50%	Yes	5/6/2008
KitchenAid	KUDC03FV	Standard	313	4	0.68	0.46	48%	Yes	6/30/2008
KitchenAid	KUDC03IV	Standard	313	4	0.68	0.46	48%	Yes	11/6/2008
KitchenAid	KUDC20CV	Standard	313	4	0.70	0.46	52%	Yes	1/26/2009
KitchenAid	KUDC20FV	Standard	313	4	0.70	0.46	52%	Yes	1/26/2009
KitchenAid	KUDD03ST	Compact	174	2.7	1.30	0.62	110%	Yes	1/9/2008
KitchenAid	*KUDE03FT****	*Standard*	*298*	*4.18*	*0.72*	*0.46*	*57%*	*No*	*5/6/2008*
KitchenAid	KUDE40CV***	Standard	301	4.18	0.72	0.46	57%	Yes	2/6/2009
KitchenAid	KUDE45CV**	Standard	301	4.18	0.72	0.46	57%	Yes	5/6/2009
KitchenAid	KUDE50CV***	Standard	302	4.31	0.72	0.46	57%	Yes	1/13/2010
KitchenAid	KUDE60FV	Standard	294	4.18	0.74	0.46	61%	Yes	1/26/2009
KitchenAid	KUDE70CV	Standard	302	4.31	0.72	0.46	57%	Yes	1/26/2009
KitchenAid	KUDE70FV	Standard	302	4.31	0.72	0.46	57%	Yes	1/26/2009
KitchenAid	KUDL03FV	Standard	313	4	0.68	0.46	48%	Yes	6/30/2008
KitchenAid	KUDL03IV	Standard	313	4	0.68	0.46	48%	Yes	6/30/2008
KitchenAid	KUDL40CV	Standard	315	4.15	0.69	0.46	50%	Yes	1/26/2009
KitchenAid	*KUDM03FT*	*Standard*	*317*	*4.03*	*0.68*	*0.46*	*48%*	*No*	*6/27/2007*
KitchenAid	KUDS30IV	Standard	315	4.15	0.69	0.46	50%	Yes	1/26/2009
KitchenAid	KUDS40CV	Standard	315	4.15	0.69	0.46	50%	Yes	1/26/2009
KitchenAid	KUDS40FV	Standard	315	4.15	0.69	0.46	50%	Yes	1/26/2009
KitchenAid	KUDS50FV	Standard	315	4.15	0.69	0.46	50%	Yes	1/26/2009
KitchenAid	KUDS50SV	Standard	315	4.15	0.69	0.46	50%	Yes	1/26/2009
Koldfront	PDW45EB	Compact	200	2.64	1.07	0.62	73%	Yes	12/12/2008
Koldfront	PDW45EW	Compact	200	2.64	1.07	0.62	73%	Yes	12/12/2008
Kuppersbusch	*IGVS6607UL*	*Standard*	*234*	*2.21*	*0.92*	*0.46*	*100%*	*No*	*4/2/2008*
LG	LDF993#**	Standard	285	3.4	0.76	0.46	65%	Yes	3/2/2009
LG Electronics	LDF681#**	Standard	294	3.4	0.73	0.46	59%	Yes	2/10/2006
LG Electronics	LDF692#**	Standard	285	3.4	0.76	0.46	65%	Yes	4/10/2008
LG Electronics	LDF781#**	Standard	294	3.4	0.73	0.46	59%	Yes	3/29/2005
LG Electronics	LDF792***	Standard	285	3.4	0.76	0.46	65%	Yes	5/1/2008
LG Electronics	LDF793#**	Standard	285	3.4	0.76	0.46	65%	Yes	11/26/2008
LG Electronics	LDF881#**	Standard	285	3.4	0.76	0.46	65%	Yes	1/10/2007
LG Electronics	LDF892***	Standard	285	3.4	0.76	0.46	65%	Yes	5/1/2008
LG Electronics	LDF981#**	Standard	285	3.4	0.76	0.46	65%	Yes	11/12/2007
LG Electronics	LDS482#**	Standard	285	3.4	0.76	0.46	65%	Yes	4/10/2008
LG Electronics	LDS581#**	Standard	294	3.4	0.73	0.46	59%	Yes	3/29/2005
Magic Chef	CDB4000AW**	Standard	310	4.5	0.69	0.46	50%	Yes	3/25/2010
Maytag	MDB3601BW**	Standard	306	4.26	0.70	0.46	52%	Yes	6/30/2008
Maytag	MDB4629AW**	Standard	312	4.83	0.69	0.46	50%	Yes	6/1/2009
Maytag	MDB4630AW**	Standard	300	4.08	0.72	0.46	57%	Yes	10/30/2009
Maytag	MDB4709AW**	Standard	302	4.31	0.72	0.46	57%	Yes	6/30/2009
Maytag	MDB6701	Standard	303	3.85	0.71	0.46	54%	Yes	2/6/2008
Maytag	MDB6702	Standard	303	3.85	0.71	0.46	54%	Yes	2/6/2008
Maytag	MDB6709AW**	Standard	302	4.31	0.72	0.46	57%	Yes	9/1/2009
Maytag	MDB6759	Standard	301	3.85	0.72	0.46	57%	Yes	8/4/2008
Maytag	MDB6769AW**	Standard	302	4.31	0.72	0.46	57%	Yes	6/30/2009
Maytag	MDB6769AW**	Standard	302	4.31	0.72	0.46	57%	Yes	6/30/2009

Table D-2
ENERGY STAR Qualified Dishwashers

ENERGY STAR Qualified Dishwashers

Last Modified: 04/20/2010

Brand	Model	Size	kWh/Year	Gallons/Cycle	Energy Factor (EF)	Federal Standard (EF)	Percent Better	Active	Active Date
Maytag	MDB7609AW**	Standard	304	4.15	0.71	0.46	54%	Yes	5/4/2009
Maytag	MDB7709AW**	Standard	304	4.15	0.71	0.46	54%	Yes	5/4/2009
Maytag	MDB7759AW**	Standard	291	4.15	0.75	0.46	63%	Yes	1/13/2010
Maytag	MDB7809AW*	Standard	304	4.15	0.71	0.46	54%	Yes	5/4/2009
Maytag	MDB7851	Standard	312	4.05	0.69	0.46	50%	Yes	2/6/2008
Maytag	MDB8859AW**	Standard	291	4.15	0.75	0.46	63%	Yes	6/14/2009
Maytag	MDB8959AW**	Standard	291	4.15	0.75	0.46	63%	Yes	5/4/2009
Maytag	MDBH949AW**	Standard	302	4.31	0.72	0.46	57%	Yes	6/30/2009
Maytag	MDBH968	Standard	301	3.85	0.72	0.46	57%	Yes	8/4/2008
Maytag	MDBH969AW**	Standard	302	4.31	0.72	0.46	57%	Yes	6/30/2009
Maytag	MDBH979AW**	Standard	304	4.15	0.71	0.46	54%	Yes	5/6/2009
Maytag	MDBH980	Standard	312	4.05	0.69	0.46	50%	Yes	2/6/2008
Maytag	MDBH989AW*	Standard	304	4.15	0.71	0.46	54%	Yes	5/4/2009
Maytag	MDBH999AW**	Standard	291	4.15	0.75	0.46	63%	Yes	5/4/2009
Maytag	MDBTT53AW**	Standard	302	4.31	0.72	0.46	57%	Yes	6/30/2009
Maytag	MDC1809AW**	Standard	317	4.15	0.68	0.46	48%	Yes	9/30/2009
Maytag	MDC4809AW**	Standard	317	4.15	0.68	0.46	48%	Yes	1/15/2010
Midea	DW5A	Compact	200	2.64	1.00	0.62	61%	Yes	10/4/2007
Midea	DW5B	Compact	200	2.64	1.00	0.62	61%	Yes	10/4/2007
Midea	DW5BII	Compact	190	2.77	1.13	0.62	82%	Yes	10/4/2007
Midea	DW5E	Compact	200	2.64	1.00	0.62	61%	Yes	10/4/2007
Midea	DW5EII	Compact	190	2.77	1.13	0.62	82%	Yes	10/4/2007
Midea	DW5F	Compact	200	2.64	1.00	0.62	61%	Yes	10/4/2007
Midea	DW5FII	Compact	190	2.77	1.13	0.62	82%	Yes	10/4/2007
Midea	WP5AII	Compact	200	3.17	1.07	0.62	73%	Yes	10/4/2007
Midea	WP5E	Compact	200	3.17	1.07	0.62	73%	Yes	10/4/2007
Midea	WP5G	Compact	220	2.91	1.02	0.62	65%	Yes	10/4/2007
Midea	WP5GII	Compact	230	2.91	1.00	0.62	61%	Yes	10/4/2007
Midea	WP5GIIW	Compact	230	2.91	1.00	0.62	61%	Yes	10/4/2007
Midea	WP5GW	Compact	220	2.91	1.02	0.62	65%	Yes	10/4/2007
Miele	G1182	Standard	289	5.15	0.75	0.46	63%	Yes	1/30/2009
Miele	G1202	Standard	285	5.41	0.76	0.46	65%	Yes	1/30/2009
Miele	G1262	Standard	285	5.41	0.76	0.46	65%	Yes	1/30/2009
Miele	G1472	Standard	289	5.12	0.74	0.46	61%	Yes	1/30/2009
Miele	G2142	Standard	292	5.23	0.74	0.46	61%	Yes	1/30/2009
Miele	G2143	Standard	292	5.23	0.74	0.46	61%	Yes	1/30/2009
Miele	G2182	Standard	292	5.23	0.74	0.46	61%	Yes	1/30/2009
Miele	G2183	Standard	292	5.23	0.74	0.46	61%	Yes	1/30/2009
Miele	G2432	Standard	297	5.17	0.73	0.46	59%	Yes	1/30/2009
Miele	G2472	Standard	297	5.17	0.73	0.46	59%	Yes	1/30/2009
Miele	G2732	Standard	281	4.96	0.77	0.46	67%	Yes	1/30/2009
Miele	G2832	Standard	298	4.96	0.75	0.46	63%	Yes	1/30/2009
Miele	G2872	Standard	298	4.96	0.75	0.46	63%	Yes	1/30/2009
Porter & Charles	DWPC4FCSS	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
Porter & Charles	DWPC6FI	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
Porter & Charles	DWPC6SS	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
Porter & Charles	DWPCT4FCSS	Standard	303	5.2	0.71	0.46	54%	Yes	7/29/2008
Porter & Charles	DWPCT6FI	Standard	303	5.2	0.71	0.46	54%	Yes	7/29/2008
Porter & Charles	DWPCT6SS	Standard	303	5.2	0.71	0.46	54%	Yes	7/29/2008
Profile	*PDW7***N*	*Standard*	*322*	*5.1*	*0.68*	*0.46*	*48%*	*No*	*12/13/2006*
Samsung	DMR57***	Standard	310	5.2	0.69	0.46	50%	Yes	10/4/2007
Samsung	DMR77***	Standard	310	5.2	0.69	0.46	50%	Yes	10/4/2007
Samsung	DMR78***	Standard	289	4.8	0.76	0.46	65%	Yes	12/1/2008
Samsung	DMT300***	Standard	299	4.8	0.74	0.46	61%	Yes	1/13/2010
Siemens	*SL65A703UC*	*Standard*	*290*	*2.58*	*0.74*	*0.46*	*61%*	*No*	*4/2/2008*
Siemens	*SL85A705UC*	*Standard*	*290*	*2.58*	*0.74*	*0.46*	*61%*	*No*	*4/2/2008*
Smeg	PLA68XU	Standard	320	4.12	0.67	0.46	46%	Yes	12/11/2007
Smeg	PLA8743XU	Standard	321	3.96	0.67	0.46	46%	Yes	12/11/2007
Smeg	STA4645U	Standard	316	4.35	0.68	0.46	48%	Yes	12/11/2007
Smeg	STA8614XU	Standard	321	3.96	0.67	0.46	46%	Yes	12/11/2007
Smeg	STA8743U	Standard	321	3.96	0.67	0.46	46%	Yes	12/11/2007
Smeg	STO905U	Standard	298	3.46	0.72	0.46	57%	Yes	12/11/2007
Summit Professional	DW2432	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
Summit Professional	DW2432SS	Standard	303	5.2	0.71	0.46	54%	Yes	7/29/2008
Thermador	DWHD410GFM	Standard	324	3.43	0.66	0.46	43%	Yes	8/18/2009
Thermador	DWHD410GPR	Standard	324	3.43	0.66	0.46	43%	Yes	8/18/2009
Thermador	*DWHD44E#*	*Standard*	*315*	*2.89*	*0.68*	*0.46*	*48%*	*No*	*5/31/2007*
Thermador	DWHD630###	Standard	305	2.94	0.70	0.46	52%	Yes	7/27/2009
Thermador	*DWHD64E#*	*Standard*	*290*	*2.58*	*0.74*	*0.46*	*61%*	*No*	*7/27/2009*
Thermador	DWHD650G##	Standard	260	1.56	0.83	0.46	80%	Yes	6/15/2009
Thermador	DWHD651GFP	Standard	260	1.56	0.83	0.46	80%	Yes	6/15/2009
Thermador	*DWHD94EP*	*Standard*	*290*	*2.49*	*0.74*	*0.46*	*61%*	*No*	*5/31/2007*
Viking	DDB200	Standard	293	4.6	0.75	0.46	63%	Yes	9/24/2009
Viking	DFUD 042	Standard	247	3.8	0.87	0.46	89%	Yes	8/5/2009
Viking	DFUD 142	Standard	234	3.8	0.93	0.46	102%	Yes	8/5/2009
Viking	DFUD042	Standard	247	3.8	0.87	0.46	89%	Yes	8/9/2004
Viking	FDB200	Standard	293	4.6	0.75	0.46	63%	Yes	9/24/2009
Viking	VDB200	Standard	293	4.6	0.75	0.46	63%	Yes	9/24/2009
Vintage	VLDW-1	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006

Table D-2
ENERGY STAR Qualified Dishwashers

ENERGY STAR Qualified Dishwashers

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Brand	Model	Size	kWh/Year	Gallons/Cycle	Energy Factor (EF)	Federal Standard (EF)	Percent Better	Active	Active Date
Vintage	VLDW-2	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
Vintage	VLDW-3	Standard	303	5.2	0.71	0.46	54%	Yes	10/24/2006
Vintage	VLDW-4	Standard	303	5.2	0.71	0.46	54%	Yes	7/29/2008
Whirlpool	DP1040XTX**	Standard	296	3.96	0.73	0.46	59%	Yes	10/30/2009
Whirlpool	DU018DWT*	Standard	313	5.15	0.72	0.46	57%	Yes	10/28/2009
Whirlpool	DU1010XTX**	Standard	300	4.08	0.72	0.46	57%	Yes	10/30/2009
Whirlpool	DU1014XTX**	Standard	300	4.08	0.72	0.46	57%	Yes	10/30/2009
Whirlpool	DU1015XTX**	Standard	300	4.08	0.72	0.46	57%	Yes	10/30/2009
Whirlpool	DU1030XTX**	Standard	300	4.08	0.72	0.46	57%	Yes	10/30/2009
Whirlpool	DU1055XTV	Standard	313	4.08	0.68	0.46	48%	Yes	10/20/2008
Whirlpool	DU1061XTV	Standard	313	4.08	0.68	0.46	48%	Yes	10/20/2008
Whirlpool	DU1300XTV	Standard	313	4.08	0.68	0.46	48%	Yes	10/20/2008
Whirlpool	DU1301XTV	Standard	313	4.08	0.68	0.46	48%	Yes	10/20/2008
Whirlpool	DU1345XTV	Standard	313	4.08	0.68	0.46	48%	Yes	10/20/2008
Whirlpool	DU400SWW**	Standard	310	4.5	0.69	0.46	50%	Yes	6/1/2009
Whirlpool	DU810SW	Standard	306	4.26	0.70	0.46	52%	Yes	8/25/2008
Whirlpool	DU811SWP**	Standard	306	4.26	0.70	0.46	52%	Yes	12/4/2008
Whirlpool	DU850SWP	Standard	306	4.26	0.70	0.46	53%	Yes	8/2/2004
Whirlpool	*DU895SWP***	*Standard*	*306*	*4.26*	*0.70*	*0.46*	*52%*	*No*	*6/19/2008*
Whirlpool	DU915PWW**	Standard	312	4.83	0.69	0.46	50%	Yes	6/1/2009
Whirlpool	DU930PWW**	Standard	312	4.83	0.69	0.46	50%	Yes	6/1/2009
Whirlpool	DU945PWW**	Standard	312	4.83	0.69	0.46	50%	Yes	6/1/2009
Whirlpool	GU2275XTV**	Standard	320	4.15	0.68	0.46	48%	Yes	5/6/2008
Whirlpool	GU2300XTV**	Standard	320	4.15	0.68	0.46	48%	Yes	5/6/2008
Whirlpool	*GU2451XTS*2*	*Standard*	*320*	*4.03*	*0.68*	*0.46*	*48%*	*No*	*10/25/2007*
Whirlpool	GU2475XTV**	Standard	320	4.15	0.68	0.46	48%	Yes	5/6/2008
Whirlpool	GU2700XTS*1	Standard	320	4.03	0.68	0.46	48%	Yes	11/6/2006
Whirlpool	GU2800XTV**	Standard	299	4.18	0.72	0.46	57%	Yes	6/13/2008
Whirlpool	GU3000XTX**	Standard	304	4.15	0.71	0.46	54%	Yes	2/12/2010
Whirlpool	GU3100XTV*	Standard	270	4.8	0.82	0.46	78%	Yes	5/7/2009
Whirlpool	GU3200XTS*2	Standard	317	4.03	0.68	0.46	48%	Yes	10/25/2007
Whirlpool	GU3200XTV**	Standard	308	4.15	0.70	0.46	52%	Yes	6/30/2008
Whirlpool	GU3200XTX**	Standard	291	4.15	0.75	0.46	63%	Yes	2/12/2010
Whirlpool	GU3600XTS*2	Standard	317	4.03	0.68	0.46	48%	Yes	10/25/2007
Whirlpool	GU3600XTV**	Standard	301	4.18	0.72	0.46	57%	Yes	5/6/2008

Average Gallons Per Cycle	4.18
Minimum Gallons Per Cycle	1.56
Max Gallons Per Cycle	5.80
Standard Deviation	0.96

Table D-3
Definitions for Clothes Washer Product Listing Column Headers

Term	Definition
Brand and Model	This is how a particular washer is identified. Retailers identify products they stock using the brand and model number. Some products may also be identified with a name or SKU, which is different from the brand or model number. Model numbers often contain wildcard characters, such as *, #, and X, that are placeholders for non-energy attributes, such as color.
Type	Type refers to whether the product is a front-loading washer or a top-loading washer.
Volume	This is the tub capacity of the clothes washer in cubic feet
KWH	Kilowatt hour
KWH/Year	This is the estimated annual energy use of the washer under typical conditions. It is based on an annual usage of 392 loads per year, or around 8 loads per week. Actual energy consumption will vary depending on the amount of laundry done, the size of the loads, and the temperature settings used. This figure is calculated according to the Department of Energy test procedure, Code of Federal Regulations, Title 10, Section 430. It incorporates the estimated energy consumed by the washer and also the energy needed to heat the water with an electric water heater. Households with a gas water heater will use significantly fewer kilowatt hours but will consume gas to heat the same water.
Modified Energy Factor (MEF)	MEF is the official energy efficiency metric used to compare relative efficiencies of different clothes washers. MEF considers the energy used to run the washer, heat the water, and run the dryer. The higher the MEF, the more efficient the clothes washer. ENERGY STAR qualified clothes washers must have a minimum MEF of 1.80. The minimum Federal standard requirement for clothes washers is an MEF of 1.26.
Water Factor (WF)	WF is a measurement of water efficiency that is calculated as gallons of water used per cubic foot of capacity. So, if a clothes washer uses 30 gallons per cycle and has a tub volume of 3.0 cubic feet, then the water factor is 10.0. The lower the WF, the more efficient the clothes washer. ENERGY STAR qualified clothes washers must have a maximum WF of 7.5.
Annual Water Use (Gallons Per Year)	This is the estimated annual water use of the washer under typical conditions. It is based on an annual usage of 392 loads per year, or around 8 loads per week. Actual water consumption will vary depending on the amount of laundry done.
Active Column	This column refers to whether the product is still being produced. Models with the word “No” in the Active column have been discontinued by the manufacturer. These models appear in parenthesis and red or in *italics and red* on the product lists. Discontinued models may still be available in stores. The models are displayed on the product lists for a year after their last production date to allow retailers to clear inventory.
Active Date	This refers to the date the product was qualified.

Table D-4
Definitions for Dishwasher Product Listing Column Headers

Term	Definition
Brand and **Model**	The brand and manufacturer model number identify a particular dishwasher. Retailers can identify products they stock using the brand and model number. Some retailers and manufacturers may also identify models with a trade name or SKU which is different from the brand or manufacturer model number. However, you should be able to find the manufacturer model number on any unit. Model numbers often contain wildcard characters, such as *, #, and X, that are placeholders for non-energy attributes, such as color.
KWH	Kilowatt hours
KWH/Year	This is the estimated annual energy use of this dishwasher in kilowatt hours under typical conditions. It is based on a usage of 215 loads per year. Your actual energy consumption will vary depending on your usage patterns, including how often you run the dishwasher and whether you use energy-saving features or not. This figure is calculated according to Department of Energy test procedures.
Gallons/Cycle	This is the estimated per cycle water use under typical conditions. Your actual water consumption will vary depending on usage patterns, such as whether you use the normal cycle.
NAECA Std.	The National Appliance Energy Conservation Act (NAECA) dictates minimum standards for energy consumption in dishwashers. All standard-sized dishwashers must have an Energy Factor of at least 0.46.
Energy Factor	This **Energy Factor** is a number computed for each dishwasher which enables you to compare the relative efficiency of different units. The equation for Energy Factor is estimated loads per year (215) divided by the annual energy usage (kWh/year).
% Better	ENERGY STAR rated dishwashers must exceed the minimum federal standard (NAECA standard) by at least 25%. This column tells you by how much each model exceeds that standard.
Active Column	Models that appear in parenthesis and in red are discontinued, but may still be available in stores. Discontinued models will appear on this list for a year after their last production date to allow retailers to clear inventory. These models are still ENERGY STAR qualified, but they are no longer manufactured. Sponsors, such as utilities, may honor incentives for discontinued models at their discretion.

Appendix E

SWSI Baseline Per Capita Water Use by County

This appendix presents the per capita water use data for each county in Colorado for the year 2000 as developed for and utilized by the Statewide Water Supply Initiative (CDM, 2004). The per capita water use data were utilized directly to develop the baseline statewide water demand estimates in the passive savings analyses. The per capita water use data were adjusted in accordance with the methodology described in Section 5 to estimate future water demand reductions related to the drought shadow and passive water savings.

Table E-1

SWSI Baseline Per Capita Water Use by County

County By Basin	Assumed County GPCD
Arkansas Basin	
Baca	255.4
Bent	181.4
Chaffee	309.9
Cheyenne	211.6
Crowley	141.9
Custer	226.0
El Paso	195.5
Elbert	113.2
Fremont	231.9
Huerfano	115.4
Kiowa	327.5
Lake	211.6
Las Animas	221.9
Lincoln	253.0
Otero	242.8
Prowers	286.8
Pueblo	254.0
Teller	173.0
Colorado Basin	
Eagle	286.0
Garfield	224.8
Grand	211.8
Mesa	154.4
Pitkin	681.4
Summit	327.1
Dolores/San Juan Basin	
Archuleta	212.5
Dolores	203.8
La Plata	192.4
Montezuma	215.8
Montrose	207.0
San Juan	207.6
San Miguel	250.8
Gunnison County	
Delta	209.7
Gunnison	188.1
Hinsdale	211.0
Mesa	154.4
Montrose	207.0
Ouray	382.9
North Platte Basin	
Jackson	266.7
Rio Grande Basin	
Alamosa	268.6
Conejos	424.7
Costilla	138.4
Mineral	296.0
Rio Grande	405.9
Saguache	332.3
South Platte Basin	
Adams	166.6
Arapahoe	195.6
Boulder	211.5
Broomfield	218.4
Cheyenne	206.2
Clear Creek	282.1
Denver	224.5
Douglas	214.9
Elbert	113.2
Gilpin	206.2
Jefferson	163.6
Kit Carson	301.0
Larimer	241.1
Lincoln	253.0
Logan	179.8
Morgan	340.7
Park	198.2
Phillips	356.6
Sedgwick	311.6
Teller	173.0
Washington	313.2
Weld	285.7
Yuma	263.1
Yampa Basin	
Moffat	189.9
Rio Blanco	292.5
Routt	237.0

GPCD - Gallons Per Capita Per Day

Appendix F

Population Data

This appendix presents the population data used to support the passive savings calculations discussed and summarized in Section 5. Specifically, two sets of population data were used as indicated below – one for estimating housing stock and one for estimating water demands.

Housing Stock Data - The passive savings calculations were based on the retrofit of existing homes and businesses that existed in the years 1994, 2005 and 2015. Given that the passive savings are based on adjustments to per capita water use for the replacement of toilets, clothes washers and dishwashers that existed at the end of each of these three years; the population for each of these three years was used as a surrogate to represent the stock of housing and businesses that existed at the time. Population data for 1994 was obtained from the State Demographers Office (SDO), whereas population data from 2005 and 2015 were provided by CDM (2010).

Water Demands - Annual water demand calculated from the baseline year of 2000 to 2050, for all water use scenarios (i.e., with drought shadow, with drought shadow and minimum passive savings, and with drought shadow and maximum passive savings) utilized the county population data provided by CDM (2004, 2010). Linear interpolations between the years with data provided by CDM for the period 2000 to 2050 were made to support the various calculations presented in this report. Note that the "medium" population prediction presented by CDM for the year 2050 was used exclusively to support the water use demand calculations contained herein.

Table F-1 presents the population data used for each of the three years 1994, 2005 and 2015 by county. Table F-2 presents the population data used for each of the years 2000 through 2050 by county. Table F-3 presents the data for population by county by five year increments from 2005 to 2050 provided by CDM (2010) and amended with the 2000 SWSI I population data (CDM, 2004)

Table F-1
Population Data for Existing Housing Stock Estimates

COUNTY	Basin	Percent Population in Basin	1994	2005	2015
Baca	Arkansas		4,391	4,282	4,206
Bent	Arkansas		5,400	6,406	6,599
Chaffee	Arkansas		14,107	17,215	20,008
Cheyenne	Arkansas	38%	871	815	826
Crowley	Arkansas		4,207	5,921	7,399
Custer	Arkansas		2,418	4,054	5,263
El Paso	Arkansas		456,500	573,822	686,079
Elbert	Arkansas	31%	3,983	7,103	9,314
Fremont	Arkansas		38,705	48,406	54,569
Huerfano	Arkansas		6,923	8,130	9,379
Kiowa	Arkansas		1,693	1,544	1,543
Lake	Arkansas		6,380	8,175	11,604
Las Animas	Arkansas		14,754	16,559	19,228
Lincoln	Arkansas	81%	4,811	4,802	4,872
Otero	Arkansas		20,490	19,675	20,090
Prowers	Arkansas		13,686	14,039	14,077
Pueblo	Arkansas		128,722	153,071	179,019
Teller	Arkansas	51%	8,053	11,565	13,307
	Total Arkansas Basin		**736,093**	**905,582**	**1,067,382**
Eagle	Colorado		29,027	51,616	67,925
Garfield	Colorado		34,496	51,621	72,516
Grand	Colorado		9,339	14,392	17,562
Mesa	Colorado	90%	92,490	119,578	152,324
Pitkin	Colorado		14,539	17,092	20,175
Summit	Colorado		17,107	28,884	35,503
	Total Colorado Basin		**196,998**	**283,183**	**366,005**
Archuleta	Dolores/San Juan		6,539	11,913	15,979
Dolores	Dolores/San Juan		1,499	1,871	2,275
La Plata	Dolores/San Juan		36,906	49,147	60,091
Montezuma	Dolores/San Juan		21,393	25,290	29,418
Montrose	Dolores/San Juan	10%	2,850	3,849	5,078
San Juan	Dolores/San Juan		566	585	624
San Miguel	Dolores/San Juan		5,305	7,450	9,777
	Total Dolores/San Juan Basin		**75,058**	**100,105**	**123,242**
Delta	Gunnison		24,343	30,776	38,388
Gunnison	Gunnison		11,671	14,826	16,832
Hinsdale	Gunnison		612	841	1,033
Mesa	Gunnison	10%	10,277	13,286	16,925
Montrose	Gunnison	90%	25,652	34,643	45,703
Ouray	Gunnison		2,902	4,354	5,907
	Total Gunnison Basin		**75,457**	**98,726**	**124,789**
Jackson	North Platte		1,642	1,565	1,577
	Total North Platte Basin		**1,642**	**1,565**	**1,577**
Alamosa	Rio Grande		13,823	16,038	18,671
Conejos	Rio Grande		7,755	8,650	9,124
Costilla	Rio Grande		3,376	3,675	3,731
Mineral	Rio Grande		646	959	1,099
Rio Grande	Rio Grande		11,461	13,303	13,608
Saguache	Rio Grande		4,942	6,965	8,138
	Total Rio Grande Basin		**42,003**	**49,591**	**54,372**
Adams	South Platte		300,794	405,150	506,588
Arapahoe	South Platte		436,405	538,163	638,031
Boulder	South Platte		252,725	290,846	330,435
Broomfield	South Platte		-	49,021	66,598
Cheyenne	South Platte	62%	1,420	1,330	1,348
Clear Creek	South Platte		8,458	9,767	10,797
Denver	South Platte		504,249	582,417	687,438
Douglas	South Platte		92,526	251,464	341,056
Elbert	South Platte	69%	8,864	15,810	20,731
Gilpin	South Platte		3,499	5,166	6,088
Jefferson	South Platte		483,433	532,417	585,264
Kit Carson	South Platte		7,340	8,308	8,848
Larimer	South Platte		214,936	280,699	334,863
Lincoln	South Platte	19%	1,128	1,126	1,143
Logan	South Platte		18,828	21,758	24,418
Morgan	South Platte		25,088	28,713	32,072
Park	South Platte		9,526	16,841	21,966

Table F-1
Population Data for Existing Housing Stock Estimates

COUNTY	Basin	Percent Population in Basin	1994	2005	2015
Phillips	South Platte		4,401	4,648	4,752
Sedgwick	South Platte		2,664	2,690	2,738
Teller	South Platte	49%	7,737	11,111	12,786
Washington	South Platte		5,221	4,955	4,897
Weld	South Platte		151,368	232,102	310,571
Yuma	South Platte		9,276	10,025	10,603
	Total South Platte Basin		**2,549,887**	**3,304,527**	**3,964,033**
Moffat	Yampa		11,996	13,628	16,398
Rio Blanco	Yampa		6,314	6,140	8,659
Routt	Yampa		16,617	22,328	28,134
	Total Yampa Basin		**34,927**	**42,095**	**53,191**
	Total Statewide		**3,712,065**	**4,785,374**	**5,754,591**

Table F-2
Population Data by Year and County

	1994	2000	2001	2002	2003	2004	2,005	2006	2007	2008	2009	2,010	2011	2012
Source of Data	**SDO**	**SWSI**					**CDM**					**CDM**		
Arkansas River Basin														
Baca County	4,391	4,516	4,469	4,423	4,376	4,329	4,282	4,256	4,231	4,206	4,181	4,155	4,165	4,175
Bent County	5,400	5,971	6,058	6,145	6,232	6,319	6,406	6,387	6,369	6,350	6,332	6,313	6,370	6,428
Chaffee County	14,107	16,298	16,481	16,665	16,848	17,032	17,215	17,335	17,454	17,574	17,694	17,813	18,252	18,691
Cheyenne County- Arkansas Basin	871	848	841	835	828	822	815	807	799	791	782	774	785	795
Crowley County	4,207	5,513	5,594	5,676	5,758	5,840	5,921	6,128	6,334	6,540	6,746	6,953	7,042	7,131
Custer County	2,418	3,540	3,642	3,745	3,848	3,951	4,054	4,122	4,191	4,260	4,329	4,397	4,571	4,744
El Paso County	456,500	520,572	531,222	541,872	552,522	563,172	573,822	584,914	596,007	607,099	618,192	629,284	640,643	652,002
Elbert County-Arkansas Basin Portion	3,983	6,258	6,427	6,596	6,765	6,934	7,103	7,164	7,226	7,287	7,348	7,410	7,791	8,172
Fremont County	38,705	46,439	46,833	47,226	47,619	48,012	48,406	48,656	48,905	49,155	49,405	49,655	50,638	51,620
Huerfano County	6,923	7,861	7,915	7,969	8,023	8,077	8,130	8,191	8,252	8,313	8,374	8,435	8,624	8,813
Kiowa County	1,693	1,617	1,603	1,588	1,573	1,558	1,544	1,530	1,516	1,502	1,489	1,475	1,488	1,502
Lake County	6,380	7,908	7,961	8,014	8,068	8,121	8,175	8,405	8,635	8,865	9,095	9,325	9,780	10,236
Las Animas County	14,754	15,276	15,532	15,789	16,046	16,303	16,559	16,722	16,885	17,048	17,210	17,373	17,744	18,115
Lincoln County-Arkansas Basin Po	4,811	4,998	4,958	4,919	4,880	4,841	4,802	4,767	4,731	4,696	4,661	4,626	4,675	4,724
Otero County	20,490	20,244	20,130	20,016	19,903	19,789	19,675	19,573	19,471	19,369	19,267	19,165	19,350	19,535
Prowers County	13,686	14,434	14,355	14,276	14,197	14,118	14,039	13,940	13,842	13,743	13,645	13,546	13,653	13,759
Pueblo County	128,722	142,054	144,257	146,461	148,664	150,867	153,071	155,340	157,609	159,878	162,147	164,417	167,337	170,257
Teller County- Arkansas Basin Portion	8,053	10,784	10,940	11,096	11,252	11,408	11,565	11,628	11,691	11,754	11,817	11,881	12,166	12,451
	736,093	**835,130**	**849,221**	**863,311**	**877,401**	**891,492**	**905,582**	**919,865**	**934,148**	**948,430**	**962,713**	**976,996**	**995,073**	**1,013,150**
Colorado River Basin														
Eagle County	29,027	43,354	45,006	46,658	48,311	49,963	51,616	53,093	54,571	56,048	57,525	59,003	60,787	62,572
Garfield County	34,496	44,267	45,738	47,209	48,680	50,151	51,621	53,523	55,425	57,327	59,229	61,131	63,408	65,685
Grand County	9,339	12,884	13,186	13,487	13,789	14,091	14,392	14,612	14,831	15,050	15,270	15,489	15,904	16,318
Mesa County- Colorado Basin Portion	92,490	105,891	108,628	111,365	114,103	116,840	119,578	123,247	126,916	130,585	134,254	137,923	140,803	143,683
Pitkin County	14,539	15,913	16,149	16,385	16,620	16,856	17,092	17,297	17,503	17,708	17,914	18,119	18,530	18,941
Summit County	17,107	25,725	26,357	26,989	27,620	28,252	28,884	29,359	29,835	30,311	30,787	31,263	32,111	32,959
	196,998	**248,034**	**255,064**	**262,094**	**269,123**	**276,153**	**283,183**	**291,132**	**299,081**	**307,030**	**314,978**	**322,927**	**331,543**	**340,158**
Dolores/San Juan River Basin														
Archuleta County	6,539	10,028	10,405	10,782	11,159	11,536	11,913	12,232	12,551	12,870	13,189	13,507	14,002	14,496
Dolores County	1,499	1,844	1,849	1,855	1,860	1,866	1,871	1,912	1,952	1,993	2,034	2,074	2,114	2,154
La Plata County	36,906	44,566	45,482	46,398	47,314	48,231	49,147	49,916	50,685	51,454	52,223	52,993	54,412	55,832
Montezuma County	21,393	23,864	24,149	24,434	24,719	25,004	25,290	25,569	25,848	26,127	26,407	26,686	27,232	27,779
Montrose County- Southwest Basin Pc	2,850	3,367	3,463	3,560	3,656	3,753	3,849	3,958	4,068	4,177	4,286	4,395	4,532	4,668
San Juan County	566	558	564	569	574	580	585	586	587	588	589	590	597	604
San Miguel County	5,305	6,666	6,823	6,980	7,137	7,293	7,450	7,622	7,794	7,966	8,138	8,310	8,603	8,897
	75,058	**90,893**	**92,735**	**94,578**	**96,420**	**98,263**	**100,105**	**101,795**	**103,485**	**105,175**	**106,865**	**108,556**	**111,493**	**114,430**
Gunnison River Basin														
Delta County	24,343	28,009	28,562	29,116	29,669	30,222	30,776	31,278	31,780	32,282	32,785	33,287	34,307	35,327
Gunnison County	11,671	13,967	14,139	14,311	14,482	14,654	14,826	14,983	15,140	15,298	15,455	15,612	15,856	16,100
Hinsdale County	612	791	801	811	821	831	841	857	873	890	906	922	944	966
Mesa County- Gunnison Basin Portior	10,277	11,766	12,070	12,374	12,678	12,982	13,286	13,694	14,102	14,509	14,917	15,325	15,645	15,965
Montrose County- Gunnison Basin Po	25,652	30,299	31,168	32,037	32,905	33,774	34,643	35,625	36,608	37,591	38,574	39,557	40,786	42,016
Ouray County	2,902	3,771	3,888	4,004	4,121	4,238	4,354	4,490	4,625	4,760	4,895	5,030	5,206	5,381
	75,457	**88,603**	**90,628**	**92,652**	**94,677**	**96,701**	**98,726**	**100,927**	**103,129**	**105,330**	**107,532**	**109,733**	**112,744**	**115,755**

Table F-2
Population Data by Year and County

	1994	2000	2001	2002	2003	2004	2,005	2006	2007	2008	2009	2,010	2011	2012
Source of Data	**SDO**	**SWSI**					**CDM**					**CDM**		
North Platte River Basin														
Jackson County	1,642	1,586	1,582	1,577	1,573	1,569	1,565	1,550	1,536	1,521	1,506	1,491	1,508	1,526
	1,642	**1,586**	**1,582**	**1,577**	**1,573**	**1,569**	**1,565**	**1,550**	**1,536**	**1,521**	**1,506**	**1,491**	**1,508**	**1,526**
Rio Grande River Basin														
Alamosa County	13,823	15,139	15,319	15,499	15,679	15,859	16,038	16,186	16,333	16,481	16,628	16,776	17,155	17,534
Conejos County	7,755	8,400	8,450	8,500	8,550	8,600	8,650	8,643	8,636	8,629	8,622	8,615	8,717	8,819
Costilla County	3,376	3,675	3,675	3,675	3,675	3,675	3,675	3,650	3,626	3,601	3,576	3,552	3,587	3,623
Mineral County	646	833	858	884	909	934	959	972	986	999	1,013	1,026	1,041	1,055
Rio Grande County	11,461	12,434	12,608	12,782	12,956	13,130	13,303	13,203	13,102	13,001	12,901	12,800	12,962	13,123
Saguache County	4,942	5,954	6,156	6,358	6,560	6,763	6,965	7,051	7,137	7,222	7,308	7,394	7,543	7,691
	42,003	**46,435**	**47,066**	**47,697**	**48,329**	**48,960**	**49,591**	**49,705**	**49,819**	**49,934**	**50,048**	**50,162**	**51,004**	**51,846**
South Platte River Basin														
Adams County	300,794	350,642	361,544	372,445	383,347	394,248	405,150	414,387	423,623	432,860	442,096	451,333	462,384	473,435
Arapahoe County	436,405	491,143	500,547	509,951	519,355	528,759	538,163	547,142	556,122	565,101	574,081	583,060	594,054	605,048
Boulder County	252,725	271,051	275,010	278,969	282,928	286,887	290,846	294,218	297,589	300,961	304,332	307,704	312,250	316,796
Broomfield County	-	39,466	41,377	43,288	45,199	47,110	49,021	51,036	53,051	55,067	57,082	59,097	60,597	62,097
Cheyenne County- South Platte Bas	1,420	1,383	1,372	1,362	1,351	1,341	1,330	1,317	1,303	1,290	1,276	1,263	1,280	1,297
Clear Creek County	8,458	9,391	9,466	9,541	9,616	9,692	9,767	9,767	9,766	9,766	9,766	9,765	9,972	10,178
Denver	504,249	555,782	561,109	566,436	571,763	577,090	582,417	593,304	604,191	615,077	625,964	636,851	646,968	657,086
Douglas	92,526	180,690	194,845	208,999	223,154	237,309	251,464	260,858	270,252	279,647	289,041	298,435	306,959	315,483
Elbert County-South Platte Basin Porti	8,864	13,930	14,306	14,682	15,058	15,434	15,810	15,947	16,083	16,220	16,356	16,493	17,341	18,188
Gilpin County	3,499	4,775	4,853	4,931	5,010	5,088	5,166	5,235	5,304	5,373	5,442	5,511	5,627	5,742
Jefferson	483,433	526,269	528,511	530,754	532,997	535,239	537,482	541,254	545,026	548,799	552,571	556,343	562,127	567,911
Kit Carson County	7,340	8,012	8,071	8,130	8,189	8,249	8,308	8,343	8,379	8,414	8,449	8,485	8,557	8,630
Larimer County	214,936	253,137	258,649	264,161	269,674	275,186	280,699	285,470	290,242	295,013	299,785	304,557	310,618	316,679
Lincoln County-South Platte Basin	1,128	1,172	1,163	1,154	1,145	1,136	1,126	1,118	1,110	1,102	1,093	1,085	1,097	1,108
Logan County	18,828	20,862	21,041	21,220	21,399	21,579	21,758	21,826	21,894	21,962	22,031	22,099	22,563	23,027
Morgan County	25,088	27,261	27,552	27,842	28,132	28,423	28,713	28,806	28,899	28,992	29,084	29,177	29,756	30,335
Park County	9,526	14,703	15,130	15,558	15,986	16,414	16,841	17,074	17,307	17,540	17,773	18,005	18,797	19,590
Phillips County	4,401	4,486	4,519	4,551	4,583	4,616	4,648	4,641	4,635	4,628	4,621	4,615	4,642	4,670
Sedgewick County	2,664	2,742	2,732	2,721	2,711	2,700	2,690	2,670	2,651	2,632	2,612	2,593	2,622	2,651
Teller County- South Platte Basin Port	7,737	10,361	10,511	10,661	10,811	10,961	11,111	11,172	11,232	11,293	11,354	11,415	11,689	11,963
Washington County	5,221	4,920	4,927	4,934	4,941	4,948	4,955	4,922	4,889	4,855	4,822	4,789	4,811	4,832
Weld County	151,368	183,557	193,266	202,975	212,684	222,393	232,102	239,254	246,406	253,558	260,710	267,862	276,404	284,946
Yuma County	9,276	9,853	9,887	9,922	9,956	9,990	10,025	10,041	10,057	10,073	10,088	10,104	10,204	10,304
	2,549,887	**2,985,586**	**3,050,387**	**3,115,188**	**3,179,989**	**3,244,790**	**3,309,592**	**3,369,801**	**3,430,011**	**3,490,221**	**3,550,431**	**3,610,641**	**3,681,319**	**3,751,997**
Yampa/White River Basin														
Mofffat County	11,996	13,185	13,274	13,362	13,451	13,539	13,628	13,959	14,291	14,623	14,954	15,286	15,508	15,731
Rio Blanco County	6,314	5,986	6,017	6,048	6,078	6,109	6,140	6,337	6,533	6,730	6,926	7,123	7,430	7,737
Routt County	16,617	20,102	20,547	20,992	21,437	21,883	22,328	22,810	23,293	23,776	24,259	24,741	25,420	26,098
	34,927	**39,273**	**39,838**	**40,402**	**40,967**	**41,531**	**42,095**	**43,106**	**44,117**	**45,128**	**46,139**	**47,150**	**48,358**	**49,567**
Colorado Total	**3,712,065**	**4,335,540**	**4,426,520**	**4,517,500**	**4,608,480**	**4,699,459**	**4,790,439**	**4,877,883**	**4,965,326**	**5,052,769**	**5,140,213**	**5,227,656**	**5,333,043**	**5,438,430**

Table F-2
Population Data by Year and County

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Source of Data			CDM					CDM					CDM	
Arkansas River Basin														
Baca County	4,186	4,196	4,206	4,205	4,204	4,203	4,202	4,201	4,208	4,215	4,222	4,229	4,236	4,241
Bent County	6,485	6,542	6,599	6,630	6,660	6,691	6,722	6,752	6,783	6,814	6,845	6,876	6,907	6,915
Chaffee County	19,130	19,569	20,008	20,619	21,231	21,842	22,454	23,065	23,585	24,104	24,624	25,143	25,663	26,064
Cheyenne County- Arkansas Basin	805	816	826	835	844	852	861	869	874	879	884	889	894	898
Crowley County	7,221	7,310	7,399	7,472	7,545	7,618	7,690	7,763	7,850	7,936	8,023	8,109	8,196	8,276
Custer County	4,917	5,090	5,263	5,441	5,618	5,795	5,972	6,149	6,328	6,507	6,687	6,866	7,045	7,217
El Paso County	663,361	674,720	686,079	697,620	709,162	720,703	732,244	743,786	756,266	768,746	781,226	793,707	806,187	818,741
Elbert County-Arkansas Basin Portion	8,552	8,933	9,314	9,962	10,611	11,259	11,907	12,556	13,148	13,741	14,334	14,926	15,519	16,011
Fremont County	52,603	53,586	54,569	55,540	56,511	57,483	58,454	59,425	60,443	61,460	62,477	63,495	64,512	65,479
Huerfano County	9,001	9,190	9,379	9,559	9,739	9,919	10,099	10,279	10,455	10,630	10,806	10,982	11,157	11,274
Kiowa County	1,516	1,529	1,543	1,552	1,561	1,569	1,578	1,587	1,598	1,608	1,619	1,629	1,640	1,650
Lake County	10,692	11,148	11,604	12,056	12,508	12,960	13,412	13,864	14,338	14,813	15,288	15,762	16,237	16,753
Las Animas County	18,486	18,857	19,228	19,587	19,947	20,306	20,666	21,025	21,363	21,701	22,039	22,377	22,714	23,011
Lincoln County-Arkansas Basin Po	4,773	4,822	4,872	4,912	4,953	4,994	5,035	5,075	5,130	5,184	5,238	5,293	5,347	5,400
Otero County	19,720	19,905	20,090	20,221	20,352	20,484	20,615	20,746	20,833	20,920	21,008	21,095	21,182	21,236
Prowers County	13,865	13,971	14,077	14,143	14,208	14,273	14,339	14,404	14,493	14,582	14,671	14,759	14,848	14,926
Pueblo County	173,178	176,098	179,019	182,108	185,198	188,288	191,378	194,468	197,593	200,718	203,843	206,968	210,093	213,402
Teller County- Arkansas Basin Portion	12,737	13,022	13,307	13,589	13,870	14,152	14,433	14,714	14,991	15,268	15,545	15,821	16,098	16,348
	1,031,227	**1,049,305**	**1,067,382**	**1,086,051**	**1,104,720**	**1,123,390**	**1,142,059**	**1,160,728**	**1,180,278**	**1,199,827**	**1,219,376**	**1,238,925**	**1,258,475**	**1,277,842**
Colorado River Basin														
Eagle County	64,356	66,140	67,925	69,507	71,090	72,672	74,254	75,837	76,838	77,838	78,839	79,840	80,841	82,374
Garfield County	67,962	70,239	72,516	76,394	80,271	84,149	88,026	91,904	94,776	97,647	100,518	103,390	106,261	108,776
Grand County	16,733	17,148	17,562	18,136	18,710	19,284	19,858	20,433	20,966	21,499	22,033	22,566	23,099	23,605
Mesa County- Colorado Basin Portion	146,563	149,444	152,324	155,836	159,349	162,861	166,374	169,886	172,970	176,054	179,138	182,222	185,306	188,337
Pitkin County	19,352	19,763	20,175	20,603	21,032	21,460	21,889	22,317	22,775	23,232	23,690	24,147	24,605	25,069
Summit County	33,807	34,655	35,503	36,500	37,498	38,495	39,492	40,489	41,536	42,582	43,629	44,676	45,723	46,697
	348,774	**357,389**	**366,005**	**376,977**	**387,949**	**398,921**	**409,894**	**420,866**	**429,860**	**438,853**	**447,847**	**456,841**	**465,835**	**474,859**
Dolores/San Juan River Basin														
Archuleta County	14,991	15,485	15,979	16,527	17,075	17,623	18,171	18,719	19,335	19,950	20,566	21,182	21,798	22,450
Dolores County	2,194	2,235	2,275	2,311	2,348	2,384	2,421	2,458	2,502	2,546	2,589	2,633	2,677	2,721
La Plata County	57,252	58,671	60,091	61,584	63,077	64,570	66,062	67,555	69,001	70,446	71,892	73,337	74,783	76,136
Montezuma County	28,325	28,872	29,418	29,970	30,522	31,074	31,626	32,178	32,811	33,445	34,079	34,713	35,347	35,957
Montrose County- Southwest Basin Pc	4,805	4,942	5,078	5,217	5,357	5,496	5,635	5,775	5,922	6,070	6,217	6,364	6,512	6,653
San Juan County	610	617	624	628	631	635	639	643	646	649	652	654	657	660
San Miguel County	9,190	9,484	9,777	10,055	10,333	10,610	10,888	11,166	11,474	11,781	12,089	12,396	12,704	12,991
	117,368	**120,305**	**123,242**	**126,292**	**129,342**	**132,393**	**135,443**	**138,493**	**141,690**	**144,887**	**148,084**	**151,281**	**154,478**	**157,568**
Gunnison River Basin														
Delta County	36,348	37,368	38,388	39,525	40,663	41,800	42,938	44,075	45,313	46,551	47,789	49,027	50,265	51,337
Gunnison County	16,344	16,588	16,832	17,089	17,345	17,602	17,858	18,115	18,351	18,588	18,824	19,060	19,297	19,502
Hinsdale County	989	1,011	1,033	1,051	1,070	1,088	1,106	1,124	1,143	1,163	1,182	1,201	1,220	1,239
Mesa County- Gunnison Basin Portior	16,285	16,605	16,925	17,315	17,705	18,096	18,486	18,876	19,219	19,562	19,904	20,247	20,590	20,926
Montrose County- Gunnison Basin Po	43,245	44,474	45,703	46,957	48,211	49,465	50,719	51,972	53,299	54,626	55,953	57,280	58,607	59,873
Ouray County	5,556	5,732	5,907	6,037	6,167	6,297	6,427	6,557	6,603	6,648	6,694	6,740	6,785	6,816
	118,767	**121,778**	**124,789**	**127,975**	**131,161**	**134,348**	**137,534**	**140,720**	**143,929**	**147,138**	**150,347**	**153,556**	**156,765**	**159,693**

Table F-2
Population Data by Year and County

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Source of Data		CDM					CDM					CDM		
North Platte River Basin														
Jackson County	1,543	1,560	1,577	1,593	1,609	1,625	1,640	1,656	1,669	1,683	1,696	1,710	1,723	1,733
	1,543	**1,560**	**1,577**	**1,593**	**1,609**	**1,625**	**1,640**	**1,656**	**1,669**	**1,683**	**1,696**	**1,710**	**1,723**	**1,733**
Rio Grande River Basin														
Alamosa County	17,913	18,292	18,671	19,012	19,353	19,693	20,034	20,374	20,743	21,111	21,479	21,848	22,216	22,596
Conejos County	8,921	9,022	9,124	9,189	9,253	9,317	9,382	9,446	9,513	9,579	9,645	9,711	9,778	9,830
Costilla County	3,659	3,695	3,731	3,754	3,777	3,801	3,824	3,847	3,872	3,896	3,920	3,945	3,969	3,992
Mineral County	1,070	1,085	1,099	1,110	1,121	1,132	1,142	1,153	1,162	1,170	1,179	1,188	1,196	1,200
Rio Grande County	13,285	13,447	13,608	13,785	13,962	14,139	14,315	14,492	14,641	14,789	14,938	15,087	15,235	15,378
Saguache County	7,840	7,989	8,138	8,256	8,375	8,493	8,611	8,730	8,836	8,943	9,050	9,157	9,263	9,352
	52,688	**53,530**	**54,372**	**55,106**	**55,840**	**56,574**	**57,308**	**58,043**	**58,766**	**59,489**	**60,212**	**60,935**	**61,658**	**62,346**
South Platte River Basin														
Adams County	484,486	495,537	506,588	516,260	525,933	535,605	545,278	554,950	565,237	575,524	585,812	596,099	606,386	615,671
Arapahoe County	616,043	627,037	638,031	647,390	656,750	666,109	675,469	684,828	694,575	704,322	714,070	723,817	733,564	742,709
Boulder County	321,343	325,889	330,435	333,950	337,465	340,981	344,496	348,011	351,721	355,432	359,142	362,853	366,563	369,445
Broomfield County	63,598	65,098	66,598	67,937	69,276	70,614	71,953	73,292	74,685	76,078	77,471	78,864	80,257	81,099
Cheyenne County- South Platte Bas	1,314	1,331	1,348	1,362	1,376	1,390	1,404	1,418	1,427	1,435	1,443	1,451	1,459	1,465
Clear Creek County	10,385	10,591	10,797	11,012	11,226	11,440	11,655	11,869	12,098	12,328	12,557	12,786	13,015	13,236
Denver	667,203	677,321	687,438	691,635	695,832	700,029	704,226	708,423	712,422	716,421	720,421	724,420	728,419	732,776
Douglas	324,008	332,532	341,056	351,511	361,965	372,420	382,874	393,329	401,824	410,320	418,815	427,311	435,806	442,345
Elbert County-South Platte Basin Porti	19,036	19,884	20,731	22,174	23,617	25,060	26,503	27,946	29,265	30,585	31,904	33,223	34,542	35,638
Gilpin County	5,857	5,973	6,088	6,198	6,307	6,417	6,527	6,636	6,753	6,870	6,987	7,104	7,221	7,335
Jefferson	573,696	579,480	585,264	591,251	597,239	603,226	609,214	615,201	621,755	628,309	634,862	641,416	647,970	653,425
Kit Carson County	8,703	8,776	8,848	8,889	8,929	8,969	9,009	9,049	9,092	9,135	9,177	9,220	9,263	9,299
Larimer County	322,740	328,802	334,863	341,437	348,012	354,586	361,160	367,735	375,118	382,502	389,886	397,270	404,654	411,583
Lincoln County-South Platte Basin	1,120	1,131	1,143	1,152	1,162	1,171	1,181	1,191	1,203	1,216	1,229	1,241	1,254	1,267
Logan County	23,490	23,954	24,418	24,928	25,437	25,947	26,456	26,966	27,485	28,004	28,523	29,042	29,561	29,967
Morgan County	30,914	31,493	32,072	32,811	33,550	34,289	35,028	35,767	36,576	37,386	38,195	39,005	39,815	40,618
Park County	20,382	21,174	21,966	23,089	24,211	25,334	26,456	27,579	28,758	29,937	31,116	32,296	33,475	34,392
Phillips County	4,697	4,724	4,752	4,770	4,789	4,807	4,825	4,844	4,864	4,885	4,906	4,927	4,947	4,957
Sedgewick County	2,680	2,709	2,738	2,758	2,777	2,797	2,817	2,836	2,856	2,875	2,894	2,914	2,933	2,949
Teller County- South Platte Basin Port	12,237	12,511	12,786	13,056	13,326	13,597	13,867	14,137	14,403	14,669	14,935	15,201	15,467	15,707
Washington County	4,854	4,876	4,897	4,902	4,906	4,911	4,915	4,920	4,928	4,937	4,945	4,954	4,962	4,965
Weld County	293,487	302,029	310,571	320,819	331,067	341,315	351,563	361,810	374,003	386,195	398,388	410,580	422,773	435,788
Yuma County	10,403	10,503	10,603	10,675	10,748	10,820	10,892	10,965	11,044	11,123	11,201	11,280	11,359	11,427
	3,822,676	**3,893,354**	**3,964,032**	**4,029,966**	**4,095,900**	**4,161,834**	**4,227,768**	**4,293,702**	**4,362,095**	**4,430,487**	**4,498,880**	**4,567,272**	**4,635,665**	**4,698,064**
Yampa/White River Basin														
Mofffat County	15,953	16,175	16,398	16,782	17,166	17,551	17,935	18,319	18,750	19,180	19,611	20,042	20,472	20,681
Rio Blanco County	8,045	8,352	8,659	9,032	9,406	9,779	10,153	10,526	10,743	10,961	11,178	11,395	11,613	11,830
Routt County	26,777	27,456	28,134	28,869	29,604	30,339	31,073	31,808	32,643	33,478	34,312	35,147	35,981	36,850
	50,775	**51,983**	**53,191**	**54,683**	**56,176**	**57,668**	**59,161**	**60,654**	**62,136**	**63,619**	**65,101**	**66,584**	**68,066**	**69,361**
Colorado Total	**5,543,817**	**5,649,203**	**5,754,590**	**5,858,644**	**5,962,698**	**6,066,753**	**6,170,807**	**6,274,861**	**6,380,422**	**6,485,983**	**6,591,543**	**6,697,104**	**6,802,665**	**6,901,466**

Table F-2
Population Data by Year and County

	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Source of Data				CDM					CDM					
Arkansas River Basin														
Baca County	4,247	4,252	4,258	4,264	4,270	4,277	4,283	4,290	4,297	4,335	4,372	4,410	4,448	4,486
Bent County	6,923	6,932	6,940	6,948	6,942	6,935	6,929	6,922	6,915	6,970	7,024	7,079	7,133	7,187
Chaffee County	26,464	26,865	27,266	27,667	27,961	28,256	28,550	28,844	29,139	29,570	30,001	30,432	30,863	31,295
Cheyenne County- Arkansas Basin	901	905	908	911	914	917	920	923	926	937	947	958	969	980
Crowley County	8,356	8,436	8,516	8,596	8,671	8,746	8,821	8,895	8,970	9,062	9,153	9,244	9,335	9,427
Custer County	7,388	7,560	7,731	7,903	8,065	8,228	8,391	8,554	8,716	8,813	8,909	9,006	9,102	9,199
El Paso County	831,296	843,850	856,405	868,959	881,653	894,347	907,041	919,734	932,428	942,283	952,138	961,992	971,847	981,702
Elbert County-Arkansas Basin Portion	16,504	16,996	17,489	17,982	18,427	18,872	19,318	19,763	20,209	20,379	20,550	20,721	20,891	21,062
Fremont County	66,446	67,413	68,380	69,347	70,279	71,212	72,144	73,076	74,009	75,238	76,466	77,695	78,924	80,153
Huerfano County	11,391	11,507	11,624	11,740	11,839	11,938	12,036	12,135	12,234	12,414	12,594	12,774	12,955	13,135
Kiowa County	1,659	1,669	1,679	1,689	1,699	1,709	1,720	1,730	1,740	1,754	1,768	1,781	1,795	1,809
Lake County	17,269	17,785	18,301	18,818	19,107	19,397	19,687	19,976	20,266	20,434	20,601	20,769	20,937	21,104
Las Animas County	23,308	23,605	23,902	24,199	24,476	24,753	25,029	25,306	25,583	25,896	26,209	26,523	26,836	27,149
Lincoln County-Arkansas Basin Po	5,453	5,506	5,559	5,612	5,667	5,721	5,776	5,831	5,886	5,973	6,059	6,146	6,233	6,320
Otero County	21,289	21,342	21,396	21,449	21,493	21,537	21,581	21,624	21,668	21,847	22,026	22,205	22,384	22,563
Prowers County	15,005	15,083	15,161	15,240	15,307	15,374	15,441	15,508	15,576	15,677	15,779	15,880	15,982	16,083
Pueblo County	216,711	220,020	223,330	226,639	230,100	233,562	237,023	240,485	243,946	246,484	249,021	251,558	254,096	256,633
Teller County- Arkansas Basin Portion	16,598	16,848	17,098	17,348	17,584	17,820	18,055	18,291	18,527	18,744	18,961	19,178	19,395	19,612
	1,297,209	**1,316,576**	**1,335,943**	**1,355,310**	**1,374,455**	**1,393,600**	**1,412,745**	**1,431,889**	**1,451,034**	**1,466,807**	**1,482,580**	**1,498,353**	**1,514,126**	**1,529,899**
Colorado River Basin														
Eagle County	83,907	85,439	86,972	88,505	90,408	92,312	94,215	96,119	98,022	99,755	101,488	103,222	104,955	106,688
Garfield County	111,292	113,807	116,322	118,838	121,523	124,209	126,895	129,580	132,266	135,314	138,362	141,409	144,457	147,505
Grand County	24,110	24,616	25,121	25,627	26,103	26,580	27,056	27,533	28,009	28,420	28,830	29,240	29,650	30,061
Mesa County- Colorado Basin Portion	191,369	194,400	197,431	200,463	203,487	206,512	209,536	212,561	215,585	219,599	223,612	227,625	231,639	235,652
Pitkin County	25,533	25,997	26,461	26,925	27,388	27,851	28,314	28,777	29,240	29,979	30,719	31,458	32,198	32,937
Summit County	47,672	48,647	49,622	50,597	51,502	52,406	53,311	54,216	55,121	56,320	57,519	58,718	59,917	61,116
	483,882	**492,906**	**501,930**	**510,954**	**520,411**	**529,869**	**539,327**	**548,785**	**558,243**	**569,386**	**580,529**	**591,672**	**602,815**	**613,958**
Dolores/San Juan River Basin														
Archuleta County	23,101	23,753	24,404	25,056	25,704	26,351	26,999	27,647	28,295	28,716	29,136	29,557	29,977	30,397
Dolores County	2,765	2,810	2,854	2,898	2,944	2,990	3,035	3,081	3,127	3,165	3,202	3,240	3,278	3,315
La Plata County	77,489	78,842	80,194	81,547	82,824	84,100	85,376	86,652	87,929	89,085	90,242	91,398	92,555	93,711
Montezuma County	36,567	37,178	37,788	38,399	38,980	39,562	40,143	40,725	41,306	41,788	42,269	42,751	43,232	43,714
Montrose County- Southwest Basin Pc	6,793	6,934	7,074	7,215	7,330	7,444	7,558	7,673	7,787	7,870	7,954	8,037	8,120	8,204
San Juan County	663	666	669	671	674	676	679	681	683	711	739	766	794	822
San Miguel County	13,278	13,566	13,853	14,141	14,414	14,688	14,962	15,235	15,509	15,944	16,378	16,813	17,248	17,682
	160,657	**163,747**	**166,837**	**169,927**	**172,869**	**175,811**	**178,753**	**181,695**	**184,637**	**187,278**	**189,920**	**192,562**	**195,203**	**197,845**
Gunnison River Basin														
Delta County	52,409	53,481	54,553	55,625	56,486	57,346	58,207	59,068	59,929	60,594	61,259	61,924	62,589	63,254
Gunnison County	19,708	19,913	20,118	20,324	20,510	20,696	20,882	21,068	21,254	21,701	22,148	22,594	23,041	23,488
Hinsdale County	1,257	1,275	1,293	1,312	1,330	1,348	1,365	1,383	1,401	1,416	1,431	1,446	1,461	1,476
Mesa County- Gunnison Basin Portior	21,263	21,600	21,937	22,274	22,610	22,946	23,282	23,618	23,954	24,400	24,846	25,292	25,738	26,184
Montrose County- Gunnison Basin Po	61,139	62,405	63,670	64,936	65,966	66,995	68,025	69,054	70,084	70,834	71,583	72,333	73,083	73,833
Ouray County	6,846	6,877	6,908	6,938	6,965	6,991	7,018	7,045	7,071	7,176	7,281	7,386	7,491	7,596
	162,622	**165,551**	**168,479**	**171,408**	**173,865**	**176,322**	**178,779**	**181,237**	**183,694**	**186,121**	**188,548**	**190,976**	**193,403**	**195,830**

Table F-2
Population Data by Year and County

	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Source of Data				CDM					CDM					
North Platte River Basin														
Jackson County	1,743	1,753	1,763	1,773	1,782	1,791	1,799	1,808	1,817	1,842	1,868	1,893	1,918	1,943
	1,743	**1,753**	**1,763**	**1,773**	**1,782**	**1,791**	**1,799**	**1,808**	**1,817**	**1,842**	**1,868**	**1,893**	**1,918**	**1,943**
Rio Grande River Basin														
Alamosa County	22,975	23,354	23,733	24,112	24,515	24,919	25,322	25,725	26,128	26,435	26,741	27,048	27,355	27,661
Conejos County	9,882	9,935	9,987	10,039	10,084	10,130	10,175	10,220	10,265	10,364	10,462	10,561	10,660	10,758
Costilla County	4,014	4,037	4,060	4,083	4,103	4,123	4,144	4,164	4,184	4,230	4,276	4,321	4,367	4,412
Mineral County	1,203	1,207	1,210	1,213	1,216	1,219	1,222	1,225	1,228	1,254	1,280	1,307	1,333	1,359
Rio Grande County	15,520	15,663	15,805	15,948	16,051	16,153	16,256	16,359	16,462	16,637	16,812	16,987	17,162	17,337
Saguache County	9,440	9,528	9,616	9,704	9,783	9,862	9,941	10,019	10,098	10,195	10,291	10,388	10,484	10,580
	63,035	**63,723**	**64,411**	**65,099**	**65,753**	**66,406**	**67,060**	**67,713**	**68,366**	**69,115**	**69,863**	**70,612**	**71,360**	**72,108**
South Platte River Basin														
Adams County	624,956	634,241	643,526	652,811	661,891	670,971	680,052	689,132	698,212	704,934	711,655	718,377	725,098	731,820
Arapahoe County	751,854	760,999	770,144	779,289	787,884	796,479	805,074	813,669	822,264	830,180	838,096	846,011	853,927	861,843
Boulder County	372,327	375,209	378,091	380,973	383,350	385,728	388,105	390,483	392,860	396,642	400,424	404,206	407,988	411,770
Broomfield County	81,941	82,784	83,626	84,468	84,940	85,413	85,885	86,358	86,830	87,666	88,502	89,338	90,174	91,010
Cheyenne County- South Platte Bas	1,470	1,476	1,481	1,487	1,492	1,496	1,501	1,506	1,511	1,528	1,546	1,563	1,581	1,599
Clear Creek County	13,457	13,678	13,898	14,119	14,336	14,553	14,770	14,987	15,204	15,447	15,690	15,932	16,175	16,418
Denver	737,134	741,491	745,849	750,206	755,702	761,198	766,695	772,191	777,687	785,174	792,660	800,147	807,634	815,120
Douglas	448,885	455,424	461,964	468,503	474,314	480,125	485,935	491,746	497,557	502,347	507,137	511,927	516,717	521,507
Elbert County-South Platte Basin Porti	36,735	37,831	38,927	40,023	41,015	42,006	42,998	43,989	44,981	45,361	45,740	46,120	46,500	46,880
Gilpin County	7,448	7,562	7,676	7,789	7,902	8,015	8,128	8,240	8,353	8,642	8,930	9,218	9,506	9,794
Jefferson	658,880	664,336	669,791	675,246	679,130	683,015	686,899	690,784	694,668	701,355	708,043	714,730	721,418	728,105
Kit Carson County	9,335	9,371	9,407	9,444	9,475	9,506	9,537	9,568	9,599	9,728	9,856	9,985	10,113	10,242
Larimer County	418,513	425,443	432,372	439,302	445,997	452,692	459,387	466,082	472,777	478,713	484,650	490,587	496,523	502,460
Lincoln County-South Platte Basin	1,279	1,292	1,304	1,316	1,329	1,342	1,355	1,368	1,381	1,401	1,421	1,442	1,462	1,482
Logan County	30,374	30,780	31,186	31,593	31,968	32,344	32,719	33,094	33,470	33,802	34,134	34,466	34,799	35,131
Morgan County	41,421	42,223	43,026	43,829	44,681	45,532	46,383	47,235	48,086	48,652	49,218	49,784	50,349	50,915
Park County	35,309	36,226	37,143	38,060	38,490	38,919	39,348	39,777	40,207	40,543	40,878	41,214	41,550	41,886
Phillips County	4,968	4,978	4,988	4,998	5,006	5,014	5,021	5,029	5,036	5,072	5,108	5,144	5,179	5,215
Sedgewick County	2,965	2,981	2,997	3,013	3,027	3,042	3,056	3,070	3,085	3,112	3,140	3,167	3,195	3,222
Teller County- South Platte Basin Port	15,947	16,188	16,428	16,668	16,894	17,121	17,347	17,574	17,800	18,009	18,217	18,426	18,635	18,843
Washington County	4,968	4,971	4,974	4,977	4,978	4,978	4,978	4,979	4,979	5,021	5,063	5,105	5,146	5,188
Weld County	448,804	461,819	474,834	487,850	501,391	514,933	528,475	542,016	555,558	562,190	568,823	575,455	582,087	588,719
Yuma County	11,494	11,562	11,629	11,697	11,756	11,815	11,874	11,933	11,992	12,101	12,211	12,320	12,429	12,538
	4,760,464	**4,822,863**	**4,885,262**	**4,947,662**	**5,006,949**	**5,066,236**	**5,125,523**	**5,184,810**	**5,244,096**	**5,297,619**	**5,351,141**	**5,404,663**	**5,458,185**	**5,511,707**
Yampa/White River Basin														
Mofffat County	20,889	21,097	21,306	21,514	21,678	21,841	22,005	22,168	22,332	22,715	23,098	23,481	23,865	24,248
Rio Blanco County	12,047	12,264	12,482	12,699	12,918	13,138	13,357	13,577	13,796	15,116	16,437	17,757	19,077	20,397
Routt County	37,719	38,588	39,457	40,326	41,175	42,024	42,873	43,722	44,571	45,275	45,980	46,685	47,390	48,094
	70,655	**71,950**	**73,244**	**74,539**	**75,771**	**77,003**	**78,235**	**79,466**	**80,698**	**83,107**	**85,515**	**87,923**	**90,332**	**92,740**
Colorado Total	**7,000,268**	**7,099,069**	**7,197,870**	**7,296,672**	**7,391,854**	**7,487,037**	**7,582,220**	**7,677,403**	**7,772,586**	**7,861,275**	**7,949,964**	**8,038,653**	**8,127,342**	**8,216,031**

Table F-2
Population Data by Year and County

	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Source of Data										CDM
Arkansas River Basin										
Baca County	4,524	4,562	4,599	4,637	4,675	4,713	4,751	4,789	4,827	4,864
Bent County	7,242	7,296	7,350	7,405	7,459	7,513	7,568	7,622	7,676	7,731
Chaffee County	31,726	32,157	32,588	33,019	33,450	33,882	34,313	34,744	35,175	35,606
Cheyenne County- Arkansas Basin	991	1,001	1,012	1,023	1,034	1,044	1,055	1,066	1,077	1,088
Crowley County	9,518	9,609	9,701	9,792	9,883	9,974	10,066	10,157	10,248	10,340
Custer County	9,295	9,391	9,488	9,584	9,681	9,777	9,874	9,970	10,066	10,163
El Paso County	991,557	1,001,411	1,011,266	1,021,121	1,030,975	1,040,830	1,050,685	1,060,540	1,070,394	1,080,249
Elbert County-Arkansas Basin Portion	21,233	21,403	21,574	21,744	21,915	22,086	22,256	22,427	22,597	22,768
Fremont County	81,382	82,611	83,840	85,069	86,298	87,527	88,755	89,984	91,213	92,442
Huerfano County	13,315	13,496	13,676	13,856	14,036	14,217	14,397	14,577	14,757	14,938
Kiowa County	1,823	1,836	1,850	1,864	1,878	1,892	1,905	1,919	1,933	1,947
Lake County	21,272	21,440	21,608	21,775	21,943	22,111	22,278	22,446	22,614	22,782
Las Animas County	27,463	27,776	28,089	28,403	28,716	29,029	29,342	29,656	29,969	30,282
Lincoln County-Arkansas Basin Po	6,406	6,493	6,580	6,667	6,754	6,840	6,927	7,014	7,101	7,187
Otero County	22,742	22,921	23,100	23,279	23,458	23,637	23,816	23,995	24,174	24,353
Prowers County	16,185	16,286	16,388	16,489	16,591	16,692	16,794	16,895	16,997	17,098
Pueblo County	259,170	261,707	264,245	266,782	269,319	271,857	274,394	276,931	279,469	282,006
Teller County- Arkansas Basin Portion	19,829	20,047	20,264	20,481	20,698	20,915	21,132	21,350	21,567	21,784
	1,545,671	**1,561,444**	**1,577,217**	**1,592,990**	**1,608,763**	**1,624,536**	**1,640,309**	**1,656,081**	**1,671,854**	**1,687,627**
Colorado River Basin										
Eagle County	108,421	110,154	111,887	113,620	115,353	117,086	118,819	120,552	122,285	124,018
Garfield County	150,553	153,601	156,648	159,696	162,744	165,792	168,840	171,888	174,935	177,983
Grand County	30,471	30,881	31,291	31,702	32,112	32,522	32,932	33,343	33,753	34,163
Mesa County- Colorado Basin Portion	239,665	243,679	247,692	251,706	255,719	259,732	263,746	267,759	271,773	275,786
Pitkin County	33,677	34,416	35,156	35,895	36,635	37,374	38,114	38,853	39,593	40,332
Summit County	62,315	63,514	64,713	65,912	67,111	68,310	69,509	70,708	71,907	73,106
	625,101	**636,244**	**647,387**	**658,530**	**669,673**	**680,816**	**691,959**	**703,102**	**714,245**	**725,388**
Dolores/San Juan River Basin										
Archuleta County	30,818	31,238	31,659	32,079	32,500	32,920	33,340	33,761	34,181	34,602
Dolores County	3,353	3,391	3,428	3,466	3,504	3,541	3,579	3,617	3,654	3,692
La Plata County	94,867	96,024	97,180	98,337	99,493	100,650	101,806	102,963	104,119	105,276
Montezuma County	44,195	44,677	45,158	45,640	46,121	46,603	47,084	47,566	48,047	48,529
Montrose County- Southwest Basin Pc	8,287	8,370	8,454	8,537	8,620	8,703	8,787	8,870	8,953	9,037
San Juan County	849	877	905	932	960	988	1,015	1,043	1,071	1,098
San Miguel County	18,117	18,551	18,986	19,421	19,855	20,290	20,724	21,159	21,594	22,028
	200,487	**203,128**	**205,770**	**208,412**	**211,053**	**213,695**	**216,337**	**218,978**	**221,620**	**224,262**
Gunnison River Basin										
Delta County	63,919	64,584	65,249	65,914	66,579	67,244	67,909	68,574	69,239	69,904
Gunnison County	23,935	24,381	24,828	25,275	25,721	26,168	26,615	27,062	27,508	27,955
Hinsdale County	1,491	1,506	1,521	1,537	1,552	1,567	1,582	1,597	1,612	1,627
Mesa County- Gunnison Basin Portior	26,629	27,075	27,521	27,967	28,413	28,859	29,305	29,751	30,197	30,643
Montrose County- Gunnison Basin Po	74,583	75,332	76,082	76,832	77,582	78,331	79,081	79,831	80,581	81,331
Ouray County	7,700	7,805	7,910	8,015	8,120	8,224	8,329	8,434	8,539	8,644
	198,257	**200,685**	**203,112**	**205,539**	**207,967**	**210,394**	**212,821**	**215,249**	**217,676**	**220,103**

Table F-2
Population Data by Year and County

	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Source of Data										CDM
North Platte River Basin										
Jackson County	1,969	1,994	2,019	2,044	2,070	2,095	2,120	2,145	2,170	2,196
	1,969	**1,994**	**2,019**	**2,044**	**2,070**	**2,095**	**2,120**	**2,145**	**2,170**	**2,196**
Rio Grande River Basin										
Alamosa County	27,968	28,274	28,581	28,888	29,194	29,501	29,807	30,114	30,421	30,727
Conejos County	10,857	10,955	11,054	11,152	11,251	11,349	11,448	11,546	11,645	11,744
Costilla County	4,458	4,504	4,549	4,595	4,640	4,686	4,731	4,777	4,823	4,868
Mineral County	1,385	1,411	1,437	1,464	1,490	1,516	1,542	1,568	1,595	1,621
Rio Grande County	17,512	17,687	17,863	18,038	18,213	18,388	18,563	18,738	18,913	19,088
Saguache County	10,677	10,773	10,870	10,966	11,063	11,159	11,256	11,352	11,448	11,545
	72,857	**73,605**	**74,354**	**75,102**	**75,851**	**76,599**	**77,347**	**78,096**	**78,844**	**79,593**
South Platte River Basin										
Adams County	738,542	745,263	751,985	758,706	765,428	772,149	778,871	785,593	792,314	799,036
Arapahoe County	869,759	877,674	885,590	893,506	901,422	909,338	917,253	925,169	933,085	941,001
Boulder County	415,552	419,334	423,116	426,898	430,680	434,462	438,244	442,026	445,807	449,589
Broomfield County	91,845	92,681	93,517	94,353	95,189	96,025	96,861	97,697	98,533	99,369
Cheyenne County- South Platte Bas	1,616	1,634	1,651	1,669	1,686	1,704	1,722	1,739	1,757	1,774
Clear Creek County	16,661	16,903	17,146	17,389	17,632	17,874	18,117	18,360	18,603	18,846
Denver	822,607	830,094	837,580	845,067	852,554	860,040	867,527	875,014	882,500	889,987
Douglas	526,297	531,086	535,876	540,666	545,456	550,246	555,036	559,826	564,616	569,406
Elbert County-South Platte Basin Porti	47,259	47,639	48,019	48,399	48,779	49,158	49,538	49,918	50,298	50,677
Gilpin County	10,083	10,371	10,659	10,947	11,236	11,524	11,812	12,100	12,389	12,677
Jefferson	734,793	741,480	748,168	754,855	761,543	768,230	774,918	781,605	788,293	794,980
Kit Carson County	10,370	10,499	10,627	10,756	10,884	11,013	11,141	11,270	11,398	11,527
Larimer County	508,396	514,333	520,269	526,206	532,142	538,079	544,015	549,952	555,888	561,825
Lincoln County-South Platte Basin	1,503	1,523	1,543	1,564	1,584	1,605	1,625	1,645	1,666	1,686
Logan County	35,463	35,795	36,128	36,460	36,792	37,124	37,456	37,789	38,121	38,453
Morgan County	51,481	52,047	52,613	53,179	53,745	54,311	54,877	55,443	56,009	56,575
Park County	42,222	42,558	42,894	43,230	43,566	43,902	44,238	44,574	44,910	45,246
Phillips County	5,251	5,287	5,322	5,358	5,394	5,429	5,465	5,501	5,537	5,572
Sedgewick County	3,250	3,277	3,304	3,332	3,359	3,387	3,414	3,442	3,469	3,496
Teller County- South Platte Basin Port	19,052	19,260	19,469	19,678	19,886	20,095	20,304	20,512	20,721	20,930
Washington County	5,230	5,272	5,314	5,356	5,397	5,439	5,481	5,523	5,565	5,607
Weld County	595,351	601,983	608,615	615,248	621,880	628,512	635,144	641,776	648,408	655,041
Yuma County	12,648	12,757	12,866	12,975	13,085	13,194	13,303	13,412	13,522	13,631
	5,565,230	**5,618,752**	**5,672,274**	**5,725,796**	**5,779,318**	**5,832,840**	**5,886,363**	**5,939,885**	**5,993,407**	**6,046,929**
Yampa/White River Basin										
Mofffat County	24,631	25,015	25,398	25,781	26,164	26,548	26,931	27,314	27,698	28,081
Rio Blanco County	21,718	23,038	24,358	25,678	26,999	28,319	29,639	30,960	32,280	33,600
Routt County	48,799	49,504	50,209	50,913	51,618	52,323	53,028	53,732	54,437	55,142
	95,148	**97,556**	**99,965**	**102,373**	**104,781**	**107,190**	**109,598**	**112,006**	**114,414**	**116,823**
Colorado Total	**8,304,720**	**8,393,409**	**8,482,098**	**8,570,787**	**8,659,476**	**8,748,165**	**8,836,853**	**8,925,542**	**9,014,231**	**9,102,920**

Table F-3
Population Data Provided by County
CDM (2004, 2010)

Arkansas Basin	2000	2005	2010	2015	2020	2025	2030	2035	2050 Low	2050 Middle	2050 High	Average Annual Change Low	Average Annual Change Middle	Average Annual Change High
Baca County	4,516	4,282	4,155	4,206	4,201	4,236	4,264	4,297	4,574	4,864	5,261	0.15%	0.28%	0.46%
Bent County	5,971	6,406	6,313	6,599	6,752	6,907	6,948	6,915	7,467	7,731	8,035	0.34%	0.42%	0.51%
Chaffee County	16,298	17,215	17,813	20,008	23,065	25,663	27,667	29,139	32,420	35,606	40,001	1.42%	1.63%	1.89%
Cheyenne County- Arkansas Basin Portion	848	815	774	826	869	894	911	926	977	1,088	1,219	0.40%	0.64%	0.90%
Crowley County	5,513	5,921	6,953	7,399	7,763	8,196	8,596	8,970	10,091	10,340	10,569	1.19%	1.25%	1.30%
Custer County	3,540	4,054	4,397	5,263	6,149	7,045	7,903	8,716	9,652	10,163	10,845	1.95%	2.06%	2.21%
El Paso County	520,572	573,822	629,284	686,079	743,786	806,187	868,959	932,428	1,007,636	1,080,249	1,189,811	1.26%	1.42%	1.63%
Elbert County-Arkansas Basin Portion	6,258	7,103	7,410	9,314	12,556	15,519	17,982	20,209	22,194	22,768	23,699	2.56%	2.62%	2.71%
Fremont County	46,439	48,406	49,655	54,569	59,425	64,512	69,347	74,009	86,692	92,442	98,380	1.30%	1.45%	1.59%
Huerfano County	7,861	8,130	8,435	9,379	10,279	11,157	11,740	12,234	14,024	14,938	16,008	1.22%	1.36%	1.52%
Kiowa County	1,617	1,544	1,475	1,543	1,587	1,640	1,689	1,740	1,837	1,947	2,097	0.39%	0.52%	0.68%
Lake County	7,908	8,175	9,325	11,604	13,864	16,237	18,818	20,266	22,157	22,782	23,739	2.24%	2.30%	2.40%
Las Animas County	15,276	16,559	17,373	19,228	21,025	22,714	24,199	25,583	28,205	30,282	33,142	1.19%	1.35%	1.55%
Lincoln County-Arkansas Basin Portion	4,998	4,802	4,626	4,872	5,075	5,347	5,612	5,886	6,599	7,187	7,795	0.71%	0.90%	1.08%
Otero County	20,244	19,675	19,165	20,090	20,746	21,182	21,449	21,668	23,130	24,353	25,842	0.36%	0.48%	0.61%
Prowers County	14,434	14,039	13,546	14,077	14,404	14,848	15,240	15,576	16,237	17,098	18,259	0.32%	0.44%	0.59%
Pueblo County	142,054	153,071	164,417	179,019	194,468	210,093	226,639	243,946	267,419	282,006	302,512	1.25%	1.37%	1.53%
Teller County- Arkansas Basin Portion	10,784	11,565	11,881	13,307	14,714	16,098	17,348	18,527	19,858	21,784	23,995	1.21%	1.42%	1.64%
TOTAL ARKANSAS BASIN	**835,131**	**905,582**	**976,996**	**1,067,382**	**1,160,728**	**1,258,475**	**1,355,310**	**1,451,034**	**1,581,169**	**1,687,627**	**1,841,210**	**1.25%**	**1.39%**	**1.59%**

Colorado Basin	2000	2005	2010	2015	2020	2025	2030	2035	2050 Low	2050 Middle	2050 High	Average Annual Change Low	Average Annual Change Middle	Average Annual Change High
Eagle County	43,354	51,616	59,003	67,925	75,837	80,841	88,505	98,022	107,216	124,018	150,162	1.64%	1.97%	2.40%
Garfield County	44,267	51,621	61,131	72,516	91,904	106,261	118,838	132,266	167,854	177,983	195,076	2.65%	2.79%	3.00%
Grand County	12,884	14,392	15,489	17,562	20,433	23,099	25,627	28,009	30,274	34,163	39,795	1.67%	1.94%	2.29%
Mesa County- Colorado Basin Portion	105,891	119,578	137,923	152,324	169,886	185,306	200,463	215,585	259,238	275,786	306,747	1.73%	1.87%	2.12%
Pitkin County	15,913	17,092	18,119	20,175	22,317	24,605	26,925	29,240	34,329	40,332	50,192	1.56%	1.93%	2.42%
Summit County	25,725	28,884	31,263	35,503	40,489	45,723	50,597	55,121	61,834	73,106	90,171	1.71%	2.09%	2.56%
TOTAL COLORADO BASIN	**248,034**	**283,183**	**322,927**	**366,005**	**420,866**	**465,835**	**510,954**	**558,243**	**660,745**	**725,388**	**832,143**	**1.90%**	**2.11%**	**2.42%**

Gunnison Basin	2000	2005	2010	2015	2020	2025	2030	2035	2050 Low	2050 Middle	2050 High	Average Annual Change Low	Average Annual Change Middle	Average Annual Change High
Delta County	28,009	30,776	33,287	38,388	44,075	50,265	55,625	59,929	66,683	69,904	74,011	1.73%	1.84%	1.97%
Gunnison County	13,967	14,826	15,612	16,832	18,115	19,297	20,324	21,254	24,181	27,955	32,677	1.09%	1.42%	1.77%
Hinsdale County	791	841	922	1,033	1,124	1,220	1,312	1,401	1,504	1,627	1,776	1.30%	1.48%	1.68%
Mesa County- TOTAL		132,864	153,247	169,249	188,763	205,896	222,736	239,539	288,043	306,429	340,830	1.73%	1.87%	2.12%
Mesa County- Gunnison Basin Portion	11,766	13,286	15,325	16,925	18,876	20,590	22,274	23,954	28,804	30,643	34,083	1.73%	1.87%	2.12%
Montrose County- Gunnison Basin Portion	30,299	34,643	39,557	45,703	51,972	58,607	64,936	70,084	77,194	81,331	86,949	1.80%	1.91%	2.07%
Ouray County	3,771	4,354	5,030	5,907	6,557	6,785	6,938	7,071	7,288	8,644	10,273	1.15%	1.54%	1.93%
TOTAL GUNNISON BASIN	**88,603**	**98,726**	**109,733**	**124,789**	**140,720**	**156,765**	**171,408**	**183,694**	**205,654**	**220,103**	**239,769**	**1.64%**	**1.80%**	**1.99%**

Metro Basin														
Adams County	350,642	405,150	451,333	506,588	554,950	606,386	652,811	698,212	774,540	799,036	874,622	1.45%	1.52%	1.72%
Arapahoe County	491,143	538,163	583,060	638,031	684,828	733,564	779,289	822,264	912,152	941,001	1,030,016	1.18%	1.25%	1.45%
Broomfield County	39,466	49,021	59,097	66,598	73,292	80,257	84,468	86,830	96,322	99,369	108,769	1.51%	1.58%	1.79%
Denver	555,782	582,417	636,851	687,438	708,423	728,419	750,206	777,687	862,702	889,987	974,177	0.88%	0.95%	1.15%
Douglas	180,690	251,464	298,435	341,056	393,329	435,806	468,503	497,557	551,949	569,406	623,270	1.76%	1.83%	2.04%
Jefferson	526,269	537,482	556,343	585,264	615,201	647,970	675,246	694,668	770,608	794,980	870,183	0.80%	0.87%	1.08%
Elbert County-South Platte Basin Portion	13,930	15,810	16,493	20,731	27,946	34,542	40,023	44,981	49,400	50,677	52,748	2.56%	2.62%	2.71%
Elbert County-TOTAL		22,913	23,903	30,045	40,502	50,061	58,005	65,190	71,594	73,446	76,447	2.56%	2.62%	2.71%
TOTAL METRO BASIN	**2,157,922**	**2,379,508**	**2,601,612**	**2,845,707**	**3,057,969**	**3,266,943**	**3,450,547**	**3,622,200**	**4,017,674**	**4,144,455**	**4,533,783**	**1.17%**	**1.24%**	**1.44%**

North Platte Basin	2000	2005	2010	2015	2020	2025	2030	2035	2050 Low	2050 Middle	2050 High	Average Annual Change Low	Average Annual Change Middle	Average Annual Change High
Jackson County	1,586	1,565	1,491	1,577	1,656	1,723	1,773	1,817	2,003	2,196	2,484	0.55%	0.75%	1.03%

Table F-3
Population Data Provided by County
CDM (2004, 2010)

Rio Grande Basin	2000	2005	2010	2015	2020	2025	2030	2035	2050 Low	2050 Middle	2050 High	Average Annual Change Low	Average Annual Change Middle	Average Annual Change High
Alamosa County	15,139	16,038	16,776	18,671	20,374	22,216	24,112	26,128	28,390	30,727	34,045	1.28%	1.46%	1.69%
Conejos County	8,400	8,650	8,615	9,124	9,446	9,778	10,039	10,265	11,076	11,744	12,470	0.55%	0.68%	0.82%
Costilla County	3,675	3,675	3,552	3,731	3,847	3,969	4,083	4,184	4,575	4,868	5,158	0.49%	0.63%	0.76%
Mineral County	833	959	1,026	1,099	1,153	1,196	1,213	1,228	1,369	1,621	1,955	0.80%	1.17%	1.60%
Rio Grande County	12,434	13,303	12,800	13,608	14,492	15,235	15,948	16,462	17,614	19,088	20,920	0.63%	0.81%	1.01%
Saguache County	5,954	6,965	7,394	8,138	8,730	9,263	9,704	10,098	11,038	11,545	12,137	1.03%	1.13%	1.24%
TOTAL RIO GRANDE BASIN	**46,435**	**49,591**	**50,162**	**54,372**	**58,043**	**61,658**	**65,099**	**68,366**	**74,062**	**79,593**	**86,684**	**0.90%**	**1.06%**	**1.25%**

South Platte Basin	2000	2005	2010	2015	2020	2025	2030	2035	2050 Low	2050 Middle	2050 High	Average Annual Change Low	Average Annual Change Middle	Average Annual Change High
Cheyenne County- TOTAL		2,145	2,037	2,174	2,288	2,353	2,398	2,436	2,572	2,862	3,209	0.40%	0.64%	0.90%
Cheyenne County- South Platte Basin Portion	1,383	1,330	1,263	1,348	1,418	1,459	1,487	1,511	1,595	1,774	1,990	0.40%	0.64%	0.90%
Clear Creek County	9,391	9,767	9,765	10,797	11,869	13,015	14,119	15,204	17,218	18,846	21,065	1.27%	1.47%	1.72%
Boulder County	271,051	290,846	307,704	330,435	348,011	366,563	380,973	392,860	435,806	449,589	492,119	0.90%	0.97%	1.18%
Gilpin County	4,775	5,166	5,511	6,088	6,636	7,221	7,789	8,353	10,072	12,677	15,807	1.49%	2.01%	2.52%
Kit Carson County	8,012	8,308	8,485	8,848	9,049	9,263	9,444	9,599	10,632	11,527	12,547	0.55%	0.73%	0.92%
Larimer County	253,137	280,699	304,557	334,863	367,735	404,654	439,302	472,777	527,638	561,825	616,873	1.41%	1.55%	1.77%
Lincoln County- TOTAL		5,928	5,711	6,014	6,266	6,601	6,928	7,266	8,147	8,873	9,624	0.71%	0.90%	1.08%
Lincoln County-South Platte Basin Portion	1,172	1,126	1,085	1,143	1,191	1,254	1,316	1,381	1,548	1,686	1,828	0.71%	0.90%	1.08%
Logan County	20,862	21,758	22,099	24,418	26,966	29,561	31,593	33,470	36,123	38,453	42,181	1.13%	1.27%	1.48%
Morgan County	27,261	28,713	29,177	32,072	35,767	39,815	43,829	48,086	53,611	56,575	60,995	1.40%	1.52%	1.69%
Park County	14,703	16,841	18,005	21,966	27,579	33,475	38,060	40,207	43,098	45,246	47,709	2.11%	2.22%	2.34%
Phillips County	4,486	4,648	4,615	4,752	4,844	4,947	4,998	5,036	5,233	5,572	6,075	0.26%	0.40%	0.60%
Sedgewick County	2,742	2,690	2,593	2,738	2,836	2,933	3,013	3,085	3,360	3,496	3,738	0.50%	0.58%	0.73%
Teller County- TOTAL		22,676	23,295	26,093	28,851	31,565	34,016	36,327	38,937	42,713	47,049	1.21%	1.42%	1.64%
Teller County- South Platte Basin Portion	10,361	11,111	11,415	12,786	14,137	15,467	16,668	17,800	19,079	20,930	23,054	1.21%	1.42%	1.64%
Washington County	4,920	4,955	4,789	4,897	4,920	4,962	4,977	4,979	5,304	5,607	6,073	0.15%	0.27%	0.45%
Yuma County	9,853	10,025	10,104	10,603	10,965	11,359	11,697	11,992	12,715	13,631	15,090	0.53%	0.69%	0.91%
Weld County	183,557	232,102	267,862	310,571	361,810	422,773	487,850	555,558	625,306	655,041	698,252	2.23%	2.33%	2.48%
TOTAL SOUTH PLATTE BASIN	**827,666**	**930,084**	**1,009,029**	**1,118,326**	**1,235,733**	**1,368,721**	**1,497,115**	**1,621,897**	**1,808,338**	**1,902,474**	**2,065,396**	**1.49%**	**1.60%**	**1.79%**

Southwest Basin	2000	2005	2010	2015	2020	2025	2030	2035	2050 Low	2050 Middle	2050 High	Average Annual Change Low	Average Annual Change Middle	Average Annual Change High
Archuleta County	10,028	11,913	13,507	15,979	18,719	21,798	25,056	28,295	32,180	34,602	37,517	2.23%	2.40%	2.58%
Dolores County	1,844	1,871	2,074	2,275	2,458	2,677	2,898	3,127	3,455	3,692	3,977	1.37%	1.52%	1.69%
La Plata County	44,566	49,147	52,993	60,091	67,555	74,783	81,547	87,929	95,803	105,276	116,996	1.49%	1.71%	1.95%
Montezuma County	23,864	25,290	26,686	29,418	32,178	35,347	38,399	41,306	45,560	48,529	52,062	1.32%	1.46%	1.62%
Montrose County- TOTAL		38,492	43,952	50,782	57,747	65,119	72,151	77,871	85,771	90,367	96,610	1.80%	1.91%	2.07%
Montrose County- Southwest Basin Portion	3,367	3,849	4,395	5,078	5,775	6,512	7,215	7,787	8,577	9,037	9,661	1.80%	1.91%	2.07%
San Juan County	558	585	590	624	643	657	671	683	830	1,098	1,395	0.78%	1.41%	1.95%
San Miguel County	6,666	7,450	8,310	9,777	11,166	12,704	14,141	15,509	17,602	22,028	27,368	1.93%	2.44%	2.93%
TOTAL SOUTHWEST BASIN	**90,893**	**100,105**	**108,556**	**123,242**	**138,493**	**154,478**	**169,927**	**184,637**	**204,008**	**224,262**	**248,977**	**1.59%**	**1.81%**	**2.05%**

Yampa Basin	2000	2005	2010	2015	2020	2025	2030	2035	2050 Low	2050 Middle	2050 High	Average Annual Change Low	Average Annual Change Middle	Average Annual Change High
Mofffat County	13,185	13,628	15,286	16,398	18,319	20,472	21,514	22,332	26,239	28,081	31,344	1.47%	1.62%	1.87%
Rio Blanco County	5,986	6,140	7,123	8,659	10,526	11,613	12,699	13,796	17,463	33,600	58,829	2.35%	3.85%	5.15%
Routt County	20,102	22,328	24,741	28,134	31,808	35,981	40,326	44,571	50,159	55,142	62,658	1.81%	2.03%	2.32%
TOTAL YAMPA BASIN	**39,273**	**42,095**	**47,150**	**53,191**	**60,654**	**68,066**	**74,539**	**80,698**	**93,860**	**116,823**	**152,830**	**1.80%**	**2.29%**	**2.91%**

	2000	2005	2010	2015	2020	2025	2030	2035	2050 Low	2050 Middle	2050 High	Average Annual Change Low	Average Annual Change Middle	Average Annual Change High
TOTAL ALL BASINS	**4,335,543**	**4,790,440**	**5,227,656**	**5,754,591**	**6,274,861**	**6,802,664**	**7,296,672**	**7,772,587**	**8,647,515**	**9,102,920**	**10,003,278**	**1.32%**	**1.44%**	**1.65%**

Appendix G

Listing of Comments Received on Final Draft Report from the Water Conservation Technical Advisory Committee and Related Responses

Table G-1
Comment Responses to SWSI Conservation Level Analysis Report

Comment Number	Page Number in Final Draft Report	Comment	Response
1	8	Could be interesting to see a map of CO with all the covered entities and then these marked in a different icon.	Good idea, but the cost impact is currently prohibitive. Note that all but seven entities are in the South Platte Basin, with four in the Arkansas River Basin. This information has been included in the report.
2	9	This section is a great recap of what SWSIs, TRTs... are and good timeline of how we got various percentage reductions and other numbers. Thanks.	Thank you
3	10	Consistency with first mention of these points in Sec 1 – are we going with ";" or "?" at the end of sentences.	We will change to "?"
4	10	Cool way to show the overlap. I dig it - Go Venn!	Thank you
5	10	In figure 2:Should DWSA '07 be CDWSU '07?	It should be CDWSU. The figure will be changed accordingly.
6	11	Worthwhile mentioning the actual east/west slope distribution of respondents? Is it representative by volume of water served or by number of providers?	We will add information discussing the distribution of respondents; however, it will be necessary for the reader to visit the specific reports to get details regarding the specific characteristics of each respondent.
7	11	"...; however, the majority of providers in the state have yet to implement meaningful water conservation programs". That seems to me like the conclusion of the last 6 paragraphs in this section, its worth mentioning upfront.	The spirit of this comment has been added to the text.
8	11	Providers are also concerned about conservation's impact (or perceived impact) on issues of: demand hardening, supply reliability, permanency of water savings, return flows and downstream water rights holders	The spirit of this comment has been added to the text.

Table G-1
Comment Responses to SWSI Conservation Level Analysis Report

Comment Number	Page Number in Final Draft Report	Comment	Response
9	11	We understand the footnote below of how CWCB defines meaningful but think it is faulty. From a utility perspective there are a number of reasons to do specific water conservation programs and all of those reasons are meaningful. Water savings is of course important, but often utilities have water conservation programs for political reasons, to improve customer satisfaction, because of customer demand and because it is the right thing to do. Often these meaningful programs produce positive results other than just water savings. If utilities limited water conservation programs to only those that were cost-effective big water savers, we may save water, but we may also run amiss with our customers and our stakeholders. As an example, harsh rules are the cheapest way to get water savings, but telling someone to tear out their lawn because it uses too much water would create more problems than it would solve. The word "meaningful" is defined as "having a purpose." Many of the programs that utilities have meet this definition. Denver Water advocates that this concept be added to this report.	This is an important point. Although we agree with the spirit of this point, as a result of the Water Conservation Plan reviews, we have seen some utilities planning to do water conservation programs that may not produce meaningful or verifiable results. Some utilities/districts may spend money inefficiently (noting that costs for water conservation programs are as high as $37,000 per acre-foot for saved water); some may not measure or verify water savings; etc. We agree with the broader definition of "meaningful water conservation", but hesitate to include a statement that any program that a utility decides to implement constitutes a meaningful effort. We do not necessarily agree that harsh rules are the cheapest way to get water savings. Most ordinances or regulations require substantial labor costs to enforce and maintain consistent compliance by all customers. The most cost effective water conservation programs typically involve implementation of audits and related improved efficiencies for high water use customers; or broad regulation at the state or federal level that define what can be sold for new and/or existing construction. We will revise the footnote to include a broader definition.
10	11	We understand the concept here, but several places in this report demonstrate that the state's largest water utilities, that serve a large percentage of the population are conserving with verifiable savings and do have plans on file with the state.	Although many of the State's largest water utilities are conducting meaningful water conservation, not all of them are. The data indicate that although most water customers are served by water providers with water conservation programs, the majority of the State's covered entities are operating without meaningful water conservation plans in place. Language has been added to further clarify this point.
11	13	Was there an omission in the first row and that is why there isn't a fifth measure listed below?	A fifth measure was not clearly identified through the DWSA.
12	14	No Council in our title, should be "by Colorado WaterWise in"	Noted and revised accordingly.
13	14	Double check the formatting of the table in Appendix A. There are a couple boxes outlined where they should be, and missing carriage returns (assuming all bullets start on a new line).	Noted and revised accordingly.
14	15	What are the specific costs associated with each strategy and the demand reduction achieved? Table 4 has it generally, but is it worth splitting it a little finer?	The costs of individual strategies by provider are not consistently reported or available. Therefore only the overall costs by provider were developed for this report.
15	15	Or maybe this paragraph should go after Table 3.	Noted

Table G-1
Comment Responses to SWSI Conservation Level Analysis Report

Comment Number	Page Number in Final Draft Report	Comment	Response
16	15	We think this is referring to a study in late 2007 that showed $11.3 million being spent on conservation in the state and $8 million of that was by Denver Water. That's 70% of the spending at that time. We believe Aurora and CSU had more than 5% of the spending here, so this seems at odds with the statistics cited.	The data described in Table 3 and 4 are from the information contained in the individual water conservation plans on file with the CWCB.
17	15	Will this be mandated by the State in order to receive State funding?	The CWCB already requires that data characterizing costs and water savings are included in grants that are awarded to entities for water conservation implementation. In addition, state statute requires that Water Conservation Plan updates include information regarding the effectiveness of past water conservation efforts.
18	16	So IBCC should be using $6,300 not $10,000 to characterize conservation costs, eh?	Yes
19	16	Are these just costs to utilities? Or do they include costs to customers as well? This should be defined here. Also it appears that the three big utilities didn't do leak detection, meter testing and water rates in this table. Of course they do this. Denver Water doesn't include this in budgeting for conservation as they are operational programs in other divisions. That is probably the case with Aurora and CSU as well and should be noted. Also the 10-year total is interesting. Are all utilities doing 10-year plans? This would lead one to believe that.	These are costs to utilities only as reported in the Water Conservation Plans on file with the CWCB. As noted in this comment, not all costs related to planning for and implementing water conservation related activities are included in the Plans. It is difficult to identify which plans omitted costs for leak detection (like Denver Water) and which entities do not fund leak detection (but only perform leak repair). Therefore, this report simply reported the data in the Plans. Not all entities are doing 10 year plans. Appendix B provides information regarding the planning horizon for each covered entity.
20	17	Interesting…	Quite
21	17	Most Front Range utilities define the drought as a 2002-2004 drought, not just a single year event.	Footnote added to address this comment
22	17	Is this system-wide per capita use? If so it should be noted and defined as such.	Yes. A comment has been added.
23	17	As an average over three years. We did see 30% in one year. If you are defining it as a one-year drought (see not above) please change this reference to 30%.	See above comment. Also note that we do not have data from the Planning entities that would provide the same detail as indicated in this comment. The 22% drop was based on the data available in the Plans on file with the CWCB.

Table G-1
Comment Responses to SWSI Conservation Level Analysis Report

Comment Number	Page Number in Final Draft Report	Comment	Response
24	18	Of course they did. The drought required emergency demand measures, which are different from conservation measures. Once you lift an emergency measure demand will rise. Need to note the difference in drought emergency measures and ongoing conservation measures.	Some water providers with Water Conservation Plans claimed in their plans that all water use reductions from 2000 to 2003 were a result of their water conservation programs and not associated with the impact of drought or related emergency measures; which is why this statement is included in the report.
25	18	Is this a State Committee? If not who's Committee is it?	This is a joint committee of the Rocky Mountain section of the American Water Works Association (AWWA) and the Water Environment Association (WEA).
26	19	Is this estimate only for active conservation? E.g. is this a total savings over 10 years that includes passive conservation as well?	This is an estimate of only active savings from those entities with Water Conservation Plans on file with the CWCB. This point has been clarified in the text.
27	19	But its also problematic to imply (as I think you have) that water conservation efforts will cease to work past 2017. Providers will continue to improve their programs, new technologies will come online, and water savings will likely continue to be gained in the further future.	We did not intend to imply that water conservation efforts would "cease to work" past 2017. The text has been revised to clarify this point (see response to following comment).
28	23	OK, so we're not comfortable estimating the effect of active conservation programs for more than about 10 years into the future or so. What is necessary for us to take this out to 2050? More data, better data, different data, commitments, more studies?	To better estimate post-2017 active savings, the CWCB will need to better understand achievements and successes of those measures and programs implemented over the next 5 to 7 years. The data that will be reported to the CWCB through Water Conservation Plan updates and implementation reports (associated with Water Efficiency Grant supported projects) will help to characterize costs and water saved for measures and programs currently being implemented by water utilities across the state. Specific data that the CWCB will need to estimate current, as well as future active savings, will include, but not be limited to, water deliveries per customer, customer type and connection over time versus the specific timing of implemented measures and programs. This response has been added to the report.

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29	23	If we can't project conservation further into the future at some point soon, providers will continue to treat conservation as an afterthought and not an integral part of their water supply portfolio.	We believe that this point does not necessarily follow from the data currently available, and the processes currently in place. Covered entities will continue to plan for and implement water conservation programs, and they will therefore be required to collect and report data related to their water conservation efforts. As more data becomes available, and as the value and importance of water conservation increases, it will become increasingly difficult for covered entities looking to expand their current water rights portfolios without meaningful water conservation programs (i.e., a plan approved by the CWCB) in place.
30	23	"Colorado WaterWise"	Noted and revised accordingly.
31	24	Are the "Foundational Measures and Programs" described here limited to rates, leak detection, and tracking? The BP Guidebook is considering other things as "foundational" such as conservation coordinator position, water waste ordinances, and public info/education. Is it possible to tie the term "foundational" from this report to the forthcoming BP Guidebook, or would that substantially affect your current draft?	The foundational measures and programs identified in this report include "rates, leak detection and data collection and tracking." Some of the measures and programs contained in the BP Guidebook - such as water waste ordinances and public information and education - are aligned with the different levels of water conservation practices described in this report. It may be desirable to have the BP Guidebook align its "foundational" measures and programs to the levels presented in this report if possible.
32	25	Its not just an inclining block rate that's important. To get a true conservation price signal, the average price curve must have a positive slope (preferably past 5,000 gallons or so). The average price also includes the fixed costs – see WRA's Water Meter report for more discussion.	We will make an addition to the text in this report and add a footnote referencing the Western Resource Advocates Water Meter Report.
33	25	I can easily design an inclining block rate that still results in customers getting charged less money per gallon as they use more water. It peeves me that some providers say they have a "conservation-oriented" rate structure when its literally no more effective at communicating value than a flat rate.	See above response.
34	25	We were unfamiliar with this term. Do you mean cost of service rate making? Or do you mean conservation-based rate structures?	This term has been removed from the report and replaced with pricing water to maintain appropriate cash flow for the utility.

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35	25	Related to "right-pricing" is the note that some utilities have begun to add large charges to their water bills for capital projects. For example a winter water bill in East Cherry Creek Valley W&S District can be $65 a month. Only $5 of that bill is for water use. A customer could double their water use for only $5. Or they could half their water use and only see a reduction of $2.50. The point being that these billing methods negate conservation efforts. The customer no longer has an ability to make a measurable impact on his water bill by conserving. This should probably be noted here.	We will make an addition to the text in this report and add a footnote referencing this issue.
36	26	Is this a national statistic? It seems very high for Colorado, where our infrastructure is much newer than utilities in the eastern half of the country. Denver Water has a statistic that was gathered for our IRP that we can lend you that shows Colorado utilities average 9.1% loss and that nationwide it is 17%.	Non-revenue water in Colorado is not well documented. Denver Water's IRP process identified an average reported system loss for 22 utilities to be about 9%; however, losses as high as 50% have been reported in some small transmission and distribution systems. This point will be noted in the text.
37	26	They may be available, but at what cost?	Leak detection programs that use acoustics are dependent on the size of the utility's water distribution system. Similarly, automated meter reading programs, which can be used to isolate specific areas within a utility's distribution system to identify leaks, have variable costs that are associated with the size of the distribution system. For small utilities, metering of water treatment plant backwash and other plant water use, flushing water use, and other non-revenue water use can help characterize system-wide losses without substantial cost to the utility.
38	27	I understand the complications associated with gpcd, but its how providers across the US report their own data. Until I see a marked change in the way utilities report their data, gpcd can't be dismissed out of hand.	Noted, see comment 39.
39	27	Oh funny, I just read your footnote. You get where I'm coming from.	Thank you

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40	27	Can you provide more info on how to determine whether the "Ongoing Water Use Measures and Programs" meet a 1, 2, or 3 (is it the bullets on page 28?)? Maybe I'm over-engineering this thing and trying to analytically apply a rating to all of the categories and instead it is more of a conceptual communication tool? But my point is that if asked to fill out a framework for one of the providers in Appendix C, I wouldn't quite know how to do it. But I like the tool concept so as long as CWCB knows how they will use it, I'm on board.	The levels associated with "Ongoing Water Use Measures and Programs" relate to first (i.e., Level 1), those measures and programs that a utility can implement fully in their control (retrofitting toilets, etc. in their facilities that currently are using water). The next level (Level 2) are those efforts that a water utility can do to better understand ongoing customer water use. The last level (Level 3) are those measures and programs that a water utility could implement to improve its customer's water use efficiency based on data collected under Level 2 activities. The framework was designed to help utilities develop priorities based on the specified levels (Level 1 being the highest priority, Level 2 the next highest priority, etc.). Since water utilities did not have this framework to support the development of their plans or prioritize their implementation efforts, the Plans on file with the CWCB do not necessarily have adequate information to "fill out" the framework. However, the CWCB will be able to use the framework to identify information gaps and data needs associated with submitted plans and proposed measures and programs, helping to focus the efforts of planning entities.
41	28	Should track with labeling in figure above – i.e. "1". Redundancy = Clarity.	Noted
42	28	I prefer the way you presented this info to the group. Block 1 has these things, Block 2 these, and its paired back to the silo graph as the blocks build upon each other. Maybe you can add in a figure here to reinforce that this is the 1st block – could be small.	Noted and revised accordingly
43	28	In conjunction with water reductions at utility/city sites theses efforts need to be communicated, i.e. how these were achieved and comparing/contrasting old and new…	We agree that utilities can and should use one way education to promote water savings realized through their water conservation efforts. However, just doing education without other meaningful water conservation measures and programs will not create measurable saved water.
44	28	Recap of hierarchical level 1,2 and 3 like Ordinances and Regulations and Educational Measures and Programs.	Noted and revised accordingly

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45	29	This is not true. Denver Water has no legal ability to establish local ordinances and regulations. And we would categorize our ability to influence them as negligible. Recommend deleting this sentence.	Although we understand that many water providers do not have the legal ability to establish local ordinances or regulations, the intent of this statement is to indicate that all utilities (and special districts) have some, albeit limited, input and influence on the development of policies and regulations that are developed by those entities with the ability to create ordinances and regulations. The Colorado Water Congress legislative committee is an example of how water utilities can influence state regulation. We will clarify this point in the text.
46	30	I still think 1, 2, 3 is a better way to go. One-way education does take some effort and it helps in some cases, so I think it appropriate to call it 1 rather than 0. Plus, messing up the pattern established already calls undue attention to this part of the silo, which we're trying to say is just as important as any of the others.	Noted and revised accordingly
47	30	I understand why the levels are 0,1 and 2, but it still bothers me. I could make the argument that ordinances and regulations should have a 0 category with a 1 being enforcement of the regulations. Aurora has had soil amendment regulations since 1980s but they were not enforced until 2002	Noted and revised accordingly
48	30	What about a comprehensive marketing and advertising campaign? Public outreach? These are highly effective methods of communicating.	We have revised the text to better characterize the benefits of these types of campaigns.
49	30	We'd like to see this changed to Level 1, 2 and 3 to be consistent with the rest of the categories. In other places in this report you reference the impact the news media had during the 2002-2004 drought. That is certainly one-way communication, but it is highly effective.	Noted and revised accordingly
50	30	I understand your logic of titling one-way ed as Level 0, because it is not measureable, but I think one-way ed is of some value, rather than no value. Could the point system for education change to illustrate level 1 as one-way ed,, level 2 water fairs, etc. and level 3, focus grps.,etc. This would also be consistent with the way the other strategies are measured.	Noted and revised accordingly

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51	31	What is the significance of 2016 in the last sentence of paragraph 1? Is this due to the CA legislation changes? Can you be more explicit about that?	The passive savings model was developed assuming that the impact to the market of the California regulations would occur in 2015, such that the effects of the regulation would be reliably observed in 2016. Replacement could begin to occur before 2016; however, for the purposes of this analysis we made this assumption to be conservative.
52	31	See note above on education. This is a one-way method, but if done correctly leveraging the news media (and social media) can be highly effective in raising awareness, changing beliefs and changing/reinforcing behavior.	Agreed
53	31	We didn't understand the word "rationed" here. We aren't aware of any utility that rations water, and certainly not for low income customers. And our lower income customers are hard pressed to conserve because of economic pressure. We would not agree that they see no need to conserve. On the contrary they are loathe to waste.	This is language directly from the literature which used "rationed" as a way to indicate that low income customers can not afford as much water as high income customers. We included it in this report to characterize the nature of the challenges related to changing customer water use behavior. A footnote has been added for clarity.
54	33	Is this referring to the "cash for appliance clunkers" legislation that ran in Colorado in April? If so we think the effect in this state was negligible. The state only provided funding for 4,000 washing machines and it was gone in a week. Denver Water only saw a small increase in the number of rebates during this time.	No. This is the larger program in California with $300 million in funding.
55	33	Need to restate that. We do see savings…but they are lost to other things.	Noted. This statement was clarified to indicate that no appreciable savings were identify prior to the 2002 drought due to limitations with technology. Since the drought, new technologies associated with toilets, urinals, dishwashers and clothes washers have been shown to save water.
56	34	How large? What segment of the toilet/washing machine U.S. market is in California?	California dominates the market of the western US. It represents approximately 54% of the population of those states from Colorado to the Pacific coast. In addition, California has the greatest "purchasing power" of any state except New York. For this reason, the California market dictates the market for the other western states.
57	34	Too funny! They don't like them because they don't work well and customers report having to run around in their shower to get wet! Also, users can modify them so they are not low-flow.	Noted.

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58	35	You do what you gotta do, but is there another source per chance?	The Google source includes information from the National Plumbers Association, EcoSanRes and others.
59	35	This makes it sound like a mandate went out to make people immediately replace toilets when what it really means is that you couldn't purchase a toilet that used more than 1.6 gpf any more.	Noted and revised accordingly.
60	35	Penetration rate – you reference 1.2% to 4% per year. This would be 25 to 83 years to get to 100% but Table 6 shows 25 to 40 years, why the difference?	Table 6 was corrected to show 25 and 83 years. Thank you.
61	35	On the toilet assumptions – you say beginning in 1994, houses were required to replace older toilets … why? Because of the 1992 NEPA requirement kicking in? Then Figure 4 shows the retrofit starting in 1996, why not 1994 per the first paragraph?	We only had one data point for per capita water use related to residential toilets, which was for 1996, so we began the analysis in that year. This has been better clarified in the text.
62	35	For pre-1994 construction, you use 1.6 gpf until 2015; what is the significance of 2015?	2015 is the year that the California point-of-sales regulation is in effect, which will require all toilets in property that is bought and sold to be 1.28 gpf or less.
63	36	Why do these (dishwashers) start getting replaced in 2005 versus 1996 for toilets?	Dishwasher technology did not improve to current levels until after 2005 when the combination of energy star and water smart assessments were in place.
64	36	Penetration rate – the 6.7% to 8.3% per year equate to 12 to 15 years which does match Table 6. In the bullets on page 36 it would help to put the 12 and 15 years in parentheses after the rates.	Note and revised accordingly
65	39	Important to note statewide legislation. The dramatic effects you noted from California were all related to statewide legislation…not local ordinances.	Note and revised accordingly
66	40	It would help me if you introduced the info on page 40, paragraph proceeding and Figure 8, before you go into the info on Figure 7.	We wanted to show Figure 7 first to draw the comparison to SWSI I, since that is the focus of this report. Figure 8 shows how the SWSI analyses should be changed to acre feet, which is suggested for all future analyses.

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67	40	It would help me if you could tie this to the analysis you did with the SWSI 1 (do I have this correct based on the info in Appendix E? I know we talked about possibly using the 2050 demands report info but that must have taken place outside this report, if at all?) demand data (because I've lost track of which population and base demand set you are building from).	The analyses performed are all conducted with respect to the SWSI I demand data.
68	41	Bolded sentence is confusing me. It is referencing Table 9, which shows the total AF passive savings by basin/statewide. The sentence says "since the acre-feet of savings do not vary by time, per capita water use, changes in future population …" But the acre-feet of passive savings will change if the 2030 or 2050 population projections used to develop Table 9 change, correct? I think working from AF is better because it is more transparent how a future update to population projection impacts the volume of savings being projected, whereas a percentage gets funky because it imbeds the starting population in the denominator, but I'm not sure I entirely understand this sentence. I know we've talked about this at the TAG meetings and it was clear to me then, but reading it here I got confused.	The analysis of passive savings will not vary by time, per capita water use or changes in future population (assuming that the population projects from 2010 to 2015 remain the same). The total AF in savings is only a function of per capita water use caused by the retro fit and the population in 1994, 2005 and 2015. Population projects for years after 2015 will not change the total passive savings acre-feet of savings. We will clarify this in the text.
69	43	Any suggestions on what, specifically, we should be collecting or how we should go about doing it?	The data collection efforts by water utilities need to include tracking water use and water savings by individual water customers and customer classes related to specific measures and programs that the utility chooses to implement. The water utilities should also include tracking of dollars spent per water conservation measure and program, timing of program implementation, and market penetration rates. More information regarding the data collection efforts that are most valuable will be developed by the WCTAG. This information has been added to the text.