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# SUPPLEMENT TO THE REGIONAL WATER CONSERVATION PLAN

Prepared for the



SOUTHEASTERN COLORADO

**Water Conservancy District**

*"Your investment in water"*

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*Under a generous grant from US Bureau of Reclamation and the Colorado Water Conservation Board*

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# Introduction

The Southeastern Colorado Water Conservancy District (hereafter “District” or “SECWCD”) is the local administrator and a cooperating agency in the Arkansas Valley Conduit (AVC) and Long-Term Excess Capacity Master Contract (MC) projects, which are features of the federally owned and operated Fryingpan-Arkansas Project (Fry-Ark). Public Law 87-590 authorized the Secretary of the Interior to “construct, operate and maintain” the Fry-Ark Project with the U.S. Department of the Interior, Bureau of Reclamation (hereafter “Reclamation”) as the lead federal agency. The District maintains an administrative role that includes being the local contracting agency responsible for repayment of the locally funded construction costs of the AVC and working with the Fry-Ark beneficiaries to the AVC and MC.

In conjunction with Reclamation’s requirement that the District must act to ensure that the Fry-Ark Project Water is used efficiently, and is put to beneficial use, the District was obligated to develop a Regional Water Conservation Plan (hereafter “RWCP” or “Plan”) that would apply to individual project partners, or Plan participants, that choose to receive AVC Project water deliveries and/or enter into an agreement for a long-term storage contract in the excess capacity of Pueblo Reservoir, storing non-project water. For the purposes of this supplement to the Regional Water Conservation Plan, there are 37 entities that will be connected to the AVC and another 12 entities that will have only MC with the District that will participate in the Regional Water Conservation Plan, as indicated in Table 1. Twenty-five of the AVC Plan participants also will have Master Contracts with the District.

In addition to Reclamation’s requirement indicated above, the District must adhere to the requirements of Section 210 of the Reclamation Reform Act of 1982 Section 210 (b) which states the following:

*Each district that has entered into a repayment contract or water services contract pursuant to Federal reclamation law or the Water Supply Act of 1958, as amended (43 U.S.C. 390b), shall develop a water conservation plan which shall contain definite goals, appropriate water conservation measures, and a time schedule for meeting the water conservation objectives.*

The RWCP was originally developed to address the efficient use of Project Water associated with the Fry-Ark Project. This concept was included in the original scopes of work that the District developed and both Reclamation and the Colorado Water Conservation Board (CWCB) funded in 2010 and 2011. However, during the development of the RWCP, specifics regarding the nature of AVC water deliveries have been clarified to include both Project and non-project water, as defined below. The RWCP was therefore been developed to address both of these water sources.

**Project water**, as described in the EIS Appendix A.1, includes Fry-Ark supplies (including Fry-Ark allocations and “not previously allocated non-irrigated water” (NPANIW)), and Fry-Ark return flows which are surface water flows that can be captured and reused in some locations (see EIS Appendix D.1 for calculations and acceptable uses of Fry-Ark return flows).

**Non-project water** are additional supplies (from both surface water and groundwater sources) that individual Plan Participants will maintain and manage through the long-term excess capacity Master Contract for storage in Pueblo Reservoir through the District as well as through other sources through exchanges and transfers.

**Table 1 – Updated Listing of RWCP Participants**

County	Entities	AVC Participant	Master Contract Participant
Bent	Hasty Water Company	X	
	Las Animas	X	X
	McClave Water Association	X	
Crowley	96 Pipeline Company <sup>a</sup>	X	X
	Crowley County Water Association <sup>a</sup>	X	X
	Crowley, Town of <sup>a</sup>	X	
	Ordway, Town of <sup>a</sup>	X	X
	Olney Springs, Town of	X	X
	Sugar City, Town of	X	
Kiowa	Eads, Town of	X	X
Otero	Beehive Water Association	X	X
	Bents Fort Water Company	X	X
	East End Water Association	X	
	Eureka Water Company	X	
	Fayette Water Association	X	X
	Fowler, Town of	X	X
	Hilltop Water Company	X	X
	Holbrook Center Soft Water	X	X
	Homestead Improvement Association	X	X
	La Junta, City of	X	X
	Manzanola, Town of	X	X
	Newdale-Grand Valley Water Company	X	X
	North Holbrook Water	X	
	Patterson Valley Water Company	X	X
	Rocky Ford, City of	X	X
	South Side Water Association	X	X
	South Swink Water Company	X	X
Swink, Town of	X		
	Valley Water Company	X	X

County	Entities	AVC Participant	Master Contract Participant
	Vroman	X	X
	West Grand Valley Water Inc.	X	X
	West Holbrook Water	X	
Prowers	Lamar, City of	X	
	May Valley Water Association	X	X
	Wiley, Town of	X	
Pueblo	Boone, Town of	X	
	St. Charles Mesa Water District	X	X
Chaffee	Poncha Springs, Town of		X
	Salida, City of		X
Fremont	Cañon City, City of		X
	Florence, Town of		X
	Penrose Water District		X
El Paso	Fountain, City of		X
	Security Water and Sanitation District		X
	Stratmoor Hills Water District		X
	Widefield Water and Sanitation District		X
Pueblo	Pueblo West Metropolitan District		X
Other <sup>b</sup>	Upper Arkansas Water Conservancy District		X
	Lower Arkansas Valley Water Conservancy District		X

<sup>a</sup> Receives a portion of its water, if not all, from the Crowley County Commissioners. The Crowley County Commissioners are whole sale providers and do not provide water service directly to any individual residential, commercial, industrial or irrigation only customers.

<sup>b</sup> The two water conservancy districts provide a portion of their water use municipal use; however the use may occur in multiple counties within the District’s service area.

Since completion of the RWC Plan, the District has recognized the importance of creating a program that connects with all of its project partners who anticipate utilizing the AVC and future Master Contracts. Therefore, a Supplemental RWCP was conceived and funded that would achieve the following:

- Present system-wide water audit and baseline water data collected from the MC participants in a manner consistent with the similar data collected from all 37 AVC participants;
- Amend the RWCP to include a presentation of the MC data; and
- Update the RWCP to include revised water conservation goals and implementation tasks.

An additional set of tasks were also performed to collect data and prepare information that has been posted on the District's BMP Tool Box. These data included water rates from all AVC and MC participants and the following case studies:

- Town of Salida Water Rate Study Request for Proposal
- South Swink Water Company Sub-metering Program
- Town of Rocky Ford Performance Contracting for AMR/AMI Installations<sup>1</sup>
- Town of Swink Water Line Replacement and AMR Installation

### **Project Funding**

The Supplemental RWCP has been funded through generous grants from both Reclamation through the Water Conservation Field Services Grant Program and the CWCB's Office of Water Conservation and Drought Planning, through its Water Efficiency Grant Fund. These funds were provided to support data collection, organization and analysis, as well as preparation of this Supplement to the RWCP<sup>2</sup>. Matching funding was provided through a cash contribution from the District and in-kind contributions from the District and all 12 MC Plan participants. Some matching funding was also provided by the entities that participated in the case studies and development of local and/or regional water conservation plans (see footnote 3).

### **Objectives of the Supplemental Regional Water Conservation Plan**

The Supplemental Regional WC Plan objectives include the following:

- Present system-wide water audit and baseline water data collected from the MC participants in a manner consistent with the similar data collected from all 37 AVC participants;
- Amend the RWCP to:
  - Include a presentation of the MC data including related to water infrastructure and water loss management;
  - Present the results of the MC water audits:

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<sup>1</sup> AMR/AMI stands for Automated Meter Reading (which consists of electronic devices that are attached to each customer meter to store and transmit data) and Advanced Meter Infrastructure (which consists of devices to collect transmitted data from each meter using satellite technology and transmit it to a centralized computer system to support billing and meter assessment).

<sup>2</sup> Funding was also provided to prepare two local water conservation plans (for South Swink and Las Animas) and two regional water conservation plans (for the Upper Arkansas Water Conservancy District and the Lower Arkansas Valley Water Conservancy District). These Plans have been developed and are in the process of either undergoing public review and comment; or receiving final review and approval by the CWCB.

- Provide a listing of MC participant infrastructure, current and future water demands and ongoing water conservation efforts;
- Develop and present Water Resources Management and Efficiency Plans for the two regional water conservancy districts operating within the Southeastern District’s service area (i.e., Upper Arkansas Water Conservancy District and the Lower Arkansas River Water Conservancy District); and
- Update the RWCP to include summary information regarding the AVC and MC participants, revised water conservation goals, and updated implementation tasks.

To these points, the Supplemental RWCP will not, as a rule, reproduce the data and information contained in the original RWCP, but will instead embellish it presenting the same information for the expanded group of Plan participants (i.e., the MC participants). The Supplemental Plan will also update the water conservation goals and implementation tasks to include an appropriate enhancement of these items in a manner consistent with the new data and evolving circumstances in the District’s programs, projects and partner needs.

It is worth noting that the original Plan, and this Supplemental Plan and its content have been developed in a manner consistent with the requirements of the State of Colorado and Reclamation to the extent feasible.<sup>3</sup>

To achieve the objectives, and in keeping with the project funding, the Supplemental Plan contains the following for each of the MC participants (noting that these data were provided in the original RWCP for the AVC participants):

- A profile of the existing water supply system for the Plan participants, including:
  - A listing of population served
  - A listing of current water demand, and
  - An overview of current infrastructure
- An overview of ongoing water conservation programs conducted currently by the Plan participants
- A summary of expected future water demands and water supply options
- A listing of water conservation goals set by the District
- A listing of best management practices that may be used to support local water conservation planning and implementation
- A summary of the implementation steps that will be performed by the District and Plan participants over the planning horizon

Vital to the original Plan was the development of the water conservation best management practices (BMP) “tool box”, which contains content and process information relevant to the planning and implementation of

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<sup>3</sup> The Plan is a first of its kind in Colorado. Colorado statute requires 2,000 acre-feet or more of water for M&I use. The District is not a covered entity by definition although it serves numerous AVC and MC Plan participants that are covered entities (Cañon City, Fountain, Lamar, La Junta, Pueblo West, Salida, Security Water, St. Charles Mesa Water District, and Widefield). Therefore, the State statutes do not apply directly to the regional water conservation planning effort. The Bureau of Reclamation, on the other hand, has Section 210(b) of the Reclamation Reform Act of 1982 presented above and guidelines for water conservation planning, as contained in Reclamation’s “Achieving Efficient Water Management - A Guidebook for Preparing Municipal Water Conservation Plans,” 1997. This Plan has been prepared to adhere to the spirit, and to the extent possible and practical, the requirements of the Federal and State oversight agencies. In this way, this Plan will provide the guidance and direction that the District and its partners need to plan for and implement meaningful water conservation without having to adhere to requirements that do not apply to the Project situation.



local water conservation plans, since the value of the RWCP is, in part, based on how it encourages and supports local water conservation efforts<sup>4</sup>. **In addition, given the needs of the community and the nature of the State water conservation policies, the original Plan and this supplement focus on issues related to utility management and operations, more so than customer demand management, such that tracking and making recommendations related to water loss management, infrastructure management and replacement, water rates, and data collection and management are supported and highlighted throughout.**

### **Planning Horizon**

The RWCP was developed in 2013 with multiple planning horizons in mind. To begin with, Reclamation requires a Plan update every 5 years; whereas, the State of Colorado requires an update no less than once every seven years for covered entities<sup>5</sup>. To address these requirements, the District will be updating its RWCP at least every 5 years. This Supplement will act to amend the current plan, extending the next update to 2020.

Separate from the planning horizon, which relates to the data collection and interpretation required to support plan development and updates, the timeframe for goal setting and local water conservation planning and implementation is tied more to local issues, local and regional water supply needs (including the MC), and the potential future operation of the AVC than the reporting requirements of either Reclamation or the State. Therefore, the planning horizon for the RWCP includes milestones set when the AVC, if constructed, is predicted to be operational (i.e., starting in 2022) as well as 2030 and 2050, which were selected to support long-range planning efforts at both the local and regional levels.

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<sup>4</sup> Meaningful water conservation related to the implementation of this Plan relates entirely to water demand reductions that are realized by the Plan participants and their customers, since these organizations and their customers are the end users of the Project and non-project water delivered by the AVC and/or stored through the MC. The District is simply responsible for the transmission of AVC deliveries from source to end user and the administration of the MC. All retail sales of Project and non-project water deliveries occur through the distribution systems owned and managed by the 50 Plan participants; it is their local water conservation efforts that will most influence future water efficiency and customer demand management.

<sup>5</sup> The State statutes require conservation plan updates at least once every seven years for covered entities. This requirement does not apply directly to the District or the Plan participants with the exception of Lamar, La Junta and St. Charles Mesa Water District, which are all covered entities, as well as Security, Widefield, Fountain, Salida, and Cañon City.

## Profile of Water Supply for the MC Plan Participants

This section of the Plan presents an overview of the current water supply attributes and characteristics for the 12 MC Plan participants (see Appendix A for a detailed map of the area locating each of the AVC and MC Plan participants). Detailed information related to the subject matter contained in this section can be found in Reclamation's Arkansas Valley Conduit and Long-Term Excess Capacity Master Contract Environmental Impact Statement (EIS) (USBR, 2013) and Pre-NEPA State and Tribal Assistance Grant (STAG) Reports (Black and Veatch, 2010). It was also supplemented by the System Wide Water Audits conducted by the District, and actively supported by the MC Plan participants in 2014. Note that the System Wide Audits were performed in a manner entirely consistent with those performed in 2011 and 2012 by the District for the 37 AVC Plan participants. The results of the audits are presented in a later section of this Plan Supplement.

### Population and Customers Served

Estimates of future water demand, as well as tracking of the effectiveness of future water conservation programs relies on population estimates and the number of customer connections, for these data are used to support calculations of per capita and per connection water use over time. Therefore, information regarding current and predicted future population and customer connections is presented herein.

Current and future service area population estimates for 2010 and 2060, respectively were made for the Plan participants by the USBR (2013) in the EIS. Table 2 presents the 2010 and 2060 population estimates based on the EIS, with a linear interpolation between the 2010 and 2060 population used to estimate 2020, 2030 and 2050 populations as shown in Table 2. Table 2 also presents an estimate of the number of customer connections for each entity in 2010 and an estimate of future connections based on the current ratio of population to customer connections for 2020 and 2030. Estimates of customer connections were made based on the calculated ratio of customer connections per population for each of the MC Plan participants based on the number of connections in 2013 (reported by each entity during the audit) and a linear interpolation of population for 2013 based on the EIS estimates for 2010 and 2060.

As can be seen in Table 2, there is a substantial amount of growth that is anticipated for nearly all of the MC Plan participants. For the group of ten entities that provide solely local municipal and industrial water supplies, the population served is predicted to increase by 23% from 2010 to 2020 and by 43% from 2010 to 2030, increasing the number of customer connections by about 20,000. For perspective, there are currently about 20,000 customer connections for all 37 AVC Plan participants operating in the lower Arkansas River valley.

**Table 2 – Summary of MC Plan Participant Populations Served and Number of Customers**

County	Plan Participant	Population				Number of Customers (based on metered connections)		
		2010 <sup>1</sup>	2020 <sup>2</sup>	2030 <sup>2</sup>	2060 <sup>1</sup>	2010 <sup>3</sup>	2020 <sup>3</sup>	2030 <sup>3</sup>
<b>Master Contract (only) Participants</b>								
Chaffee	Poncha Springs	701	937	1,174	1,883	286	382	479
	Salida	5,600	7,489	9,377	15,043	2,444	3,269	4,093
El Paso	Fountain	26,000	38,200	50,400	87,000	6,646	9,765	12,884
	Security	18,200	19,960	21,720	27,000	7,098	7,784	8,471
	Stratmoor Hills	5,500	5,600	5,700	6,000	2,053	2,090	2,127
	Widefield	16,000	19,825	23,649	35,123	6,399	7,929	9,458
Fremont	Cañon City	25,300	31,208	37,115	54,838	8,001	9,869	11,737
	Florence	8,090	10,112	12,135	18,202	1,651	2,064	2,477
	Penrose	3,300	4,117	4,934	7,385	1,619	2,020	2,420
Pueblo	Pueblo West	31,036	34,829	38,622	50,000	10,299	11,558	12,817
	Total	139,727	172,277	204,826	302,474	46,496	56,730	66,963
Other	LAVWCD	n/a				n/a		
	UAWCD	39,125	n/a	n/a	90,331	1,095 <sup>4</sup>	1,463 <sup>5</sup>	1,955 <sup>5</sup>

<sup>1</sup> From Appendix A.1 Final EIS (USBR, 2013)

<sup>2</sup> Linear interpolations between 2010 and 2060 for Master Contract Participants

<sup>3</sup> Extrapolated using 2013 meter and population data to calculate ratio of number of person per meter, and 2010, 2020 and 2030 populations as shown in this table.

<sup>4</sup> Number of structures supported by UAWCD replacement water programs as per the UAWCD Water Resources and Efficiency Plan (2015)

<sup>5</sup> Based on an observed increase in structures supported by the UAWCD programs from 2010 to 2013 of 12.9%.

### Current Water Demand and Per Capita Water Use

Table 3 summarizes the MC Plan participant water demand (reported by the participants as total water production) and total system per capita water use<sup>6</sup> in 2010 and 2013. The MC Plan participant 2010 water demand and per capita water use were obtained from the EIS (USBR, 2013) Appendix A.1; whereas the 2013 water demand was obtained from each of the MC participants based on the System Wide Water Audits conducted in 2014<sup>7</sup>. Table 3 also presents the per capita water use on a system wide basis in 2013 which is estimated based on calculated 2013 population developed assuming a linear interpolation between the 2010 and 2060 population information provided in Table 2.

Noteworthy is that system wide per capita water use has trended sharply downward from 2010 to 2013 based on the estimates made, with a reduction of over 20% from 173 gpcd to 133 gpcd. This reduction may be explained by any number of factors. To begin with, all communities benefited from 2013 being less hot and dry

<sup>6</sup> Per capita water use is calculated as the total annual water produced divided by the population served normalized to a per day amount in gallons per capita per day (gpcd).

<sup>7</sup> 2013 water demand for the two water conservancy districts (i.e., the Upper Arkansas and the Lower Arkansas Valley) were estimated based on data collected during development of the Water Resources Management and Efficiency Plans for these two entities.

than 2010, reducing the overall summertime demand for irrigation water. In addition, organic changes in customer water use behaviors associated with passive water demand reductions occurred during this 4 year stretch. Both of these factors are expected to have reduced per capita water use in each of the MC Plan participant service areas. However reductions in many communities were substantially larger than might have been expected due to weather impacts (5-10%) or passive savings related demand reductions (2-6%).

**Table 3 – Summary of MC Plan Participant Water Demand and Per Capita Water Use**

County	Plan Participant	2010 <sup>1</sup>		2013		Change in GPCD from 2010 to 2013
		Total Demand (AF)	Per Capita Water Use (gpcd)	Total Demand (AF)	Per Capita Water Use (gpcd)	
Chaffee	Poncha Springs	147	187	103	119	37%
	Salida	1,406	224	1,430	207	8%
El Paso	Fountain	4,369	150	2,620	79	47%
	Security	3,653	179	2,896	138	23%
	Stratmoor Hills	640	104	663	107	-3%
	Widefield	2,491	139	2,336	122	12%
Fremont	Cañon City	5,600	198	5,073	167	16%
	Florence	1,450	160	1,959	201	-26%
	Penrose	510	138	417	105	24%
Pueblo	Pueblo West	6,877	198	4,742	132	34%
	Total	27,143	173 ( average)	22,240	133 (average)	23%
Other	LAVWCD	n/a		1551	n/a	n/a
	UAWCD	602	n/a	407	n/a	n/a

n/a – not applicable or not available.

<sup>1</sup> From Appendix A.1 Final EIS (USBR, 2013)

For example, the biggest drops in per capita water use occurred in some of the largest communities, such as Fountain (47%) and Pueblo West (34%), where some of the apparent reduction in per capita water use may be a result of accounting incongruities. Fountain’s 2009 Water Conservation Plan indicates that the average per capita water use for 2003-2007 was 128 gpcd, which is about 15% lower than the per capita water use included in the EIS for 2010. Pueblo West, on the other hand, reported a per capita water use of 167 gpcd in 2010, which is 16% lower than the per capita water use included in the EIS. These differences, which may be attributable to both entities including non-potable water supply needs as part of the 2010 demand versus the 2013 demand which only includes potable water use. **This incongruity brings into focus the vital importance of maintaining consistent data collection and reporting protocols throughout the assessment of water production, water treatment and water demand. The system wide audits performed as part of this project were included to support the education and outreach needed to ensure future assessments of water conservation and water use efficiency programs were conducted using data that is consistently collected and reported.**

Notwithstanding the data issues, local water conservation programs have helped to reduce customer per capita water use currently and into the future. Fountain and Pueblo West have implemented water rate increases and tiered water rates to help curtail outdoor irrigation and penalize over watering. Poncha Springs which is a small

mountain community also realized a very large drop in per capita water use, connected to rates and improvements in water loss management (presumably associated with a reduction in unmetered, authorized uses). Other communities such as Security (23%), Widefield (12%) and Cañon City (16%) may link reduced per capita water use to improved customer metering and the implementation of other water conservation measures and programs as will be discussed later in this Plan; however, it is unclear to what extent incongruous data may influence the validity of the apparent reductions.

Increases in per capita water use were observed in only two communities - Stratmoor Hills and Florence. Stratmoor Hills, which is a relatively small community that is not growing very quickly, per capita water use may have been influenced by increased water losses associated with aging pipe and shifting soils. Florence, on the other hand, has had a change in the water demand at the local prison, which has the impact of increasing production without increasing population served based on the way that data is collected and reported.

Water use by the MC Plan participant customers varies depending on water provider location, local customer types, density of the population served, and various other influences. For the municipal water providers, the vast majority of customer water use is residential, except in those communities that have prisons (e.g., Florence and Cañon City). All other uses in these municipalities include town and city uses (e.g., City Parks, golf courses, cemeteries, administration buildings), schools, commercial and industrial customer use. Alternatively, the two water conservancy districts conduct and administer replacement water programs that support municipal, agricultural, and industrial uses, as well as some environmental use.

### **Future Water Demand**

Future water demands for the MC Plan participants are predicted to increase in the future as a result of growing population in the service areas of the various organizations. As indicated in Table 2, population in the Arkansas River Valley served by the MC Plan participants is expected to grow on average by about 116% over the next 50 years (between 2010 and 2060), or about 1.6% per year, creating an increase of about 162,000 persons during this time.

Future water demands associated with the increase in population served was developed to support the EIS (USBR, 2013), with the results presented in Table 4.

Future water demand can be predicted assuming that per capita water use rates will not change over the coming decades, resulting in an estimated demand of about 58,824 AF for the MC Plan participants (see Table 4), which is up from the 2010 demand of 27,143 AF for the same entities – an increase of over 115% from 2010 to 2060. However, as presented in Table 4, the EIS contained future demands that are less than predicted using this method. The justification includes the effects of both passive and active water conservation programs in the MC Plan participant communities.

Passive savings related to the natural replacement of toilets, clothes washers and dish washers in single family and multi-family residences with more water efficient fixtures and appliances is expected to reduce per capita water use over the next 50 years. This is a phenomenon that was documented by the CWCB (CWCB, 2010) and has been used in many communities since to differentiate the effects of passive savings from active savings. Active water conservation savings relate to those water use efficiencies and demand reductions that occur as a result of local water conservation planning and implementation.

To evaluate the potential water conservation related savings that are included in the EIS demand forecasts, calculations were made to account for the expected impact of passive water savings on future demands. The calculations used to characterize and bracket (reasonable high and low) passive savings were made based on the following assumptions:

- Future water demands can be estimated using the product of current (i.e., 2010) per capita water use and predicted future population served, based on 2010 per capita water use reported in the EIS; and
- The impact of passive savings<sup>8</sup> can be estimated by developing an adjusted per capita water use using the methodology presented in the CWCB Report “SWSI Conservation Levels Analysis Report”, Great Western Institute (2010). The passive savings are related to the natural replacement of only toilets, clothes washers and dish washers in single family and multi-family residences. The replacement of other water saving devices is not accounted for in this analysis for those reasons detailed in the CWCB report.

Estimating passive savings using the methodology contained in the SWSI Conservation Levels Report hinges on determining the population served by each local water provider, or in this case MC Plan participant, in three key years – 1994, 2005 and 2015. These times relate to when key federal or state legislation impacted (or will impact) the availability of water conserving fixtures and/or appliances.

To estimate the populations served by each of the Plan participants in 1994, 2005 and 2015, the following methodology was used:

1. The ratio of current (i.e., 2010) population served by each MC Plan participant to the current county population within which each resides was calculated.
2. The relevant County populations for 1994 and 2005 were obtained from the SWSI Conservation Levels Report (which utilized the SWSI Phase I Report (CDM, 2004) and the State Demographers Office as sources for past population data).
3. The ratio developed in Step 1 was multiplied by the 1994 and 2005 relevant County population to estimate the MC Plan participant population served in 1994 and 2005.
4. The Reclamation estimate of MC Plan participant population was obtained for 2060.
5. A straight-line interpolation of the MC Plan participant population from 2010 to 2060 was developed to estimate the 2015 population for all MC Plan participants.

Once the key year service populations were estimated, the estimates of annual demand adjustments were developed. The demand adjustments were obtained by multiplying the subject population for each MC Plan participant by the reduced gallons per capita per day (gpcd) associated with each of three different passive water conservation actions:

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<sup>8</sup> 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)).

- After 1994, only low flow toilets (1.6 gallons per flush (gpf)) could be purchased by residential water users.
- After 2005, only Energy Star clothes washers and dish washers could be purchased by residential water users<sup>9</sup>.
- After 2015, only 1.28 gpf toilets will be available on the market in response to California’s “point-of-sales” laws that will require these types of toilets be installed prior to any property sale that takes place.

Given the size of the California market, changes in California State laws that affect the supply chain in that state are expected to affect the supply chain in all western states, including Colorado.

A high and low passive saving estimate of the adjustment to future water demand was calculated based on the following:

- Passive savings change over time depending on the rate at which the fixtures and appliances are replaced. For toilets, the replacement rate was estimated to be between 25 and 83 years (Great Western Institute, 2010). For clothes washers and dishwashers, the replacement rate was estimated to be between 12 and 15 years (Great Western Institute, 2010).
- The change to the gpcd associated with the gradual replacement of the subject fixtures and appliances was obtained from the SWSI Conservation Levels Report.
- The gradual decrease in future water demand for each AVC participant was estimated by multiplying the reduced gpcd associated with each type of passive retrofit (i.e., toilet, clothes washer, dish washer) by the target population.
- The decreased water demand for all three fixtures and appliances were summed and the difference between the water demands for each water provider was determined for the period from 2010 to 2070.

Note that in accordance with the SWSI Conservation Levels Report, both a high and low passive savings estimate was calculated for 2070. The difference between the two scenarios chiefly address expected differences in replacement rates for the fixtures and appliances in question and the variability of water use between different models of the new fixtures and appliances.

The results of the passive savings estimates are presented in Table 4, which contains the 2060 forecasted demand without passive savings and the 2060 forecasted demand with both high and low estimates of passive savings. Overall the passive savings were estimated to range from about 4 to 6 percent of total forecasted 2060 water demand; however, on a per participant basis the variability was found to be substantially larger – varying from about 2.4% to over 18% depending on the age of the housing stock<sup>10</sup>, the predicted growth rate of the service population, and the current per capita water use. For example, entities with large per capita water use have a smaller percentage change in future demand associated with the impacts from passive savings as compared to those with low per capita water usage. Overall, the reduction in forecasted 2060 water demand associated with passive savings is estimated to be between 2,230 and 3,240 AF for all the MC Plan participants combined.

<sup>9</sup> Energy Star clothes and dishwashers, which were developed in association with California State laws that required energy use reductions by all residential customers, included substantial reductions in appliance water use.

<sup>10</sup> Population was used as a surrogate parameter for housing stock.

It should be noted that the EIS reported 2060 demands for the MC Plan participants are typically lower than would be expected if the maximum amount of passive savings occurred over the 50 year period from 2010 to 2060. For all the entities save three (Penrose, Stratmoor Hills and Widefield), 2060 demands are lower than those predicted with the reasonable maximum amount of passive savings by a factor of about 4-5%. This difference is most likely associated with the expected demand reductions that will occur as a result of active water conservation savings as planned for implementation by each organization locally. Active conservation will include measures and programs such as outdoor watering restrictions and water waste regulations, improved water loss management, customer education and water audits, customer incentive programs, landscape irrigation efficiency programs, and others which are described in additional detail later in this Supplemental Plan. The cumulative effect of the active conservation programs above and beyond the passive savings ranges from about 1,200 to 2,200 AF by 2060.

**Table 4 - Summary of Forecasted Water Demands with and without Passive Savings for MC Participants**

County	Participant	2010 per Total Demand <sup>1</sup> (AF)	Forecasted 2060 Demands (Acre Feet)			
			Without Passive <sup>2</sup>	With Minimum Passive Savings	With Maximum Passive Savings	EIS 2060 Demand <sup>1</sup>
Chaffee	Poncha Springs	147	394	383	378	360
	Salida	1,406	3,774	3,684	3,643	3,418
El Paso	Fountain	4,369	14,618	14,206	14,017	13,156
	Security	3,653	5,414	5,125	4,993	4,930
	Stratmoor Hills	640	699	612	572	750
	Widefield	2,491	5,469	5,215	5,099	5,195
Fremont	Cañon City	5,600	12,162	11,754	11,570	11,070
	Florence	1,450	3,262	3,132	3,073	2,975
	Penrose	510	1,142	1,088	1,064	1,679
Pueblo	Pueblo West	6,877	11,089	10,597	10,372	10,000
	Total	27,143	58,824	55,796	54,780	53,533
Other						
	LAVWCD	n/a	n/a			
	UAWCD	602	n/a	n/a	n/a	960

<sup>1</sup> From EIS (USBR, 2013) (Appendix A.1) (gpcd – gallons per capita per day) including potable and non-potable demands

<sup>2</sup> Calculated as the product of 2060 population (from Table 2) and 2010 per capita water use

Noteworthy is that Penrose predicts that future demand will be greater than the predicted demand using the 2010 per capita water use, indicating that future per capita water use will increase by a factor of about 47% by 2060 over 2010 levels. This prediction goes against the trend indicated by all the other MC Plan participants. Penrose expects land use within its service area to change, resulting in higher per capita water use in the future. Penrose currently serves a relatively large percentage of underused taps primarily used to provide stock water on an intermittent basis. The majority of these taps are committed to properties zoned for single family homes and Penrose assumes that these property owners will construct homes, which will increase average per capita water use in the future. Since Penrose foresees a more than 300% increase in water demand from 2010 to 2060, it will be important for the water district and its community to evaluate and implement meaning water conservation into their future water resources management practices.



Overall, future monitoring and verification of the impact of active and passive water conservation on future water demand will be an important component of all the local water provider water conservation and water resources planning efforts. In addition, it will behoove the District to include a monitoring and tracking protocol in its regional data collection efforts to help characterize and assess local programs and the impact of those programs on local planning and implementation needs.

### Water Supply Limitations and Needs

Current supplies of water to the MC Plan participants are generally characterized as direct diversions of surface water from various sources within the geography of the basin. Those entities high in the basin and/or adjacent to the main stem operate direct diversions into treatment facilities and distribution systems, providing potable water supply to their customers. Water providers along Fountain Creek north of the Main Stem (i.e., those in El Paso County) utilize multiple sources of water, coupling groundwater with surface water supplies to meet customer demand. For these entities, all groundwater production must be augmented with appropriately timed surface water flows to replace water is need to prevent downstream injury. For that reason, all future water supplies in the basin can be described in terms of available surface water supplies.

Table 5 presents a summary of the 2060 EIS estimated demands and the current reported average annual total surface water supplies for each of the MC Plan participants.

**Table 5 – Total Available Water Supplies for MC Participants and their Requested MC Storage Volumes**

County	Participant	EIS 2060 Demand <sup>1</sup>	Total Reported Average Annual Surface Water Supply <sup>1</sup> (AF)	Supplies Available for MC Storage <sup>1</sup> (AF/yr)	MC Request <sup>1</sup> (AF)
Chaffee	Poncha Springs	360	527	376	200
	Salida	3,418	1,302	1,156	2,000
El Paso	Fountain	13,156	8,002	5,907	1,000
	Security	4,930	4,566	3,002	1,500
	Stratmoor Hills	750	727	612	900
	Widfield	5,195	6,410	4,985	650
Fremont	Cañon City	11,070	28,196	805	1,000
	Florence	2,975	5,940	5,050	2,250
	Penrose	1,679	727	612	900
Pueblo	Pueblo West	10,000	10,429	10,429	6,000
	Total	53,533	66,826	32,934	16,400
Other					
	LAVWCD	n/a	n/a	n/a	5,000
	UAWCD	960	991	848	1,000

<sup>1</sup> from EIS (USBR, 2013) (Appendix A.1)

As illustrated in Table 5, there are some local water providers within the District that indicate a gap between the EIS 2060 demand and their total reported average annual water supply. Although the improved carryover storage afforded by the Master Contract will help stretch average annual surface water supply yields, each

organization will need to continue to work independently and regionally to develop additional supplies, improve water use efficiency and reduce customer demand.

### **Variability in Water Supply and Demand**

Both water supply and water demand are subject to variations in climate and river conditions. Variations in precipitation, temperature, wind, and evaporation may impact project water yields and availability; as well as other water supply sources that the MC Plan participants rely upon.

Confounding this reality is that in those years when project yield and deliveries are reduced due to ambient weather conditions, it is likely that individual water customer consumption will increase, since warm dry weather typically increase demands while decreasing supply. Therefore, water conservation programming, which can help to reduce system demand; drought response planning, which can limit customer demands during acute water shortages; and water resources planning should be integrated at both the local and regional level to help manage water supply and water demand during non-average dry years. In addition, the valuation of water conservation programs should be assessed for not only average conditions, but for periods of drier than average conditions to best characterize the importance of water conservation to the overall water resources management portfolio.

# MC Plan Participant Water Supply Infrastructure

The MC Plan participants provided substantial data to the water audit team during the period March through November of 2013 which has been used to characterize the water supply infrastructure.

Specifically, the data that were collected were used to determine the following for all 10 of the MC Plan participants:

- Meter Information – size and amount of automation (i.e., automatic meter reading, advanced meter infrastructure) currently in place. Age was also tracked when possible.
- Billing/General Record Keeping – timing of meter reading and billing including reading of master meters and customer meters as a means to track non-revenue water and water loss
- Distribution Pipe Information – size, material, and amount (length) (age of pipe materials was discussed with all MC Plan participants but was not typically reported by the majority of the project participants)
- Water Treatment Plant Information – nature of water treatment and for those with filtration, how backwash water is managed

## Qualification of the Data

The data that were provided by the MC Plan participants came to the audit team in various formats, for various timeframes, and in varying states of completeness. This occurred since the organizations that collect and use these data manage and oversee the operations of substantially different water systems, which differ in size and complexity, and location and type of source water. Unlike the AVC Plan participants, all of the MC Plan participants are either municipal organizations or special districts, and are therefore funded through public means. At the end of the day, the data provided was considered adequate in characterizing those system attributes of the various water providers to allow for the development of comparisons and evaluations on a regional basis.

However, the specific accuracy of all the data collected during the System Wide Water Audits is not entirely understood given the nature of the data collection and management systems in place<sup>11</sup>. Therefore, some screening and qualification of the data was deemed necessary to support a consistent and fair use of those data that were provided by the Plan participants – both with respect to the AVC Plan participants and the MC Plan participants. To this point, the data that was collected and is presented in the tables that follow were considered to be of acceptable quality and quantity to support regional planning efforts. A more rigorous use of the data may not be warranted without a better understanding of the data background and history, which was beyond the scope of this effort.

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<sup>11</sup> For example, the length of distribution water line was estimated in some cases from scaling maps, or from anecdotal information; meter age was estimated from institutional knowledge; water line material was provided anecdotally to the audit team. These data were considered reasonably quantifiable within the limitations of the data use – that being for regional planning purposes.

## Meters

The MC Plan participants, in general, are fully metered, such that they are all able to measure water use at the connections with all of their customers. There are a few uses identified by various project participants that are not metered, such as some town and/or city facilities, an occasional church or other grandfathered user, and some hydrants or stand pipes; however the vast majority of uses are metered. Table 6 presents a summary of the unmetered uses found during the audit.

**Table 6 – Authorized Unmetered Water Uses Identified During Data Collection**

Church	Other Water Treatment Plant Uses
Construction Water (from hydrants and/or standpipes)	Street Cleaning
Filter Backwash	Sewer Collection Cleaning
Fire Suppression	Town/City Hall
Firehouse	Town/City Shop
Hydrant and Line Flushing	Town/City Parks

Note that not all MC Plan participants had unmetered uses; nor were all churches, for example, unmetered. It was found that for each of the uses listed in Table 6, at least one of the MC Plan participants had this type of unmetered use. It is important to note that authorized, unmetered uses such as those listed in Table 6 contribute to non-revenue water, and for some organizations non-revenue water may be of concern as future water conservation and water use efficiency programs are identified and evaluated. For this reason, an entire section related to non-revenue water and water loss follows in the Plan.

A summary of the data collected to characterize the size and age of the Plan participant’s meters is presented in Table 7. As this table indicates, nearly 50,000 meters are owned and maintained by the MC Plan participants. Of these meters, roughly 95% are  $\frac{5}{8}$  by  $\frac{3}{4}$  inch or  $\frac{3}{4}$  inch meters; which are typically used for single family residential customers based on the efficacy of the meters and the expected volume and flow of water to a domestic tap. The vast majority of the water customers served by the MC Plan participants are in fact single family residential user. This fact will impact the planning and implementation of water conservation plans both locally and regionally.

**Table 7 - Listing of Meter Sizes by Water Provider**

Entity	Size (inches)										Total	
	$\frac{3}{4} \times \frac{5}{8}$	$\frac{3}{4}$	<u>1</u>	<u>1.5</u>	<u>2</u>	<u>2.5</u>	<u>3</u>	<u>4</u>	<u>6</u>	<u>8</u>		<u>10</u>
Cañon City	8,114		280	58	68		15	18	6	1	1	8,561
Florence	1,710	12	32	5	6		4	3	2	1		1,775
Fountain	7,438		69	33	26		12	4				7,582
Penrose	1,714		13	10	2							1,739
Poncha Springs	288		10	11	5			1				315
Pueblo West	9,628		960	50	27		10	1	1			10,677
Salida	1,925	544	155	26	29		6	7				2,692
Security	7,133		86	33	33		17	2				7,304
Stratmoor Hills	1,951		97	10	2	3		1				2,064
Widefield	3,390	3,299	91	22	32		17	3		4		6,858
	43,291	3,855	1,793	258	230	3	81	40	9	6	1	49,567

The largest water users; however, are parks, schools, hospitals, nursing homes, and especially prisons, in the upper Arkansas River Valley and along Fountain Creek, where potable water is rarely to never used for stock water or feed lots (which are common in the Lower Arkansas Valley below Pueblo). Tourism impacts water use along the Upper Arkansas River, especially in locations such as Cañon City, Salida and Poncha Springs; whereas residential areas influenced by fluctuations in military base use impacts water use along Fountain Creek, especially in Fountain, Widefield, and Security and to a lesser extent Stratmoor Hills.

Another important characteristic of the meters owned and maintained by the MC Plan participants is the amount of automated technology that has been installed along the Upper Arkansas and Fountain Creek. Over 96% of the meters have automated meter reading (AMR) devices, and of these about 20% are linked through advanced metering infrastructure (AMI) to wireless relay stations and data collection systems (see Table 8). Because the technology for AMR and AMI is fairly new (i.e., less than 15 years old for broad use nationwide), many utilities and special districts upgraded their meters when the automated devices were installed. To this point, Cañon City, Florence, Fountain, Salida, Security, Widefield, and Poncha Springs have completed meter replacement and upgrade programs for all their meters since 2008. It appears, therefore, that at least 70% of the customer meters utilized by the MC Plan participants are less than 8 years old.

**Table 8 – Type of Technology Used for Meter Reading and Enhancements**

	AMR	AMI	Manual	Total	Type of AMR Read Technology	Timing of Installation
Cañon City	1,690	6,818	53	8,561	touch pad	complete AMI by 2015
Florence		1,775		1,775	n/a	completed in 2014
Fountain	7,032	550		7,582	drive by	complete AMI in 3 to 5 years
Penrose			1,739	1,739	n/a	no plans for AMR/AMI
Poncha Springs	315			315	drive by	completed in 2008
Pueblo West	10,677			10,677	drive by	not available
Salida	2,692			2,692	drive by	completed in 2009
Security	7,304			7,304	drive by	since 2010
Stratmoor Hills	2,064			2,064	drive by	completed in 2004
Widefield	6,852		6	6,858	drive by	since 2010
Totals	38,626	9,143	1,798			

AMR – automated meter reading; AMI – advanced metering infrastructure

Although a residential water meter may last beyond 10 years<sup>12</sup>, it is important that the MC Plan participants maintain accurate customer meters such that water sales are consistent with water use. Large diameter meters are more susceptible to under reading actual usage than are typical domestic meters; however, all meters can

<sup>12</sup> One of the most important best practices that will be proposed for the Plan participants involves tracking individual water meter use. Mr. Norman Noe of South Swink has collected data indicating that a water meter tends to lose reasonable accuracy after passing about 2 million gallons of water. For his systems, he therefore tracks water use for each meter and attempts to replace meters as they reach 2 million gallons. This method may not be effective for all MC Plan participants, depending on local conditions (e.g., corrosive water, water high in iron or manganese, etc.) which may compromise meters sooner; however, a general tracking of water use for each meter installed would be an effective method to identify and budget for appropriate meter replacement programs.

become inaccurate with age and use. However, even residential meters can under read usage<sup>13</sup>. Since all meters tend toward under reading actual use, old meters can negatively impact cash flow for operating water companies. Given the percentage of non-revenue water measured for the MC Plan participants (see the next section- “MC Plan Participant Meter Reading, Billing and Water Rates”), it is anticipated that a portion of the non-revenue water is attributable to under-reading customer meters<sup>14</sup>.

It is worth noting that new EPA regulations dictate that new customer meters be “lead-free” (see Appendix B) after 2014, which is a rule that will impact future meter replacement activities. Therefore, programs that involved meter testing and repair that have been used in the past will be replaced by meter replacement programs to ensure compliance with the new lead-free rules.

### **Distribution Piping**

Perhaps the largest sunk cost related to water supply in the Arkansas River Valley is distribution piping<sup>15</sup>, which span over thousands of miles, varying in sizes from 1-inch to 42-inches in diameter, or more. Appendix C presents a summary of the pipe material and size data collected during the System Wide Water Audits conducted with the MC Plan participants, which represents only a portion of the pipe in the basin<sup>16</sup>. As can be seen in the table in Appendix C, a majority of the distribution piping is asbestos concrete (AC) (about 52%), followed by PVC (about 26%), cast iron (13%), and various other materials. AC is favored by Pueblo West based on the age of the infrastructure, the pipe sizes, and the distances covered. Pueblo West has about 40% of the pipe in the ground for those MC Plan participants that reported on distribution piping.

A substantial portion of the PVC piping is new since 2000; however some of it dates back 40 plus years. For smaller water supply systems (e.g., Poncha Springs), PVC of appropriate thickness (dependent on system pressures) is the preferred distribution pipe material due to its availability, cost, lack of reactivity to corrosive soils, and ease of installation. The City of Fountain also uses a large amount of PVC.

Another best practice that may be of some benefit to the small water providers (e.g., Penrose) would be to maintain detailed distribution system maps that would identify pipe and appurtenance locations; piping materials; and piping age. This information would be of benefit to document and pass along current institutional knowledge that may not currently be adequately archived.

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<sup>13</sup> The City of Rocky Ford implemented a performance contract, which included the replacement of all the customer water meters in town. Testing and data collected on water demand since the installation occurred have indicated an increase in same home water sales of 8 percent (which is the difference between the 90.5% accuracy of the replaced meters and the 98.5% accuracy of the new meters).

<sup>14</sup> This kind of water loss is termed “an apparent loss” since the water company does not bill or receive revenue for this water, but has to pay to treat and distribute it.

<sup>15</sup> This is the piping that delivers water from the production well and/or treatment facility to the customers, linking the water supply system to the customer service lines. Service lines, both before the customer meters and after the customer meters are not included in these quantities.

<sup>16</sup> Distribution pipe information contained in the Regional Water Conservation Plan (2013) indicated that about 1,000 miles of distribution pipe existed in the ground in the Lower Arkansas River valley, below Pueblo; whereas, Colorado Springs Utilities and the Board of Water Works in Pueblo, the two largest water utilities in the Basin, are not represented in either this supplement.

Finally, leak detection testing using sonic devices have had substantial success in some rural settings in Colorado and in other locations across the country, dependent on the pipe materials and pipe accessibility (test pits may have to be dug to provide access for placement of listening devices on the buried pipe in some locations). The MC Plan participants have further supported the importance and value of leak detection testing based on recent experience. To this point, leak detection programs will likely be considered a Best Management Practice (BMP) in the RWCP.

## **Water Production and Treatment**

Most of the MC Plan participants utilize surface water diversions for local water supply, with the exception of those along Fountain Creek – Stratmoor Hills, Security, Widefield and the City of Fountain – who offset surface supplies provided through the Fountain Valley Authority with local alluvial wells; and Poncha Springs. For the surface water diverters, chemical treatment and filtration is needed to create potable supplies; whereas, for those with alluvial wells, treatment typically only requires chlorination prior to distribution. Poncha Springs adds phosphate<sup>17</sup> to its well water along with chlorine prior to distribution.

Appendix D presents a summary of the current potable water treatment facilities for each system as verified at the time of the audit.

Water production and treatment has a substantial operational cost for the MC Plan participants. The combined energy use for water production and treatment by the MC Plan participants is estimated in the range of about 10 million kWh per year; or about \$800,000 annually. This translates into a green house gas emission in the range of 7,500 metric tons of CO<sub>2</sub> per year.

Unlike some of the water providers in the Lower Arkansas River basin, none of the MC Plan participants have outstanding compliance orders or other operational permitting issues to contend with or manage. Local shallow groundwater contamination impacts the quality of supply water for some of the Stratmoor Hills and Widefield production wells; however, these impacts are well documented and appropriate treatment facilities are in place to maintain potable water supply standards.

It is worth noting that all of the MC Plan participants that perform chemical treatment and filtration, except Salida<sup>18</sup>, recirculate and/or recover their backwash water in closed loop systems or it is used for non-potable purposes<sup>19</sup>. Although metering of these closed systems are can be improved to support more rigorous water loss management assessments, in general, the backwash systems allow for the efficient use of this treatment plant related waste stream.

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<sup>17</sup> Phosphates are used in municipal water systems to perform three broad functions: inhibit corrosion of water mains/plumbing (iron, steel, galvanized, asbestos/cement, lead, copper), sequester nuisance metals in the water supply (iron, manganese, calcium, magnesium). They can also improve the quality of water in the distribution system by removing scale deposits & tuberculation, discourage microbial film formation/regrowth, and stabilizing free chlorine disinfectant residuals (from [http://water.me.vccs.edu/exam\\_prep/phosphates.html](http://water.me.vccs.edu/exam_prep/phosphates.html)).

<sup>18</sup> Salida has in the past discharged backwash water to evaporation ponds. The City is currently upgrading the water treatment facility to make improvements including recovering/recirculating backwash water.

<sup>19</sup> Pueblo West uses some filter backwash water to supplement local golf course irrigation during the warm weather seasons. Otherwise, the filter backwash water is recycled through the water treatment sedimentation ponds.

## Master Metering

One area worth mentioning regarding water provider operations relates to the master metering of water production and treated water deliveries to the distribution system. This is noteworthy because the master metering of water being placed into the distribution system is utilized by any calculations that support the characterization of non-revenue water and the management of water loss – two characteristic parameters that are vital to the overall water use efficiency of any water utility or water provider.

In general, the master metering of treated water effluent from the various treatment works provide a reasonable estimate of water being placed into the individual distribution systems being operated by the MC Plan participants. However, each entity has some challenges regarding the balancing of meter readings into and out of the local treatment facilities, the coordination of master meter readings with customer meter readings, and the accuracy of master meters across all operating flow ranges (including if back flow occurs at interconnections of treated water between water providers). In addition, many of the MC Plan participants rely on master metering reported to them from the Fountain Valley Authority (FVA), which did not participate in this project and therefore did not provide information on the testing and calibration of their master meters<sup>20</sup>.

**Master metering in general is a major issue across the state, as it relates to water loss management and forecasting of future demands. Therefore, one key outcome of this regional planning effort will be to make recommendations in support of future investments in master metering infrastructure, as one part of improved water loss management programs and BMPs.**

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<sup>20</sup> As will be discussed in the following section entitled “MC Plan Participant Meter Reading, Billing and Water Rates” there made be some systematic data errors associated with the FVA master meters.



# MC Plan Participant Meter Reading, Billing and Water Rates

## Meter Reading and Billing

The vast majority of the MC Plan participants collect master meter data and customer meter data on a monthly basis; turning around water use data collected from customer meters within weeks to bill their customers, as shown in Table 9. Most MC Plan participants read customer meters in one or two days during the month and bill at either the end of the month or at the first of the following month. There are two organizations that read meters quarterly due to the number of customers and/or the geography of their customer base; and then bill on the first of the following month, but these are not the typical operations. Noteworthy is that both of these organizations have chosen to go to monthly billing cycles for all their customers beginning in 2015 (which is in part as a result of the District’s system-wide water audits).

**Table 9 – Timing of Meter Reading and Customer Billing**

	Meter Reading/Billing (see Table 8 for a listing of meter reading technologies in place)			Comment
	Timing	Meter Reading Detail	Billing Detail	
Cañon City	Residential – Quarterly Commercial and City - Monthly			City Changing to Monthly Meter Reading and Billing in 2015
Florence	Monthly	End of the month	First of the month	
Fountain	Monthly	14 separate meter groups throughout the month		
Penrose	Monthly	20 <sup>th</sup> of the month	End of the month	
Poncha Springs	Monthly	1 <sup>st</sup> of the month	1-2 days after meters read	
Pueblo West	Monthly	10 <sup>th</sup> of the month	25 <sup>th</sup> of the month	
Salida	Quarterly	23 <sup>rd</sup> of the month	End of the month	City Changing to Monthly Meter Reading and Billing in 2015
Security	Monthly	Mid- month	End of the month	
Stratmoor Hills	Monthly	Last day of the month	5-6 days after meters read	
Widefield	Monthly	2 separate meter groups during the month		

## Water Rates

Given that the MC Plan participants are generally larger than the AVC Plan participants, their water rate structures are substantially more complex, including tap rates and water rates differing by customer type, tap size, and amount of water used. Although not all the MC Plan participants provided information on their water rates (or made their rates available on a publically accessible website), a comparison of rates could be made between cooperating MC Plan participants, as shown in Table 10.

**Table 10 – MC Plan Participant Residential (3/4-inch tap) Water Rates  
(for those entities that provided this information)**

Cañon City		Fountain		Pueblo West		Salida		Security		Stratmoor Hills <sup>2</sup>		Widefield	
Rate	Tier <sup>1</sup>	Rate	Tier <sup>1</sup>	Rate	Tier <sup>1</sup>	Rate	Tier <sup>1</sup>	Rate	Tier <sup>1</sup>	Rate	Tier <sup>1</sup>	Rate	Tier <sup>1</sup>
\$ 1.34	< 12,000	\$ 33.08	Base	\$ 17.70	Base	\$ 17.75	Base	\$ 9.82	Base	\$ 13.82	Base	\$ 17.32	Base
2.58	< 21,000	included	< 1,500	1.97	< 5,000	included	< 2,000	2.38	< 5,000	3.39	> 1,000	3.92	< 5,000
2.73	> 21,000	\$ 5.31	< 3,000	2.96	< 10,000	\$ 1.63	< 13,333	2.98	< 15,000			4.70	> 10,001
		5.50	< 6,000	5.18	> 10,001	2.17	> 13,334	3.73	< 25,000				
		6.72	< 10,000					5.60	> 25,001				
		7.42	< 15,000										
		8.43	< 21,000										
		9.36	> 21,001										

<sup>1</sup> Tier represents different volumes of water (in gallons) at which the cost (rate) per thousand gallons of water changes. For those that include some volume of water within their base rate, that volume is indicated as “included” in the table.

<sup>2</sup> Stratmoor Hills, just like most other water providers, have customer meters that are read in increments of 1,000 gallons. Therefore, water use of less than 1,000 gallons is indicated as no use, until such time as the cumulative volume of water passing through the meter exceeds 1,000 gallons. This explains why the only rate provided for water use in this location begins at 1,000 gallons.

The average residential rate for water in the lowest water use tier for the MC Plan participants that reported their water rates (as indicated in Table 10) is \$2.85 per thousand gallons, ranging from \$1.34 to \$5.31. For the AVC Plan participants, the average current water rate is \$2.68, ranging from \$1.00 to \$5.00 (see Appendix E). These rates are reasonably comparable, and indicate a wide range of prices paid by local residential water customers.

Also noteworthy are the steeply inclining rate structures that some MC Plan participants have chosen to implement to support customer demand reductions. Fountain, Pueblo West, and Security have inclining block rates that increase to over \$5 per thousand gallons, increasing from lowest rate to highest rate by 176%, 262% and 235%, respectively. As will be discussed later, these steeply inclining block rates, some of the most aggressive in the State, have helped to reduce summertime water demand and per capita water use locally in support of local water conservation planning.

Best practices related to water rate structures for many Plan participants may include establishing lower service fees and charging for all water used<sup>21</sup>, perhaps even on a per gallon or per hundred gallon basis<sup>22</sup>. Given that many residential customers use some increment of 1,000 gallons per billing period, it may be of benefit to local water providers to obtain more accurate meters, which read in ten or hundred gallon increments. This change would carry a cost related to upgrading all customer meters; however, it would also make billing more accurate and better aligned with actual usage. It may also help characterize non-revenue water, since errors related to meter reading increment would be reduced. Although this is not a BMP that can be implemented without planning and financing, each organization will be faced with meter replacement numerous times prior to 2050; and therefore this BMP is included in this Plan.

<sup>21</sup> Changing the service fee structure would reduce the bill of some customers that use less than the allotted amount of “free water” that comes attached to the service fee.

<sup>22</sup> Changing the cost for water from per thousand gallons to per gallon or per hundred gallons would have to be supported by meters that read in graduations of less than 1,000 gallons.

## Data Management

Overall data management is variable across the different MC Plan participants. Some organizations have sophisticated data archives; whereas others have hard copy archives which may or may not be subject to risk from flood or fire. Future data management for all MC and AVC Plan participants may require more uniform data reporting and storage protocols, since it is anticipated that each organization will provide data to the District on a regular basis to support project water administration, operations and reporting. No specific protocols have been identified at this time; however, it may become important for the District and the MC and AVC Plan participants to track various metrics in the future such as non-revenue water; total billed water; total produced water; total AVC deliveries; etc. The RWCP will discuss this issue further in the implementation section.

An indication of the variability of data management currently in place across the region relates to one of the results of the system wide water audits. Forty seven organizations participated in the water audits; producing data and sharing anecdotes related to local water loss management best management practices and programs. Of the 47 entities, four<sup>23</sup> were unable to provide adequate data to support the basic analyses developed for water utilities by the AWWA. The size of the organizational service area or number of customers did not appear to factor into which entities were unable to provide the requisite data. It appeared that data collection and management was more a function of standard operating procedures and cultural issues, than organizational size and complexity. **For this reason, it is vital to understand that part of the RWCP is a call to action for some change management related to the standardization of data collection and reporting – to support District reporting requirements and to improve local water provider programs for purposes of supporting more robust economic analyses of their individual systems.**

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<sup>23</sup> The four entities that could not provide adequate data included Penrose, South Side, Sugar City and West Holbrook.

# Non-Revenue Water, Water Loss and Performance Guidelines

## Importance of Water Loss Management

Water loss management was identified by the local water providers as a key focus of the RWCP and the supplement. As reported by the AWWA, water loss management using the M-36 manual offers a “better system of accounting” to characterize and understand non-revenue water and water loss. The methods can assist developing and implementing better service for drinking water customers, improve the bottom line for water utilities and facilitate better management of water resources for the common good (AWWA, 2009). The BMPs that are presented in the AWWA methodology and echoed in the RWCP and the District’s BMP Tool Box, will improve the methods and means of data collection, verification and analysis for participating water utilities and in doing so allow for more robust assessment of the economics of water use efficiency, conservation and accountability. Not all water utilities need to maintain similar levels of non-revenue water and water loss, given that many localized factors influence the ability of entities to control real and apparent water loss. The BMPs presented herein are therefore focused on helping individual water providers collect high quality data and develop rigorous assessments that can support financial decision-making at the Board or City Council level.

## Top-Down versus Bottom-Up Approach

Noteworthy is that the District has performed the water audits as part of an overall technology transfer bringing educational and water system management resources to all of the participating organizations and communities. The District, therefore, conducts the audit in a “top-down” approach as described in the AWWA M-36 Manual. In other words, the District’s efforts are focused on collecting information from existing records, procedures, data and other information systems, and developing desk top analyses of these data. It is expected that some of the participating organizations and communities will utilize the results of the District’s auditing program to move toward more of a “bottom-up” auditing procedure which being the process of validating the top-down results with field measurements, billing systems and data assessments, and detail customer meter testing. It is the expectation of the District that future support by the District of local water conservation planning will be the next step in regional efforts to perform requested bottom-up auditing processes.

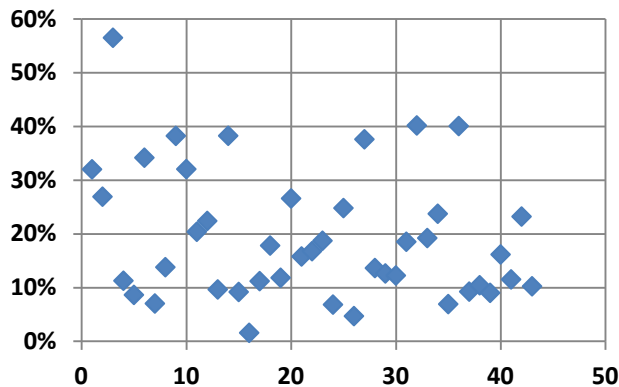
## Characteristics of Non-Revenue Water for the Plan Participants

A vital part of the development of the supplement to the RWCP was collecting data and assessing water loss management at each of the 10 MC Plan participants (excluding the two water conservancy districts). This was performed using the American Water Works Association (AWWA) M-36 Manual - Water Audits and Loss Control Programs – methodology; which allows for collecting data in a manner that is consistent with the system wide water audits performed on the 37 AVC Plan participants, and helps to establish baseline conditions prior to the construction and/or operation of the Master Contract and the AVC. Appendix F provides a detail presentation of the M-36 methodology. Appendix G presents a summary of the data collected from each organization and the results of the water loss assessment.

Using this methodology, data were collected to, among other things<sup>24</sup>, characterize the following:

- non-revenue water<sup>25</sup>,
- authorized, unbilled water consumption<sup>26</sup>, and
- real and apparent water loss for each of the participating entities.

**Figure 1 - Percent Non-Revenue Water For Each Plan Participant**



Non-revenue water was characterized and estimated using the water production and billing data provided by each of the individual MC Plan participants. In addition, the auditing process helped to identify and estimate quantities of authorized (unmetered and metered), unbilled water use within each individual distribution system. Based on these calculations (see Appendix G), non-revenue water was found to vary from about 2 to 57 percent of total water produced as illustrated in Figure 1, with the average amount of non-revenue water (based on volume) for all Plan participants combined at

about 14% of produced water, or about 4,620 acre-feet of water per year.

It is important to note that a direct comparison of non-revenue water between communities is unwise for several reasons. First, non-revenue water may be composed of different components from water provider to water provider. For example, authorized, unbilled uses vary from 0 to 32% of total water production within the Plan participants. Given that authorized unbilled uses are a component of non-revenue water, the portion of non-revenue water that relates to water loss varies from location to location.

Note that authorized, unbilled uses that are tracked by the various Plan participants are often not metered. Therefore, the amount of water that falls into this category of non-revenue water is typically estimated and not measured. Therefore, improvement is needed for most water providers in tracking and quantifying authorized, unbilled water use – which will translate into more accurate characterization of non-revenue water and ultimately water loss.

Next, non-revenue water relies on the accuracy of both master meters measuring the amount of water being placed into distribution and customer meters reading the water use at each tap. Errors in master meter readings (noting that meters typically read lower than actual volume passing through the meter) will typically underestimate the amount of water going into distribution. If more water is going into the distribution system than is measured, non-revenue water is greater than estimated. One method to check for this type of error

<sup>24</sup> See Appendix G for a complete description of the data collection and its use.

<sup>25</sup> Non-revenue water is the difference between water placed into the distribution system and the water sold to customers. It is estimated using monthly data and a rolling annual total, which allows for annualization, and therefore comparison, of the data reported by each project participant.

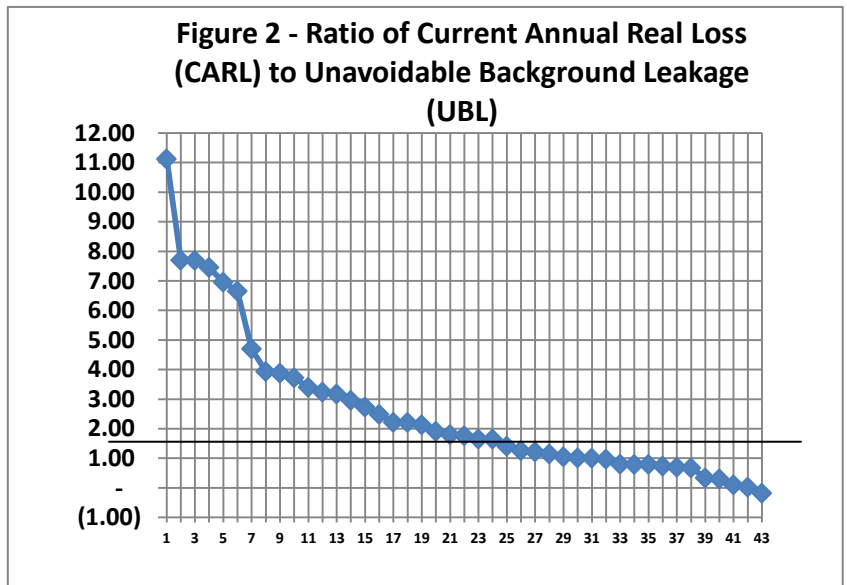
<sup>26</sup> Authorized, unbilled water is that water that has authorized uses (see Table 6) but is not billed for by the water provider. Authorized, unbilled uses vary from 0% to 33% of total water production depending on the local situation.

relates to comparing calculated annual real water loss (or current annual real loss (CARL)) to empirical estimates of unavoidable water loss (for entities with more than 3,000 connections) and/or unavoidable background leakage (UBL) – both of which are characteristic parameters developed through research by the AWWA. For those situations where CARL is approximately equal to UBL, or less, it is unlikely that the characterization of non-revenue water and water loss is accurate, since none of the entities that partook in the District sponsored water audits have aggressive water loss management programs<sup>27</sup>.

CARL = Non-Revenue Water Annual Volume-Authorized, Unbilled Water Volume Annually- Apparent Annual Water Loss (in consistent units) (M-36 provides methods to estimate apparent annual water loss)

UBL =  $(0.20 * \text{Length of Mains in miles} + 0.008 * \text{Number of Connections} + 0.34 * \text{Number of Connections} * \text{Length of Private Pipes Per connection}) * (\text{Average System Pressure (psi)} / 70)^{1.5}$

As shown in Figure 2, which presents a comparison of CARL to UBL for both the AVC and MC Plan participants, a dozen (over 25%) of the Plan participants appear to have real losses at a level less than background leakage, based on the size of their distribution system, system pressure and number of customer taps. Another seven show the ratio to be less than 1.5. To this point, nearly 45% of the project participants appear to have data characterizing real water loss, and therefore non-revenue water that may be subject to some significant amount of metering inaccuracies. This further illustrates the current concern that master metering issues may be affecting the reliability of local water loss management efforts.



Apparent water losses, related to inaccurate meters, data handling errors, and unmetered water uses also are expected to influence the non-revenue water characteristics of the Plan participants. The vast majority of the meters in place are  $\frac{5}{8}$  by  $\frac{3}{4}$  inch meters connected to older homes (built before 1980)<sup>28</sup>. It is anticipated that these meters cannot accurately measure small leaks on the customer side of the meter (e.g., dripping faucets, leaking toilet flappers) which can average about 10 gallons per day per connection<sup>29</sup>. At this rate, inaccurate metering can attribute for 1 to 2% of observed non-revenue water on average. In another example, as reported by Rocky Ford (see footnote 14 and the case study presented in the SECWCD BMP Tool Box

<sup>27</sup> According to the AWWA, only a handful of utilities in the United States have aggressive water loss management programs, coupling automated meter reading programs with aggressive meter testing, leak detection, leak repair, and data collection and management programs to limit real water loss. Even in these cases, CARL is larger than UBL, by definition.

<sup>28</sup> roughly 95% of all meters in place are  $\frac{5}{8}$  by  $\frac{3}{4}$  inch meters

<sup>29</sup> Water Conservation Handbook, Vickers, 2003

([www.secwcd.org/BMPToolbox](http://www.secwcd.org/BMPToolbox)), testing of customer meters prior to and after installation of all new water meters found that customer water use increased 8% solely based on improved meter reading accuracy. The effects of the new meter installation reduced non-revenue water by a substantial percentage of the volume of previously delivered but unsold (meaning unmeasured) water. To this point, some of the Plan participants may have overestimated non-revenue water volumes due to old and inaccurate water meters. Most of the MC Plan participants have installed new meters within the past 8 years; so this issue likely affects more of the AVC participants currently, but has the potential to impact any entity that does not keep its customer meters current and functioning correctly.

Overall, system wide water loss from real and apparent losses cannot be specifically correlated to meter or material age, or amount of pipe in the ground. It appears that water loss is based on a combination of variables (e.g., water pressure, elevation variability, etc.); including the manner in which water production and customer water use data is collected. Nonetheless, Plan participants will be able to reduce their non-revenue water by reducing both real and apparent losses by replacing meters, installing automated meter reading devices, improving data handling and reporting<sup>30</sup>, and improving best management practices including replacing and repairing leaking pipe, and tracking unmetered water uses. Various BMPs that have been identified to support local water provider needs will be evaluated and assessed for effectiveness and cost in the RWCP and this supplement.

### **Performance Guidelines (an important revision to the discussion and recommendations provided in the RWCP)**

The concept of performance guidelines which would promote water use efficiency at the individual water provider level stems from the requirement of the U.S. Bureau of Reclamation (hereafter “Reclamation”) that the District must ensure that Fryingspan-Arkansas Project water is used efficiently, and is put to beneficial use. To this point, performance guidelines would support more efficient water use by each Plan participant – promoting improved water use efficiency over currently observed levels, and in the process reducing non-revenue water, and therefore lost water sales receipts, for under-performing water providers.

Therefore, the policy that is explored in this report relates to developing a non-revenue water “goal” for all Plan participants including:

- The assessment of a numerical goal
- The identification of a timeframe to achieve the goal
- The BMPs that Plan participants may choose to implement to achieve the goal
- The potential financial tools that the District can employ to encourage Plan participants to achieve the goal and support local infrastructure investments that will improve overall water use efficiency
- The reporting mechanisms that would be needed to support tracking of progress toward achieving and maintaining the goal.

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<sup>30</sup> One key recommendation that will come out of the planning effort will be to standardize data collection methodologies, to the extent practical, such that water loss information can be assessed consistently from water provider to water provider.

**Background** - Developing a guideline for water loss – as a combination of real and apparent losses<sup>31</sup> – is challenging given the breadth of water providers that are party to the AVC, the Master Contract and share the Fryngpan- Arkansas water resources. However, it makes sense to develop a single performance guideline for all project partners, since any losses that occur compromise the District’s and Reclamation’s defined mission - to ensure water is used efficiently; and is put to beneficial use by the Plan participants.

The American Water Works Association (AWWA) has developed target setting guidelines for leak management based on specific water resource, operational and financial constraints<sup>32</sup>. These guidelines are summarized in Table 11, noting that the target values are for infrastructure leakage index, which is a comparison of real losses (as current annual real losses, CARL) to unavoidable annual real losses (UARL). Given that UARL is an empirical parameter that applies only to those entities with 3,000 connections or more, Table 11 has been prepared to address the many smaller providers that are Plan participants<sup>33</sup>.

**Table 11 – Summary of Leakage Management Target-Setting Guidelines (from AWWA, 2009)**

Target Range (CARL/UBL)	Water Resources Constraints	Operational Constraints	Financial Constraints
1.5-4.5	Available resources are greatly limited and are difficult and/or environmentally unsound to develop.	Operating with system leakage above this level would require expansion of existing infrastructure and/or additional water resources to meet demand.	Water resources are costly to develop or purchase. Ability to increase revenues via water rates is greatly limited due to regulation or low rate payer affordability.
4.5-7.5	Water resources are believed to be sufficient to meet long-term needs, but demand management interventions (leakage management, water conservation) are included in long-range planning.	Existing water supply infrastructure capability is sufficient to meet long-term demand as long as reasonable leakage management controls are in place.	Water resources can be developed or purchased at reasonable cost. Periodic water rate increases can be feasible and are tolerated by the customer base.
7.5-12	Water resources are plentiful, reliable, and easily developed and/or produced.	Superior reliability, capacity and integrity of the water supply infrastructure make it relatively immune to supply shortages.	Costs to purchase or develop water are low, as are rates charged to customers.
>12	While operational and financial considerations may allow a long-term target greater than 8, such a level of leakage is not an effective utilization of water as a resource, such that setting a target greater than 8 is discouraged.		
< 1.5	In theory, a value of CARL to UBL of less than 1.5 is not possible. If the calculated ratio is under 1.5 excellent leakage control is indicated. If the water utility is consistently applying comprehensive leakage management controls, a ratio of CARL to UBL may be possible and would be indicative of the program’s effectiveness. However, if strict leakage management controls are not in place, the low ratio might be attributed to error in a portion of the water audit data, which is causing the real losses to be under estimated. If the calculated ratio is less than 1.5 and only cursory leakage management controls are consistently used and documented, the low ratio should be considered preliminary until it is validated by field measurements via a bottom-up approach (where data is collected to characterize all of the components of the water audit).		

<sup>31</sup> Real losses relate to distribution and service line leaks (before the customer meter) and storage tank overflows; apparent losses relate to unauthorized consumption, inaccurate customer meters and systematic data handling errors (which can include labeling unmetered uses as losses).

<sup>32</sup> Based on information provided in AWWA, 2009.

<sup>33</sup> The ratio of UARL to UBL was assessed using data from those project participants that have more than 3,000 connections. Based on these data, UBL can be approximated as roughly two thirds of UARL. Table 11 was created using this ratio to adjust the AWWA reference to be more applicable to the smaller organizations subject to this Plan supplement.



An additional source of guidance that may be leveraged to assess a performance guideline is the Colorado Water Conservation Board's (CWCB) Conservation Strategy developed as a component of Statewide Water Supply Initiative (SWSI) (Aquacraft, 2010). This document indicated that water loss goals, for combined real and apparent losses when managed properly should be in the range of 6 to 8%. Coupling the CWCB target with the AWWA guidelines would indicate that a reasonable target for apparent losses would be in the range of 3% of total water production. Noteworthy is that Colorado water providers with water conservation plans on file with the CWCB report an average unaccounted for water of just over 10%<sup>34</sup> (Great Western Institute, 2011).

Timeframe - The performance guideline proposed for evaluation in the RWCP is suggested to be in place for each of the Plan participants at a time when each local organization is satisfied with the need, the data available to characterize water loss, and funding needed to support improved water loss management. By default, the District suggests that each Plan participant may want to consider meeting this performance guideline by 2050 (which is roughly consistent with the District's overall goal – see the following section “Ongoing Water Conservation Programs”). However, it is the intent of the District to have each Plan participant define its own goal for water loss management, and the timeframe for reaching that goal – given that some organizations are at or below a proposed performance guideline of 1.5 to 4.5 for the ratio of CARL to UBL; and others are substantially above that level. To this point, some of the Plan participants may choose to have goals that are achieved at 10-years, 20-years or 40-years into the future.

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<sup>34</sup> Covered entities that reported water loss in their water conservation plans typically used the term “unaccounted for” water, rather than non-revenue water, or real and apparent water loss. Since unaccounted for water is ill defined, there is no standard method to allow for a consistent comparison of reported water loss from entity to entity using the current information available from the State approved water conservation plans.

# Ongoing Water Conservation Programs

## **RWCP Implementation**

The District has conducted a number of tasks in direct response to the completion and approval of the RWCP over the past two years. The tasks that have been conducted include supporting the development of local water conservation plans, updating the BMP Tool Box, and supporting and conducting various educational programs. In addition, the District has developed regional water conservation plans in partnership with the Upper Arkansas and Lower Arkansas Valley Water Conservancy Districts (WCDs). These efforts, which are described in more detail below, have occurred in conjunction with the District performing the system wide water audits presented in earlier sections of this Plan and the District working with the Lower Arkansas Valley WCD to develop the water conservation and water use efficiency section of the Basin Implementation Plan in support of the Arkansas Round Table and the Interbasin Compact Commission (IBCC) of the State of Colorado.

## ***BMP Tool Box***

As indicated in the RWC plan, the District's web-based BMP Tool Box was developed to support local and regional water conservation planning and implementation. In that water conservation planning and implementation is an ever changing field of study and application, the BMP Tool Box is expected to expand and morph as data and case studies become available that help to educate and illuminate trends and technologies that may be applied to multiple locations and/or may support local water utility needs.

Over the past two years, the District collected data and information from some of its partners to provide insight from the relevant experiences of others. The relevant case studies include:

- Town of Salida Water Rate Study Request for Proposal
- South Swink Water Company Sub-metering Program
- City of Rocky Ford Performance Contracting for AMR/AMI Installations<sup>35</sup>
- Town of Swink Water Line Replacement and AMR Installation

Each of the case studies, which are currently available on the District's website, describe the type of investment that was made, the cost of the investment, and the outcome of the investment with respect to reduced water loss, improved water use efficiency, and reduced operational expenses. Impacts on water loss, water sold, and water sales revenues are also discussed.

## ***District Support of Local Water Conservation Planning***

The District has continued its efforts to support local water conservation planning and implementation. Although the intention of the District was to support the development of four local water conservation plans, the process of data collection and assessment required a greater level of effort than was available for the time period. Therefore, plans were developed for South Swink Water Company and the City of Las Animas, while CWCB water efficiency grant applications were developed (in partnership with Sustainable Practices) for the City of Lamar, the City of La Junta, and the City of Rocky Ford.

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<sup>35</sup> See page 17 for definitions.

The South Swink Water Company's plan identified water conservation goals related to reducing summertime peak usage, improving treatment plant efficiencies and reducing real and apparent water loss. Implementation for South Swink may include improving master metering, conducting annual water audits, continuing infrastructure improvements (e.g., water line and service line replacements, meter testing and replacement, etc.), and evaluating water rates. South Swink is also going to be participating in the Water Quality Working Group being facilitated by the District to support mid- and long-term management of their water supply system and coordinate the establishment of efficient operations in connection with future Project Water use.

The City of Las Animas identified water conservation goals related to reducing summertime peak usage and reducing real and apparent water loss. Implementation for Las Animas may include improving master metering, conducting annual water audits, continuing infrastructure improvements (e.g., water line and service line replacements, meter testing and replacement, etc.), and evaluating water rates. The City is also looking to improve and enhance the technology that it uses to collect customer water use data, by installing AMR on selected meters and upgrading AMR devices for meter reading and billing.

### ***District Support of Regional Water Conservation Planning***

The Southeastern District has supported the development of two regional Water Resources Management and Efficiency Plans, which address water resources uses and management in both the Upper Arkansas and Lower Arkansas River Water Conservancy Districts. Appendix H presents the two Water Resources Management and Efficiency Plans developed as a result of these efforts.

Water conservation and water use efficiency planning and implementation related to the operations and functions of the two Water Conservancy Districts is not necessarily consistent with what is typically associated with municipal and industrial water providers. Customer demand management programs, such as those listed in CRS 37-60-126, are not applicable to the types of programs that would be implementable by or useful to the Upper or Lower District and many of its partners in water management. This is due to the fact that the components of state statute dictate conservation program considerations for entities with retail water sales that are substantially, if not exclusively, for municipal and/or industrial uses. The Upper and Lower Districts do not provide retail water sales to any of its customers, but instead provides services and programs that support municipal, industrial, institutional, commercial, environmental, and agricultural water use in locations throughout its operational jurisdiction.

Because these two Districts take responsibility for owning, leasing, and managing water for these different uses; it is only natural that the organizations are constantly evaluating means to improve efficiencies.

The nature of water conservation and its benefits, as it relates to Upper District customers and its operations are not dissimilar to the nature and benefits of water conservation to municipal utilities and their customers. For example:

- The Upper District and its customers benefit from improved transit efficiencies<sup>36</sup> since more efficient transportation of replacement water to the location of expected depletion reduces overall storage needs and replacement releases; and
- District customers benefit from reduced water demands due to reduced energy costs associated with pumping costs.

Noteworthy, however, is that the impact of water conservation measures and programs on Upper District customers and operations can be substantially different than those realized by a typical municipal utility. For example, customer demand management in a municipality typically reduces water supply production (or diversion), treatment and distribution needs; whereas in many cases demand management by Upper District customers does not necessarily create a reduction in replacement water needs.

Therefore, the Upper District's water conservation planning and implementation effort is focused on improving the efficiency of its replacement water programs, which will allow for the following:

- Reduced transit losses
- Improve operational and administrative flexibility in conducting exchanges
- Increased available storage to allow for improved system reliability
- Improved data collection and management programs, including but not limited to, monitoring of meteorological, stream flow, and aquifer level data

For the Lower District, improved efficiencies can include, but not be limited to:

- Improving opportunities for water to be shared between water users<sup>37</sup> creating options for multiple use within the lower Arkansas River valley;
- Reducing transit and storage losses associated with the management of the District's water rights portfolio and the delivery of water to those locations of beneficial use and need; and
- Increasing the flexibility of the use of Lower District water, which would in turn provide for alternative points of diversion, exchanges and storage such that more wet water remains within the lower Arkansas River valley to the benefit of local and regional water users.

Given that there is a distinct overlap between the intent of the Colorado Statute addressing municipal and industrial water conservation and water use efficiency (i.e., CRS 37-60-126) and the kinds of programs that the Upper and Lower Districts conduct and support, there is value to the two Districts to develop water resources management and efficiency plans that the State can review and provide guidance on through the staff and programs of the Colorado Water Conservation Board (including the Office of Water Conservation and Drought Planning). It may also be the case that some of the regional water efficiency programs that the Upper and Lower Districts and their partners conduct may help to inform the State and its constituency in their efforts to develop and implement a statewide water plan and Arkansas basin implementation plan.

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<sup>36</sup> Reduced transit losses for the Upper District are similar to reduced real losses in municipal utility distribution systems associated with leaks.

<sup>37</sup> Water users in this case may include those entities, including farms that may need augmentation water, replacement water, and/or wet water for municipal, industrial, agricultural, or environmental purposes.

**Therefore, by improving water use and water resources management efficiencies, the Upper and Lower Districts will be able to utilize the available water supply in a more reliable and sustainable manner, supporting all the needs of the local community including residential, commercial, environmental and industrial uses.**

### ***Education***

The District has many regional programs that it sponsors and conducts that are focused on maintaining a commitment to stewardship of the region's water resources and the fulfillment of its responsibility to Reclamation related to ensuring efficient use of Project water. The programs and practices that the District conducts, in addition to its broad range of educational efforts, include the following:

- Water allocation policies and principles that define mechanisms for water sharing, water allocation and carryover storage all of which allow for improved system reliability and wise use of water resources;
- Water accounting protocols that allow for the tracking of Project water use and allocations;
- Return flow management program to ensure appropriate reuse and/or sale of Project water return flows;
- Project water request protocols that allow for more accurate purchases and use of Project water, reducing waste and inefficiencies;
- Reallocation procedures for Project water made available through agricultural dry-up;
- Enhanced data collection to characterize water availability and use through federal and state partnerships with SNOTEL, satellite stream gauging program, and other cooperative agreements;
- Tamarisk control program and the Arkansas Watershed Invasive Plant Program (ARKWIPP) to reduce the impact of evapotranspiration along open conveyances; and
- Maintaining a water conservation coordinator that supports public education, Xeriscape demonstration gardening, and municipal water conservation efforts.

The District also provides educational resources to all its partners – including:

- Facilitation and support of the annual Arkansas River Basin Water Forum.
- Website resources on indoor and outdoor wise water use, Xeriscaping and use of native planting materials, and weather data including evapotranspiration monitoring.
- Printed materials on wise water use are distributed annually to municipalities that receive an allocation of Project water.
- An award winning Xeriscape demonstration garden.
- K-12 educational resources – including support for water fairs, K-12 water education for teachers (Project WET), and in classroom presentation support.

Additional details related to these programs can be found in the District's 2010-2014 Water Conservation and Management Plan (2010)<sup>38</sup>.

### **MC Entities with Local Water Conservation Plans**

Unlike the AVC Plan participants, which are typically small and without water conservation plans, the MC Plan participants are larger and are required by the State to have approved water conservation plans. In addition, most of the smaller entities, such as Poncha Springs and Florence, have programs that relate wise water use to changing weather conditions and water scarcity.

Cañon City, Fountain, Pueblo West, Salida, Security and Widefield all have water conservation plans that have been filed with and approved by the State; with only Cañon City being behind on filing since the change of regulation in 2004. These approved plans have helped each entity reduce per capita water use, sometimes dramatically, since 2010, and are expected to continue to support reduced customer demand over the mid to long-term. A summary of each organization's local water conservation plan is provided below. A summary of the water conservation measures and programs presently being implemented by the various MC Plan participants is presented in Table 12.

**Cañon City** completed a water conservation plan in 1996 that includes the following measures: low water use fixtures and appliances; efficient landscape irrigation; commercial water conservation; leak detection and repair; customer education; block rate structures; city ordinances; and rebates. Meters, water efficient plumbing fixtures (as mandated by the 1992 Energy Policy Act) and education were already in place at the time of the plan (USBR, 2013). The water conservation plan does not contain a target demand reduction percentage. Cañon City is due to update their local water conservation plan in accordance with the State's updated regulations.

**Florence** adopted a Phased Water Conservation Plan in 2003 which dictated how the community responds to changing water availability in the Arkansas River (i.e., the timing of calls). The City's Plan identifies best management practices for wise water use, and defines different levels of drought that trigger alternative restrictions and enforcement actions by the City to manage the limited resource. No water savings goals are included in Florence's Plan (USBR, 2013).

**Fountain** adopted a water conservation plan in 2001, which was updated in 2009 (W. W. Wheeler & Associates, 2009). The update concluded that since the original conservation plan was adopted, Fountain has reduced its system-wide demand by about 12 percent, in part due to passive savings. Based on information supplied by Fountain, it is anticipated that an additional 3 percent reduction in per capita use will be realized between 2008 and 2013 (USBR, 2013).

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<sup>38</sup> Reclamation supports and partners with the District on many water conservation programs including public education, District educational website management, Xeriscape demonstration garden, SNOTEL, and the satellite stream gauging programs, for example.

**Penrose** adopted a Conservation Rate Structure and Use Policy that discourages high usage and allows the Penrose Water Board to define allowable uses of water when it is in short-supply conditions. There are no water savings goals in the policy paper (USBR, 2013).

**Poncha Springs** water conservation measures include lawn watering restrictions and individually metered wells, as adopted by Town Council.

**Pueblo West** developed a state-approved water conservation plan in 2012 (JVA, Inc., 2012). The Plan characterized the District's water supply characteristics, water demand, and future water needs, as well as defined water conservation goals. The Plan also indicated which measures and programs the District would implement. As stated in the Plan, Pueblo West is looking to reduce future demands over the next 20 years by 9%. Pueblo West also has a drought contingency plan (USBR, 2013).

**Salida** completed a water conservation plan in 2008 (Clear Water Solutions, 2008). Existing water conservation measures include even/odd day restrictions on outside watering, and outside watering restrictions between 10:00 A.M. and 4:00 P.M. daily. The water conservation plan goal is to reduce water use by 13 percent over the ten-year planning horizon of the plan by utility based programs to reduce system losses, passive conservation programs, changes to inclining block rate structures, and Xeriscaping in parks (USBR, 2013).

A water conservation plan was initially developed by **Security** in 2004. The plan included the use of water-efficient fixtures and appliances, installation of low water use landscapes and efficient irrigation, and development of water efficient industrial and commercial processes. Security also implemented an inclining rate block structure in 2004. Security updated and expanded its water conservation plan in 2011 (Water Matters, 2011). The update estimates a water conservation savings of about 19 percent between 2004 and 2009, which it attributes to changing attitudes towards water use, implementation of water meters and the Security's efforts to encourage conservation. The water conservation plan update expands indoor water conservation efforts, expands public education, and implements water audits and incentives. Security is investigating water reuse systems for both potable and non-potable uses (USBR, 2013). A distribution system leak repair protocol is already being used, as is the dissemination of water use efficiency information. The water conservation plan update defines future water savings as a 3.7% reduction in demand over the next 20 years.

Although no conservation plan is in place for **Stratmoor Hills**, newsletters and public meetings are used to help encourage customers to actively conserve.

**Table 12 – Current Water Conservation Measures and Programs Being Implemented by MC Plan Participants**

	Water Waste Ordinance	Water Conservation Coordinator	Codes – New Construction		Reuse	Water Rates	Watering Restrictions	Water Loss Management	Leak Detection	Capital Projects*	Customer Audits	Customer Incentives	Drought Triggers and Response Plan
			Indoor	Landscape									
Cañon City										X			
Florence										X			X
Fountain	X	X	X	X	X	X		X	X	X	X	X	X
Penrose										X			X
Poncha Springs										X			
Pueblo West			X	X		X	X		X	X			
Salida						X			X	X	X	X	
Security				X		X		X	X	X	X	X	
Stratmoor Hills										X			
Widefield						X		X	X	X	X	X	

\*Capital projects include meter testing and replacement, water line replacement, hydrants replacement, saddle tap replacement, etc.



**Widefield** completed a state-approved water conservation plan in 2009 (Widefield Water & Sanitation District, 2009). Conservation measures selected for implementation by Widefield include increasing block rate structure, education and outreach, low water use fixtures, water loss accounting, customer contact for high water usage, water audits, and water use profiling (USBR, 2013). New conservation measures to be implemented include landscaping recommendations to new customers, additional fixture retrofitting, and pricing incentives. The water conservation plan indicates that current incentives provide an annual 5 to 6 percent water savings, and new water conservation measures will provide an additional savings to an additional 4.8 percent.

### Issues Related to Quantifying Water Savings

Although it is the objective of the various local water providers to quantify water savings that may be expected as a result of various water conservation and water use efficiency measures and programs, this seemingly simple task is complicated by a number of factors. Due to these factors, which are described below, quantification of potential water savings may be difficult until better, more rigorous data collection methods exist and longer periods of consistent data collection occur. Future data collection and reporting, as well as improved monitoring and verification procedures will strive to improve the ability of future planners to estimate water conservation related savings. The factors of note include:

- i) Many local water conservation and water use efficiency programs and projects are in the process of improving their data collection and verification procedures which are the basis for measuring “saved water.” Data is becoming more readily available, especially with the development of regional reporting requirements associated with the SECWCD and other District administration of regional water projects. However, there are limitations related to those projected water “savings” that are contained in local planning efforts - limitations that stem from the accurate quantification of baseline conditions, the accurate preparation of comparative analyses, and the nature of perceived or real water savings (i.e., are they permanent or temporary).
- ii) Some water savings that have been identified by local water utilities and providers may be paper savings related to reduce apparent water losses. Apparent water losses include those water losses that appear to occur based on meter inaccuracies, systematic data handling errors and unauthorized water uses (e.g., water theft). Improvements to tracking and reducing apparent water loss will be important to the local and regional communities as real water loss is controlled; however, apparent water loss improvements cannot be used to address the water supply gap.
- iii) Passive water conservation savings associated with changes in commercially available water using fixtures and appliances is not typically included in the estimates of water savings provided by the water conservation planning community. Passive savings may create an additional 7 to 9 percent of demand reductions for the period from 2005 to 2020 depending on location in the basin, the age of housing stock, and the number of new customers during that period of time. However, utilities may observe customer demand reductions and confuse the impact of passive savings with the impact of other local water conservation efforts. Therefore, data collection processes need to be developed that targets the characterization of individual conservation programs such that the effects of one program can be separated from the effects of other influences on customer water use behaviors.

- iv) All water savings estimates are in the process of being measured and verified. In some locations, the actual water savings have been less than expected, whereas in others, the water savings have been more than expected. Therefore, it is anticipated that as communities that have existing water conservation plans go through the process of updating their plans, the level of sophistication and maturity related to water conservation planning and implementation (including monitoring) will improve and water savings estimates will become more accurate.
- v) It is clear that water supplies can be significantly impacted by variability in weather patterns, as well as many other external factors beyond the control of a water utility or company (e.g., changing tourism visits, closing and opening businesses, impacts of new residential construction, changing customer demographics, etc.). For example, an analysis of monthly per connection variability for a number of water utilities found standard deviations that were 30 to 50% of the mean. This means that one out of every ten years, the water demand may fluctuate by a factor of about 40 to 65% of average conditions simply due to variations in behavior brought on by weather patterns and other factors. Accurately measuring the effects of water conservation savings that are a fraction of this variability is challenging and will require continued perseverance to collect the correct data and perform appropriate supporting analyses.
- vi) More small and medium sized communities will be developing water conservation programs, in conjunction with funding provided through the SECWCD and as a matter of improved business practices. In addition, larger communities will be supporting improved water use efficiency in smaller communities as regionalized water projects continue to grow in need and popularity. Therefore, better estimates of the amount of reliable water conservation related savings (through demand reduction, improved source water quality and improved water loss management practices) will continue to occur in the coming decades.

For those reasons listed above, there is no one number associated with water savings that may be expected as the result of the implementation of these and future water conservation plans. As seemingly valuable as adding up expected savings for each plan may be, the nature of the savings, and the realization of future savings is highly variable and must be considered in light of when and where savings occur.

## Water Conservation Goals

The nature of water conservation goals for the District is based on the fact that the District does not provide Project water for retail sale; instead the District has an administrative role that includes being the local contracting agency with Reclamation who is responsible for repayment of locally funded construction costs of the AVC and related projects (e.g., Long-Term Excess Capacity Master Contract<sup>39</sup>). Therefore, the District will be in the position in the future to collect and report data associated with AVC deliveries from the Plan participants – including total water deliveries and customer water sales. These data will be used to help track the future benefits of water conservation and water use efficiency programs being implemented by local water providers.

For this reason, the District does not directly control how local water providers and their customers will leverage the benefits of local water conservation programs to reduce water demand. However, the District is committed to provide financial and technical resources to support local water conservation efforts being planned and implemented by the AVC and MC Plan participants, including the 47 local water providers and two regional water conservancy districts.

Given that the efforts of the District and the Plan participants will over time improve local and regional water use efficiency through improvements to water loss control and overall system water management, as well as other water conservation measures and programs, the District has developed the following broad goals<sup>40</sup> for improved water use efficiency by the combined group of Plan participants:

- By 2030, reduce water loss on average from 14% to 10% of total water production (reducing demand by about 1,528 acre-feet from estimated 2030 demands (38,198 acre-feet)); and
- By 2050, reduce water loss on average from 10% to 8% of total water production (reducing demand by another 980 acre-foot for a total of about 2,508 acre-feet from expected 2050 demands (49,252 acre-feet)).

These goals were developed to align with the expected gaps in future water supply discussed previously in this document.

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<sup>39</sup> This is a long-term contract between the District and Reclamation allowing for storage of non-Project water in Pueblo Reservoir when space is available. The water providers that could benefit from the existence of the Master Contract are all located within the District's service boundaries. The AVC participants that are also participating in the Master Contract may store non-Project water for delivery through the AVC. Non-AVC water providers that are participating in the Master Contract would use existing water systems or the Arkansas River to receive water deliveries.

<sup>40</sup> The goals as presented above reflect revisions from those goals contained in the original RWC Plan, since additional information has been gathered and the efforts of the MC Plan participants are included in the goal setting and will be included the future water demand reductions. The goals in the original RWCP included: by 2030, reduce water loss from 20% to 15% of total water production (reducing demand by about 540 acre-feet from estimated 2030 demands (10,811 acre-feet)); and by 2050, reduce water loss from 15% to 10% of total water production (reducing demand by another 600 acre-foot for a total of about 1,140 acre-feet from expected 2050 demands (11,423 acre-feet))

Additionally, the District is requesting that the Plan participants:

- Develop local water conservation plans that document water demand reduction goals (including water loss management improvements);
- Select water conservation measures from the District’s Toolbox to support local water conservation efforts; and
- Implement the selected activities (or an appropriate portion thereof) by 2022 (which is when the AVC is predicted to be constructed and operational, and each Plan participant would have to execute a contract with the District to receive AVC deliveries) or sooner (for those participants that are covered entities and will have Master Contracts with the District).

The District suggests that the Plan participant water use efficiency goals identify potential water demand reductions that may be expected in 2030 and 2050 as a result of implementing the individual water conservation plans.

**The District will strive to facilitate and support the development of 24 local water conservation plans by 2026 (which constitutes 50% of the Plan participants, which is approximately 3 plans and/or plan updates every two years)<sup>41</sup>.**

It is fully anticipated that Plan participant water conservation programs will evolve over time as data collection improves, and management systems and technology changes. For this reason, some Plan participants may choose to have water conservation plans that focus on data collection (including meters) and interpretation activities before developing programs that address water loss management and/or customer demand reductions.

Finally, the District will work to support the Upper and Lower Arkansas River Water Conservancy Districts in their efforts to implement their regional Water Resources Management and Efficiency Plans (see Appendix H).

The Upper District has developed the following list of goals related to the implementation of its Plan:

- Develop projects and facility management policies that reduce transit and evaporative losses related to reservoir and other storage vessel operations;
- Support the development of policies that allow for the flexible use of upper basin water supply, and the transfer and exchange of water between uses and users, to the extent allowed by the prior appropriations doctrine;
- Support local, regional and state-wide water education programs that help to educate the electorate, future voters, and water users of all kinds; and
- Support local and regional projects that improve water use efficiency and water resources management by the Upper District and by its partners.

Water use reductions that may be related to achieving the stated goals may include reductions in transit losses (which will be in the range of 8 to 10 AF); and evaporative losses (which may be in the range of 100 plus AF).

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<sup>41</sup> As of the end of 2015, the District has supported the development of plans and/or planning grants for South Swink, Las Animas, Rocky Ford, Lamar, and La Junta.

More importantly, however, will be those efforts put forth by the Upper District to improve water use efficiency in the Upper Basin, allowing for the more effective utilization of thousands of acre feet of in-basin resources<sup>42</sup>.

A list of specific goals that the Lower District has developed with respect to water use efficiency and water conservation are provided below.

- Continue to reduce transit and storage losses associated with the operation of the Lower District's programs; working to eliminate the need for Pueblo Reservoir releases by 2020 (which would in turn reduce transit losses by 30-50 AF, see Table 1 and 2).
- Improve the understanding of aquifer recharge on stream accretions along the Arkansas River below Pueblo. This objective may be able to conserve as much as 5% of current replacement water sources associated with Rule 10 (which translates into a savings of about 50AF, see Appendix H).
- Identify opportunities to expand and/or enhance aquifer recharge effort to support improved efficiencies related to the operation of Rule 10 and Rule 14 replacement water programs.
- Continue to evaluate the efficacy of developing and operating a Super Ditch program that would allow for the efficient exchange of agricultural water due to rotational fallowing to municipal providers both within and outside of the basin. This project will evaluate the option of developing up to 500 AF of transferable consumptive use water without detrimentally impacting agricultural businesses.

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<sup>42</sup> Although this number can only be estimated, construction and operation of a large conjunctive use facility in the upper portion of the Arkansas River Basin will not only allow for the more effective timing of releases to address consumptive and non-consumptive needs, it will also greatly reduce evaporative losses that would accompany a similar sized surface reservoir. In addition, the implementation of programs and projects such as the Master Contract with the Southeastern District to store water in Pueblo Reservoir enhances the exchange potential with lower basin resources allowing for the transfer of underutilized Fry-Ark reusable return flows upstream, thus saving additional wet water resources. The policy changes that the Upper District seeks to explore also have the potential effect of expanding the use of wet water to achieve multiple objectives in a more efficient manner.

## Identification of Water Conservation Measures and Programs

The State of Colorado and Reclamation have guidelines that must be considered in developing water conservation plans, including supplements. Reclamation requires that any entity that enters into a repayment contract (such as the District) “develop a water conservation plan which shall contain definite goals, appropriate water conservation measures, and a time schedule for meeting the water conservation objectives” (as per the Water Supply Act of 1958, as amended (43 U.S.C. 390b)). The guidelines that Reclamation has prepared to direct the development of said plans include tasks for:

- Providing a description of the water supply system, including delineating sources and amounts of water, and identifying opportunities and challenges to the current water supply system that would potentially benefit from improved water use efficiency;
- Developing water conservation goals that are measurable and address specific water supply limitations and needs;
- Reviewing, evaluating and selecting water conservation measures including considering a listing (see Table 13) provided by Reclamation; and
- Specifying a schedule for implementing the selected water conservation measures to meet the stated goals.

Reclamation’s guidelines are nearly identical to those that have been established by the State of Colorado, which were developed in part to adhere to the current regulations (CRS 37.160.26, see Appendix I). The State’s regulations while not applicable to the District’s RWCP, are relevant and appropriate to use to guide and direct the process. Within the Colorado statutes are a listing of water conservation measures and programs “each covered entity shall, at a minimum, consider.” These are also listed in Table 13.

By necessity, the District and the Plan participants have developed a culture of water conservation over the decades, given the environment and realities of the Arkansas River basin. Certain water conservation measures have naturally been implemented as a matter of course. Other water conservation measures, as listed in Table 13, have not been considered per se, due to expected or perceived cost, organizational constraints, and/or lack of available resources. However, the District and the Plan participants realize that the future may require that any and/or all of the water conservation measures listed by Reclamation and the State may be important to future demand reduction management and water use efficiency programs that are needed locally in the valley.

To this point, the District developed the Best Management Practices Tool Box (or Tool Box for short) that was designed to fully encompass all listed “to be considered” water conservation measures; and expanded to include others that are relevant to currently identified local needs. The Tool Box, which was developed through funding from Reclamation and was completed in the first quarter of 2013, and has since been updated to include relevant case studies and other material that may be applied to any and every water provider within the SECWCD service area.

**Table 13 – Summary of Water Conservation Measures that Should Be Considered in the Development of a Water Conservation Plan**

<b>Water Conservation Measure to be Considered</b>	<b>Reclamation Guidelines</b>	<b>State of Colorado Regulations</b>	<b>Current Status in the AVC/MC Service Area</b>	<b>Included in Best Management Practices Tool Box</b>
Metering all water deliveries to customers	Fundamental	Covered by another regulation	Implemented by all Plan Participants	Included as updating and repairing meters <sup>43</sup> ; use of new technologies
Maintaining water pricing structures that encourage customer water use efficiency (i.e., having pricing that is based on quantity of water used)	Fundamental	To be considered	Implemented by all Plan participants <sup>44</sup>	Included as water rates and water rate structures
Provide information and education for water customers designed to promote increased water use efficiency	Fundamental	To be considered	Implemented by the District throughout the service area	Included as education and training, and messaging to customers
Designate a Water Conservator Coordinator	Fundamental	Not contained in State Regulation	Implemented by the District throughout the service area	Included as management of human collateral
Residential/Government/Institutional Audits and Incentives	To be considered	To be considered		Included
Commercial/Industrial Audits and Incentives	To be considered	To be considered		Included
Landscape Programs	To be considered	To be considered		Included
Distribution System Wide Audit Program	To be considered	To be considered		Included
Drought & Water Supply Contingency Plans	To be considered			Included as integrated resource planning
Wastewater Reclamation and Recycling	To be considered	To be considered		Included as alternative water supplies
Plumbing Regulations (for fixtures)	To be considered	To be considered		Included as regulatory
Fixture Replacement	To be considered	To be considered		Included
Conjunctive Use	To be considered	Not contained in State Regulation		Included as alternative water supplies

<sup>43</sup> Includes references to EPA’s Reduction of Lead in Drinking Water Act of 2014.

<sup>44</sup> Some Plan participants maintain a service fee that provides a nominal fixed volume of water to each customer, with water use above this fixed volume charged on a per unit volume of water delivered.

# Evaluation and Selection of BMPs by the Plan Participants

## Local Water Conservation Planning

The Plan participants are being requested to develop a local water conservation plan that is consistent with the needs and the resources of the local area; based on the ideals and objectives described in the RWCP. The District, in its role as a facilitator of regional resources, is committed to providing technical assistance to support these local water conservation planning efforts, to help Plan participants:

- Adhere to State requirements as they relate to covered entities;
- Develop reasonable and measurable conservation goals (for the 2022, 2030 and 2050 timeframes<sup>45</sup>);
- Understand options for evaluating and selecting water conservation measures;
- Maintain reasonable expectations regarding the effectiveness and cost of implementation; and
- Develop an implementation plan that is meaningful and supports the needs of the local community.

In addition, the District will assist the Plan participants by identifying and facilitating funding from various State and Federal sources that may be used to support local planning and implementation efforts.

A key component of the District's support to the Plan participants included the development, maintenance, and use of the BMP Tool Box. For this reason, the District will continue to maintain a "live" website that can be updated and added to in real time as local planning and implementation efforts by the Plan participants continues to add to the available knowledge base. The District will commit those resources need to maintain and update the website and the related data warehouse as water conservation and water use efficiency efforts mature in the AVC and MC service areas.

It is the intent of the District to provide enough information in the Tool Box for each BMP such that the Plan participants can:

- Determine what the BMP is and how it may help their specific circumstance;
- Understand how to plan for and implement the BMP; and
- Have examples that include links to technical resources, templates and other relevant materials to assist in scoping and costing the BMP.

The decision whether to select and implement any specific water conservation measure contained in the Tool Box will depend on business and political decisions made by the individual Plan participants.

**Vital to local planning will be the identification of local water conservation plan elements that allow for appropriate business decision-making at the water Board level to occur.** To this point, local water providers should look upon the water conservation planning effort as a process that supports the

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<sup>45</sup> These timeframes coincide with not only the specified District goals, but with the projected beginning of the AVC operation (2022) at which time each Plan participant will be required to enter into a contract with the District to define the terms and conditions of AVC water delivery, payment, data reporting, etc.



development of appropriate information and data that can be collected over time to support future business decision-making. For example, some water providers may find that their first water conservation plan focuses on the collection and organization of data characterizing customer water use, water loss and non-revenue water, and/or fixed and variable costs associated with water production, treatment and delivery – including making improvements in infrastructure (e.g., master meters), data collection processes, and /or data handling procedures. Once more accurate and reliable data have been collected in a meaningful and consistent manner over a period of months to years, the water conservation plan could be updated to include metering improvements, water rate studies, and/or other water conservation measures that could not be properly evaluated previously. Using a step-wise approach, local water providers can:

- Maintain continuous improvement in their local water conservation and water use efficiency programs;
- Develop supporting data for business assessment and decision-making; and
- Potentially access funding for each of the steps along the way.

The District will provide technical support to those Plan participants that wish to develop a plan for collecting adequate data to support Board decision-making; as well as to those that wish to begin implementation of more aggressive programs including all the covered entities in the District’s service area (i.e., Cañon City, Fountain, La Junta, Lamar, Pueblo West, Salida, Security, St. Charles Mesa Water District, Widefield). Given the timeframe for water demand reductions to be achieved (i.e., by 2022, 2030 and 2050), the Plan participants have the time to develop data collection programs before developing water conservation programs focused on demand reductions.

Of course, there will be those organizations that have adequate data to support business assessments and analyses in the near term. These organizations may choose to develop a plan and implement water conservation measures without additional data collection. Still others may decide that their current water use efficiency programs are adequate for their ongoing circumstance such that water conservation planning is not needed at this time. Although the District would urge all Plan participants to develop some form of meaningful water conservation plan, it will ultimately be the decision of each local water provider as to the extent of planning and implementation that will best serve their community.

Irrespective of the decision made by local water providers to plan or not plan, they will have the District and the Tool Box as resources to support assessments and business decision-making by each local Board.

### **Best Management Practices**

The tool box has been designed and conceived to support all the different types of water conservation measures that may be applicable to the Plan participants, including those identified by Reclamation and the State. The focus of the Tool Box on water system management and operations resulted from

numerous discussions with the Plan participants and recent CWCB policy assessments (CWCB, 2010, 2011).

To this point, the Tool Box has been organized into five categories of water conservation practices, as follows:

- System Management
- Water production and treatment
- Water Distribution
- Water Delivery (to customers)
- Customer Water use

Table 14 lists the specific BMPs that fall within each of these five categories. The Tool Box will be populated to include each of these BMPs providing information that is relevant to and supports local water provider planning and implementation needs.

### **Funding Support**

The District will develop a portfolio of financial tools that may become available to support and/or augment local water provider water conservation and water use efficiency planning and/or implementation efforts. The financial tools will include:

- Developing and maintaining an accurate listing of federal and State grant and loan programs that may be available to support local planning and/or implementation efforts;
- Developing and maintaining sample grant and loan applications that may inform local application efforts; and
- Providing grant and loan writing technical support.

A listing of the currently available funding options that has been identified as a result of the District's planning efforts is provided in Appendix J.

It is anticipated that the Plan participants will evaluate and determine their individual funding needs independently, depending on program type, financial need, scope and budget of plan and/or implementation task, and organizational mission or structure<sup>46</sup>. In addition, local water providers will have to determine whether they will pursue funding alone, in teams and/or with regional partners. The District will provide technical assistance on an as-needed basis to support funding assessments performed by local water providers.

Finally, the District will consider developing technical assistance programs that are either stand-alone or in partnership with selected small water system service providers (e.g., Colorado Rural Water Association). Technical assistance may include services such as:

- System Wide Water Audits

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<sup>46</sup> Different types of grant and low interest loans have restrictions regarding the type of organization that qualify for funding.

**Table 14 – Overview of Best Management Practices in the Tool Box by Functional Component of Utility Operations**

System Management	Water Production and Treatment	Water Distribution System	Water Delivery to Customers	Customer Water Use
Data Collection (e.g., synchronizing reading of Master Meters with Customer Meters)	Data Collection and Management (e.g., collection of master meter readings, data warehousing, etc.)	Data Collection <ul style="list-style-type: none"> <li>- Tracking water line breaks and repairs</li> </ul>	Data Collection and Management <ul style="list-style-type: none"> <li>- Timing of Meter Readings</li> <li>- Tracking Water Delivery per Meter</li> <li>- Submetering</li> </ul>	Data Collection and Management <ul style="list-style-type: none"> <li>- Water Use Tracking (real time)</li> <li>- Submetering</li> </ul>
Data Management and Archiving (maps, standard operating procedures, electronic filing of data, etc.)	Master Meter Testing and Replacement	Small Systems infrastructure <ul style="list-style-type: none"> <li>- Submetering</li> <li>- Looping</li> <li>- Isolation valving</li> </ul>	Meter Replacement <ul style="list-style-type: none"> <li>- Testing and Replacement</li> <li>- Low Flow Batching</li> <li>- Yokes and PRVs</li> </ul>	Customer Messaging/Surveys <ul style="list-style-type: none"> <li>- Message development</li> <li>- Customer feedback/Surveys</li> <li>- Campaign management</li> </ul>
Organizational Structure(s) <ul style="list-style-type: none"> <li>- Districts and Associations</li> <li>- Authorities</li> <li>- Regionalization/MOUs</li> </ul>	Metering Unmetered Uses <ul style="list-style-type: none"> <li>- Filter backwash</li> <li>- RO Reject</li> <li>- WTP/WWTP Uses</li> </ul>	Leak Detection <ul style="list-style-type: none"> <li>- testing</li> <li>- system monitoring (flow, pressure)</li> <li>- system shocking</li> </ul>	Metering Unmetered Use <ul style="list-style-type: none"> <li>- Tracking</li> <li>- Metering Options</li> </ul>	Technical Assistance for Customers <ul style="list-style-type: none"> <li>- Training</li> <li>- Licensing/Certifications</li> <li>- Audits (Kits and Resources)</li> <li>- Demonstration Gardens</li> </ul>
Evaluate and Update Water Rates <ul style="list-style-type: none"> <li>- Tracking fixed and variable costs</li> <li>- Tracking customer water use by category</li> <li>- Maintaining reserves</li> <li>- Budgeting for capital improvements</li> <li>- Evaluating Water Rate Structures</li> </ul>	System Storage Water Management (e.g., overflow prevention switches)	Metering Unmetered Uses <ul style="list-style-type: none"> <li>- Hydrant flushing</li> <li>- Fire fighting</li> <li>- Construction water</li> </ul>	Alternative Metering Technologies <ul style="list-style-type: none"> <li>- AMR touch pads</li> <li>- AMR radio reads</li> <li>- AMI remote reading</li> </ul>	Customer Audits <ul style="list-style-type: none"> <li>- Residential</li> <li>- Commercial/Industrial</li> <li>- Institutional</li> </ul>
Integrated Resources Management <ul style="list-style-type: none"> <li>- Raw Water Master Planning</li> <li>- Drought Planning</li> <li>- Contingency Planning</li> </ul>	Alternative Water Supplies <ul style="list-style-type: none"> <li>- Conjunctive use</li> <li>- Reuse/reclaimed wastewater</li> <li>- Interconnects</li> <li>- Carry-over storage</li> <li>- Exchange water options</li> </ul>	Pressure Management <ul style="list-style-type: none"> <li>- Pressure Reducing Values</li> <li>- Tank Placement and Management</li> </ul>	Repairs <ul style="list-style-type: none"> <li>- Service Lines</li> </ul>	Policies and Regulations <ul style="list-style-type: none"> <li>- Guidelines</li> <li>- Regulations</li> </ul>
System-Wide Water Audits		Repairs <ul style="list-style-type: none"> <li>- Distribution pipe and pipe materials</li> <li>- Hydrants</li> <li>- Service Lines</li> </ul>		Customer Retrofits (give-aways, incentives) <ul style="list-style-type: none"> <li>- Indoor</li> <li>- Outdoor</li> </ul>
Billing and Bill Collection				Customer Education <ul style="list-style-type: none"> <li>- General Outreach</li> <li>- Newsletters</li> <li>- Interactive Website</li> <li>- K-12 Education</li> </ul>
Management of Human Collateral (board development, staffing, training, operator licensing)				
Data Reporting <ul style="list-style-type: none"> <li>- Funder requirements</li> <li>- Contracting requirements</li> <li>- Board requirements</li> </ul>				

- Water rate studies
- Leak detection testing
- Meter testing
- Water conservation data tracking
- Professional training

All of these programs – maintaining and updating BMPs, developing and administering financial support, and providing technical assistance - may require that some funding mechanism(s) be established to support the District’s efforts in the future.

### **Water Use Tracking and Reporting**

It will be incumbent on the District to maintain contact with all the Plan participants to track individual water provider water use, water loss, and water use efficiency prior to and once the Master Contracts are in place and being used, and the AVC is operational. The terms of data sharing and reporting will be by necessity contained in the contract terms and conditions that will be created between the District and each of the Plan participants, if not already in place, that commits the participants to provide information to track the effectiveness of implemented water conservation plans and programs, or participates in a RWCP (Section V.A.9.). This language is as follows:

*Participant will provide information to SECWCD, as requested, in order to track the effectiveness of implemented water conservation plans, whether the Participant has its own water conservation plan or participates in a regional water conservation plan.*

The District has considered the data collection and reporting requirements of both Reclamation and the State with regards to the District repayment contract, as well as the District’s RWCP in developing its requirements for Plan participant reporting. Reclamation requires an update of the RWCP every 5 years, whereas the State requires updates no longer than every 7 years. In addition, the District became aware of the current data collection activities that all the Plan participants undertake as a result of the System Wide Audits that were performed in 2011 and 2012. As a result, the District has developed the following annual reporting requirements for all AVC Plan participants, beginning in 2014, to include, at a minimum:

- Monthly data production data
- Monthly water sales data (by customer category if possible)
- Number of active connections by customer category
- Non-revenue water (as a percent of annual water production)
- Status of local water conservation planning efforts
- Listing of implemented water conservation programs (in the last year)
- Current water rates (base fee and fee structure)

Note that one of the District’s roles in implementation of this Plan will be to organization and use of those data reported to the District annually by the Plan participants.

## **System Wide Water Audits**

One key component of the District's RWCP is the continuation of the system-wide water audits, which have helped to establish baseline conditions for future comparison of data use and water loss data, and have supported the implementation of important changes to local water provider BMPs related to water loss management, water billing, and overall data collection and assessment. As indicated above, each of the Plan participants will be collecting those data on an annual basis that are used in the AWWA M-36 water loss management calculations, and reporting much of that data to the District in partial fulfillment of their contract obligations to the District. As each participant collects and organizes these data, water loss management at a local scale will improve and efficiencies will be realized.

However, efficiencies will be best realized locally if a third party is allowed access to the data collection process, as well as the data, to verify data assessments and provide additional expertise to each of the local water providers regarding data interpretation and water loss management. To this point, the District will conduct system-wide water audits on all of the Plan participants on a rotating schedule with the intent to ensure that data collection and assessment efforts are being conducted regularly and in a manner consistent with the AWWA methodology.

It is the expectation of the District that the audits are to be performed in a "top-down" approach as described in the AWWA M-36 Manual. In other words, the District's efforts are focused on collecting information from existing records, procedures, data and other information systems, and developing desktop analyses of these data. It is expected that some of the participating organizations and communities will utilize the results of the District's auditing program to move toward more of a "bottom-up" auditing procedure which being the process of validating the top-down results with field measurements, billing systems and data assessments, and detail customer meter testing. It is the expectation of the District that future support by the District of local water conservation planning will be the next step in regional efforts to perform requested bottom-up auditing processes.

## **Water Quality Working Group**

One area of local water use efficiency that has received particular attention since the completion of the RWCP in 2013 relates to State health department (i.e., Colorado Department of Public Health and the Environment (CDPHE)) solid waste and materials management, and drinking water regulations. In that numerous local water providers in the lower Arkansas River basin have drinking water supplies that are contaminated with naturally occurring radioactive materials, some entities have outstanding compliance orders related to providing water to their customers that exceed primary drinking water standards. In addition, new solid waste regulations developed in 2013 regulate iron filtration systems, both in terms of sludge and backwash water management. Finally, spent filter media may require testing and disposal as potentially hazardous materials dependent on the composition of the source water, among other factors.

In that the AVC may provide substantial reduction, if not complete elimination of local reliance on tainted groundwater supplies, a working group has been established to help identify potential solutions to the regulatory and operational issues currently confounding the CDPHE and local water providers. Inasmuch as reducing the amount of water pumped to waste (e.g., evaporation) as a result of

backwashing iron treatment and filtration facilities constitutes an improvement in water use efficiency, the working group has been linked to local water conservation programs.

Therefore, the District will continue to facilitate the Working Group and in doing so pursue funding such that the Working Group is allowed to fully explore and develop local and regional solutions to what is a challenging set of problems. Arkansas River Basin roundtable is currently providing funding, with matching cash support provided by the District and the Lower Arkansas Valley Water Conservancy District, as well as in-kind support from dozens of local, regional and state stakeholders.

# Updated Implementation Tasks

## Implementation Tasks

The District, working with the Plan participants have identified the following tasks as necessary and appropriate for implementing the RWC Plan, as supplemented herein, over the coming 3 to 5 years. These tasks include the following:

- Continue to facilitate and support the Water Quality Working Group, using District resources and resources from the State and other local stakeholders;
- Continue to support local water conservation planning by:
  - Identifying those Plan participants that intend to develop local water conservation plans and would like to receive technical and/or financial support from the District for purposes of plan development and implementation;
  - Pursuing annual to bi-annual grant funding (pending on the scope and schedule for each grant application) from Reclamation and the CWCB in partnership with selected Plan participants to support plan development and implementation; and
  - Conduct technical reviews of local water conservation plans and implementation activities as requested by local entities.
- Continue to support local system-wide water audits by:
  - Conducting system wide water audits on all 48<sup>47</sup> Plan participants once every four years, or 12 system-wide water audits per year, taking the fifth year off to develop the reports for Reclamation and the CWCB based in part on the audit data;
  - Pursuing annual to bi-annual grant funding (pending on the scope and schedule for each grant application) from Reclamation and the CWCB in partnership with selected Plan participants to support the system wide water audits; and
  - Creating brief documents that summarize the system wide water audits and provide specific direction and feedback to each of the audited entities regarding data quality, water loss, and best management practices.
- Review and provide guidance to any Plan participant that has developed a local water conservation plan to assist local efforts to link conservation goal setting with resources from the Tool Box and ongoing and future data collection efforts.
- Conduct annual management of the Plan participant data reporting effort, including collecting and recording the data submittals, reviewing the data reports for completeness, and tracking

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<sup>47</sup> This number was arrived at by including the 47 entities (i.e., the 38 AVC Plan participants less one for the Crowley County Commissioners who do not have retail water sales) and the 10 Master Contract Plan participants, plus the Town of Cheraw for a total of 48.

key characteristic parameters related to water production, water sold, non-revenue water, per connection water use, and water loss.

In addition, the District will maintain and update the Tool Box, collecting information and reference material from the Plan participants and other interested organizations to keep the Tool Box relevant, accessible and current.

The District will also make technical resources available to support water conservation measure implementation, on an as-needed basis. Resources may be allocated for performing the following tasks:

- Holding workshops related to local water conservation planning, the AVC, and the Tool Box
- Conducting water provider and customer water use efficiency training
- Maintaining the District Xeriscape Demonstration Garden
- Printing and disseminating water conservation information and educational materials
- Supporting basin wide conservation message development and broadcasting
- Supporting K-12 water education throughout the valley

Finally, the District will develop specific data reporting requirements for the Plan participants related to their individual contracting terms and conditions, which will take into account Reclamation and State of Colorado reporting requirements, local water conservation planning efforts, and overall MC and AVC Plan participant water use efficiency.

### **Public Review and Comment**

The Draft RWCP was distributed and otherwise made available for public comment on June 23, 2015. Public comment was open for over 60 days as per the announcement placed in local papers (see Appendix K). Public input was sought and obtained prior to the close of the public comment period which was on September 14, 2015. Copies of the Final Draft RWCP were made available at the District's offices, on line, and via email, upon request.

No public comments were received by the District Board.

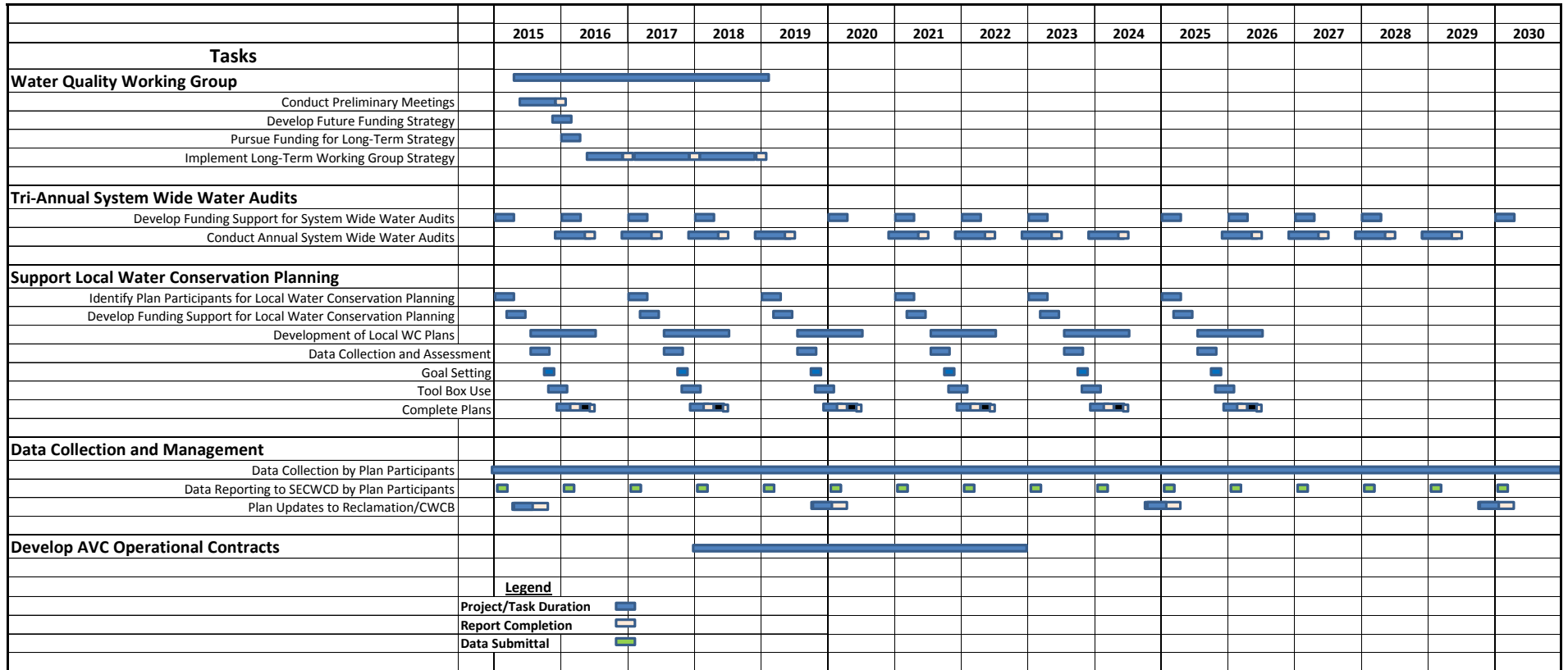
### **Schedule**

The proposed schedule for implementation of the supplement to the RWCP is provided on the following page.



**Proposed Implementation Schedule  
Regional Water Conservation Plan**

**Southeastern Colorado Water Conservancy District**



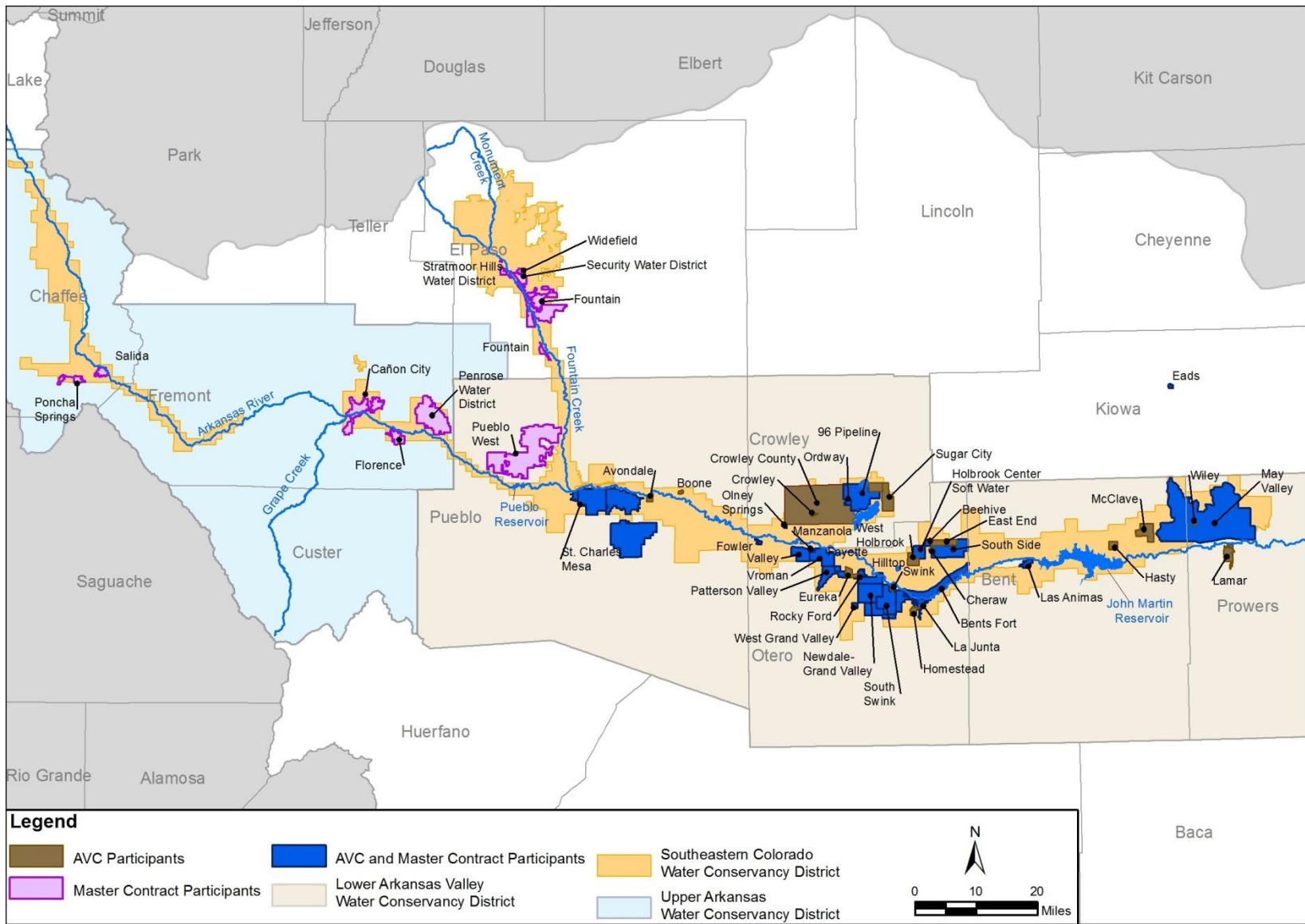
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## Appendix A - Map of Plan Participants



## **Appendix B – Lead Free in 2014 – A Discussion of the EPA’s Reduction of Lead in Drinking Water Act**

# Are You Ready For 'Lead Free' 2014?

By [Kevin Westerling](#)  
[@KevinOnWater](#)



The clock is ticking, counting down to the new “lead free” mandate, effective Jan. 4, 2014, which will be considerably stricter than the current federal requirement. Under the *Reduction of Lead in Drinking Water Act*, signed Jan. 4, 2011, “lead free” will be redefined as “not more than a weighted average of 0.25% lead when used with respect to the wetted surfaces of pipes, pipe fittings, plumbing fittings, and fixtures.”

## What “Lead Free” Really Means

Although “lead free” still doesn’t mean completely free of lead, 0.25% (0.2% with respect to solder and flux) is a far cry from the current definition of 8.0%. Semantics aside, the repercussions of the altered definition are significant. Come next year, it will be illegal to sell or install products that do not adhere to the new requirement.

Wetted parts include meters, expansion tanks, backflow preventers, flexible connectors, strainers, and assorted gauges, fittings, valves, etc. — any product used to convey water anticipated for human consumption. Wetted components for nonpotable services such as manufacturing, industrial processing, outdoor watering, or toilets are therefore exempt. But in the case of the former, there is much work to be done.

The good news is that the rule does not require existing infrastructure to be replaced. However, if a noncompliant component is taken out of service for any reason, such as repair or testing, it *may* need to be replaced. According to the [EPA's "Frequently Asked Questions"](#) on the topic, "Any part used in the repair of the meter that is a pipe, pipe fitting, plumbing fitting, or fixture must meet the new definition of lead free, but the meter being repaired is not independently subject to the [*Reduction of Lead in Drinking Water Act*] requirements...because it is not being used or installed for the first time in that location."

## Certifying Compliance

As the developer of the highly recognized and long-standing NSF/ANSI Standard 61 certification that heretofore verified “lead free,” NSF International, along with the American National Standards Institute (ANSI), has responded to the updated definition with updates of its own. The result is [NSF/ANSI 372](#), which will go into effect in October 2013 as certification for the 2014 lead-content requirements, designated here:

Some states, namely California, Vermont, and Maryland, are ahead of the curve on compliance; in fact, it was the EPA that followed their lead. California and Vermont adopted the 0.25% standard in 2010, as did Maryland in 2012. Louisiana jumped on board with legislation that takes effect Jan. 1, 2013, beating the EPA to the punch by a year. In response, NSF/ANSI 61, Annex G was developed to verify compliance in these states.

Both NSF/ANSI 372 and NSF/ANSI 61-G are acceptable certifications for the new rule, though the latter is more expensive to procure (a cost passed on to utilities) because it evaluates lead leaching as well as content.

## Enforcement

Though implemented by the U.S. Environmental Protection Agency (EPA) as an amendment to the [Safe Drinking Water Act \(SDWA\)](#), the “lead free” mandate will be enforced by individual U.S. states and territories — or more likely the cities, towns, and municipalities within those states, with health and plumbing codes used to drive enforcement.

If misery loves company, U.S. utilities can take heart that their neighbors to the north will also be under the gun. According to NSF, Canada is including the same wording as the U.S. legislation in its standards and codes, with the same effective date.

## How To Prepare For 2014

As we approach the January deadline, here’s a recommended “to-do” list:

- *Avoid getting stuck with useless inventory.* Have a plan in place to reduce stock of noncompliant products.
- *Ensure your products are reliable.* The move away from standard alloys represents a paradigm shift in manufacturing — one that can yield results equal to or better than traditional brass or bronze, but suppliers must nonetheless prove their products’ dependability.
- *Protect yourself.* Noncompliance can be expensive; be diligent in safeguarding against it.
- *Learn how to identify the new “lead free.”* Products may say “lead free,” but bear in mind that the definition is a moving target that renders prior definitions and certifying marks obsolete.

One thing to be wary of is the sliding-scale definition of “lead free.” If it was changed once, it can change again. The hypothetical municipality that invested heavily in “low lead” meters with a 5.0% weighted average of lead would likely have a major case of buyer’s remorse today. Because meters have traditionally incorporated (lead-leaching) bronze components, these products draw specific scrutiny with the tightening limits on lead. For municipalities that remain concerned about lead content in their water, or the uncertain nature of future regulations, “zero lead” provides an alternative.



“Utilities have a range of ‘lead free’ or zero-lead products to choose from,” Bridget Berardinelli, a product manager for the utility infrastructure company Sensus, told me. “It’s critical that they consider all of the options when selecting new meters.”

Berardinelli noted that composite meters, blending plastic and fiberglass, are becoming a popular choice due to their proven strength ([see video demonstration](#)) and steadier price, since they aren’t subject to fluctuations in the cost of metal. Furthermore, as the name implies (which shouldn’t be taken for granted), composite meters actually contain zero lead, as opposed to “low lead” or even “no lead” bronze meters. In the bordering-on-ridiculous series of lead-content classifications, “low lead” can mean anything less than 8.0%, while “no lead,” though used within the industry, is not defined by any standard.

There are, of course, a number of quality products and suppliers in the market that can get you compliant. So long as you [do your research](#) and put a proper plan in place, you can enter 2014 without fear or dread — “dread free,” if you will. (Or is it “no dread,” or “zero dread” ...?).

<http://www.wateronline.com/doc/are-you-ready-for-lead-free-0001>

**Appendix C – Distribution Pipe Material and Size for the MC Plan  
Participants**

## Appendix C

### Summary of Distribution Pipe Sizes and Materials MC Plan Participants Regional Water Conservation Plan Supplement Southeastern Colorado Water Conservancy District

		PVC									
		2-inch	4-inch	6-inch	8-inch	10-inch	12-inch	14-inch	16-inch	18-inch	24-inch
<b>Canon City</b>		840	27,681	43,616	42,300	2,172	16,929	3,408	6,691	31,005	13,745
<b>Florence</b>		-	4,100	41,400	48,000	34,300	75,800	30,000	53,400	30,000	
<b>Fountain</b>		4,558	16,318	81,915	301,055	18,600	137,323		114	65	146
Penrose	not available	specific data not available - majority of distribution system is PVC (~94%)									
<b>Poncha Springs</b>				50,025	8,000	6,500					
<b>Pueblo West</b>				2,037	28,202	1,929	25,201			117	49,117
<b>Salida</b>					562	5,972					
Security	not available										
<b>Stratmoor Hills</b>			1,400	15,900							
<b>Widefield</b>				354	302	144	564		4,462		16,118
	Totals	5,398	49,499	235,247	428,421	69,617	255,817	33,408	64,667	61,187	79,126
											1,282,387
										% of all pipe	26.0%

## Appendix C

### Summary of Distribution Pipe Sizes and Materials MC Plan Participants Regional Water Conservation Plan Supplement Southeastern Colorado Water Conservancy District

		<b>Cast Iron</b>										
		1-inch	2-inch	3-inch	4-inch	6-inch	8-inch	10-inch	12-inch	14-inch	16-inch	18-inch
<b>Canon City</b>				1,700	69,203	109,040	105,747	5,430	42,322	8,520	12,428	3,065
<b>Florence</b>					3,600	1,000	7,200	2,300	600			
<b>Fountain</b>					2,620	19,398	14,709	1,140	1,406			
Penrose	not available											
<b>Poncha Springs</b>												
<b>Pueblo West</b>												
<b>Salida</b>		2,033			64,117	23,789	21,717	13,580	33,422		2,352	
Security	not available											
<b>Stratmoor Hills</b>					2,900	60,475	9,575	1,050				
<b>Widefield</b>												
	Totals	2,033	-	1,700	142,440	213,702	158,948	23,500	77,750	8,520	14,780	3,065
												646,438
											% of all pipe	13.1%

## Appendix C

### Summary of Distribution Pipe Sizes and Materials MC Plan Participants Regional Water Conservation Plan Supplement Southeastern Colorado Water Conservancy District

		Ductile Iron												
		2-inch	4-inch	6-inch	8-inch	10-inch	12-inch	14-inch	16-inch	18-inch	20-inch	24-inch	30-inch	36-inch
<b>Canon City</b>														5,998
<b>Florence</b>		7,000										20,500		
<b>Fountain</b>				60	339		2,632		1,684					
Penrose	not available													
<b>Poncha Springs</b>														
<b>Pueblo West</b>					106		4				1,442			134
<b>Salida</b>			1,136	758	24,457	2,597	14,818		14,115					
Security	not available													
<b>Stratmoor Hills</b>				3,900	1,175	1,250	3,475							
<b>Widefield</b>			588	37,820	178,797	5,122	48,726	58	2,246	1,480	3,758	-	1,428	
	Totals	7,000	1,724	42,538	204,874	8,969	69,655	58	18,045	1,480	3,758	21,942	1,428	6,132
														387,603
													% of all pipe	7.9%

## Appendix C

### Summary of Distribution Pipe Sizes and Materials MC Plan Participants Regional Water Conservation Plan Supplement Southeastern Colorado Water Conservancy District

		AC											
		2-inch	4-inch	6-inch	8-inch	10-inch	12-inch	14-inch	16-inch	18-inch	20-inch	24-inch	
<b>Canon City</b>		1,260	41,522	65,424	63,450	3,258	25,393	5,112					
<b>Florence</b>													
<b>Fountain</b>				7,738	17,770	1,056	12,875						
Penrose	not available												
<b>Poncha Springs</b>													
<b>Pueblo West</b>		915	1,579	1,317,609	667,809	40,669	25,096	48	867	3,481	18		
<b>Salida</b>													
Security	not available												
<b>Stratmoor Hills</b>				6,025									
<b>Widefield</b>			10,060	113,813	87,213	18,246	19,661						
	Totals	2,175	53,161	1,510,609	836,242	63,229	83,025	5,160	867	3,481	18	-	
												2,557,967	
												% of all pipe	51.9%

## Appendix C

### Summary of Distribution Pipe Sizes and Materials MC Plan Participants Regional Water Conservation Plan Supplement Southeastern Colorado Water Conservancy District

		Galvanized/Copper					Steel				RCP
		0.75-inch	1-inch	1.25-inch	1.5-inch	2-inch	12-inch	16-inch	20-inch	42-inch	30-inch
<b>Canon City</b>		500	900	600	3,000	2,100			31,005	1,820	1,544
<b>Florence</b>											
<b>Fountain</b>							1,819				
Penrose	not available										
<b>Poncha Springs</b>											
<b>Pueblo West</b>											
<b>Salida</b>				394			831	10,010			
Security	not available										
<b>Stratmoor Hills</b>											
<b>Widefield</b>											
	Totals	500	900	994	3,000	2,100	2,650	10,010	31,005	1,820	1,544
						7,494				45,485	1,544
					% of all pipe	0.2%			% of all pipe	0.9%	0.0%

## Appendix C

### Summary of Distribution Pipe Sizes and Materials MC Plan Participants Regional Water Conservation Plan Supplement Southeastern Colorado Water Conservancy District

		HDPE				Totals	
		6-inch	8-inch	12-inch	30-inch	Feet	Miles
<b>Canon City</b>						798,728	151.27
<b>Florence</b>						359,200	68.03
<b>Fountain</b>		50	271	1,292		646,953	122.53
Penrose	not available					-	-
<b>Poncha Springs</b>						64,525	12.22
<b>Pueblo West</b>						2,166,380	410.30
<b>Salida</b>						236,660	44.82
Security	not available					-	95.00
<b>Stratmoor Hills</b>						107,125	20.29
<b>Widefield</b>					172	551,132	104.38
	Totals	50	271	1,292	172	4,930,703	1,028.85
					1,785	4,930,703	
				% of all pipe	0.0%		



## **Appendix D – Treatment System Summary for the MC Plan Participants**

## Appendix D - Water Sources, Water Treatment and Master Meter Information

	Water Source(s)	Water Treatment	Master Meters	Master Metering Issues
Cañon City	Direct diversion from the Arkansas River	Pumped to raw water settling pond then uphill to water treatment which consists of coagulation, flocculation, disinfection and filtration. Filter backwash pumped to recovery pond then settling pond.	Influent to treatment plant has 36-inch line with 20-inch flow meter; effluent lines from the East and West Filter Rooms have 2 older propeller meters before tank storage. After the storage tanks there is a 42-inch transmission main with a 36-inch magnetic flow meter that measures all water sent to the Distribution System.	Mag meter at diversion point before settling pond is calibrated regularly. Venturi flow tubes are also calibrated. Note that water for the water treatment plant (WTP) is taken from an unmetered tap from the storage tank. The WTP use includes filter backwash and chlorine injection that are returned to the system. WTP also has unmetered uses in bathrooms and lab.
Florence	Direct diversion from Arkansas River through Union Ditch and Minnequa Canal, Adobe/Mineral Creek, and Newlin Creek	Diverted water is pumped to raw water settling ponds then pumped to the City's water treatment (new in 2005) which uses flocculation and filtration prior to chlorination. Filter backwash is pumped to recovery pond then settling pond for recycling.	Master meters/flumes at diversions used to track influent to treatment plant (although settling ponds have been known to leak); effluent from treatment plant metered.	Mag meter at diversion point before settling pond is calibrated regularly. Master metering at treatment plant not consistently calibrated.
Fountain	Majority of water for the City is from Fountain Valley Authority (FVA) (which is Fry-Ark Water); with additional sources including the shared Venetucci wells <sup>1</sup> and the City's other four wells.	Water from FVA is treated prior to delivery to Fountain such that Fountain only chlorinates prior to distribution. Venetucci Treatment facility effluent and the City wells have individual chlorination prior to delivery.	Master metering of FVA deliveries at Goldfield Site conducted and reported by FVA; Venetucci wells metered at Bandley Metering Site and Booster Station; City Wells individually metered. Goldfield Facility metering may miss low flows and reverse flows through the interconnect.	All master meters tested and calibrated annually.  Note that Fountain operates above ground storage to support fire fighting and maintain system pressures. The storage also facilitates interconnects with Security and Widefield <sup>2</sup> . There is no metering on outflow from storage tanks.
Penrose	Surface water diverted from Brush Hollow Creek via the Brush Hollow Supply Ditch.	Water is delivered to lined sedimentation ponds, passing sequentially through the ponds in series, then to the water treatment plant built in 1992 for flocculation, clarification and filtration. Filter backwash and clarifier flush water is returned to a lined sedimentation pond for recycle.	Penrose utilizes flow meters in the treatment plant to calculate flow through the system and into distribution. The water treatment plant effluent is collected in a 140,000 gallon clear well. Distribution consists of a metered pump from the clear well and a gravity flow system which is not currently metered.	Penrose calculates volume delivered into the distribution system by metering the combined inflow of the microfloc units, then subtracting the volume used for filter backwash and clarifier flushing. While the filter and clarifier rise rates are calculated to determine flow demand for backwashing and flushing, neither are metered. Therefore, some systematic error may exist within the water production data for Penrose.

<sup>1</sup> Will be phased out and replaced with Southern Delivery System water in 2016. Currently these wells are owned by the Pikes Peak Community Foundation and water from the wells is piped through the Security WSD piping to the Venetucci Treatment facility, then provided to Fountain.

<sup>2</sup> No interconnect in either 2012 or 2013.

## Appendix D - Water Sources, Water Treatment and Master Meter Information

Poncha Springs	Four alluvial wells are used to produce water for distribution after phosphate is added for water stabilization and chlorination.	The well treatment occurs at three treatment units. One well (#4) is only used for peak demand in the summer.	All four wells have master meters after treatment. These meters are read manually on a monthly basis in the past. Have transitioned to weekly in 2014.	Each master meter is calibrated once every 3 years.
Pueblo West	Pueblo West is a direct diverter from the Arkansas River currently using water drawn from Pueblo Reservoir, but will add Southern Delivery System supplies in the future.	Raw water is pumped to a sedimentation pond and then is treated through flocculation and filtration. Filter backwash water is used to irrigate the golf course or is recycled through the sedimentation pond.	Effluent from the water treatment plant is measured through 3 electromagnetic meters tracked with SCADA and verified manually.	The effluent production master meters are tested and calibrated once every three years.
Salida	The City is a direct diverter from the Arkansas River. The City also relies on groundwater production from a shallow groundwater gallery (which is chlorinated prior to distribution) and flow from Pasquales Springs.	Water from the Arkansas River is passed through Parshall Flume into a pre-sedimentation basin, from which flow is directed into the water treatment plant. Raw water is treated through flocculation and filtration. Filter backwash water is discharged to evaporation ponds.	Effluent from the water treatment plant is measured using a Cipoletti Weir and a totalizing flow meter which is calibrated once every 3 years. Each is read manually on a daily basis.  Flow from the two groundwater sources are metered and read manually on a daily basis.	The effluent and groundwater production master meters are tested and calibrated once every three years.
Security	24 groundwater production wells plus Fry-Ark Water treated and supplied by Fountain Valley Water Authority (FVA)	20 wells are pumped directly to distribution after chlorination; 4 wells are pumped to the Venetucci treatment then to distribution in Fountain (outside of the Security service area); Fry-Ark water is pumped to distribution after chlorination.	Each well has a master meter; the Venetucci water treatment system has a totalizing meter; and FVA has a master meter that is maintain by FVA.	Well master meters are calibrated every 3 years; FVA master meter has an unknown calibration routine; the Venetucci water treatment plant went online in Feb 2014 <sup>3</sup> .
Stratmoor Hills	Fry-Ark water provided by Fountain Valley Authority (FVA); plus two wells which have chlorination prior to distribution.		FVA and two production well master meters are calibrated once every three years.	
Widefield	Fry-Ark water provided by Fountain Valley Authority (FVA) plus 17 wells operated by WWSD. No augmentation of well water is required because of return flow credits associated with Fry Ark water use and lawn irrigation.	All produced water is pumped directly to distribution except for 4 wells which have treatment via air stripping prior to distribution. All well water is chlorinated prior to distribution. FVA water is treated prior to deliver to WWSD; however, it is chlorinated prior to distribution.	Each well has a master meter that is read via SCADA daily. Calibration of these meters occurs on a regular basis. FVA water delivery tracked by FVA master meter.	Mag meters on all production wells.

<sup>3</sup> The four wells that deliver water to the Venetucci Treatment Facility are owned by the Pikes Peak Community Foundation and operated by the City of Fountain's Water Department. Security collects flow data from the four mag meters located in the pump houses of the wells and provides daily reporting to the State Engineer's office. There is a mag meter on the effluent of the Venetucci Treatment Facility and in Fountain at the Bandley vault. Consistent errors in the well meters were identified and corrected in early 2014. Prior to that, the totalizers in the pump houses over read volumes of water delivered.

## Appendix E –Water Rates for the Plan Participants

**Appendix E**  
**Water Rates for the Plan Participants**  
**Regional Water Conservation Plan**  
**Southeastern Colorado Water Conservancy District**

AVC Participants	City/Town	PDF/URL	All Rates are Per 1000 Gallons			First Tier		Second Tier		Third Tier		Source
			Base Fee	Water Provided with Base Fee (gallons)	Rate	Upper Limit (gallons)	Rate	Upper Limit (gallons)	Rate	Upper Limit (gallons)		
											Rate	
Hasty Water Company	Bent											
Las Animas, City of	Bent	PDF									2015 SECWCD Reporting	
McClave Water Assoc.	Bent		\$ 38.00	2,000	\$ 3.00						2015 SECWCD Reporting	
96 Pipeline	Crowley		\$ 21.25	5,000	\$ 2.25						2015 SECWCD Reporting	
Crowley County Water Authority	Crowley		\$ 24.00	4,000	\$ 2.30						2014 Phone Survey	
Crowley, Town of	Crowley		\$ 25.00	2,000	\$ 2.15						2014 Phone Survey	
Olney Springs, Town of	Crowley		\$ 33.00	4,000	\$ 1.50	8,000	\$ 3.00				2014 Phone Survey	
Ordway, Town of	Crowley		\$ 29.10	7,000	\$ 2.20						2015 SECWCD Reporting	
Sugar City, Town of	Crowley		\$ 16.00	7,500	\$ 1.00						2014 Phone Survey	
Eads, Town of	Kiowa	PDF									2015 SECWCD Reporting	
Beehive Water Assn	Otero		\$ 20.00		\$ 2.50						2015 SECWCD Reporting	
Bents Fort Water Co.	Otero		\$ 29.00	3,000	\$ 4.50	10,000	\$ 5.50				2015 SECWCD Reporting	
Cheraw, Town of	Otero											
East End Water Assn.	Otero											
Eureka Water Co.	Otero		\$ 25.00		\$ 4.00						2014 Phone Survey	
Fayette Water Assn.	Otero		\$ 35.00	3,000	\$ 1.50						2014 Phone Survey	
Fowler, Town of (potable only)	Otero		\$ 11.50	1,000	\$ 2.00	10,000	\$ 3.00				2014 Phone Survey	
Hancock Inc.	Otero											
Hilltop Water Co.	Otero		\$ 25.00		\$ 3.00	5,000	\$ 3.50	10,000	\$ 4.00		2015 SECWCD Reporting	
Holbrook Center Soft Water	Otero		\$ 40.00		\$ 2.00						2015 SECWCD Reporting	
Homestead Improvement Assn.	Otero		\$ 25.00		\$ 3.75	15,000	\$ 4.00				2015 SECWCD Reporting	
La Junta, City of	Otero	PDF									2015 SECWCD Reporting	
Manzanola, Town of	Otero	PDF									2015 SECWCD Reporting	
Newdale-Grand Valley Water Co.	Otero		\$ 25.00		\$ 2.75	10,000	\$ 3.00				2015 SECWCD Reporting	
North Holbrook Water	Otero		\$ 30.00		\$ 2.50	50,000	\$ 2.50				2014 Phone Survey	
Patterson Valley	Otero		\$ 35.00		\$ 2.50						2015 SECWCD Reporting	
Rocky Ford, City of	Otero		\$ 31.50	1,000	\$ 2.16	4,000	\$ 2.26	10,000	\$ 2.35		2015 SECWCD Reporting	
South Side Water Assoc. (LaJunta)	Otero		\$ 15.00		\$ 2.50						2015 SECWCD Reporting	
South Swink Water Co.	Otero		\$ 23.00		\$ 3.50						2015 SECWCD Reporting	
Swink, Town of	Otero											
Valley Water Co.	Otero											
Vroman	Otero											
West Grand Valley Water Inc.	Otero		\$ 30.00		\$ 3.00						2015 SECWCD Reporting	
West Holbrook Water	Otero											
Lamar, City of	Prowers											
May Valley Water Assoc.	Prowers	PDF									2015 SECWCD Reporting	
Wiley, Town of	Prowers		\$ 30.00	3,000	\$ 5.00	7,000	\$ 6.00				2015 SECWCD Reporting	
Boone, Town of	Pueblo											
St. Charles Mesa Water District	Pueblo	PDF									2015 web search	
<b>Master Contract Participants</b>	<b>averages</b>		\$ 26.80	3,541.7	\$ 2.68	13,222	\$ 3.64					
Poncha Springs	Chaffee											
Salida	Chaffee	PDF									2015 web search	
Fountain	El Paso	URL									2015 web search	
Security	El Paso	URL									2015 web search	
Stratmoor Hills	El Paso	URL									2015 web search	
Widefield	El Paso	URL									2015 web search	
Canon City	Fremont				\$ 1.34	12,000	\$ 2.58	21,000	\$ 2.73		2014 audit	
Florence	Fremont	URL									2015 web search	
Penrose	Fremont											
Pueblo West	Pueblo	PDF									2015 web search	

## Appendix F – System Wide Audit Scope and M-36 Methodology

### System Wide Water Audits - Overview of Work Performed

The System Wide Water Audits were conducted using a modification of the methodology contained in Manual-36 – Water Audits and Loss Control Programs – prepared by the American Water Works Association (AWWA). This manual of water supply practices defines a water audit program that “is an effective tool available to utilities to quantify consumption and losses that occur in the distribution system and the management of these processes.” The manual provides step-by-step instructions on how to compile the information and calculate performance factors for water distributors.

The scope of the AWWA’s methodology is admittedly grander than what is needed for many of the AVC Plan participants, and some of the MC Plan participants; however, the themes and the concepts remain the same regardless of the size or sophistication of the distributor, and these themes and concepts are clearly applicable to all water providing operations. Therefore, slight modifications to the M-36 methodology were incorporated to address the needs of the project without creating undue hardship on the Plan participants.

#### Objectives

The overall objective of the System Wide Water Audits was to develop an understanding of the challenges faced and successes realized by the Plan participants in managing ongoing water loss - including both real and apparent losses - from their collective water supply systems. Key components of the project were therefore performed to:

- Inventory existing infrastructure including number and sizes of master meters, customer meters, treatment works and distribution piping (including materials);
- Estimate and characterize non-revenue water within each local water supply system;
- Estimate and characterize authorized, unbilled water uses;
- Estimate apparent and real water loss;
- Compare estimated real water losses to empirical estimates of background leakage expected for each water provider based on their individual water distribution system characteristics; and
- Identify best management practices (BMPs) which would improve local water use efficiency by addressing current and future water loss.

In addition, these data collected through the audit process were used to support evaluations of potential performance guidelines and assessments of costs related to planning for and implementing regional water efficiency programs.

#### Preliminary Audit Tasks/Data Collection Request

Prior to the audits being performed, communications were made with each Plan participant to inform them of the nature and intent of the water audit; and to request that specific data be made available (in any format that was easy) for the audit team on their arrival. The transmittal included:

- A request for the definition of the system boundaries and area;
- Setting a specific time period over which data will be collected and reported; and
- Setting the units of measure.

Based on this request, the Plan participants were asked to assemble the data and have it prepared to provide to the audit team upon their arrival. Data was typically made available in hard copy format – based on files maintained in either electronic and/or handwritten formats.

The specific data request included:

- List of all the meters serviced by size (preferably in table format).
- When each meter, by size category, was last tested/replaced (including master meters).
- For small systems: A map showing locations of well head(s) and other source water, master meter and service area.
- For larger systems: A map showing locations of water treatment plant(s), master meter(s) and service area.
- Estimates of master meter accuracy (and what regular adjustments are used).
- Monthly master meter data for two years, with date read (i.e., monthly listing of water produced and water placed into distribution).
- For smaller systems: Monthly water delivery data for all customers for two years (including authorized unbilled, billed, and date billed).
- For larger systems: Monthly water delivery data for all customers, by customer category, for two years (including authorized unbilled and billed, and date billed).
- Listing of metered, unbilled accounts, if they exist (for example City Parks, water treatment use, and so on).
- List of other authorized unmetered water use for past two years (examples include flushing flows, firefighting, filter backwash, leaks and line breaks).
- Any other useful data.

Noteworthy is that the majority of the Plan participants were able to compile the requested data; however, as expected, the form and the completeness of the data was not consistent from organization to organization. In addition, some of the data collected was anecdotal in nature such that the results of the analyses performed must be tempered based on the known limitations of the available data.

Notwithstanding the limitations in the data and the data collection process, the System Wide Water Audits succeeded in determining the nature of water loss management for nearly all of the Plan participants and the characteristics of data collection and management related to overall water production and delivery tracking to the extent needed to support regional water conservation planning and the District’s permitting requirements. It is the desire of the District to help all the Plan participants, including those that were not able to comply with the audit data reporting requirements, to develop best management practices that will support rigorous characterization and tracking of non-revenue water and water loss in the future using the M-36 methodology.



## Conducting the Audit

The in-the-field audit team performed the audits over a three month period from April through June 2014. During this time, the 10 MC Plan participants were visited individually in face-to-face meetings with staff, operators, and/or board members. The meetings were used to update the MC Plan participants regarding the ongoing development of the RWC Plan, and to conduct the business of the audit. In particular, the following tasks were completed in conducting the audit:

- Water production and distribution information were collected (including a map of the system and production records);
- Water billing information were collected; and
- Other key water distribution system information and policies information were collected (e.g., system wide pressure, length of pipelines, piping material, number of customer tie-ins, history of recent leaks, leak detection and repair policies, meter testing and replacement policies, quantity and nature of unbilled and unmetered uses).

These data were used by the audit team to determine the key characteristics of each of the ten MC Plan participant systems; to estimate non-revenue water; and characterize real and apparent system losses for each operating system. These data were also crucial in helping to identify ongoing best management practices that are in use within current operational programs.

## Developing the Database and Calculations

The audit team organized the data collected from each of the MC Plan participants into an Excel database previously populated with data from the AVC Plan participants. The data base included each of the key attributes of the data collected including:

- Meter sizes and age (including whether or not automated meter reading devices (AMR) have been installed);
- Distribution system pipe diameter, length, and materials;
- Water treatment plant/system characteristics; and
- Comparison of produced water and/or water placed into distribution to water sold (including accounting for unbilled, unmetered and unbilled, metered water uses).

The calculations for non-revenue water were developed based on these data using methodologies discussed in the M-36 Manual including:

- Total water supplied per period
- Total billed authorized consumption per period
- Calculated non-revenue water per period<sup>48</sup>

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<sup>48</sup> Non-revenue water is a term that has been developed by the American Water Works Association (AWWA) to describe the water that a water company or utility produces by does not sell. The components of non-revenue water include real losses (due to leaks, etc.) and apparent losses (due to inaccurate meters, etc.). Non-revenue water also includes unbilled authorized uses such as hydrant flushing, filter backwash, etc. This report will use the term non-revenue water in place of the less accurate term unaccounted for water.

- Estimated authorized unbilled consumption per period
- Estimated total apparent water losses per period
- Estimated total real water losses per period

In addition, characteristic parameters related to unavoidable real water loss and/or undetectable background losses were calculated and compared to estimated real water loss to evaluate the nature and accuracy of the audit findings.

### **Develop Project Summary and Data Compilations**

The audit team prepared the supplement to the RWCP to summarize the results of the audit for each Plan participant, which includes a data compilation and the results of the calculations for each organization that participated in the system wide audit. This Plan and its attachments will be used to inform the RWCP such that information regarding the scope of and need for water loss control programs can be ascertained and cost benefit calculations can be developed.

In addition, a data compilation (AKA, white paper) was produced for each of the 10 MC Plan participants based on the information collected during the audit. The individual white papers include a summary of the data collected by each Plan participant, as well as a list of recommendations that each participating organization may wish to consider to manage and reduce current system wide water loss – including both real and apparent losses. These white papers are included under separate cover to this Plan.

## Appendix G – Water Audit Data and Summary of Results

**Appendix G**  
**Water Audit Data from All Plan Participants**  
**Southeastern Colorado Water Conservancy District**  
**Regional Water Conservation Plan**

Name	in thousands of gallons		Number of Connections	Connections per Feet	Average System Pressure	Annualized Water Production	Annualized Water Sold	Annualized Non-Revenue Water	% Non-Revenue	Annualized Authorized Unbilled	% Authorized Unbilled
	Number	Miles of Connections									
Florence, City of	37	68.03	1,769	26.00	90.00	638,469.00	382,686.00	255,783.00	40%	41,072.62	6.4%
<b>East End Water Assn.</b>	9	5.00	30	6.00	75.00	12,556.49	7,755.95	4,800.54	38%	-	0.0%
Lamar, City of	18	45.00	3,434	76.31	65.00	775,760.00	637,583.21	138,176.79	18%	509.13	0.1%
Salida, City of	41	44.82	2,692	60.06	55.00	465,928.47	390,672.76	75,255.71	16%	1,223.00	0.3%
Rocky Ford, City of	27	45.00	1,655	36.78	65.00	307,651.78	191,994.50	115,657.28	38%	47,706.39	15.5%
Boone, Town of	3	1.99	153	76.94	65.00	24,772.96	10,776.13	13,996.83	57%	8,075.82	32.6%
Hilltop Water Co.	14	9.12	119	13.04	65.00	16,023.00	9,894.00	6,129.00	38%	446.64	2.8%
<b>La Junta, City of</b>	17	60.00	3,213	53.55	65.00	732,864.00	650,851.00	82,013.00	11%	955.48	0.1%
Eureka Water Co.	10	8.65	134	15.49	65.00	15,772.45	10,718.50	5,053.95	32%	133.41	0.8%
Stratmoor Hills	43	20.29	2,064	101.72	75.00	216,161.00	165,985.00	50,176.00	23%	2,502.84	1.2%
Town of Crowley	6	2.84	110	38.72	75.00	11,470.30	7,813.90	3,656.40	34%	478.58	4.2%
Manzanola, Town of	20	4.86	187	38.45	65.00	27,074.60	19,877.50	7,197.10	27%	2,737.01	10.1%
Beehive Water Assn	1	15.50	88	5.68	75.00	2,518.51	1,712.43	806.08	32%	-	0.0%
<b>Eads, Town of</b>	8	10.34	418	40.43	75.00	69,420.80	59,560.20	9,860.60	14%	25.43	0.0%
<b>Las Animas, City of</b>	19	25.00	1,167	46.68	65.00	176,447.00	155,591.45	20,855.55	12%	99.94	0.1%
St. Charles Mesa Water District	30	192.00	4,063	21.16	65.00	777,569.10	679,445.00	98,124.10	13%	-	0.0%
South Swink Water Co.	29	33.57	220	6.55	65.00	27,767.00	23,984.00	3,783.00	14%	685.00	2.5%
Vroman	33	12.38	59	4.76	65.00	10,147.30	6,070.84	4,076.46	40%	1,505.40	14.8%
Wiley, Town of	35	9.75	225	23.08	65.00	18,529.73	14,132.15	4,397.58	24%	854.81	4.6%
<b>Fowler, Town of (potable only)</b>	12	12.00	700	58.33	65.00	39,043.70	30,299.50	8,744.20	22%	118.06	0.3%
96 Pipeline	4	9.00	66	7.33	75.00	26,525.00	23,538.00	2,987.00	11%	-	0.0%
Newdale-Grand Valley Water Co.	23	19.88	193	9.71	65.00	26,739.00	21,736.00	5,003.00	19%	482.46	1.8%
Security Water District	42	115.00	7,304	63.51	75.00	943,795.80	835,139.24	108,656.56	12%	10,524.01	1.1%
Valley Water Co.	32	12.75	115	9.02	65.00	14,831.80	12,084.48	2,747.32	19%	134.53	0.9%
Bents Fort Water Co.	2	41.00	331	8.07	65.00	25,109.00	18,352.00	6,757.00	27%	286.17	1.1%
Olney Springs, Town of	25	4.62	242	52.34	45.00	24,183.00	18,188.12	5,994.88	25%	4,501.05	18.6%
Holbrook Center Soft Water	15	3.35	27	8.06	55.00	6,067.46	5,510.88	556.58	9%	-	0.0%
Fountain, City of	38	122.53	7,582	61.88	75.00	853,663.00	774,786.11	78,876.89	9%	2,484.81	0.3%
Widefield WSD	44	104.38	6,858	65.70	80.00	761,265.81	681,448.39	77,896.63	10%	9,540.41	1.3%
Swink, Town of	31	3.65	288	78.91	65.00	13,613.80	11,948.25	1,665.55	12%	32.97	0.2%
Fayette Water Assn.	11	6.25	26	4.16	75.00	3,804.42	3,029.11	775.31	20%	27.00	0.7%
CCWA	5	115.00	362	3.15	75.00	210,150.80	192,026.30	18,124.50	9%	99.09	0.0%
Pueblo West WD	40	410.00	10,677	26.04	104.00	1,545,157.00	1,405,961.00	139,196.00	9%	1,223.00	0.1%
Canon City, City of	36	151.27	8,561	56.59	90.00	1,653,137.53	1,538,868.45	114,269.08	7%	11,922.97	0.7%
West Grand Valley Water Inc.	34	10.10	36	3.56	65.00	4,544.00	3,671.00	873.00	19%	109.50	2.4%
<b>McClave Water Assoc.</b>	22	36.31	167	4.60	65.00	18,100.00	15,066.00	3,034.00	17%	269.30	1.5%
May Valley Water Assoc.	21	170.00	581	3.42	65.00	113,352.00	95,465.00	17,887.00	16%	4,530.63	4.0%
Hasty Water Company	13	11.00	119	10.82	55.00	10,427.00	9,422.00	1,005.00	10%	50.40	0.5%
Ordway	7	25.00	546	21.84	65.00	82,339.81	76,557.10	5,782.71	7%	1,563.28	1.9%
North Holbrook Water	24	6.00	24	4.00	45.00	2,554.28	2,380.09	174.19	7%	9.02	0.4%
Poncha Springs, Town of	39	12.22	315	25.78	75.00	33,456.99	29,968.76	3,488.22	10%	2,300.83	6.9%
Patterson Valley	26	12.75	40	3.14	65.00	5,502.20	5,244.69	257.51	5%	72.00	1.3%
Homestead Improvement Assn.	16	2.08	27	13.01	55.00	2,232.00	2,197.00	35.00	2%	0.04	0.0%
Total (thousands of gallons)						10,746,498.88	9,239,991.99	1,504,586.09	14.0%	159,293.04	1.5%
Total (acre-feet)						32,979.84	28,356.53	4,617.41		488.85	
							% Non-Revenue	14.0%			

**Appendix G**  
**Water Audit Data from All Plan Participants**  
**Southeastern Colorado Water Conservancy District**  
**Regional Water Conservation Plan**

Name	Annualized Apparent Losses (annual)	CARL	UARL	UBL	CARL/UBL	OP23	OP24 (gal/con/d ay)	OP24 (gal/mile/ day)	OP24/PSI	Connections/ Mile	ILI	Length of Record
Florence, City of	12,365.35	202,345.04	25,806.05	18,192.74	11.12	19.15	313.38	8,148.87	90.54	26.00	7.84	24
<b>East End Water Assn.</b>	249.65	4,550.89	-	591.05	7.70	22.80	415.61	2,493.64	33.25	6.00	-	7
Lamar, City of	19,881.65	117,786.01	23,782.94	15,310.14	7.69	15.86	93.97		1.45	76.31	4.95	20
Salida, City of	12.16	61.87	14.13	8,299.09	0.01	0.01	0.06		0.00	60.06	4.38	24
Rocky Ford, City of	6,172.05	61,778.84	14,454.28	8,880.56	6.96	10.22	102.27		1.57	36.78	4.27	24
Boone, Town of	365.18	5,555.83	-	834.97	6.65	6.54	99.49		1.53	76.94	-	8
Hilltop Water Co.	318.48	5,363.88	-	1,141.25	4.70	7.33	123.49	1,610.84	24.78	13.04	-	20
<b>La Junta, City of</b>	20,147.77	60,909.74	24,549.35	15,477.78	3.94	17.18	51.94		0.80	53.55	2.48	24
Eureka Water Co.	341.06	4,579.48	-	1,180.55	3.88	6.97	93.63	1,450.46	22.31	15.49	-	11
Stratmoor Hills	5,211.39	42,461.77	-	11,396.47	3.73	6.92	56.36		0.75	101.72	-	24
Town of Crowley	248.57	2,929.25	-	860.99	3.40	6.19	72.96		0.97	38.72	-	18
Manzanola, Town of	627.06	3,833.03	-	1,183.13	3.24	9.19	56.16		0.86	38.45	-	20
Beehive Water Assn	52.95	815.87	-	256.90	3.18	1.65	25.40	144.21	1.92	5.68	-	18
<b>Eads, Town of</b>	1,849.64	7,985.54	-	2,698.00	2.96	12.12	52.34		0.70	40.43	-	20
<b>Las Animas, City of</b>	4,819.62	15,935.99	-	5,828.35	2.73	11.31	37.41		0.58	46.68	-	8
St. Charles Mesa Water District	20,383.35	77,740.75	52,795.26	31,267.87	2.49	13.74	52.42	1,109.31	17.07	21.16	1.47	20
South Swink Water Co.	744.35	2,353.65	-	1,062.01	2.22	9.27	29.31	192.09	2.96	6.55	-	20
Vroman	196.21	2,374.85	-	1,072.29	2.21	9.11	110.28	525.38	8.08	4.76	-	20
Wiley, Town of	444.02	3,098.75	-	1,452.19	2.13	5.41	37.73	870.74	13.40	23.08	-	8
<b>Fowler, Town of (potable only)</b>	950.27	7,700.87	-	4,029.01	1.91	3.72	30.14		0.46	58.33	-	23
96 Pipeline	853.85	2,133.15	-	1,183.98	1.80	35.44	88.55	649.36	8.66	7.33	-	19
Newdale-Grand Valley Water Co.	678.52	3,842.02	-	2,178.64	1.76	9.63	54.54	529.41	8.14	9.71	-	21
Security Water District	25,861.16	72,271.39	64,064.34	43,778.80	1.65	9.70	27.11		0.36	63.51	1.13	24
Valley Water Co.	377.15	2,235.64	-	1,356.32	1.65	8.99	53.26	480.39	7.39	9.02	-	20
Bents Fort Water Co.	579.22	5,891.62	-	4,181.01	1.41	4.79	48.77	393.69	6.06	8.07	-	20
Olney Springs, Town of	572.29	921.54	-	731.70	1.26	6.48	10.43		0.23	52.34	-	19
Holbrook Center Soft Water	259.01	297.57	-	243.94	1.22	26.28	30.19	243.36	4.42	8.06	-	20
Fountain, City of	23,937.43	52,454.64	66,969.67	45,696.85	1.15	8.65	18.95		0.25	61.88	0.78	24
Widefield WSD	21,079.82	47,276.40	63,594.23	44,967.40	1.05	8.42	18.89		0.24	65.70	0.74	24
Swink, Town of	370.27	1,295.28	-	1,276.00	1.02	3.52	12.32		0.19	78.91	-	7
Fayette Water Assn.	94.75	653.56	-	648.95	1.01	9.98	68.87	286.49	3.82	4.16	-	16
CCWA	5,929.19	11,389.51	-	11,735.06	0.97	44.87	86.20	271.34	3.62	3.15	-	12
Pueblo West WD	43,428.08	94,544.92	156,508.09	118,109.21	0.80	11.14	24.26	631.77	6.07	26.04	0.60	24
Canon City, City of	47,438.18	54,907.93	93,036.93	69,182.88	0.79	15.18	17.57		0.20	56.59	0.59	24
West Grand Valley Water Inc.	114.67	648.83	-	818.14	0.79	8.73	49.38	176.00	2.71	3.56	-	21
<b>McClave Water Assoc.</b>	469.22	2,295.48	-	3,116.21	0.74	7.70	37.66	173.19	2.66	4.60	-	20
May Valley Water Assoc.	2,969.86	10,386.51	-	14,859.85	0.70	14.00	48.98	167.39	2.58	3.42	-	21
Hasty Water Company	291.21	663.39	-	982.42	0.68	6.70	15.27	165.23	3.00	10.82	-	20
Ordway	3,010.29	1,209.14	-	3,583.96	0.34	15.11	6.07	132.51	2.04	21.84	-	20
North Holbrook Water	73.36	91.81	-	301.31	0.30	8.37	10.48	41.92	0.93	4.00	-	20
Poncha Springs, Town of	926.99	260.40	-	2,589.27	0.10	8.06	2.26	58.38	0.78	25.78	-	24
Patterson Valley	161.35	24.16	-	1,007.47	0.02	11.05	1.65	5.19	0.08	3.14	-	20
Homestead Improvement Assn.	67.41	(32.44)	-	180.04	(0.18)	6.84	(3.29)	(42.82)	(0.78)	13.01	-	20
Total (thousands of gallons)	274,924.07	995,824.32										
Total (acre-feet)	843.71	3,056.08			Average CARL/UBL	0.44						

**Appendix G**  
**Water Audit Data from All Plan Participants**  
**Southeastern Colorado Water Conservancy District**  
**Regional Water Conservation Plan**

Definitions										
CARL	current annual real losses (thousands of gallons) - estimated by subtracting estimate of authorized, unbilled consumption and apparent losses from non-revenue water									
UARL	unavoidable annual real losses (thousands of gallons) - calculated from empirical equation for entities with 3,000 or more effective connections (i.e., connections plus a factor for length of water mains)									
	$UARL = 365 * ((5.41 * \text{length of mains(ft)}) + (0.15 * \text{number of service connections}) + (7.5 * \text{number of service connections} * \text{average length of service connections (ft)})) * \text{average system pressure (psi)} / 1000$									
UBL	unavoidable background leakage (thousands of gallons) - calculated from empirical equation									
	$UBL = 365 * ((0.20 * \text{length of mains (ft)}) + (0.008 * \text{number of service connections}) + (0.34 * \text{number of service connections} * \text{average length of service connection (ft)})) * (\text{average system pressure (psi)} / 70)^{1.5}$									
OP23	Operational function (gallons per connection) calculated as ratio of apparent losses per connection									
OP24	Operational function (gallons per connection) calculated as ratio of real losses per connection									
OP24	Operational function (gallons per mile of mains) calculated as ratio of real losses per miles of mains for those with service density less than 32/mile)									
ILI	Infrastructure Leakage Index = CARL/UARL									

**Appendix H – Regional Water Resources Management and  
Efficiency Plans**

**Upper Arkansas Water Conservancy District**

**Lower Arkansas River Water Conservancy District**

Final  
**Water Resources Management and Efficiency Plan**

**September 2015**



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**Upper Arkansas Water Conservancy District**



**Prepared by Sustainable Practices**

*Through generous grants provided by the US Bureau of Reclamation and the Colorado Water Conservation Board*

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### **Appendices**

**Appendix A – CRS 37-60-126**

**Appendix B – Record of Public Notice**

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# **Water Use and Water Resources Management Efficiency Plan**

## **Upper Arkansas Water Conservancy District**

### **Organizational Background and Summary**

The Upper Arkansas Water Conservancy District (hereafter “the District” or “the Upper District”) is a statutory organization founded in 1979 for the purpose of protecting and securing water in the upper Arkansas Valley. In performing this role, the Upper District administers replacement water programs for thousands of customers using infrastructure located in the upper reaches of the Arkansas River Valley above Pueblo, and various legal instruments and decrees. The Upper District also serves as a “watchdog” for the upper basin challenging legislation that may threaten the availability and use of the Upper Arkansas River water supply, and securing sufficient water rights to provide augmentation for residential, commercial, environmental and industrial use within the Upper District’s service boundaries.

One example of the Upper District’s role in protecting and supporting appropriate use of the Arkansas River occurred in 1995, in the aftermath of the *Kansas v. Colorado* dispute. The District led the efforts of water users to join the State Water Engineer in amending the Rules and Regulations for water administration in the Arkansas River. In that landmark case, irrigation wells in the lower Arkansas Basin were found to be pumping out of priority and depleting Stateline flows requiring the State of Colorado to adopt new administrative rules. Pursuant to the adoption of the “Amended Rules and Regulations Governing the Diversion and Use of Tributary Ground Water in the Arkansas River Basin<sup>1</sup>” many wells in the region were required to cease diversions. The Upper District stepped in to offer an augmentation water plan while other areas outside the Upper District lost legal use of their well water. When the Rules and Regulations were amended by the Water Court, the District was instrumental in protecting property owners, businesses, and the environment by providing a means to replace stream depletions to meet State well pumping regulations.

### **Nature of Operations in the Upper District**

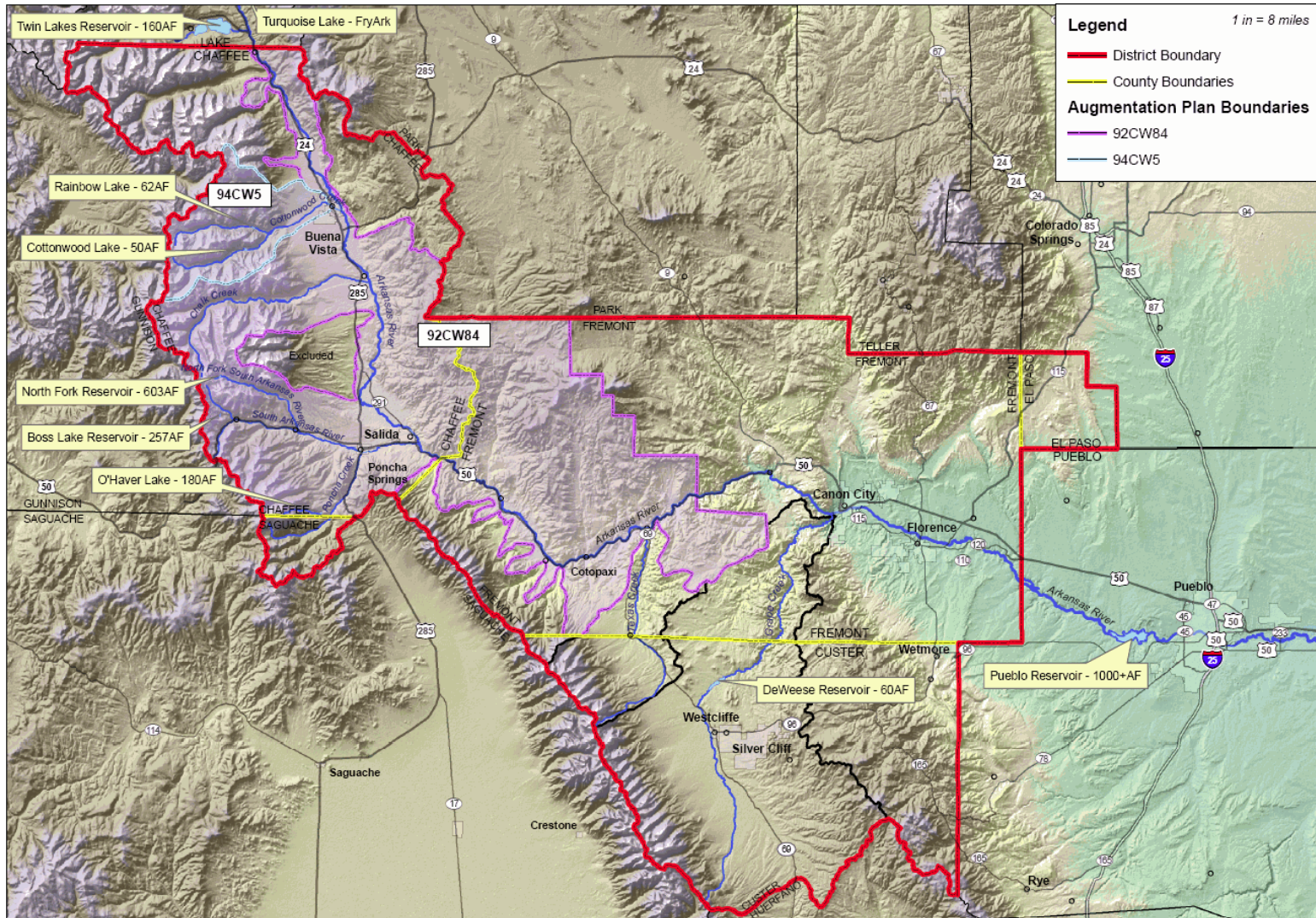
Water conservation planning related to the operations and functions of the Upper District is somewhat unique in Colorado, since the Upper District does not provide retail water sales to its customers, nor does it maintain the infrastructure typical for a municipal water utility (e.g., the District has no water distribution system or customer meters). Instead, the Upper District provides for and administers augmentation and Rule 14<sup>2</sup> replacement water programs for residential, commercial, environmental and industrial customers within the District’s boundaries (see Figure 1). To perform its services, the Upper

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<sup>1</sup> The Amended Rules and Regulations referenced herein were developed and executed on September 27, 1995 to amend the February 1973 rules and regulations that govern the use, control and protection of the surface and ground water rights located in the Arkansas River and its tributaries.

<sup>2</sup> Out-of-priority stream depletions to senior surface water rights caused by pumping wells which were permitted prior to 1986 which do not require augmentation plans are replaced under Rule 14 based on the Upper District’s Replacement Plan approved each year by the State Engineer.

Figure 1 – Upper Arkansas River Water Conservancy District Boundaries



District utilizes its augmentation and replacement programs based on anticipated stream depletions for each of its customers, executing the appropriate releases and accretions in accordance with the expected timing and location of the depletions. To properly perform the replacement water program, the Upper District must track information related to each structure that it supports on a daily basis such that all senior surface rights may be protected. Specific data that is tracked for each structure covered by the Upper District’s replacement water programs includes:

- Structure location and expected depletion in time, amount, and location;
- Consumed water (i.e., replacement requirement); and
- Transit losses related to replacement water releases<sup>3</sup>.

Therefore, the Upper District’s business focuses on the following:

- Performing the most efficient management of its replacement water sources<sup>4</sup> for the configuration of customer depletions in each month;
- Tracking the releases to ensure that senior surface rights are protected; and
- Reporting the releases to the State Engineers Office (SEO).

As previously stated, the Upper District does not utilize the typical infrastructure related to municipal water supply since the Upper District’s operations are focused on supporting multiple types of land use within Upper District boundaries while protecting downstream senior surface rights. The Upper District

therefore operates infrastructure based on a series of decrees and leases that allow for the shifting of water releases and accretions to support replacement water needs. Each customer (a listing of customer categories is shown in Table 1) pays an augmentation water fee and application fee to enroll their respective qualified structures in the Upper District’s umbrella augmentation decrees, and pays an annual fee to cover the costs for the Upper District to maintain storage and administer the replacement water program. For those customers that pump groundwater, they must provide annual meter readings to verify their actual water use, and pay a fee if they over pump. Under its “blanket” augmentation plan for Chaffee and western Fremont Counties (decree 92CW84, 06CW32 and others), the typical residential well depletions are augmented at a rate of 1/10 acre-foot per home per year based on an engineering analysis which determined that 10% of pumped water is consumed through normal in-house uses and outdoors as correlated to a 1,500 square foot irrigated lawn. The remaining 90% of pumped

<b>Table 1 Summary of Customers and Structures</b>	
<b>Customers Category by Structure</b>	<b>Number</b>
<b>Wells</b>	
Residential	1,061
Commercial	134
Industrial	5
Institutional (e.g., CDPW, schools)	4
Municipal	5
Trusts (wetlands, etc.)	27
<b>Total</b>	<b>1,236</b>
<b>Ponds</b>	
Residential	8
Commercial	2
Institutional (e.g., CDPW)	1
Trusts (wetlands, etc.)	1
<b>Total</b>	<b>12</b>
CDPW – Colorado Department of Parks and Wildlife	

<sup>3</sup> Each release of replacement water from a structure (e.g., reservoir or ditch) may lose a portion of the released water in transit, depending on location, time of year, and river conditions.

<sup>4</sup> The District has storage rights in nine reservoirs and additional rights in ditches and leases that are combined and integrated to provide replacement water as required to protect senior surface rights (see Table 3 for additional detail).

water is returned to the ground via non-evaporative means (e.g., septic tank and leaching field). A new customer would pay approximately \$4,000 to enroll their structure under this plan, and pay \$165 a year for storage and maintenance of the augmentation water program related to their depletions<sup>5</sup>.

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<sup>5</sup> Any over pumping of groundwater based on annual reporting requirements would cost the customer \$5 per thousand gallons of over use.

## Benefits of Water Conservation to the Upper District

The nature of water conservation and its benefits, as it relates to Upper District customers and its operations are not dissimilar to the nature and benefits of water conservation to municipal utilities and their customers. For example:

- The Upper District and its customers benefit from improved transit efficiencies<sup>6</sup> since more efficient transportation of replacement water to the location of expected depletion reduces overall storage needs and replacement releases; and
- District customers benefit from reduced water demands due to reduced energy costs associated with pumping costs.

Noteworthy, however, is that the impact of water conservation measures and programs on Upper District customers and operations can be substantially different than those realized by a typical municipal utility. For example, customer demand management in a municipality typically reduces water supply production (or diversion), treatment and distribution needs; whereas in many cases demand management by Upper District customers does not necessarily create a reduction in replacement water needs.

For example, installing high efficiency toilets and faucet aerators does not reduce water consumption for the Upper District's residential water customers<sup>7</sup>. Similarly, reducing outdoor water use by increasing efficiency (e.g., via more efficient irrigation practices) may not change the irrigation-based consumption only the demand, such that outdoor watering efficiencies may not reduce augmentation requirements, and may in fact increase augmentation requirements as a percentage of water use. Therefore, typical municipal water conservation measures and programs may not have any positive impact on the management of local and regional water supply and water resources, except for that related to the production of energy<sup>8</sup>. For these reasons, customer water use demand reduction measures typically do not have a positive impact on replacement water requirements or improved efficiencies in the Upper District's water resources portfolio<sup>9</sup>.

Another unique attribute of the Upper District's system of water resources, in comparison to those water utilities that typically develop and implement water conservation plans, is that the Upper District serves a customer base that lies within a service area of approximately 3,000 square miles, which is substantially larger than any municipality in Colorado<sup>10</sup>. The regional nature of the Upper District's customer base and related infrastructure that it uses to provide replacement water creates a different kind of opportunity, and need, for water conservation than is associated with Colorado's municipal water providers. This is

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<sup>6</sup> Reduced transit losses for the Upper District are similar to reduced real losses in municipal utility distribution systems associated with leaks.

<sup>7</sup> Residential water consumption is based on outdoor water use for irrigation only – based on an expected 1,500 square feet of irrigated bluegrass grass (or equivalent) on a 2-acre property.

<sup>8</sup> Reduced groundwater pumping will reduce energy consumption, which may translate into reduced water consumption for coal powered energy at a rate of between 2 to 20 gallons per kilowatt hour (WRA, 2010; other).

<sup>9</sup> Given that each home is required to use a totalizing flow meter to check and verify pumping, highly efficient water use homes can be designed and included in the Upper District's augmentation programs; however, these homes need to include calculations related to how irrigated acreage and return flows will be managed to allow for any changes in replacement water requirements.

<sup>10</sup> The area that the Upper District serves extends from Twin Lakes Reservoirs to Pueblo County (see Figure 1 for the District boundaries).

not to say that water conservation for the Upper District is not important, rather, typical municipal water conservation planning related to customer demand management measures and programs are not necessarily applicable to the Upper District's needs since many customer demand reductions typically will not reduce augmentation and/or replacement water requirements. In addition, typical water loss management programs related to non-revenue water and other utility best management practices are not applicable to the District's operations, per se.

Therefore, the Upper District's water conservation planning and implementation effort is focused on improving the efficiency of its replacement water programs, which will allow for the following:

- Reduced transit losses
- Improve operational and administrative flexibility in conducting exchanges
- Increased available storage to allow for improved system reliability
- Improved data collection and management programs, including but not limited to, monitoring of meteorological, stream flow, and aquifer level data

**By improving water use and water resources management efficiencies, the Upper District will be able to utilize the available water supply in a more reliable and sustainable manner, supporting all the needs of the local community including residential, commercial, environmental and industrial uses.**

## Summary of Water Supply System

The Upper District utilizes various facilities and legal instruments (e.g., decrees and leases) to provide replacement water in a timely and appropriate manner. This is because it is the Upper District's responsibility to "place" the appropriate amount of water consumed by those "covered" under the Upper District's programs into the appropriate stream segment impacted by customer water use as required by amount, location and time. This requires an elaborately engineered system which measures and records customer use and replacement water delivery from a senior water source, as well as tracks all transit related losses. The structures that must be maintained include reservoirs, and stream measurement stations, as well as the acquisition and legal maintenance of the water rights utilized in the plan.

Table 2 presents a summary of those replacement activities<sup>11</sup> that the Upper District conducted in each month of 2013 and the first quarter of 2014, indicating required replacements, origin of replacement water, and nature of replacement (i.e., direct replacement, release). Table 2 also indicates which leases were included in the operation of any particular month's replacement programs, and a summary of those decrees and leases that were relevant in the monthly operations.

Note that the volume of "requirements" listed in Table 2 is equivalent to the volume of "replacements" (with some rounding error). The volume of "releases" listed on Table 2 is consistent with the volume of "replacements" unless "direct replacement" water was used in conjunction with the releases. In those months when direct releases were made to support the replacement of depletions, transit losses and system inefficiencies required that larger releases be made to protect senior water rights downstream.

A total of 432 acre-feet (AF) of releases were made in 2013, with about 25 AF or approximately 6% of the Upper District's releases related to "make up" for transit losses.

Note that a significant portion of water that serves the Upper District's' augmentation plan comes from the Fryingpan - Arkansas Project, delivered to the eastern slope of Colorado via the tunnels operated by the US Bureau of Reclamation in conjunction with the Southeastern Colorado Water Conservancy District. This water is commonly referred to as "Project Water." Approximately 54,700 AF of Project Water is delivered annually to the Arkansas River basin, with the Upper District retaining an allocation of this water to support its annual operations. In 2013, for example, the Upper District requested a Project Water allocation of over 350 AF from the Southeastern Colorado Water Conservancy District.

### Importance of Water Dedication by the Upper District

In Colorado, counties require the dedication of water before approval of building permits or approval of the sub-division of property. Thus, developers and lot owners must obtain augmentation (dedicated replacement water) for each lot created upon which a dwelling may be constructed. Further, in order for the State of Colorado to issue a well permit to a lot owner, the owner must provide augmentation or be included in a court decreed augmentation plan. Regardless of whether a well is constructed or used, the Upper District is required to reserve the replacement water, the storage of this water and continues to

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<sup>11</sup> Replacement activities include programs that the District administers under augmentation plans, substitute supply plans, Rule 14 Plans, and leases.



**Table 2 – Summary of Upper District Operations 2013**

Requirement or Replacement Account	Location or Rule	(Volumes in Acre-Feet)												2014		
		2013												Jan	Feb	Mar
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar
<b>Requirement</b>																
Arkansas River Main Stem	Replacement	2.58	4.06	6.34	8.81	19.83	25.84	26.9	24.29	21.73	10.87	17.66	13.08	27.99	36.31	32.08
Cottonwood Creek	Cottonwood Creek Replacement	0.84	0.8	0.8	2.1	6.8	8.04	7.64	6.89	6.1	2.63	1.75	1.3	0.87	0.83	0.84
Moltz, SWSP 02CW073	Paul Moltz Trout Creek Res. Evaporation	4.72	2.54	4.28	4.04	3.93	3.97	4.12	4.34	4.54	4.68	4.76	4.79	4.72	4.54	4.28
Rule 14	Rule 14	4.96	0.31	2.4	2.6	5.43	4.88	13.3	10.5	1.5	3.33	3.61	7.25	1.26	0.82	1.79
So Arkansas River	South Arkansas Replacement	2.08	2.36	3.76	3.25	7.63	10.09	10.76	9.51	8.16	5.43	3.05	2.61	2.09	2.08	3.78
	<b>Total</b>	<b>15.18</b>	<b>10.07</b>	<b>17.58</b>	<b>20.8</b>	<b>43.62</b>	<b>52.82</b>	<b>62.72</b>	<b>55.53</b>	<b>42.03</b>	<b>26.94</b>	<b>30.83</b>	<b>29.03</b>	<b>36.93</b>	<b>44.58</b>	<b>42.77</b>
<b>Replacement</b>																
Arkansas River	DeWeese Dye Reservoir		1.35	6.34	2.35									9.93	31.28	
Arkansas River	Pueblo Res Project	2.58	2.71		6.46	19.83	25.84	26.9	24.29	21.73	10.87	17.66	13.08	18.06	5.02	32.08
Cottonwood Creek	Cottonwood Lake					1.53			1.11	1.44	0.07					
Cottonwood Creek	DeWeese Dye Reservoir		0.25	0.8	0.56							0	0.92	0.68	0.71	
Cottonwood Creek	Pueblo Res Project	0.84	0.54		1.42	0.81	2.97	1.65		1.43	1.44	1.75	0.38		0.12	0.84
Cottonwood Creek	Rainbow Lake					1.6			1.42							
Cottonwood Creek	Thompson Ditch				0.12	2.99	5.07	5.99	4.35	3.24	1.11					
Cottonwood Creek	Twin Lakes Reservoir													0.2		
Moltz, SWSP 02CW073	DeWeese Dye Reservoir		0.82	4.28												
Moltz, SWSP 02CW073	Pueblo Res, If and When	4.72	1.72		4.04	3.93	3.97	4.12	4.34	4.54	4.68	4.76	2.47			
Moltz, SWSP 02CW073	Twin Lakes Reservoir											0	2.32	4.72	4.54	4.28
Rule 14	DeWeese Dye Reservoir		0	0.85	0.69							0	3.27			
Rule 14	Lester Attebery											0	1.87	1.26	0.82	0.98
Rule 14	Pueblo Res, If and When	4.96	0.31	1.55	1.91	5.43	4.88	13.3	10.5	1.5	3.33	3.61	2.1			0.81
So Arkansas River	DeWeese Dye Reservoir		0.83	3.76	0.87							0	1.85	2.09	1.78	
So Arkansas River	North Fork Reservoir				0.02	0.15	0.05	0.19	0.16		0.1	0.06	0			
So Arkansas River	Pueblo Res Project	2.08	1.53		2.36	7.48	5.92	10.6	9.36	8.16	5.32	3	0.76		0.3	3.78
So Arkansas River	White Ditch from North Fork Reservoir					4.12										
	<b>Total</b>	<b>15.18</b>	<b>10.06</b>	<b>17.58</b>	<b>20.8</b>	<b>43.75</b>	<b>52.82</b>	<b>62.75</b>	<b>55.53</b>	<b>42.04</b>	<b>26.92</b>	<b>30.84</b>	<b>29.02</b>	<b>36.94</b>	<b>44.57</b>	<b>42.77</b>
<b>Direct Replacement</b>																
Lester Attebery													1.87	1.26	0.82	0.98
Thompson Ditch					0.12	2.99	5.07	5.99	4.35	3.24	1.11					
	<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0.12</b>	<b>2.99</b>	<b>5.07</b>	<b>5.99</b>	<b>4.35</b>	<b>3.24</b>	<b>1.11</b>	<b>0</b>	<b>1.87</b>	<b>1.26</b>	<b>0.82</b>	<b>0.98</b>
<b>Release</b>																
Cottonwood Lake	(UAWCD)					1.53			1.11	1.44	0.07					
DeWeese Dye Reservoir	(USBR & DWR)		3.25	16.03	4.47								6.04	12.69	33.78	
North Fork Reservoir	(UAWCD)				0.02	0.15	4.18	0.2	0.17		0.1	0.06				
Pueblo Res, If and When	(USBR & DWR)	9.68	2.04	1.55	5.95	9.36	8.85	17.42	14.84	6.04	8.01	8.37	4.58			
Pueblo Reservoir Project	(USBR & DWR)	5.5	4.79		10.24	28.13	34.76	39.15	33.66	31.33	17.63	22.41	14.22	18.06	5.44	37.5
Rainbow Lake	(UAWCD)					1.6			1.42							
Twin Lakes Reservoir	(USBR & DWR)												2.32	4.92	4.54	4.28
	<b>Total</b>	<b>15.18</b>	<b>10.08</b>	<b>17.58</b>	<b>20.92</b>	<b>46.75</b>	<b>57.93</b>	<b>68.75</b>	<b>59.9</b>	<b>45.29</b>	<b>28.03</b>	<b>30.84</b>	<b>30.9</b>	<b>38.19</b>	<b>45.4</b>	<b>43.74</b>

**Table 2 – Summary of Upper District Operations 2013 (continued)**

<b>Leases included in above Summary by Plan</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>June</b>	<b>July</b>	<b>Aug</b>	<b>Sept</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>
Alebrie, LLC			0.09	0.13	0.17	0.22	0.22	0.19	0.15			0.16			0.09
Freemont Paving Evans Pit #2											2.89	2.32	1.94	1.7	1.7
Freemont Paving Mackenzie Pit Well											0.81	0.46	0.43	0.41	0.81
Holcim											5.27	3.66	2.91	11.66	6.3
Valco - Canon City East Pit											1.75	2.4	1.94	1.77	1.65
Freemont Paving & Redi Mix								1.28	1.27	0.91					
Valco - Rocky Ford													18.08	16.7	15.22
<b>Other Leases</b>															
Freemont Paving and Redi-Mix Evans Pit												16.54			
MOLTZ												1.3			
Valco - Canon City East Pit										1.64	1.17				
Freemont Paving Evans Pit #2										3.22					
Hocim Wetlands Lease			3.1	5.86	8.85	13.24	12.83		7.94	11.49					
			<b>3.19</b>	<b>5.99</b>	<b>9.02</b>	<b>13.46</b>	<b>13.05</b>	<b>1.47</b>	<b>9.36</b>	<b>17.26</b>	<b>11.89</b>	<b>26.84</b>	<b>25.3</b>	<b>32.24</b>	<b>25.77</b>
<b>Summaries of Leases and Decreases by Plan</b>															
Leases											10.7	9	25.3	32.2	25.8
06CW32	0.1	0.1	0.1	0.3	0.4	0.6	0.6	0.5	0.5	0.3	0.1	0.1	0.1	2	4.2
07CW87	0	0	1.7	0	0	0	0	0	0	1.4	0	0	0	0	1.7
92CW84	4.5	6.1	8.3	11.8	28	35.5	36.2	32.3	28.6	14.1	9.8	6.4	4.3	4.1	4.2
94CW05	0.8	0.8	0.8	1.7	5	6.7	7.4	6.9	6	2.6	1.6	1.2	0.9	0.8	0.8
94CW41	0.1	0.1	0.1	0.4	0.8	1.2	1.1	1	0.9	0.5	0.2	0.2	0.3	0.1	0.1
A												0			
MOLTZ	4.8	2.5	4.3	4	3.9	4	4.1	4.3	4.5	4.7	4.8	4.8	4.7	4.5	4.3
RULE14	5	0.3	2.4	2.6	5.4	4.9	13.3	10.5	1.5	3.3	3.6	7.3	1.3	0.8	1.8
<b>Total ACFT</b>	<b>15.3</b>	<b>9.9</b>	<b>17.7</b>	<b>20.8</b>	<b>43.5</b>	<b>52.9</b>	<b>62.7</b>	<b>55.5</b>	<b>42</b>	<b>26.9</b>	<b>30.8</b>	<b>29</b>	<b>36.9</b>	<b>44.5</b>	<b>42.9</b>

maintain the vessels and measurement devices for each owner of augmentation in the plans. Administrative functions include tracking ownership, reporting accounting for releases of water (including type of replacement (i.e., Rule 14, augmentation plan, etc., transit losses, etc.), as well as (in the case of constructed wells) reporting of meter readings to the State of Colorado.

The cost of maintaining the reservoirs and measurement devices as well as administrative functions by the Upper District are defrayed by the annual assessment of maintenance and storage fees. Without the dedicated and maintained augmentation for each lot, the lot could not legally exist, no well permit could be issued, and no occupancy in a dwelling could happen. Inherent in the value of the property is the dedicated replacement water. Augmentation can be viewed as an improvement to the property/lot. Unlike traditional improvements on a property such as fencing and landscaping, the right to appropriate water for beneficial use, provided by inclusion in an augmentation plan, is an essential part of the initial underlying value of the lot. In fact, the property/lot could not have been subdivided from the original land without the dedication of the augmentation water. Just as land improvements must be maintained in order to retain value, the maintenance of the augmentation water for delivery when needed is an integral part that makes up the value of the property.

### **Augmentation Plan and Water Storage Facilities**

Augmentation plans are very expensive to create and develop costing as much as several hundred thousand dollars and the plans can take more than two years to obtain once filed with the State. Even then, this expense does not end with the acquisition of a decreed plan of augmentation. In 1992, the Upper Arkansas Water Conservancy District board filed for and obtained a "blanket plan of augmentation", a plan in which citizens needing augmentation could make application through the Upper District for inclusion in its blanket plan at a greatly reduced cost. Today the cost to participate in the plan is \$4,000.00 per customer structure, which is a one-time fee, plus a nominal annual fee for maintenance and storage. For the typical residential customer who has in-house water use plus limited outside water use, approval for a well permit supported by the District's blanket plan takes less than 90 days. Note that some of the Upper District's customers may choose to join the Upper District's blanket plan requiring the dedication of water (augmentation) for a lot with the anticipation to construct a well or home at a later date.

<b>Table 3 Summary of Reservoirs Available to Store District Water Resources</b>	
<b>Reservoir</b>	<b>Sub-Basin</b>
Turquoise Lake	Main Stem
Twin Lakes	Main Stem
Rainbow Lake	Middle Cottonwood Creek
Cottonwood Lake	South Cottonwood Creek
North Fork Reservoir	South Arkansas River
Boss Lake Reservoir	South Arkansas River
O'Haver Lake	South Arkansas River
DeWeese Reservoir	Grape Creek
Pueblo Reservoir	Main Stem
Conquistador Reservoir	Taylor & Grape Creek

The blanket augmentation plan is only one of the Upper District's tools for supporting the use of the lands within the Upper District boundaries. The Upper District also maintains several other decrees, substitute supply plans and leases to allow for the appropriate protection of senior water rights on the Upper Arkansas River, Cottonwood and Chalk Creeks, and the South Arkansas River.

As part of Upper District operations, it stores water in several major reservoirs (see Table 3) along the Arkansas River and its tributaries to allow for replacement water to be drawn from its transmountain and

local water sources. **Having the geographic breadth of facilities and water rights allows the Upper District the flexibility to meet the demand for expanded water use in the region protecting against stream depletions associated with current and new development.**

### Summary of Current and Future Water Use and Depletions

As indicated previously, required releases related to District customer’s depletion obligations was 432 AF in 2013. This demand was composed of about 218 AF on the main stem and 114 AF on side drainages. This point illustrates the importance of the Upper District maintaining decrees and leases for water supply and water storage in various geographies throughout the upper basin.

It is also important to note that it is the Upper District’s policy to maintain three times the expected annual replacement water demand in storage. Therefore, the Upper District currently maintains about 1,500 AF of water in storage within those reservoirs listed in Table 3 at any given time.

New demands are occurring across the Upper District’s boundaries on a fairly consistent basis. Between 2000 and 2010, the number of structures that were registered by participants in the Upper District’s augmentation plans rose from 417 to 1,095 – which is an increase of over 160%. In 2013, 39 new structures were enrolled in the Upper District’s plans, which is equivalent to an increase of 3% for last year alone.

<b>Table 4 Estimate of Future Water Demand Based on Population Growth in Chaffee, Custer and Fremont Counties<sup>12</sup></b>					
County	Population			Percent Increase from 2015 to 2050	
	2015	2050		High	Low
		High	Low	High	Low
Chaffee	19,923	40,409	31,653	103%	59%
Custer	5,469	11,388	9,639	108%	76%
Fremont	54,743	99,513	86,692	76%	54%
<b>Total</b>	<b>81,866</b>	<b>151,310</b>	<b>127,984</b>	<b>85%</b>	<b>56%</b>

It is anticipated that population growth within the Upper District will continue within the existing decreed augmentation areas. A large part of future growth in augmentation water demand will be due to an expansion of the augmentation areas served within the existing Upper District boundaries. By 2020, an additional demand for domestic/household lots of about 20% will exist, or about 90 AF of additional depletions will require replacement, and an additional 300 AF of storage will be needed to maintain adequate buffers to protect against future depletions from this use. Augmentation water demand in future areas to be served within the existing District boundaries by expanding the augmentation decreed coverage are driven primarily by industrial demands. The water demands are much larger than the traditional domestic users. Within the next two years this demand will exceed 400 to 600 acre feet of depletion replacements. The growth, which is also referred to in the State Water Supply Initiative (SWSI) and in the work of the Arkansas River Basin Round Table, will produce a water supply gap characterized

<sup>12</sup> Data based on SWSI Phase II, CWCB, 2010. Note that although population growth in these three counties will not all be attributable to District current and future customers, since there are municipalities with separate water supply systems within each of these counties; there is an expectation that the District may be called upon to support municipal use in the future, including depletions that may occur related to changing publicly owned treatment works that have reduced return flow credits and changing irrigation return flow schemes. Therefore, these estimates are presented to indicate a reasonable range of potential future demands and storage needs for planning purposes.

to be in the range of 56% to 85% of current water use in Fremont, Chaffee and Custer Counties by 2050, reflecting the need for about 250 to 370 AF of additional replacement water, and about 750 to 1,100 AF of additional storage (see Table 4) by this time within the existing decreed augmentation areas. However it is anticipated that expansion of the decreed areas to meet present demands will require the addition of 400 to 600 acre feet of fully consumable water and at least 1000 acre feet of storage within the next 2 years.

## **Water Efficiency/Water Resources Management Programs – Cause and Effect**

The Upper District has long been a proponent of local and regional water use efficiency, due in part to its mission as an organization, and that prudent and intelligent water resources management makes sense and is good business. To this end, the Upper District has long supported customer education and engagement. The Upper District is also committed to providing resources to support promising pilot programs and studies that will bring about improvements to the science and the administration of the improved management and efficient use of local and regional water resources. Current programs that the Upper District supports and/or sponsors include:

- Water conservation tips on the Upper District website
- Website based evapotranspiration calculation tool (to help characterize water consumption) on the Upper District website
- Financial and other resource support to local and regional water education programs (e.g., Arkansas River Basin Water Forum, Rancher education program, water and hydrology internship program, etc.)
- Studies on improving irrigation efficiencies (e.g., lease following pilot, interruptible water supply pilot, TR-21 (related to engineering analyses of crop depletions))
- COAGMET Data Collection and Transmission (which provides meteorological data online and through the State Climatologist to support the estimation of crop consumption and total water needs)
- Development of decrees and leases that allow for operational flexibility in augmentation and Rule 14 replacements that improve water exchange potential, and/or protect the regional water resources.

Future water conservation programs will focus on leveraging educational programs with those programs that improve Upper District operational flexibility; and allow for regional management of water resources improving the overall efficiency of the Upper District's operations and programs. To accomplish these goals, the Upper District will pursue the development of legal, fiscal, and physical programs and tools that will support the regional management of water resources in support of residential, commercial, environmental and industrial needs. For this purpose, the Upper District will continue to support the water use efficiency and water resources management programs that are listed above.

In addition, the Upper District by necessity will pursue new water efficiency/water resources management programs related to those physical and legal tools that will address future gaps in both water supply and water storage. For example, the Upper District will invest in studying and potentially developing an aquifer storage recovery (ASR) facility in conjunction with a conservation easement and multiuse reservoirs that would enhance and expand the operational flexibility and efficiency of the Upper

District's replacement water programs. The ASR program is considered to be an improvement to the Upper District's current water storage facilities since water loss associated with below ground storage is minimal in comparison to reservoir evaporative losses. In addition, the location of potential ASR sites within the Upper District's boundaries may enhance the operational flexibility for the Upper District to replace stream depletions while minimizing transit related and evaporative losses. For these reasons, ASR facility development and operation is considered an important component of future water use efficiency and water resources management for the Upper District<sup>13</sup>.

Other programs that the Upper District may wish to consider involve supporting more rigorous assessment of selected State policies that address two key areas:

- i) The flexible use of conserved water which is placed into storage for regional use; and
- ii) The enhanced assessment of ecosystem mitigation and injury in association with the State's instream flow and lake protection programs.

Each of these issues is described in more detail below.

One of the most effective means of improving water use efficiency, especially as it relates to improving water supply reliability and sustainability, involves developing and implementing measures and programs that reduce water demand and storing the "conserved water" for use during periods of reduced water availability. Given that the Upper District utilizes its water supplies for purposes of supporting agricultural, municipal, industrial, commercial, and recreational uses, as well as for stock watering and fish and wildlife protection, measures and programs that the Upper District implements to create demand reduction and improve water use efficiency would support all of these uses. However, certain regulations may currently limit how regionally stored conserved water is shared and utilized. It may be in the best interest of the Upper District to be proactive in supporting actions that allow for the flexible use of water stored in regional facilities<sup>14</sup>, without requiring change of use and/or location re-quantification assessments and reporting through the State Engineers Office (SEO). This issue may directly impact the scope of water rights that may be managed and utilized through future Upper District projects including its Trout Creek ASR projects

With respect to instream flows and lake protection programs, improvements in data collection and ecosystem assessment protocols have not necessarily been included in State policies that regulate how and where instream flows are evaluated and considered. It may be in the best interest of the Upper District and many of its partners, including the CWCB, to re-evaluate the methodologies used to determine how instream flows protect the natural environment to a reasonable degree, such that greater balance between neighboring stream reaches and lake systems can be assessed, especially in circumstances where limited available water supplies will need to be shared between competing ecosystems (e.g., lake protection balanced with adjacent downstream instream flow right). The heart of this issue for the Upper District is to promote those policies that help manage resources at a macro scale,

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<sup>13</sup> Evaporation on some high mountain small storage vessels is inefficient compared to large deep vessels. Evaporation from these smaller vessels is as high as 25 to 50% for the Upper District.

<sup>14</sup> More flexible use of conserved water in this case creates efficiencies in terms of the sharing and future utilization of Ark basin water supplies that can be reused (e.g., Fry-Ark return flows, non-tributary groundwater sources, etc.) and in terms of human and capital resources that would be need to support filing and application with the SEO.

linking areas that are adjoining and/or share limited water supply availability, such that multi-use objectives can be considered in future allocation. It is important to note that the Upper District's interests are not in conflict with the State's ISF program, per se, but rather the manner in which the State determines to "preserve or improve the natural environment to a reasonable degree" is established and evaluated. The Upper District believes that new data collection and management programs may allow for a more sophisticated assessment than what has been used in the past, all in the name of improving water use (and water allocation) efficiency.

## Goals for Water Use Efficiency and Improved Water Resources Management

In the Upper District's role to protect and secure water in the Upper Arkansas Valley, it is continuously looking for ways to improve water resource management efficiency to maximize the appropriate use of wet water in the basin with the multiple needs of the community and the available water management facilities. Since many of the traditional best management practices related to municipal water conservation are not applicable to the operations and needs of the Upper District and the communities that it serves, it is important for the Upper District to focus its assessments and commitments to those measures and programs that will support improved water use efficiency within the constructs of the Upper District's operations – thereby helping to protect and secure water for the many uses of water in the Upper Arkansas River Basin<sup>15</sup>.

Therefore, the objectives of the Upper District with respect to improved water use efficiency and water resources management relate to identifying and implementing measures and programs that enhance the use of those water resources that are available to the Arkansas River, in general and the upper basin, specifically. The measures and programs of importance are both structural and procedural – linking the construction of facilities with flexible and creative uses permitted within the constraints of the prior appropriation doctrine.

Developing specific quantitative goals for the Upper District related to the implementation of water use efficiency and improved water resources management is not straightforward, given that the implementation of measures and programs by the Upper District, and the commitment of resources by the Upper District to move its efforts forward, may or may not directly reduce water use or demand in the upper basin. Some of the measures and programs that the Upper District will consider are expected to reduce water losses in the system by reducing demands related to transit and evaporation losses, for example. In other cases, the Upper District's efforts will be focused on allowing water to be shared and managed more efficiently, which by creating flexibility, allows for water to be “moved” from one place to another depending on circumstances and conditions. To this point, flexibility supports enhanced sustainability and utilization of basin-wide resources – efficiency, in other words comes from adjusting demands on an as needed basis, leveraging resources on a regional scale, using water savings in one location (or in one period of time) to support demands in another location or time.

With these limitations in mind, the Upper District has developed the following list of goals related to the implementation of this Plan:

- Develop projects and facility management policies that reduce transit and evaporative losses related to reservoir and other storage vessel operations;

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<sup>15</sup> Note that the District utilizes its water supplies for agricultural, municipal, industrial, domestic, commercial, and non-consumptive uses including protection of fisheries and habitat. Although, the District does not have customers that directly utilize local water resources for recreational uses, the District's management of replacement water enhances the flow of wet water through reaches of the river and its tributaries that support substantial recreational uses (e.g., fishing and rafting). For this reason, the District's water replacement programs sustain benefits for not only the District's customers, but for other entities and interests that rely on the Arkansas River and its tributaries for their livelihood and quality of life.



- Support the development of policies that allow for the flexible use of upper basin water supply, and the transfer and exchange of water between uses and users, to the extent allowed by the prior appropriations doctrine;
- Support local, regional and state-wide water education programs that help to educate the electorate, future voters, and water users of all kinds; and
- Support local and regional projects that improve water use efficiency and water resources management by the Upper District and by its partners.

Water use reductions that may be related to achieving the stated goals may include reductions in transit losses (which will be in the range of 8 to 10 AF); and evaporative losses (which may be in the range of 100 plus AF). More importantly, however, will be those efforts put forth by the Upper District to improve water use efficiency in the Upper Basin, allowing for the more effective utilization of thousands of acre feet of in-basin resources<sup>16</sup>.

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<sup>16</sup> Although this number can only be estimated, construction and operation of a large conjunctive use facility in the upper portion of the Arkansas River Basin will not only allow for the more effective timing of releases to address consumptive and non-consumptive needs, it will also greatly reduce evaporative losses that would accompany a similar sized surface reservoir. In addition, the implementation of programs and projects such as the Master Contract with the Southeastern District to store water in Pueblo Reservoir enhances the exchange potential with lower basin resources allowing for the transfer of underutilized Fry-Ark reusable return flows upstream, thus saving additional wet water resources. The policy changes that the Upper District seeks to explore also have the potential effect of expanding the use of wet water to achieve multiple objectives in a more efficient manner.

## Identification and Selection of Projects, Measures and Programs

The Upper District is not a covered entity under the definition that the State uses to determine which municipal water providers are required to develop and implement a water conservation plan under CRS 37-60-126 (see Appendix A). Therefore, the Upper District is not explicitly required to consider those measures and programs that are contained in Colorado Revised Statute 37-60-126 which defines specific content requirements for all water conservation plans developed by covered entities and approved by the State.

It is nonetheless valuable to present a review of how each of the State's required types of water conservation measures and programs were considered with respect to the Upper District's unique needs (see Table 5). In general, the Upper District has determined that customer demand management techniques are not particularly relevant to the operational issues that it currently faces, due in part to the nature of the augmentation plans that it administers. Indoor demand management does not impact the consumption of water, since all indoor use is essentially returned to the ground through non-evaporative means (i.e., septic tank and leaching field systems). Improvements in outdoor irrigation efficiency do not necessarily reduce consumption either, unless grass is removed and/or replaced with lower water use plantings. Therefore, many traditional water conservation demand management measures and programs do not impact the augmentation requirements needed to offset downstream depletions, and therefore is not of specific concern to the Upper District and the implementation efforts related to this Plan.

For example, customers have an incentive to install high efficiency fixtures and appliances in their homes, to the extent that lower domestic water use requires less energy to pump and heat water; however, these savings are the customer's alone, and do not impact the augmentation deliveries that are provided by the Upper District. Incentives are limited from the Upper District perspective regarding promoting and encouraging indoor and even outdoor water use efficiencies if those efficiencies do not directly impact augmentation efforts.

As for water loss management, which is also a component of the State's requirements for consideration, the Upper District does not operate an infrastructure latent water distribution system similar to those that all municipalities must construct, maintain and operate. The Upper District instead focuses its water loss management efforts on the reduction of transit and evaporative losses since the main stem and tributaries of the Arkansas River serve as the distribution system for the delivery of customer water (i.e., augmentation deliveries to offset the timing and volume of depletions). Therefore, water loss management for the Upper District is not at all like the programs that are applicable to municipal utilities. Even customer metering is different for the Upper District<sup>17</sup>.

For these reasons, the District will choose to focus its resources on those projects, measures and programs that address improved water use efficiency and water resources management of upper basin water supplies that are integrated or related to the augmentation water programs that it administers. Table 5 presents a review of the State's measures and programs that must be considered by a covered entity, and discussed the relevance of each with respect to the Upper District's circumstance and need.

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<sup>17</sup> Each customer/augmentation plan member is responsible for metering, meter maintenance, and meter data reporting to the Upper District on a monthly basis.

**Table 5**  
**Review of State Required Measures and Programs for Consideration Under CRS 30-67-126 (4)(a)**

Measure or Program	Applicability to the Upper District's Water Conservation Needs	Status for Further Evaluation
Water-efficient fixtures and appliances, including toilets, urinals, clothes washers, showerheads, and faucet aerators	Customer efforts to replace aging water using fixtures and appliances will create water demand reductions over the planning period saving energy costs and regional water demand for coal power generation; however the augmentation water provided by the District will not change based on indoor water efficiency improvements.	No further evaluation necessary
Low water use landscapes, drought-resistant vegetation, removal of phreatophytes, and efficient irrigation	Augmentation water requirements can be affected by reduced outdoor irrigation consumption, as long as lawn size is reduced and/or replaced with low water use landscapes and/or drought-resistant native vegetation.	The District may consider changes to enrollment fees and augmentation rates for appropriate landscape improvements
Water-efficient industrial and commercial water-using processes	The Upper District has only a few commercial customers who are chiefly gravel operations that have augmentation requirements related to evaporative losses. These facilities may benefit from improved water use efficiency; however the cost for new commercial equipment is beyond the scope of this planning effort.	No further evaluation necessary
Water reuse systems	The District does have the potential to utilize reusable water supplies, such as Project Water return flows, once the Master Contract has been executed. This may allow the Upper District to make exchanges with more entities including those in the lower basin leveraging the Master Contract to manage Pueblo Reservoir storage pools. Other future programs may also allow for expansion of other alternative water supplies.	Water reuse will be considered by the Upper District within its Plan
Distribution system leak identification and repair	The Upper District will evaluate methods to reduce transit losses and reservoir evaporative losses.	Include transit and evaporative loss management improvements within the Plan
Dissemination of information regarding water use efficiency measures, including by public education, customer water use audits, and water-saving demonstrations	The Upper District currently maintains educational programs to support public and customer education	Include water education programs within the Plan
Water rate structures and billing systems designed to encourage water use efficiency in a fiscally responsible manner	The Upper District has a rate structure that is consistently applied to its customers. Future rate structures may be revised to provide incentives for more efficient landscapes; however, that effort is beyond the scope of this Plan.	No further evaluation necessary
Regulatory measures designed to encourage water conservation	The Upper District will continue to support improvements to water policy and procedures that improve water use efficiency and allow for the more flexible exchange and transfer of water within the construct of the prior appropriations doctrine.	Include efforts to support appropriate water policy development that supports the goals and mission of the Upper District
Incentives to implement water conservation techniques, including rebates to customers to encourage the installation of water conservation measures	The Upper District does not receive direct benefit in providing incentives for customer indoor water conservation. Outdoor landscape water conservation developed by reducing consumptive use of lawns may be worth considering in the future but is beyond the scope of this Plan.	No further evaluation necessary

The projects, measures and programs that are relevant to the Upper District for consideration within the current planning horizon of 5 to 7 years are presented in Table 6. The projects, measures and programs that are listed in Table 6 include those that are ongoing, those that are related to other regional efforts (e.g., the Master Contract for storage with the Southeastern Colorado Water Conservancy District), those that the Upper District has long conducted (e.g., establishing proactive positions on relevant water policy), and those that are new, but have been long under consideration and evaluation (e.g., Trout Creek conjunctive use project). Combined, these projects, measures and programs not only address the goals of the Upper District's Water Use and Water Resources Management Efficiency Plan, but dictate a significant portion of regional water management in the upper basin.

**Table 6**  
**Listing of Projects, Measures and Programs for Consideration by the Upper District**

Program	Description	Implementation Tasks	Timing		
			1-2 years	3-5 years	>5 years
Master Contract for Storage of Non-Project Water in Pueblo Reservoir	Allows for exchanges with the LAVWCD including reusable Fry-Ark Project Water return flows and allows for the Upper District to meet demand during periods when direct flow rights do not meet demands and higher elevation storage vessels are subject to freezing - allowing for storage during peak runoff in Pueblo Reservoir until wintertime needs arise.	Execute contract with Southeastern	X		
		Continue operations with new contract (which allows for prolonged use of Pueblo Reservoir, and enhances potential for exchanges and transfers)	X	X	X
		Establish and continue annual reporting to Southeastern		X	X
Trout Creek ASR Project	Relates to the construction and future operations of 10,000 AF of conjunctive use facilities in the Buena Vista area, managed in coordination with downstream gravel pits reducing transit and evaporative losses associated with storage and delivery of augmentation flows.	Establish regional entity (i.e., legal structure and sub-district enterprise) to carry debt service	X		
		Obtain control of land and water rights		X	
		Conduct physical studies on ASR and the site hydrogeology		X	X
Establish proactive positioning regarding relevant state water policies	Regarding two key issues that currently impact (or will impact) the efficient management of Upper District facilities and water rights; and limits the efficient utilization of water for multiple uses in the upper basin	Follow and engage with SEO regarding the nature and use of conserved water stored regionally for multiple uses	X	X	
		Engage the CWCB in discussions regarding enhancing scope and scale of instream flow evaluations in light of improved data collection and assessment methodologies – including existing and future instream flow rights	X	X	
Evaluate alternative fees for customers that reduce or eliminate lawn irrigation consumptive use	By eliminating or reducing outdoor consumption, augmentation water demands would decrease. Need to balance reduced cost with operational needs of the Upper District	Evaluate revised enrollment and annual fees as incentive		X	
		Establish “red-flags” associated with monthly reporting that would indicate non-compliance; and enforcement actions (fines, etc.)		X	
Continue current programs related to education, outreach and policy support		Water conservation tips on the Upper District website	X	X	X
		Website based evapotranspiration calculation tool	X	X	X
		Support to local and regional water education programs	X	X	X
		Studies on improving irrigation efficiencies (e.g., lease following pilot, interruptible water supply pilot, TR-21, etc.)	X	X	X
		COAGMET Data Collection and Transmission	X	X	X
		Development of decrees and leases that allow for operational flexibility in augmentation and Rule 14 replacements	X	X	X

## Implementation of the Plan

The implementation of the selected Plan elements presented in Table 6 will proceed based on a number of factors. The factors that will influence implementation include:

- Funding availability within the annual operating budget of the Upper District;
- Ongoing regional partnerships;
- Contractual obligations and requirements;
- Coordination with coordinating agencies and organizations; and
- Funding support from other parties relevant to large, shared projects.

Current funding levels within the Upper District will support all of the proposed projects, measures and programs listed in Table 6 except the development of the Trout Creek ASR project, since that project will require a new administrative structure and/or regional entity to issue bonds and pay debt, beyond the scope of what the Upper District can currently perform. Nonetheless, the Upper District has, and will continue to commit resources to evaluating the ASR project and supporting discussions within regional and statewide entities to help move the project forward.

Data collection related to the implementation of this Plan will essentially be the same as it currently is for the Upper District. Daily and monthly reporting to the Board and the State will remain the same, and those data will be used, as they are now, to track and quantify transit and evaporation related losses. Therefore, any progress that is made regarding the stated water conservation goals and improvements in water use efficiency is already incorporated into the data collection and management efforts of the Upper District.

Some of the benefits of the Upper District's efforts related to formalizing the implementation of this Plan will be how those efforts are incorporated into the Arkansas Basin Basin Implementation Plan. The nexus between the Upper District's regional efforts (projects and policy) and those of the Arkansas Basin Round Table will help to create a broader understanding and involvement of water interests and water agencies in critical policy discussions. The nexus will also help to link project and policy needs with CWCB funding through one of the grant programs that CWCB administers (e.g., Water Supply Reserve Account, Water Efficiency Grant Fund, etc.)<sup>18</sup>. Coordination of the Upper District's efficiency efforts with the Arkansas Round Table will also help to inform and support regional and basin wide water efficiency efforts.

### Updating the Plan

The Upper District's Plan will be reviewed and updated informally throughout the planning period (i.e., until the end of 2022). The Upper District may choose to formally update the Plan whenever it is valuable to the organization dependant on financial needs, and/or substantial changes to its current

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<sup>18</sup> Grant funding to support the implementation of the Upper District's Plan may include grants that are awarded to the Upper District, or are awarded to other groups of project participants of which the Upper District is either an active participant or collaborator.

operating conditions. At the very least, the Upper District will update this Plan in 7 years, or by the end of 2022.

### **Plan Public Review and Comment**

The Plan has undergone public review in accordance with the requirements of the State regulations for a period of 60 days – from June 11, 2015 to August 10, 2015. A notice of the public review was printed in the local newspaper (see Appendix B). A copy of the draft Plan was made available to the public at the offices of the District. During this period of time, no public comments were received.

## **Appendix A**

Colorado Revised Statute 37-60-126





*C.R.S. 37-60-126*

COLORADO REVISED STATUTES

\*\*\* This document reflects changes current through all laws passed at the First Regular Session of the Sixty-Ninth General Assembly of the State of Colorado (2013) \*\*\*

TITLE 37. WATER AND IRRIGATION  
WATER CONSERVATION BOARD AND COMPACTS  
ARTICLE 60. COLORADO WATER CONSERVATION BOARD  
PART 1. GENERAL PROVISIONS

C.R.S. 37-60-126 (2013)

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

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

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

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

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

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

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

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

(g) "Water conservation" means water use efficiency, wise water use, water transmission and distribution system efficiency, and supply substitution. The objective of water

conservation is a long-term increase in the productive use of water supply in order to satisfy water supply needs without compromising desired water services.

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

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

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

(b) The office shall review previously submitted conservation plans to evaluate their consistency with the provisions of this section and the guidelines established pursuant to paragraph (a) of subsection (7) of this section.

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

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

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

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

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

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

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efficient irrigation;

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

(IV) Water reuse systems;

(V) Distribution system leak identification and repair;

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

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

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

(VIII) Regulatory measures designed to encourage water conservation;

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(8) A covered entity may at any time adopt changes to an approved plan in accordance with this section after notifying and receiving concurrence from the office. If the proposed changes are major, the covered entity shall give public notice of the changes, make the

changes available in draft form, and provide the public an opportunity to comment on such changes before adopting them in accordance with subsection (5) of this section.

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

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

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

(10) Repealed.

(11) (a) Any section of a restrictive covenant or of the declaration, bylaws, or rules and regulations of a common interest community, all as defined in [section 38-33.3-103, C.R.S.](#), that prohibits or limits xeriscape, prohibits or limits the installation or use of drought-tolerant vegetative landscapes, or requires cultivated vegetation to consist wholly or partially of turf grass is hereby declared contrary to public policy and, on that basis, is unenforceable. This paragraph (a) does not prohibit common interest communities from adopting and enforcing design or aesthetic guidelines or rules that require drought-tolerant vegetative landscapes or regulate the type, number, and placement of drought-tolerant plantings and hardscapes that may be installed on the unit owner's property or property for which the unit owner is responsible.

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

(I) "Executive board policy or practice" includes any additional procedural step or burden, financial or otherwise, placed on a unit owner who seeks approval for a landscaping change by the executive board of a unit owners' association, as defined in [section 38-33.3-103,](#)

C.R.S., and not included in the existing declaration or bylaws of the association. An "executive board policy or practice" includes, without limitation, the requirement of:

(A) An architect's stamp;

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

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

(D) The adoption of a landscaping change fee.

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

(II.5) "Turf" means a covering of mowed vegetation, usually turf grass, growing intimately with an upper soil stratum of intermingled roots and stems.

(III) "Turf grass" means continuous plant coverage consisting of nonnative grasses or grasses that have not been hybridized for arid conditions which, when regularly mowed, form a dense growth of leaf blades and roots.

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

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

(I) No enforcement action shall require that a unit owner water in violation of water use restrictions declared by the jurisdiction in which the common interest community is located, in which case the unit owner shall water his or her landscaping appropriately but not in excess of any watering restrictions imposed by the water provider for the common interest community;

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

(III) In any enforcement action in which the existing turf grass is dead or dormant due to insufficient watering, the unit owner shall be allowed a reasonable and practical opportunity, as defined by the association's executive board, with consideration of applicable local growing seasons or practical limitations, to reseed and revive turf grass before being required to replace it with new sod.

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(d) This subsection (11) does not supersede any subdivision regulation of a county, city and county, or other municipality.

(12) (a) (I) There is hereby created the water efficiency grant program for purposes of providing state funding to aid in the planning and implementation of water conservation plans developed in accordance with the requirements of this section and to promote the benefits of water efficiency. The board is authorized to distribute grants to covered entities, other state or local governmental entities, and agencies in accordance with its guidelines from the moneys transferred to and appropriated from the water efficiency grant program cash fund, which is hereby created in the state treasury.

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

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

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

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

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

**HISTORY:** Source: L. 91: Entire section added, p. 2023, § 4, effective June 4. L. 99: (10) repealed, p. 25, § 3, effective March 5. L. 2003: (4)(g) amended and (11) added, p. 1368, § 4, effective April 25. L. 2004: Entire section amended, p. 1779, § 3, effective August 4. L. 2005: (11) amended, p. 1372, § 1, effective June 6; (1), (2)(b), and (7) amended and (12) added, p. 1481, § 1, effective June 7. L. 2007: (1)(a), (2)(a), (5), (7), and (12) amended, p. 1890, § 1, effective June 1. L. 2008: IP(4) amended, p. 1575, § 30, effective May 29; (12)(a) amended, p. 1873, § 14, effective June 2. L. 2009: (12)(a) amended, ([HB 09-1017](#)),

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ch. 297, p. 1593, § 1, effective May 21; (9)(a) amended, (SB 09-106), ch. 386, p. 2091, § 3, effective July 1.L. 2010: (4)(a)(I) and (9)(a) amended and (4.5) added, (HB 10-1051), ch. 378, p. 1772, § 1, effective June 7; (12)(a)(III), (12)(a)(IV), and (12)(c) amended, (SB 10-025), ch. 379, p. 1774, § 1, effective June 7.L. 2013: (11)(a), (11)(b)(III), IP(11)(c), (11)(c)(I), and (11)(c)(III) amended and (11)(b)(II.5) and (11)(d) added, (SB 13-183), ch. 187, p. 756, § 1, effective May 10; (6) and (12)(a)(IV) amended, (SB 13-181), ch. 209, p. 873, § 24, effective May 13.

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

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

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



## **Appendix B**

### Record of Public Notice



# CERTIFICATE OF PUBLICATION

STATE OF COLORADO } SS

County of Chaffee

I, MERLE J. BARANCZYK,


Being first duly sworn according to law, on oath depose and say, that I am, and at all the times herein mentioned, was the publisher of the Mountain Mail and that said Mountain Mail is a daily newspaper of general circulation, in said County and State, printed and published in the City of Salida, County of Chaffee and State of Colorado, and that copies of each number thereof are, and at all the times herein mentioned were, regularly distributed and delivered, by carrier or mail, to each of the subscribers said newspaper, in accordance with the customary method of business in newspaper offices.

That the annexed \_\_\_\_\_  
PUBLIC NOTICE \_\_\_\_\_  
BY \_\_\_\_\_  
THE UPPER ARKANSAS WATER CONSERVANCY DISTRICT \_\_\_\_\_


In the matter of \_\_\_\_\_  
WATER USE AND WATER RESOURCES MANAGEMENT EFFICIENCY  
PLAN \_\_\_\_\_  
60 DAY PUBLIC REVIEW/PUBLIC COMMENT \_\_\_\_\_

This is a true copy of the original, and the same was regularly published in the newspaper proper and not in a supplement, for the full period of \_\_\_\_\_  
ONE (1) INSERTION \_\_\_\_\_  
of said newspaper, and that the first publication was in the issue dated \_\_\_\_\_  
JUNE 11TH, 2015 \_\_\_\_\_  
and that the last publication of the same was in the issue dated \_\_\_\_\_  
JUNE 11TH, 2015 \_\_\_\_\_

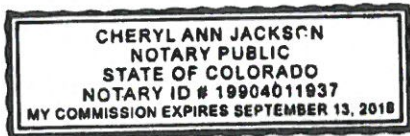
and the said Mountain Mail has been established, printed and published for the full period of fifty-two consecutive weeks, and continuously and uninterruptedly prior to the said date of the first publication of the notice aforesaid, in the City of Salida, County of Chaffee and State of Colorado, and is a newspaper duly qualified for the publishing of said notice within the meaning of an Act of the General Assembly of the State of Colorado, approved May 30th, 1923, and entitled "An act to Amend an Act Entitled 'An Act Concerning Legal Notices, Advertisements and Publications and the Fees of Printers and Publishers thereof, and to Repeal all Acts and Parts of Acts in Conflict with the Provisions of this Act'." and within the meaning of an Act amendatory thereof, approved May 18th, 1931 and entitled "An Act to Amend Section 4, of Chapter 139, Session Laws of Colorado, 1923, relating to Legal Notices and Advertisements," and within the meaning of any and all other Acts amendatory thereof or supplemental thereto. And further affiant saith not.



The above certificate of publication was subscribed and sworn to before me by the above named Merle J. Baranczyk who is personally known to me to be the identical person described in the above certificate, on the 11TH Day of JUNE, 2015 A.D. FEIN # 84-0718607



CHERYL ANN JACKSON, NOTARY PUBLIC-ID#19904011937  
STATE OF COLORADO/COUNTY OF CHAFFEE  
My Commission Expires: September 13<sup>th</sup>, 2018



## PROOF OF PUBLICATION

### PUBLIC NOTICE Upper Arkansas Water Conservancy District Water Use and Water Resources Management Efficiency Plan Available for Comment

The Upper Arkansas Water Conservancy District has completed a draft Water Use and Water Resources Management Efficiency Plan. The goal of the plan is to develop programs for efficient and sustainable water use. Before finalizing the Plan, the District welcomes comments from the public. The 60-day public review period begins the day of this notice, June 11, 2015 through August 10, 2015. A complete draft copy will be available at the District's Offices at 339 East Highway 50, Salida, CO for public review, Monday through Friday, between 9:00 am and 4:00 pm. The draft Water Use and Water Resources Management Efficiency Plan will also be posted on the web at [www.uawcd.com](http://www.uawcd.com). All written comments are due prior to 4:00 pm, August 10, 2015. Comments can be dropped off or mailed to UAWCD, P.O. Box 1090, Salida, CO 81201. Published in The Mountain Mail June 11, 2015.

Final

**Water Resources Management and Efficiency Plan**

Prepared for the

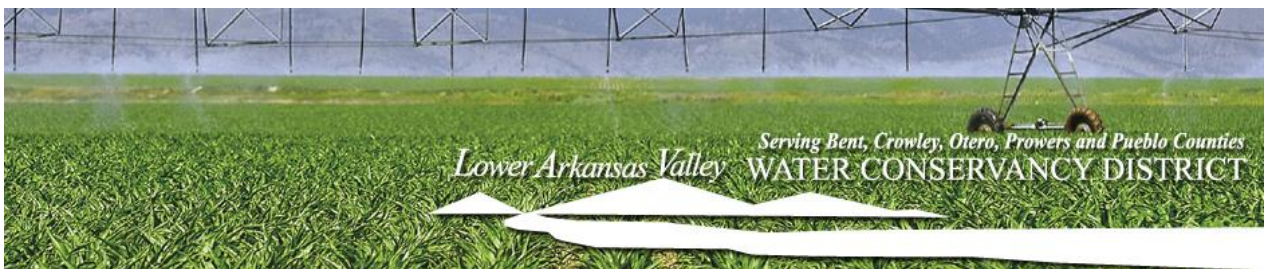
**Lower Arkansas Valley Water Conservancy District**

September 2015



**Prepared by Sustainable Practices**

*Through generous grants provided by the US Bureau of Reclamation and the Colorado Water Conservation Board*



*Lower Arkansas Valley*

*Serving Bent, Crowley, Otero, Prowers and Pueblo Counties*  
**WATER CONSERVANCY DISTRICT**

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## Organizational Summary

The Lower Arkansas Valley Water Conservancy District (hereafter “the District” or “the Lower Ark” or the “Lower District”) was formed in 2002 to protect water rights in the lower Arkansas River basin. The District is contained within and is wholly contiguous to Pueblo, Otero, Crowley, Bent and Prowers Counties (see Figure 1). The Lower District receives its funding through a mill levy which supports a multi-million dollar annual operating budget through 2022.

The Lower Ark’s mission includes three key areas objectives related to water resources management in the lower Arkansas River valley:

- To acquire, retain and conserve water resources;
- To encourage the use of water for socio-economic benefit; and
- To participate in projects which encourage thoughtful conservation, responsible growth and beneficial water use.

### Nature of Operations in the Lower District

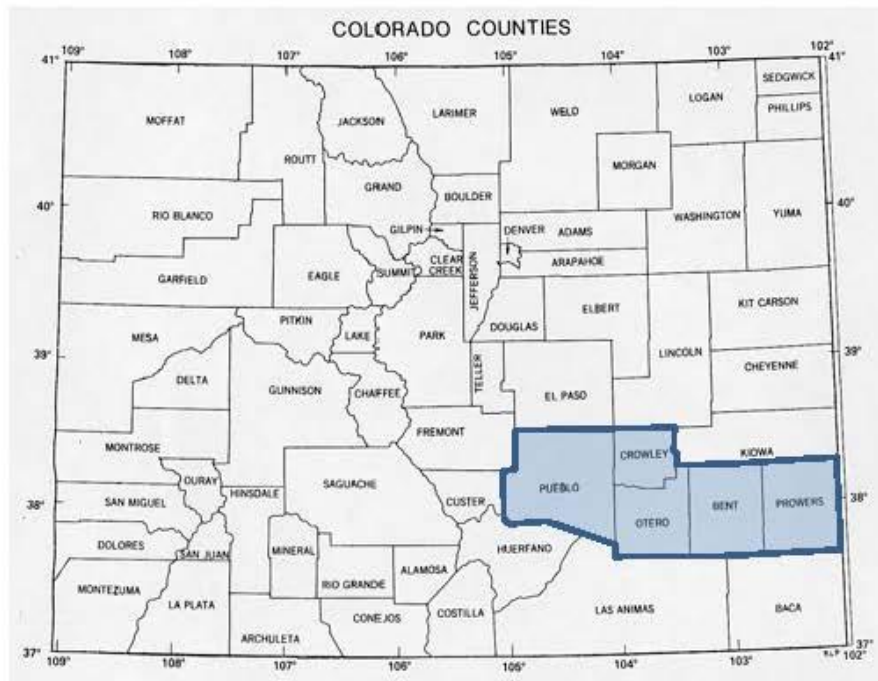
The District has ongoing interests and operations that focus on the active implementation of projects that support its missions. Specifically, the Lower District maintains operations in the following areas and/or practices. The District:

- Accepts donations and purchases conservation easements that protect farm lands and water rights, and that provide socio-economic and environmental benefits;
- Manages the Rule 10 replacement water program for 124 farms in the lower Arkansas River valley (see Appendix A for a description of Rule 10 and 14 as it relates to replacement water requirements in the lower Arkansas River valley);
- Supports Rule 14 augmentation programs through leasing of water shares and storage rights to Arkansas River based water management organizations (e.g., Arkansas Groundwater Users Association (AGUA), the Colorado Water Protective and Development Association (CWPDA), the Lower Arkansas Water Management Association(LAWMA));
- Supports the development and administers the creation (and in the future operation) of the Super Ditch (in conjunction with the Lower Arkansas Valley Super Ditch Company);
- Conducts and supports pilot projects to better characterize and understand water resources management in the lower Arkansas River valley;
- Protects lower Arkansas River valley water interests through legal and administrative means; and
- Conducts and supports local and regional water education programs.

The District is also involved, at many levels (e.g., local, regional, etc.), in the development and implementation of local and regional water policy, especially with respect to those policies that do or may influence water conservation, water use efficiency and water resources management in the lower Arkansas River basin.

Figure 1

### Lower Arkansas Valley Water Conservation District Boundaries



## Plan Objectives

This Plan serves to summarize the operations of the Lower District, and identify those opportunities where the District – working either independently or in conjunction with other local and regional water users – can improve local and regional water conservation and water use efficiency with the goal of keeping more usable water within the basin, and/or to make exchanges of water out of the basin in a more efficient and reliable, as well as less detrimental, manner than may otherwise occur without formal planning and collaboration.

Regional improvements in water use efficiencies and efforts to conserve water, which support local and regional water resources management, are the hallmark of the Plan contained herein. For this reason, the Lower District will consider and evaluate water use efficiency programs that include:

Structural components – such as improved aquifer and farm recharge projects that improve the timing and quantity of accretions to the Arkansas River and its tributaries.

Non-structural components – such as improved legal structures that provide for the increased flexibility of managing and using water rights in and along the lower Arkansas River and its tributaries.

### Relevance of Water Conservation and Water Use Efficiency to the District's Operations

Water conservation and water use efficiency planning and implementation related to the operations and functions of the Lower District is not necessarily consistent with what is typically associated with municipal and industrial water providers. Customer demand management programs, such as those listed in CRS 37-60-126 (see Appendix B), are not applicable to the types of programs that would be implementable by or useful to the Lower District and many of its partners in water management. This is due to the fact that the components of state statute dictate conservation program considerations for entities with retail water sales that are substantially, if not exclusively, for municipal and/or industrial uses. The Lower District does not provide retail water sales to any of its customers, but instead provides services and programs that support municipal, industrial, institutional, commercial, environmental, and agricultural water use in locations throughout its operational jurisdiction.

Because the District takes responsibility for owning, leasing, and managing water for these different uses; it is only natural that the organization is constantly evaluating means to improve efficiencies. For the Lower District, improved efficiencies can include, but not be limited to:

- Improving opportunities for water to be shared between water users<sup>1</sup> creating options for multiple use within the lower Arkansas River valley;
- Reducing transit and storage losses associated with the management of the District's water rights portfolio and the delivery of water to those locations of beneficial use and need; and
- Increasing the flexibility of the use of Lower District water, which would in turn provide for alternative points of diversion, exchanges and storage such that more wet water remains within the lower Arkansas River valley to the benefit of local and regional water users.

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<sup>1</sup> Water users in this case may include those entities, including farms that may need augmentation water, replacement water, and/or wet water for municipal, industrial, agricultural, or environmental purposes.

Given that there is a distinct overlap between the intent of the Colorado Statute addressing municipal and industrial water conservation and water use efficiency (i.e., CRS 37-60-126) and the kinds of programs that the Lower District conducts and supports, there is value to the District to develop a water conservation and efficiency plan that the State can review and approve through the Colorado Water Conservation Board. It may also be the case that some of the regional water efficiency programs that the Lower District and its partners conduct may help to inform the State and its constituency in their efforts to develop and implement a statewide water plan and Arkansas basin implementation plan.



## Description of Operations and Programs

### Water Rights Portfolio

The Lower District maintains a water rights portfolio to support its efforts to achieve its mission. Specifically, the District owns and leases water rights to provide for local water uses (as discussed above), increasing options and flexibility to water users within the five county area. Water rights are leased and owned to support the replacement of groundwater depletions, chiefly, but also as part of various conservation easements that the District either holds or owns. The discussions below highlight each of the key areas that the District's water rights support and identify recent quantities and timing of use as it relates to each of the District's programs.

### Current and Future Storage Rights

Past and current use of storage by the Lower District in Pueblo Reservoir has occurred using an "If and When" agreement – which is a temporary excess capacity contract that is approved on an annual basis. Table 1 presents the historical Pueblo Reservoir excess capacity contract for the Lower District from 2002 (when the District came into being) through 2009. Since 2009, the Lower District has maintained an excess capacity contract of 2,500 AF.

Through the Southeastern Colorado Water Conservancy District (SECWCD) excess capacity Master Contract<sup>2</sup>, the Lower District has requested 5,000 ac-ft of storage space related to future operations of Pueblo Reservoir. The Lower District has proposed to store existing water rights that it owns and future ditch leases, and deliver those supplies for municipal, industrial and agricultural purposes (Reclamation, 2013). Several other Arkansas Valley Conduit (AVC) and Master Contract participants have listed Lower District water as a potential supply for meeting future demand. The Lower District has also identified several privately-owned water supplies and irrigation companies that may temporarily lease water to the Lower District for use in their Master Contract related storage (see Table 2). According to the Master Contract Environmental Impact Statement (EIS), it is assumed that the owned supplies will constitute permanent agricultural dry-up (and therefore have a set annual yield), whereas the leased supplies will be provided on a rotational fallowing basis which will be determined by the irrigation companies.

**Table 1 – Pueblo Reservoir Excess Capacity Contract for Lower District**

	Excess Capacity Contract (AF)
2002	0
2003	0
2004	500
2005	500
2006	500
2007	1,000
2008	2,000
2009	2,500

<sup>2</sup> The SECWCD excess capacity Master Contract received permit approval from the US Bureau of Reclamation in 2013 for operations to begin in 2015 (performed in conjunction with the approval of the Environmental Impact Statement (EIS) that included the Arkansas Valley Conduit). The Master Contract will allow for a 40-year agreement between the SECWCD and its project partners for excess capacity storage of non-project water in Pueblo Reservoir.

**Table 2 - Proposed Lower District Supplies For Use in Master Contract  
(from Reclamation, 2013 and updated with transactions through the first quarter 2015)**

Supply	Ditch Shares Owned or Leased	Consumptive Use Ratio <sup>a</sup>	Average Annual Yield (AF)
<b>Supplies Owned by Lower District</b>			
Catlin Canal	0.1	0.4634	0.0
Ft. Lyons Canal	50.0	0.5094	25.5
Twin Lakes	91.0	1.1000	100.1
Colorado Canal/Lake Henry	282.0	0.6356	282.0
Lake Meredith	276.0	0.2500	161.0
Bessemer Ditch	73.6	0.5916	43.5
Rocky Ford Ditch	1.0		
Las Animas Consolidated Canal	1.0	0.5353	0.5
High Line Canal	6.0	0.5553	3.3
Larkspur Ditch	14,127.4		500.0
<i>subtotal</i>	<b>14,908.1</b>		<b>1,115.6</b>
<b>Supplies Leased to Lower District</b>			
Bessemer Ditch	2,767 <sup>b</sup>	0.5916 <sup>c</sup>	
High Line Canal	259 <sup>b</sup>	0.5553 <sup>c</sup>	
Oxford Farmers Canal	519 <sup>b</sup>	0.4728 <sup>c</sup>	
Otero Canal	8,980 <sup>b</sup>	0.5675 <sup>c</sup>	
Catlin Canal	2,193 <sup>b</sup>	0.4634 <sup>c</sup>	
Holbrook Canal	3,452 <sup>b</sup>	0.5771 <sup>c</sup>	
Ft. Lyon Canal/Storage Canal	4,947 <sup>b</sup>	0.5094 <sup>c</sup>	
<i>subtotal</i>	<b>23,117 <sup>b</sup></b>		
<b>TOTAL</b>	<b>35,767.4</b>		

Notes:

- (a) Consumptive use ratio is the assumed ratio of yield to shares owned or leased. This value varies by ditch due to differences in share structure by the ditch company, water rights, yields and other factors.
- (b) Shares needed to fill the 5,000 ac-ft of excess capacity space once per year. Represents the maximum shares needed if a particular ditch was the only supply.
- (c) Leased supplies yield depends on remaining demand calculated within the Daily Model.

The Lower District's use of its water and storage rights is unique in that it supplies water to other municipal and agricultural demands, as opposed to a dedicated Lower District demand. The following entities have been identified by the Lower District as potential recipients (leasees) of the water stored in the Lower District's excess capacity storage space (Reclamation, 2013).

- Fountain Valley Authority (Fountain Valley Authority) – Many Master Contract participants that receive water from the Fountain Valley Authority have identified the Lower District as a potential source of water to meet 2070 demands, including the cities of Fountain, Security, and Widefield. Constraints in conveyance facilities (e.g. Fountain Valley Conduit, Southern Delivery System) may limit Lower District deliveries, although all of these participants have Master Contract storage space to which water could be transferred and stored for later use.
- AVC participants – Several AVC participants have specifically identified the Lower District as a source of non-Fry-Ark water supply which may be used for augmentation water. Other participants have a gap between identified supplies and 2070 demands, and it is assumed that Lower District supplies will help to fill these gaps. Conveyance constraints are not anticipated as the AVC is sized according to identified percentages of demand to be met with combined Fry-Ark and non-Fry-Ark water AVC deliveries.

- Upper Arkansas Water Conservancy District (Upper District) – The Upper District is located upstream from Pueblo Reservoir, and provides water supplies and augmentation water for residential, commercial, industrial, and agricultural use. Constraints in exchange potential in the upper Arkansas River basin may limit Lower District deliveries to the Upper District. The Upper District is also requesting Master Contract storage space, so Lower District supplies could be transferred to Upper District storage for exchange at a time when storage space is available.
- Surface Water Irrigation Improvements Rule 10 – The Lower District has been identified as a supply for Rule 10 water. In this EIS, Lower District water associated with Rule 10 requirements will be limited to a portion of Lower District’s Master Contract storage that will be dedicated to releases to meet Rule 10 obligations.
- Seep Ditches – Seep ditches are decreed water rights for diverting from drainage ditches associated with agriculture runoff. It is anticipated that future out-of-priority diversions from seeps ditches will require augmentation water supplies. Similar to Rule 10 supplies, this supply will be limited to a portion of Lower District’s Master Contract storage that will be dedicated to releases to meet Seep Ditch obligations.

The annual Lower District storage demand for these participants is shown in Table 3. In the EIS it was assumed that the above listed participants can access Lower District storage to meet demand after all other supplies are exhausted. Lower District storage does not require a transfer to another excess capacity account; rather it is delivered directly to the participant.

Based on responses to Master Contract questionnaires and subsequent communication provided by the Lower District, use of water proposed for storage in Lower District Master Contract storage space will be limited to the above identified participants. Other potential water supplies and recipients, such as Super Ditch leases to Aurora and other entities outside of the Southeastern Colorado Water Conservancy District (Southeastern District) boundaries, were not analyzed in the EIS.

<b>Table 3 - LAVWCD Master Contract Storage Leases</b>	
	<b>Maximum Annual Lease (AF)</b>
<b>Fountain Valley Authority</b>	4,000
<b>AVC Participants</b>	800
<b>Upper Ark</b>	1,000
<b>Rule 10 Demand and Seep Ditches</b>	2,000

**Rule 10** (see Appendix A for a discussion of the Rule 10 Improvement Rules Plan)

The Lower District manages two Rule 10 Plans<sup>3</sup> related to the operation of 124 farms in the Lower Arkansas River valley<sup>4</sup>. Rule 10 reporting is based on analysis of changes in tail water and deep percolation occurring at each farm improvement (prior to lagging), as well as the total change in return

<sup>3</sup> Based on the April 30, 2013 State Engineer’s approval of Condition No. 14 of the Fort Lyon Rule 10 Plan and Condition No. 18 of the Lower District Rule 10 Plan.

<sup>4</sup> The Fort Lyon Plan includes 80 farms with 18,078.1 total acres (12,100.7 improved acres). The non-Fort Lyon Plan includes 44 farms with 10,348.6 total acres (6,688.3 improved acres).

flows experienced at the River (after lagging). Return Flow Maintenance Requirements (RFMR) are calculated, with a negative value representing an accretion to the river/tributary from the farm-related improvement and a positive value representing a depletion. The total 2013-2014 RFMR for both plans was 1,550.6 acre-feet (AF), with 610.0 AF for the Fort Lyon Plan and 940.6 AF for the LAVWCD Plan<sup>5</sup>.

As required by the State Engineer’s Irrigation Improvement Rules (Rules), RFMRs that occur each month are to be replaced in the following month, except for obligations that occur from November through March, whereupon a single delivery is to be made in March. The Rules allow credits and deficits to be carried forward through this five month winter period, but during the rest of the year only one month carry-forward is allowed. Tailwater return flows are assumed to reach the River/tributary in the same month as farm headgate deliveries. Deep percolation return flows are lagged forward using the Ground Water Accounting Model (GWAM) or a Glover model.

Pursuant to the stipulation between the Lower District and the State Engineer’s Office (SEO), return flow maintenance water was not required to be delivered to any tributary drains for the 2013-2014 Plan Year. Therefore, all releases of return flow maintenance water from storage were delivered to the River.

Table 4 presents a summary of the most recent Rule 10 water accounting as reported to the SEO.

<b>Table 4 – LAVWCD 2013-2014 Rule 10 Plan Replacement Water Summary</b>			
	<b>Approved Maintenance Flow Sources (AF)</b>	<b>Fort Lyon Plan Replacements (AF)</b>	<b>LAVWCD Plan Replacements (AF)</b>
Pueblo Reservoir (which may include releases from Lake Meredith based on potential exchanges with Aurora or CSU) <sup>a,b</sup>	2,100	219.40	643.60
Transit Losses		10.54	21.21
Board Water Works of Pueblo Return Flow Credits <sup>b</sup>	172	77.40	94.79
Fry-Ark Allocation Return Flow Credits <sup>c,d</sup>	300	218.84	209.67
Busk-Ivanhoe Return Flow Credits <sup>c</sup>	130	117.98	n/a
<b>Totals</b>		<b>644.16</b>	<b>969.27</b>
<sup>a</sup> – includes 1,000 AF leased from the Board Water Works of Pueblo (BWWP) <sup>b</sup> – applicable to both plans <sup>c</sup> – applicable to Fort Lyons Plan only <sup>d</sup> – LAVWCD traded water stored in Pueblo Reservoir for excess Fry-Ark return flow credits that allowed for use of these credits as replacement water under the LAVWCD Rule 10 Plan			

The 2014-2015 Rule 10 Plan Replacements are projected to be as indicated in Table 5. Operations for both Plans are expected to be similar. The total RFMR projected for the 2014-2015 Plan Year for both

<sup>5</sup> As shown in Table 1, replacement water is provided at a volume equal to or greater than the estimated depletion, such that for the Ft Lyon Plan, the 610 AF of depletions were replaced with 644 AF of replacement water. Similarly, for the non-Ft Lyon Plan (LAVWCD Plan), depletions, which were estimated to be 940.6 AF, were replaced with 969.27 AF of replacement water.

Plans, excluding transit losses, is 1,896.5 AF, with 1,006.0 AF for the Fort Lyon Plan and 890.5 AF for the non-Fort Lyon Plan. Of these amounts, 746.0 AF of the projected RFMR is owed above John Martin Reservoir and 1,150.5 AF is owed below John Martin Reservoir. These projections were calculated using ten-year (2004 through 2013) average deficits.

**Table 5 – Projected LAVWCD 2014-2015 Rule 10 Plan Replacement Water Summary**

	<b>Approved Maintenance Flow Sources (AF)</b>	<b>Estimated Fort Lyon Plan Replacements (AF)</b>	<b>LAVWCD Plan Replacements (AF)</b>
Pueblo Reservoir (may include releases from Lake Meredith based on exchanges with Aurora and/or CSU) <sup>a,b</sup>	2,100	861.90	970.1
Estimated Transit Losses		25.93	24.49
Board Water Works of Pueblo Return Flow Credits <sup>b</sup>	117	116.55	Not available
Fry-Ark Allocation Return Flow Credits <sup>c,d</sup>	1,380 (conditional)	Not available <sup>c</sup>	-
<b>Totals</b>		<b>1,004.38</b>	<b>994.59</b>
<p><sup>a</sup> – Includes 1,100 AF of fully-consumable water stored in Pueblo Reservoir with the option of releases occurring from Lake Meredith with a contract exchange with Colorado Springs Utilities or Aurora Water, (an additional 500 ac-ft of fully-consumable water is available to Lower District through a long-term contract with BWWP that has not yet been requested for delivery), and an additional 1,000 ac-ft of fully-consumable water stored in Pueblo Reservoir that was acquired from BWWP after the Plan applications were submitted, which also has the option of releases occurring from Lake Meredith with a contract exchange with Colorado Springs Utilities or Aurora Water.</p> <p><sup>b</sup> – applicable to both plans</p> <p><sup>c</sup> – applicable to Fort Lyons Plan only</p> <p><sup>d</sup> – Note that Fry-Ark Return Flows were not applied during this analysis due to uncertainties associated with the timing of delivery of the Project Water that produces those return flows. This would reduce reservoir releases for the Fort Lyon Plan by at least the amount of Return Flows received, which are expected to be approximately 682 acre-feet.</p>			

It is worth noting that the District’s role in providing replacement water for the 124 farms under Rule 10 is the following:

It is the goal of the Lower District to reduce releases from Pueblo Reservoir over time, which in turn will be expected to reduce the transit losses that are related to conveying Pueblo Reservoir releases to the river reach where replacement is being supported. The District has a multi-pronged approach to work toward this goal.

- i) The District has been conducting farm recharge pilot studies to more accurately measure farm recharge on river accretion rates. These studies have found that farm recharge is more efficient, providing larger volumes of water to the river than was accounted for in prior years by the SEO. More efficient farm recharge means that less replacement water sourced by the Lower Ark, including Pueblo Reservoir releases may be needed.

- ii) The Lower District has actively pursued leasing Fry Ark return flows which are generated by municipal water users in the lower Arkansas River valley. The Fry-Ark return flows reduce the need for reservoir releases, to the extent that they are properly timed and available. Rule 10 plans for future years do not include Fry-Ark return flows in the calculations, since they cannot be accurately predicted; however, each year the Lower District purchases Fry-Ark return flows improving the overall efficiency of the basin by using these return flow to reduce annual reservoir releases and in doing so reduce transit losses.
- iii) The Lower District trades/exchanges water that is stored in Pueblo Reservoir with Aurora and Colorado Springs who have water in Lake Meredith; allowing for Lake Meredith releases to replace river depletions below Lake Meredith, reducing transit losses.

These practices have improved recreational uses in Pueblo Reservoir by maintaining more water within the reservoir body; improved the water availability for municipal water supply by increasing the options for diverting water from the Pueblo Reservoir as transit losses are reduced (increasing yield in the reservoir); and improving the water quality of the reservoir as lake levels are stabilized.

<b>Table 6 - Pueblo Reservoir Releases by the Lower District for Rule 10 Replacement Water</b>	
<b>Year</b>	<b>Release (Acre-Feet)</b>
2011	624.37
2012	1,971.63
2013	793.84
2014	333.63
2015 (projected)	0.00

Table 6 tracks the releases from Pueblo Reservoir since the start of the Rule 10 Plan submittals in 2011, illustrating the reductions that have been taking place since 2012.

**Rule 14** (see Appendix A for explanation of Rule 14 Amended Use Rules)

Each year since the approval of the Amended Use Rules by the State Engineer, there have been 10-15 Rule 14 Plans approved annually. Three large well associations have represented the vast majority of well owners represented by Rule 14 Plans in the lower Arkansas River valley. These associations include the Arkansas Groundwater Users Association (AGUA) currently based in Avondale, the Colorado Water Protective & Development Association (CWPDA) based in La Junta and the Lower Arkansas Water Management Association (LAWMA) based in Lamar, Colorado (Tyner, 2014).

The LAWMA plan includes wells almost exclusively below John Martin Reservoir and in the area under the most scrutiny by the State of Kansas. LAWMA has carried out a strategy of acquiring surface water rights that could be converted from crop irrigation to augmentation and has completed change of water rights cases on virtually all of the water rights they currently own. LAWMA’s water right dry-up (surface water removed) represented over 12,000 acres in 2013 and facilitates the irrigation with supplemental or sole source wells of more than five times that many acres. LAWMA is the primary well association that can take advantage of the Offset Account, a special account in John Martin Reservoir that is used to provide replacement water to Kansas. LAWMA’s Rule 14 Plan normally accounts for 40,000 to 60,000 acre-feet of approved pumping (Tyner, 2014).

The CWPDA plan represents the largest number of well owners of the three organizations, with the wells located primarily above John Martin Reservoir as well as within other counties throughout the basin. Since most of the CWPDA replacement wells are located west of John Martin, which is in an area that produces lower yields than the wells located to the east, the CWPDA plan, with twice as many member wells as LAWMA, still normally accounts for 40,000 to 50,000 acre-feet of pumping. CWPDA has employed a strategy of owning fewer water rights for augmentation and competing more aggressively for municipal leases of consumable water. CWPDA also fosters an environment of member provided replacement water where farmers can bring their own water rights to support the plan and increase their pumping levels. CWPDA's member water rights and owned water rights are just recently being adjudicated in Water Court for replacement purposes (Tyner, 2014).

AGUA is the smallest of the three well associations, but provides a reliable plan for its members totaling around 300 wells. AGUA has one primary water right purchased and owned by the association, the Excelsior Ditch just east of Pueblo. This water right has been changed in Water Court and provides some reliable base replacement in average or above average hydrologic years. AGUA also relies on municipal leased consumable water. AGUA employs a recharge pond system under the Excelsior Ditch that helps stretch their resources (Tyner, 2014).

The Lower District interacts and supports each of these three entities by providing monthly leases of water for replacement needs, including meeting state-line depletions. Table 7 (see Page 10) summarizes the history of the District's leasing of water for these programs. Note that only LAWMA continues to lease water from the Lower District for augmentation since 2010. Also note that the District was able to allocate a portion of its leased water to Board of Water Works of Pueblo (BWWP) for state-line depletions from 2005 through 2008.

### **Conservation Easements**

The Lower District either holds or is working to create and maintain conservation easements that will link irrigation water to the farm land of its historic use. The conservation easements are intended to keep farm land in production and to keep the historic water rights (such as ditch shares) tied to the land such that water continues to be used on the farm, supplied through traditional methods (which mean that canal and /or ditches continue to convey the water to the farm from its source and/or diversion point). For this reason, conservation easements not only maintain open spaces and agricultural uses, but also they tend to provide local environment benefit in and along canals and ditches used to convey water to the conservation easements. In addition, accretions from the canals and ditches may provide benefit to receiving waters and other downstream water users supporting environmental, agricultural, and municipal uses.

<b>Table 7 - Rule 14 Leases and Deliveries</b>					
<b>LAVWCD Leases of Carry Over Storage<sup>6</sup></b>					
Twin Lakes	Shares	Colorado Canal/ Lake Meredith	Shares		
10/2003 – 9/2004	141.00	11/2004 – 10/2005	80.00		
1/2004 – 1/2005	195.00	11/2005 – 10/2006	80.00		
10/2004 – 9/2005	533.85	11/2006 – 10/2007	80.00		
10/2005 – 9/2006	426.87				
10/2006 – 9/2007	547.66				
<b>AGUA Leases From LAVWCD</b>					
Twin Lakes	Shares			Pueblo Reservoir	AF
4/2004 – 3/2005	50.00			9/2008 – 4/2009	500.00
4/2007 – 3/2008	200.00				
<b>CWPDA Leases From LAVWCD</b>					
Twin Lakes	Shares	Colorado Canal/ Lake Meredith	Shares		
4/2004 – 3/2005	200.00	4/2004 – 3/2005	30.00		
	AF	10/2004 – 3/2005	20.00		
10/2005 – 9/2006	61.34	11/2005 – 10/2006	80.00		
		11/2006 – 10/2007	80.00		
<b>Board of Water Works of Pueblo Leases from LAVWCD for Stateline Depletions<sup>7</sup></b>					
				Pueblo Reservoir	AF
				3/2005 – 5/2005	2,000.00
				5/2005 – 7/2005	1,004.00
				8/2005 – 10/2005	1,573.00
				6/2006 – 11/2006	4,696.00
				5/2008 – 5/2008	3,441.37
<b>LAWMA (Deliveries of LAVWCD Water for LAWMA Replacement)</b>					
LAWMA Shares					
	Shares				
4/2004 – 3/2005	150.00				
4/2005 – 3/2006	150.00				
4/2006 – 3/2007	150.00				
4/2007 – 3/2008	150.00				
4/2008 – 3/2009	150.00				
4/2009 – 3/2010	150.00				
4/2010 – 3/2011	150.00				
4/2011 – 3/2012	150.00				
4/2012 – 3/2013	150.00				

<sup>6</sup> The carryover storage is for unused water from LAVWCD holdings in Larksburg Ditch (transmountain); Otero County (from an IGA); and Twin Lakes (100 shares)

<sup>7</sup> Includes approximately 8,000 AF of transit losses from Pueblo Reservoir to the State line



The conservation easements that the Lower District currently maintains and/or is looking to establish include those listed in Table 8.

<b>Table 8 - LAVWCD Conservation Easements</b>		
<b>Location</b>	<b>Number of Current Holdings (through March 2015)</b>	<b>Proposed</b>
Bessemer Ditch	5	2
Catlin Canal	2	1
Highline Canal	9	3
Holbrook Canal	1	1
Fort Lyon Canal	1	1
Rocky Ford Ditch	LAVWCD owns a farm on this ditch	

### **Current Pilot Programs**

The Lower District supports and at times sponsors important pilot projects that help to inform policy and demonstrate alternative water management programs within the Lower District’s five county service area. As part of the Lower Ark’s efforts, two current pilot programs are worth mention: the Super Ditch and the Farm Pond Study.

#### **Super Ditch (HB 13-1248)**

The Super Ditch is a rotational crop following plan based on long-term leasing of water rights to provide a reliable water supply that benefits both farm and urban communities. The Lower District has been instrumental in evaluating and supporting the assessment of this program, most recently through the Catlin Canal Following-Leasing Pilot Project being funded by the CWCB (see Appendix B for the CWCB Board Memo which summarizes the pilot program).

The proposed pilot project involves transferring certain shares of agricultural water from farmland irrigated by the Catlin Canal, within Otero County, to temporary municipal uses by the Town of Fowler, City of Fountain, and the Security Water District. This pilot, if successful, may help to establish the larger scale use of rotational crop following in the Lower Arkansas River valley to provide for a reliable and sustainable source of municipal water supply without detrimental impact to agriculture, and the communities that rely on agriculture, within the basin. At its heart, this is a water use efficiency program that allows for the exchange and alternative use of water in a manner that is flexible and sustainable, within the constraints and requirements of Colorado water law<sup>8</sup>.

<sup>8</sup> Note that SB 15-198 was signed into law by Governor Hickenlooper in May 2015. This bill expands the applicability of the Super Ditch pilot project to include transfer of certain shares from agricultural water to recreational and industrial uses .

## Farm Pond Study

The CWCB is also funding a study that is managed by the Lower District that has been quantifying seepage from 27 ponds that farmers use to feed sprinkler systems. The study is being conducted to gather data quantifying rates of seepage and return flow from the ponds back into the receiving water – which may revise current estimation techniques developed by the State for accretion rates. If successful, the pond pilot studies will provide data supporting a higher seepage rate<sup>9</sup>, which will effectively reduce augmentation requirements if accretions are greater than current estimated for some locations.

At a meeting earlier this year, the District reported that farmers in the study already are able to claim greater leakage. The study found 13 of the original 22 ponds in the study had leakage rates higher than 20 percent. Measurements were taken as water flowed into ponds and as it ran through sprinklers. Overall, seepage from the farmer’s ponds was found to be in the range of 300 AF of the 1,340 AF that flowed into ponds. The state’s formula would have given them credit for just 40 AF (Pueblo Chieftain, 2014). The State is presently working with the Lower District to develop testing methods to verify a subset of the pond measurements.

The study, which will continue for another two years, will help researchers evaluate the relationship between seepage and physical or environmental conditions. This study may also influence the improved management of water resources in the Lower Arkansas River valley, as information is collected to inform more efficient operations of farm ponds and more accurate accounting of stream accretions and depletions.

## Educational Programs

The District engages in a number of water education programs to help engage and educate local water providers and ditch companies, water officials, and the community as a whole. In that the District’s mission includes the goal of encouraging the thoughtful conservation, responsible growth and beneficial use of water in the Lower Arkansas River valley, these messages are included in the educational programs sponsored by the Lower Ark.

Drip Irrigation Workshops	2004-2008
Conservation Easement Workshops	2004-2008
Local K-6 Classroom Education	2003-2013
Water 2012 Statewide Water Program	2012
Career Water Day (CSU-Pueblo)	2012
Arkansas River Basin Water Forum Sponsor	2002 - present
LAVWCD Website	2008 - present
Children’s Water Festival (Pueblo)	2010 - present
Children’s Water Festival (Trinidad)	2012 - present
Western Landscape Symposium	2012 - present

The education programs that the District supports over the years since its formation in 2002 are summarized in Table 9.

<sup>9</sup> The State currently estimates seepage rates as 3 percent of stored water.

## Water Conservation Goals and Objectives

Overall, the Lower District strives to improve water use efficiency throughout the Lower Arkansas River basin. The District also encourages the thoughtful conservation of the water resources in the basin, as well. A list of specific goals that the District has developed with respect to water use efficiency and water conservation are provided below.

- Continue to reduce transit and storage losses associated with the operation of the District's programs; working to eliminate the need for Pueblo Reservoir releases by 2020 (which would in turn reduce transit losses by 30-50 AF, see Table 1 and 2).
- Improve the understanding of aquifer recharge on stream accretions along the Arkansas River below Pueblo. This objective may be able to conserve as much as 5% of current replacement water sources associated with Rule 10 (which translates into a savings of about 50AF, see Table 1 and 2).
- Identify opportunities to expand and/or enhance aquifer recharge effort to support improved efficiencies related to the operation of Rule 10 and Rule 14 replacement water programs.
- Continue to evaluate the efficacy of developing and operating a Super Ditch program that would allow for the efficient exchange of agricultural water due to rotational fallowing to municipal providers both within and outside of the basin. This project will evaluate the option of developing up to 500 AF of transferable consumptive use water without detrimentally impacting agricultural businesses.

## Identification and Selection of Projects and Programs

The Lower District is not a covered entity under the definition that the State uses to determine which municipal water providers are required to develop and implement a water conservation plan under CRS 37-60-126 (see Appendix B). Therefore, the Lower District is not explicitly required to consider those measures and programs that are contained in Colorado Revised Statute 37-60-126 which defines specific content requirements for all water conservation plans developed by covered entities and approved by the State.

It is nonetheless valuable to present a review of how each of the State's required types of water conservation measures and programs were considered with respect to the Lower District's unique needs (see Table 5). In general, the Lower District has determined that customer demand management techniques are not particularly relevant to the operational issues that it currently faces, due in part to the nature of the various replacement water plans and conservation easement programs that it administers. Indoor demand management does not impact the consumption of water associated with the Lower District's operations, since water use efficiencies relate more to the storage and transmission of water, and the improvement of exchanges that allow for regional efficiencies and the conservation of resources. Similarly, improvements in outdoor irrigation efficiency do not necessarily reduce consumption either as it relates to the Lower District's operations. Therefore, most traditional water conservation demand management measures and programs do not impact the operations of the Lower District and therefore are not of specific relevance to the Lower District and the implementation efforts related to this Plan.

As for water loss management, which is also a component of the State's requirements for consideration, the Lower District does not operate an infrastructure latent water distribution system similar to those that all municipalities must construct, maintain and operate. The Lower District instead focuses its water loss management efforts on the reduction of transit and evaporative losses, as well as those programs that allow for multiple uses of the water (e.g., conservation easements<sup>10</sup>) since the main stem and tributaries of the Arkansas River serve as the distribution system for the delivery of customer water (i.e., Rule 10 and Rule 14 deliveries to offset the timing and volume of depletions). Therefore, water loss management for the Lower District is not at all like the programs that are applicable to municipal utilities.

For these reasons, the Lower District will choose to focus its resources on those projects, measures and programs that address improved water use efficiency and water resources management of lower basin water supplies that are integrated or related to the various water programs that it administers. Table 10 presents a review of the State's measures and programs that must be considered by a covered entity, and discussed the relevance of each with respect to the Lower District's circumstance and need.

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<sup>10</sup> Conservation easements provide an unique opportunity for water resources management in the lower Arkansas River basin, and anywhere within the State. Specifically, protecting a historical water right, continuing to bring water through a ditch to a farm that may continue to operate or not, helps to maintain local ecosystems reliant on the ditch flow, provides recharge and accretions to the receiving waters, and allows for continued operations of the farm on its open space. Well crafted conservation easements can support improved municipal (and industrial), environmental, agricultural, and recreational uses of the main stem and its tributaries.

**Table 10 - Review of State Required Measures and Programs for Consideration Under CRS 30-67-126 (4)(a)**

Measure or Program	Applicability to the Lower District's Water Conservation Needs	Status for Further Evaluation
Water-efficient fixtures and appliances, including toilets, urinals, clothes washers, showerheads, and faucet aerators	The Lower District does not have influence over the water use behaviors of specific residential and/or commercial customers.	No further evaluation necessary
Low water use landscapes, drought-resistant vegetation, removal of phreatophytes, and efficient irrigation	The Lower District does not have influence over the water use behaviors of specific residential and/or commercial customers.	No further evaluation necessary
Water-efficient industrial and commercial water-using processes	The Lower District does not have influence over the water use behaviors of specific residential and/or commercial customers.	No further evaluation necessary
Water reuse systems	The Lower District does have the potential to utilize reusable water supplies, such as Project Water return flows, once the Master Contract has been executed. Using excess storage capacity, the Lower District may be able to make exchanges with more entities including those in other basins or in the upper basin. Other future programs may also allow for expansion of other alternative water supplies.	Water reuse will be considered by the Lower District
Distribution system leak identification and repair	The Lower District will evaluate methods to reduce transit losses and reservoir evaporative losses.	Include transit and evaporative loss management improvements within the Plan
Dissemination of information regarding water use efficiency measures, including by public education, customer water use audits, and water-saving demonstrations	The Lower District currently maintains educational programs to support public and customer education	Include water education programs within the Plan
Water rate structures and billing systems designed to encourage water use efficiency in a fiscally responsible manner	The Lower District has been working to improve the understanding of the value of water and water rights in the Arkansas Basin, and will continue to do so; however, the Lower District does not have water sales except based on market prices for replacement water and other wholesale transactions.	No further evaluation necessary
Regulatory measures designed to encourage water conservation	The Lower District will continue to support improvements to water policy and procedures that improve water use efficiency and allow for the more flexible exchange and transfer of water within the construct of the prior appropriations doctrine.	Include efforts to support appropriate water policy development that supports the goals and mission of the Lower District
Incentives to implement water conservation techniques, including rebates to customers to encourage the installation of water conservation measures	The Lower District does not have influence over the water use behaviors of specific residential and/or commercial customers.	No further evaluation necessary

Given that the Lower District has a number of ongoing and long-planned projects and programs that all relate to improved water use efficiency and water resources management in the lower basin, all of these programs will be included in how the Plan is implemented. To this point, the Plan recommends that all of these projects and programs be developed and/or continued with the support of the Lower District's regional, State and Federal partners.

The various relevant projects and programs, many of which are described previously, are provided below.

Continue pilot studies (e.g., Caitlin lease following pilot and Farm Pond Study) that support regional water resources management with exchanges, releases, leases, replacements and augmentation; with the District working to create opportunities for more efficiency water sharing, water use and water management through these vehicles.

Facilitation of small community programs (e.g., rural water authorities) with the intent of supporting improved and more sustainable operations. This effort will include the Lower District supporting the Southeastern District in creating a water quality working group in the lower basin. The working group, which is funded in part by the Arkansas Basin Roundtable, is tasked with developing solutions for regulatory compliance, as well as finding funding support, for small public and private water providers impacted by naturally occurring contamination in local groundwater and surface water supplies. Improvements in water quality management are expected to reap benefits in local water use efficiency.

Assisting water companies to understand the business of operations, maintenance and repair, sustainability, and pricing of water in the valley through various programs that help create consistent markets for water use. This can be accomplished by leveraging regional infrastructure and management programs to improve water use efficiency aiding recreational, agricultural, environmental and municipal water uses. The largest issues in the lower basin may relate to hiring (and valuing) technical expertise in the Valley to perform facility and canal operations, conducting engineering studies (including water rate studies local water providers), and valuing the assets owned and managed by each water and ditch company/overall ditch company management.

Developing additional conservation easements that would contain municipal and industrial components that allow farmers to lease water to cities and towns 7 out of 10 years, thus keeping water in local ditches, canals, and the river. Conservation easements can also be strategically placed to draw water to the end of the ditch, which promotes local recharge, maintains historical accretions, and benefits the environment; all of which are components of regional water use efficiency.

Continue to work with regional and statewide programs and initiatives to help promote local and regional water use efficiency. These programs and initiatives include serving on the Arkansas Basin Roundtable, the Interstate Basin Compact Commission (IBCC) and its various committees, and the Colorado Water Congress.

Continue to support local and regional water education programs such as those listed in Table 9.

Work with the Southeastern District to implement an excess storage capacity Master Contract that would support various improved efficiencies in water exchanges in both the upper and lower basin. In addition, the Lower District will work to support those local and regional water providers that will have their own Master Contracts<sup>11</sup>. Overall, the Master Contract will allow for

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<sup>11</sup> Note that many of the local water providers that are partners to the AVC also will be utilizing the excess storage capacity of Pueblo Reservoir. The Lower District plans to help these entities prepare for and plan operations of local

storage, exchanges, leases to small communities, and improved regional water use efficiency (including more captured reusable return flows).

Table 11 summarizes the programs that the Lower District is proposing to implement along with an indication of the timeframe associated with implementation.

It is important to note that as part of the implementation of these programs, data collection must occur to monitor and verify progress and results relative to not only improvements in water use efficiency on a local and regional scale, but as a means to ensure that each program maintains compliance and adheres to the requirements of the State regarding water resources management. To this end, the Plan provides information on what data will be collected and with what regularity within the framework of program implementation, which is presented in the following section.

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water supply once the AVC is constructed. These efforts may begin during the current planning horizon and extend into next decade.

**Table 11 - Listing of Projects, Measures and Programs for Consideration by the Lower District**

Program	Description	Implementation Tasks	Timing		
			1-2 years	3-5 years	>5 years
Master Contract for Storage of Non-Project Water in Pueblo Reservoir	Allows for exchanges with other entities in and outside of the basin. Includes storage of reusable Fry-Ark Project Water return flows and allows for the Lower District to meet demand during periods when direct flow rights do not meet demands and higher elevation storage vessels are subject to freezing - allowing for storage during peak runoff in Pueblo Reservoir until wintertime needs arise.	Execute contract with Southeastern District	X		
		Continue operations with new contract (which allows for prolonged use of Pueblo Reservoir, and enhances potential for exchanges and transfers)	X	X	X
		Establish and continue annual reporting to Southeastern District		X	X
Caitlin Canal Lease Following Pilot	Allows for the leasing of agricultural water rights for municipal and other uses on a rotating basis. Leases can occur for 10 years up to 40 years through the pilot allow municipal share purchasers to develop reliable yield from program.	Establish regional entity (i.e., legal structure and sub-district enterprise) to allow for exchanges	X		
		Obtain control of water rights, including change case		X	
		Conduct physical studies		X	X
Farm Pond Pilot Program	Created pilot to measure and verify pond recharge rates in various (up to 27) locations. Ongoing program that started 2 years ago.	Establish monitoring and verification program working with SEO	X		
		Collect and analyze data and make recommendations	X	X	
Establish proactive positioning regarding relevant state water policies	The Lower District will continue to work to support appropriate local and regional water use efficiency and water resources management	Support the CWCB, Basin Roundtables and the IBCC	X	X	X
		Support and Participate in the Lower Valley Water Quality Working Group	X	X	X
		Support the State Legislature and the Colorado Water Congress	X	X	X
Continue Expansion of Conservation Easements		Identify opportunities	X	X	X
		Develop contracts and agreements	X	X	X
Continue current programs related to education, outreach and policy support	Support local understanding of the value of water and the assets that exist within the Arkansas River valley, and promote more effective engagement of engineering and technical talent needed to plan for, design, construct, and operate current and future water systems and facilities.	Water conservation tips on the Lower District website	X	X	X
		Website links to Southeastern District BMP Tool Box	X	X	X
		Support to local and regional water education programs (see Table 9)	X	X	X
		Studies on improving irrigation efficiencies (e.g., lease following pilot, interruptible water supply pilot, TR-21, etc.)	X	X	X
		COAGMET Data Collection and Transmission	X	X	X
		Support training programs at Otero Junior College	X	X	X



## Implementation of the Plan

The implementation of the selected Plan elements presented in Table 11 will proceed based on a number of factors. The factors that will influence implementation include:

- Funding availability within the annual operating budget of the Upper District;
- Ongoing regional partnerships;
- Contractual obligations and requirements;
- Coordination with coordinating agencies and organizations; and
- Funding support from other parties relevant to large, shared projects.

Current funding levels within the Lower District will support all of the proposed projects, measures and programs as listed in Table 11

Data collection related to the implementation of this Plan will essentially be the same as it currently is for the Lower District. Daily and monthly reporting to the Lower District's Board and the State (e.g., State Engineers Office, CWCB) will remain the same, and those data will be used, as they are now, to track and quantify transit and evaporation related losses. In addition, the Lower District will provide annual reports to the Southeastern District with regard to the excess capacity Master Contract. Therefore, any progress that is made regarding the stated water conservation goals and improvements in water use efficiency is already incorporated into the data collection and management efforts of the Lower District.

Some of the benefits of the Lower District's efforts related to formalizing the implementation of this Plan will be how those efforts are incorporated into the Arkansas Basin Implementation Plan. The nexus between the Lower District's regional efforts (projects and policy) and those of the Arkansas Basin Round Table will help to create a broader understanding and involvement of water interests and water agencies in critical policy discussions. The nexus will also help to link project and policy needs with CWCB funding through one of the grant programs that CWCB administers (e.g., Water Supply Reserve Account, Water Efficiency Grant Fund, etc.)<sup>12</sup>. Coordination of the Lower District's efficiency efforts with the Arkansas Round Table will also help to inform and support regional and basin wide water efficiency efforts.

### Updating the Plan

The Lower District's Plan will be reviewed and updated informally throughout the planning period (i.e., until the end of 2022). The Lower District may choose to formally update the Plan whenever it is valuable to the organization dependent on financial needs, and/or substantial changes to its current operating conditions. At the very least, the Lower District will update this Plan in 7 years, or by the end of 2022.

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<sup>12</sup> Grant funding to support the implementation of the Upper District's Plan may include grants that are awarded to the Upper District, or are awarded to other groups of project participants of which the Upper District is participator or collaborator.

### **Plan Public Review and Comment**

The Plan has undergone public review in accordance with the requirements of the State regulations for a period of 60 days – from July 17, 2015 to September 15, 2015. A notice of the public review was printed in the local newspaper (see Appendix C). A copy of the draft Plan was made available to the public at the offices of the District. No public comments were received during the public review period.

## **Appendix A**

### **Rule 10 and 14 Program Overviews**



## Rule 10 Overview

Colorado and Kansas entered into the Compact in 1948 to apportion the waters of the Arkansas River and the benefits arising from the construction, operation, and maintenance of John Martin Reservoir. Compact, Article I. Article IV-D of the Compact governs future developments in the Arkansas River basin (Basin) in Colorado. It provides that:

This Compact is not intended to impede or prevent future beneficial development of the Arkansas River basin in Colorado and Kansas by Federal or State agencies, by private enterprise, or by combinations thereof, which may involve construction of dams, reservoirs, and other works for the purpose of water utilization and control, as well as the improved or prolonged functioning of existing works: Provided, that the waters of the Arkansas River, as defined in Article III, shall not be materially depleted in usable quantity or availability to the water users in Colorado and Kansas under this Compact by such future development or construction.

Irrigation improvements are subject to the Compact's limit on future developments in Colorado. The State Engineer supports efforts to increase irrigation efficiency in the Arkansas River Basin in Colorado as long as they do not violate Article IV-D of the Compact. The irrigation return flows from Colorado farms that were being used in Kansas in 1948 cannot now be consumed by improved irrigation practices in Colorado. With the Irrigation Improvement Rules in place, the State Engineer can provide the oversight necessary to allow Colorado water users to continue to improve the efficiency of surface water irrigation systems with confidence that they will be in compliance with the Compact.

A variety of factors affect whether a change in irrigation method will have an impact on historical seepage and return flows. Perhaps the most important factor is the sufficiency of the water supply to the field using the unimproved irrigation system. On a water-short farm, the water supply available to the farm does not provide a sufficient amount of water to meet the crop demand on all of the acres decreed for irrigation. In water short systems, when a more efficient method of irrigation is used, a greater portion of water applied will be delivered to the crop root zone and can be consumed by crop evapotranspiration. Certain improvements in efficiency on water-short systems will result in more water being made available for crop evapotranspiration, increasing the crop consumptive use of water applied for irrigation and reducing historical seepage and return flows. (Bill Tyner, Arkansas River Water Forum, 2014)

Requirements for 2011 Compact Rules Governing Improvements to Surface Irrigation in the Arkansas River Basin in Colorado for applications for Improvement Rules Plans (Rule 8 or 10) can be found at <http://water.state.co.us/DWRIPub/Documents/IrrigationImprovementExpectationLtr2011.pdf>.

An example of a Rule 10 application for 2014-15 can be viewed at <http://water.state.co.us/SurfaceWater/RulemakingAndAdvising/ArkRiverAC/Documents/2014%20LAVWCD%20Rule%2010%20Plan%20Request.pdf>.

## Rule 14 Overview

Augmentation plans allow for out-of-priority diversions by replacing the water a new well owner (junior water right holder) consume, which in turn depletes the hydrologic system by an equal amount of water. The replacement water must meet the needs of senior water rights holders such as being available at the time, place, quantity and suitable quality they would enjoy absent the out-of-

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priority diversions. Having an augmentation plan allows a junior water user, for example, to pump a tributary groundwater well, even when a senior call exists on the Arkansas River.

Replacement water may come from any legally available source and be provided by a variety of means. An augmentation plan identifies the structures, diversions, beneficial uses, timing and amounts of depletions to be replaced, along with how and when the replacement water will be supplied and how the augmentation plan will be operated. Some augmentation plans use storage water to replace depletions. Others include the use of unlined irrigation ditches and ponds during the non-growing season to recharge the groundwater aquifers that feed the river. A person who wants to divert out [of priority] must file an application with the regional Water Court. Under certain circumstances the State Engineer may approve temporary changes of water rights and plans to replace out-of-priority depletions using Substitute Water

Supply Plans. This allows well pumping to continue while Water Court applications for changes of water rights or augmentation plans are being approved. A Substitute Water Supply Plan requires adequate replacement water to cover depletions of water that would injure senior water rights. (Steve Gibson, *The Valley Courier*, 2013)

Colorado promulgated the Amended Rules and Regulations Governing the Diversion and Use of Tributary Ground Water (Amended Use Rules) in 1996. This set of Rules prevented approval of Kansas' request that all post-Compact wells be curtailed when it was determined that Colorado had violated the Compact with respect to these wells. Curtailment would have had a devastating impact on irrigated agriculture in the Arkansas River Basin so operation under the Amended Use Rules has been a vital part of water administration since 1996 in Division 2.

The Amended Use Rules allowed wells to continue to be operated as long as they were included in a Water Court decreed plan for augmentation, a substitute water supply plan approved by the State Engineer or a plan approved pursuant to the Rules for a limited population of wells in existence and used consistently with their water rights as of the time Kansas brought suit. This last type of plan has commonly been referred to as either a Rule 14 Plan (denoting the portion of the Amended Use Rules that specifies the construct of this type of plan application) or an Arkansas River Replacement Plan. (Bill Tyner, *Arkansas River Water Forum*, 2014).

## **Appendix B**

Colorado Revised Statute 37-60-126



COLORADO REVISED STATUTES

\*\*\* This document reflects changes current through all laws passed at the First Regular Session of the Sixty-Ninth General Assembly of the State of Colorado (2013) \*\*\*

TITLE 37. WATER AND IRRIGATION  
WATER CONSERVATION BOARD AND COMPACTS  
ARTICLE 60. COLORADO WATER CONSERVATION BOARD  
PART 1. GENERAL PROVISIONS

C.R.S. 37-60-126 (2013)

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

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

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

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

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

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

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

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

(g) "Water conservation" means water use efficiency, wise water use, water transmission and distribution system efficiency, and supply substitution. The objective of water conservation is a long-term increase in the productive use of water supply in order to satisfy

water supply needs without compromising desired water services.

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

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

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

(b) The office shall review previously submitted conservation plans to evaluate their consistency with the provisions of this section and the guidelines established pursuant to paragraph (a) of subsection (7) of this section.

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

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

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

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

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

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

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

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(IV) Water reuse systems;

(V) Distribution system leak identification and repair;

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

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

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

(VIII) Regulatory measures designed to encourage water conservation;

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(9) (a) Neither the board nor the Colorado water resources and power development authority shall release grant or loan proceeds to a covered entity unless the covered entity provides a copy of the water conservation plan adopted pursuant to this section; except that the board

or the authority may release the grant or loan proceeds notwithstanding a covered entity's failure to comply with the reporting requirements of subsection (4.5) of this section or if the board or the authority, as applicable, determines that an unforeseen emergency exists in relation to the covered entity's loan application, in which case the board or the authority, as applicable, may impose a grant or loan surcharge upon the covered entity that may be rebated or reduced if the covered entity submits and adopts a plan in compliance with this section in a timely manner as determined by the board or the authority, as applicable.

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

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

(10) Repealed.

(11) (a) Any section of a restrictive covenant or of the declaration, bylaws, or rules and regulations of a common interest community, all as defined in [section 38-33.3-103, C.R.S.](#), that prohibits or limits xeriscape, prohibits or limits the installation or use of drought-tolerant vegetative landscapes, or requires cultivated vegetation to consist wholly or partially of turf grass is hereby declared contrary to public policy and, on that basis, is unenforceable. This paragraph (a) does not prohibit common interest communities from adopting and enforcing design or aesthetic guidelines or rules that require drought-tolerant vegetative landscapes or regulate the type, number, and placement of drought-tolerant plantings and hardscapes that may be installed on the unit owner's property or property for which the unit owner is responsible.

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

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

(A) An architect's stamp;

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

(C) An analysis of water usage under the proposed new landscape plan or a history of water

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usage under the unit owner's existing landscape plan; and

(D) The adoption of a landscaping change fee.

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

(II.5) "Turf" means a covering of mowed vegetation, usually turf grass, growing intimately with an upper soil stratum of intermingled roots and stems.

(III) "Turf grass" means continuous plant coverage consisting of nonnative grasses or grasses that have not been hybridized for arid conditions which, when regularly mowed, form a dense growth of leaf blades and roots.

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

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

(I) No enforcement action shall require that a unit owner water in violation of water use restrictions declared by the jurisdiction in which the common interest community is located, in which case the unit owner shall water his or her landscaping appropriately but not in excess of any watering restrictions imposed by the water provider for the common interest community;

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

(III) In any enforcement action in which the existing turf grass is dead or dormant due to insufficient watering, the unit owner shall be allowed a reasonable and practical opportunity, as defined by the association's executive board, with consideration of applicable local growing seasons or practical limitations, to reseed and revive turf grass before being required to replace it with new sod.

(d) This subsection (11) does not supersede any subdivision regulation of a county, city and county, or other municipality.

(12) (a) (I) There is hereby created the water efficiency grant program for purposes of providing state funding to aid in the planning and implementation of water conservation plans developed in accordance with the requirements of this section and to promote the benefits of water efficiency. The board is authorized to distribute grants to covered entities, other state or local governmental entities, and agencies in accordance with its guidelines

from the moneys transferred to and appropriated from the water efficiency grant program cash fund, which is hereby created in the state treasury.

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

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

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

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

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

**HISTORY:** Source: L. 91: Entire section added, p. 2023, § 4, effective June 4. L. 99: (10) repealed, p. 25, § 3, effective March 5. L. 2003: (4)(g) amended and (11) added, p. 1368, § 4, effective April 25. L. 2004: Entire section amended, p. 1779, § 3, effective August 4. L. 2005: (11) amended, p. 1372, § 1, effective June 6; (1), (2)(b), and (7) amended and (12) added, p. 1481, § 1, effective June 7. L. 2007: (1)(a), (2)(a), (5), (7), and (12) amended, p. 1890, § 1, effective June 1. L. 2008: IP(4) amended, p. 1575, § 30, effective May 29; (12)(a) amended, p. 1873, § 14, effective June 2. L. 2009: (12)(a) amended, ([HB 09-1017](#)), ch. 297, p. 1593, § 1, effective May 21; (9)(a) amended, ([SB 09-106](#)), ch. 386, p. 2091, § 3, effective July 1. L. 2010: (4)(a)(I) and (9)(a) amended and (4.5) added, ([HB 10-1051](#)), ch. 378, p. 1772, § 1, effective June 7; (12)(a)(III), (12)(a)(IV), and (12)(c) amended, ([SB 10-025](#)), ch. 379, p. 1774, § 1, effective June 7. L. 2013: (11)(a), (11)(b)(III), IP(11)(c), (11)(c)(I), and (11)(c)(III) amended and (11)(b)(II.5) and (11)(d) added, ([SB 13-183](#)), ch. 187, p. 756, § 1, effective May 10; (6) and (12)(a)(IV) amended, ([SB 13-181](#)), ch. 209, p. 873, § 24, effective May 13.

Editor's note: Subsection (12) was originally enacted as subsection (13) in House Bill 05-

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1254 but was renumbered on revision for ease of location.

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

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

## **Appendix C**

### Record of Public Notice

## CITY OF ROCKY FORD Water Conservation Plan Available For Comment

The City of Rocky Ford has completed a draft Water Conservation Plan. The goal of the plan is to develop programs for efficient and sustainable water use. Before finalizing the Water Conservation Plan, the City welcomes comments from the public. The 60-day public review period begins the day of this notice, July 17, 2015 through September 15, 2015. A complete draft copy will be available at the Lower Arkansas Valley Water Conservancy District, 801 Swink Ave., Rocky Ford CO 81067 for public review, Monday through Friday, between 8:00 a.m. — 5:00 p.m. The draft regional Water Conservation Plan will also be posted on the web at [www.secwcd.org](http://www.secwcd.org).

All written comments are due prior to 4:30 p.m., September 15, 2015. Comments can be dropped off or emailed to Lower Arkansas Valley Water Conservancy District, 801 Swink Ave., Rocky Ford CO 81067.

*Published in the RF Daily Gazette 7/17/15*



## **Appendix I – Colorado Revised Statutes (CRS) 60-37-126.5**

C.R.S. 37-60-126

COLORADO REVISED STATUTES

\*\*\* This document reflects changes passed at the Second Regular Session and First Extraordinary Session of the Sixty-Eighth General Assembly of the State of Colorado (2012) \*\*\*

TITLE 37. WATER AND IRRIGATION  
WATER CONSERVATION BOARD AND COMPACTS  
ARTICLE 60. COLORADO WATER CONSERVATION BOARD  
PART 1. GENERAL PROVISIONS

C.R.S. 37-60-126 (2012)

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

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

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

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

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

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

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

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

(g) "Water conservation" means water use efficiency, wise water use, water transmission

and distribution system efficiency, and supply substitution. The objective of water conservation is a long-term increase in the productive use of water supply in order to satisfy water supply needs without compromising desired water services.

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

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

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

(b) The office shall review previously submitted conservation plans to evaluate their consistency with the provisions of this section and the guidelines established pursuant to paragraph (a) of subsection (7) of this section.

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

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

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

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

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

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

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

(IV) Water reuse systems;

(V) Distribution system leak identification and repair;

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

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

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

(VIII) Regulatory measures designed to encourage water conservation;

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

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

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

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

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

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

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

regarding the guidelines. These guidelines shall:

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

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

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

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

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

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

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

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

(8) A covered entity may at any time adopt changes to an approved plan in accordance with this section after notifying and receiving concurrence from the office. If the proposed

changes are major, the covered entity shall give public notice of the changes, make the changes available in draft form, and provide the public an opportunity to comment on such changes before adopting them in accordance with subsection (5) of this section.

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

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

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

(10) Repealed.

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

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

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

(A) An architect's stamp;

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

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

(D) The adoption of a landscaping change fee.

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

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

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

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

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

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

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

(12) (a) (I) There is hereby created the water efficiency grant program for purposes of providing state funding to aid in the planning and implementation of water conservation plans developed in accordance with the requirements of this section and to promote the benefits of water efficiency. The board is authorized to distribute grants to covered entities, other state or local governmental entities, and agencies in accordance with its guidelines from the moneys transferred to and appropriated from the water efficiency grant program cash fund, which is hereby created in the state treasury.

(II) Moneys in the water efficiency grant program cash fund are hereby continuously

appropriated to the board for the purposes of this subsection (12) and shall be available for use until the programs and projects financed using the grants have been completed.

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

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

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

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

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

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

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



328, Session Laws of Colorado 1991.

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

**Appendix J – Funding Options for Water Conservation Planning and  
Implementation**

**(reprinted from Regional Water Conservation Plan – 2013)**

## Appendix I - Funding Options for Water Conservation Planning and Implementation

Funding Source			Fund Details		Water Loss Management (Infrastructure)					Water Conservation (Catch-all)			
Funding Category	Name of Funder	Name of Fund	Funds Available	Required Match	Meter Replacement	Repairing Distribution Piping	Sub-Metering and Valving	Data Handling	System-Wide Audits	Water Rates	Education Materials	Workshops	Facility Audits and Retrofits
Federal	USBR	<a href="#">Water and Energy Efficiency Grants</a>	<b>Maximum:</b> \$300k (small projects); \$1.5M (large/phased projects) <b>Average (FY2011):</b> ~\$237k (small projects); ~\$577k (large/phased projects)	50%	X	X	X	X	X	X			X
Federal	USBR	<a href="#">System Optimization Review Grant</a>	\$300k per project (maximum)	50%				X	X				X
Federal	NRWA/ USDA	<a href="#">NRWA Revolving Loan Fund</a>	\$100k per project (maximum); population <10,000 required \$150,000 or \$500,000 (maximum); population <10,000 and significant decline in quantity or quality due to emergency required	25%	X	X	X						
Federal	USDA	<a href="#">Emergency Water Assistance Grants</a>		None		X							
Federal	USDA	<a href="#">Water and Waste Disposal Direct Loans and Grants</a>	No stated funding limit; population <10,000 required	Requires funding from other sources	X	X	X						
State	CWRPDA	<a href="#">Drinking Water Revolving Fund</a>	\$2M for direct loans; >\$2M (leveraged loans) may take additional time; pop. <5,000 can receive grant	20%	X	X	X						
State	CWRPDA	<a href="#">Small Water Resources Projects</a>	<b>Maximum:</b> Invstmt grade: \$500M; <b>1000+ taps or 2500+ pop.:</b> \$2.55M; <b>650+ taps or 1000+ pop.:</b> \$250k \$2M for direct loans;	None	X	X	X						
State	CWRPDA	<a href="#">Water Pollution Control Revolving Fund</a>	>\$2M (leveraged loans) may take additional time; pop. <5,000 can receive grant	20%	X	X	X						
State	CWRPDA	<a href="#">Water Revenue Bonds</a>	<b>Invstmt grade:</b> \$500M; <b>1000+ taps or 2500+ pop.:</b> \$2.55M; <b>650+ taps or 1000+ pop.:</b> \$250k	None	X	X	X						
State	CWCB	<a href="#">Water Conservation Planning Grants</a>	<b>Maximum:</b> <\$50k can be submitted any time; >=\$50k must be submitted by 1st of month prior to bi-monthly Board mtg	25%			X			X	X	X	X
State	CWCB	<a href="#">Water Conservation Implementation Grants</a>	<b>Maximum:</b> <\$50k can be submitted any time; >=\$50k must be submitted by 1st of month prior to bi-monthly Board mtg	25%			X			X	X	X	X
State	CWCB	<a href="#">Water Resource Conservation Public Education and Outreach Grants</a>	<b>Maximum:</b> <\$50k can be submitted any time; >=\$50k must be submitted by 1st of month prior to bi-monthly Board mtg	25%							X	X	
State	CWCB	<a href="#">Water Supply Reserve Account Community Development Block Grant</a>	<b>Basin Account:</b> No Limit; <b>State Account:</b> \$1M maximum	20%	X	X	X	X	X	X	X	X	X
State	DOLA	<a href="#">Local Government Water &amp; Wastewater Management</a>	No stated funding limit	Not stated	X	X	X						
State	DOLA	<a href="#">Technical Assistance</a>	No direct funds	None	DOLA staff support in development of programs and identification of other funding sources for many of the activities listed								
State	CRWA		No direct funds	None	CRWA provides technical assistance that may support many of the activities listed								

LEGEND	
<b>CRWA</b>	Colorado Rural Water Association
<b>CWCB</b>	Colorado Water Conservation Board
<b>CWRPDA</b>	Colorado Water Resources and Power Development Authority
<b>DOLA</b>	Department of Local Affairs
<b>NRWA</b>	National Rural Water Association
<b>USBR</b>	United States Bureau of Reclamation
<b>USDA</b>	United States Department of Agriculture

## Appendix K – Record of Public Notice

First Publication June 24, 2015  
Second Publication July 1, 2015  
PO 15000263

Roni Kimbrel, CPA  
Director of Finance  
150 Central Main Street  
Pueblo, CO 81003  
Attn: Finance Department

LEGAL NOTICE  
NOTICE OF FINAL SETTLEMENT

The City of Pueblo, Colorado will make final settlement with Swerdfeger Construction Inc on July 13, 2015 for work performed on Project known as New 60" Manhole and 24" Pipe at Prairie & 13th St. City of Pueblo Project# 13-012 (WVAN03). Verified statement of claims for labor, materials or supplies furnished on the project may be filed with the Director of Finance on or before the time of final settlement.

Dated: June 18, 2015  
First Publication June 24, 2015  
Second Publication July 1, 2015  
PO 15000263

By Roni Kimbrel  
Roni Kimbrel, CPA  
Director of Finance  
150 Central Main Street  
Pueblo, CO 81003  
Attn: Finance Department

LS6451

LEGAL NOTICE  
NOTICE OF FINAL SETTLEMENT

The City of Pueblo, Colorado will make final settlement with Cortez Construction Company on July 13, 2015 for work performed on Project known as 816 Minnequa Ave; City of Pueblo Project# 13-012 (WVAN03). Verified statement of claims for labor, materials or supplies furnished on the project may be filed with the Director of Finance on or before the time of final settlement.

Dated: June 18, 2015  
First Publication June 24, 2015  
Second Publication July 1, 2015  
PO 15000263

By Roni Kimbrel  
Roni Kimbrel, CPA  
Director of Finance  
150 Central Main Street  
Pueblo, CO 81003  
Attn: Finance Department

LS6458

INVITATION FOR BIDS  
FOR IMPROVEMENTS TO  
LAS ANIMAS - BENT COUNTY AIRPORT  
BENT COUNTY, COLORADO  
C.D.A.G. PROJECT NO. 13-7V9-01

Sealed bids for improvements to the Las Animas - Bent County Airport C.D.A.G. Project No. 13-7V9-01, will be received by Bent County at the County Courthouse, 522 Cassin Street, Box 1000, Pueblo, Colorado 81054 until June 23, 2015 at 11:00 a.m. MDT. Bids will then be opened and read aloud.

The work to be performed includes the following:

SCHEDULE OF WORK  
CONSTRUCT AIRCRAFT PARKING APRON (~3,375 S.Y.)

For a complete list of Plans, Specifications, and Contract Documents all purchases must be made through the website at [www.armstrongconsultants.com](http://www.armstrongconsultants.com). A digital copy may be downloaded for \$30.00. A hardcopy may be purchased for \$100.00 for each set. There will be no refunds.

Each bid must be accompanied by a Certified Check or Cashier's Check in an amount not less than five percent of the total bid made payable to Bent County, or by a Bid Bond in the amount specified by a Surety Company.

The Bidder must supply all the information required by the proposal forms and specifications and he/she must bid on all items of every schedule. Bent County reserves the right to reject any informality in or to reject any or all portions of the various items. No proposals will be drawn for a period of thirty (30) days from the opening thereof.

A Pre-Bid meeting will be held at the Las Animas - Bent County Airport on June 23, 2015 at 11:00 a.m. MDT. All bidders are advised to examine the site to become familiar with all site conditions.

The proposed contract is under and subject to Executive Order 11246 of 24 September 1963, as amended and to the equal opportunity clause and the Standard Federal Equal Employment Opportunity Construction Contract Specifications, including the goals and timetables for minority and female participation.

A Certification of Nonsegregated Facilities must be submitted prior to the award of the proposed contract, including any subcontracts in excess of \$10,000.00.

The proposed contract is subject to the provisions of Department of Transportation Regulations 49 CFR Part 26 (Disadvantaged Business Enterprise Participation).

Minimum wage rates as established by the Secretary of Labor are applicable to all schedules awarded for this project.

Contract Documents - Bent County Airport AB-1  
138165 Las Animas - Bent County Airport  
Any questions regarding this project are to be directed to the office of Armstrong Consultants, Inc., Grand Junction, Colorado, (970) 242-0101, for interpretation.

BENT COUNTY, COLORADO

Published: June 10, 2015  
June 17, 2015  
June 24, 2015

LS7325

Miscellaneous items - truck wheels, wall mirrors, Lowrey organ, Broyhill couch, dining table/chairs, 252-3075.

Futon, oak, good condition, \$50. 719-406-4903

Bicycle, Mountain/Touring, 18 speeds, excellent condition, \$60 offer. 719-561-8434

Bike, Schwinn Air-Dyne and Mini Cardio Cycle, \$250 for both, 542-4796.

# PUBLIC NOTICES

## PUBLIC NOTICE

Pueblo Community Health Center, Inc. will destroy outdated medical and dental patient records, per State law regulations, for patients with a last date of service of 12/31/2004 or earlier. Patients or their court ordered personal representatives wishing to obtain a copy of their records should contact the Medical Records Manager at (719) 543-8711.

LS6458

## Southeastern Colorado Water Conservancy District Regional Water Conservation Plan Available for Public Comment

The Southeastern Colorado Water Conservancy District has completed a draft Water Conservation Plan. The goal of the plan is to develop programs for efficient and sustainable water use. Before finalizing the Water Conservation Plan, the District welcomes comments from the public. The 60-day public review period begins the day of this notice, June 23, 2015 through September 14, 2015. A complete draft copy will be available at the District's offices at 31717 United Avenue, Pueblo, Colorado for public review, Monday through Friday, between 7:30 am and 4:30 pm. The draft Regional Water Conservation Plan will also be post on the web at [www.secwcd.org](http://www.secwcd.org).

All written comments are due prior to 4:30 pm, September 14, 2015. Comments can be dropped off or mailed to SECWCD, 31717 United Avenue, Pueblo, CO 81001 or emailed to [jean@secwcd.com](mailto:jean@secwcd.com).

LS6464

## LEGAL NOTICE NOTICE OF FINAL SETTLEMENT

The City of Pueblo, Colorado will make final settlement with Construction LLC on July 13, 2015 for work performed on Project known as 2006 E. 13th St.; City of Pueblo. Project# CD1311/IDIS 3006/ 151-003. Verified statement of claims for labor, materials or supplies furnished on the project may be filed with the Director of Finance on or before the time of final settlement.

Dated: June 18, 2015  
First Publication June 24, 2015  
Second Publication July 1, 2015  
PO 15000264

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LS6460

## INVITATION FOR BID

The City of Pueblo will receive sealed bids up to the hour of 10:00:00 AM (MT) on the 10th day of July 2015, at the City's Purchasing Office, 230 South Mechanic Street, Pueblo, Colorado, 719-553-2350 for the following:

PROJECT NO.: 16-036 (WV1503)  
PROJECT NAME: Selenium Reduction Flow Monitoring

PRE-BID MEETING: July 1, 2015 at 10:00 AM in the James R. Diorio WRF, Engineering Conference Room, 1300 S. Queens Ave., Pueblo, CO

In general, this project will consist of providing and installing, configuration, activation and training of five (5) laserflow area-velocity flow data loggers into five (5) sanitary sewer manholes.

Contract documents may be obtained from the office of the Wastewater Department - Engineering Bldg., 1300 S. Queens Ave., Pueblo, CO, 81001, 719-553-2998, at a NON-REFUNDABLE cost of \$20.00. Only bids that are made out upon the City-prepared forms will be considered. The bid form must not be separated from the required proposal submittal packet as defined in the Mandatory Submittals checklist. Any correction on the bid forms must be initiated by the person signing the bid.

Addenda shall be sent to all contract document holders as verified by the Plan Holder's List by electronic data transmission (i.e. E-mail). It is the bidder's responsibility to provide an accurate E-mail address. It is the bidder's responsibility to verify, via the City's website at [www.pueblo.us/purchasing](http://www.pueblo.us/purchasing), whether any addenda were issued and to notify the Department of Public Works of successful receipt of any addenda. Bidders must follow the bid submittal procedures outlined in the contract document.

Each bid must be accompanied by a certified check, cashier's check, postal money order or bid bond in the amount of five (5) percent of the grand total bid, plus all alternates if applicable, payable to the City of Pueblo as a guarantee that if the bid is accepted, the bidder will execute and file the proposed contract and bond within ten (10) days from the date of the award of the contract by City Council.

All bids must be received at the Purchasing Office before the time specified and be enclosed in sealed envelope plainly marked with the above referenced Project number and name.

The City reserves the right to reject any and all bids for any or all items covered in the Invitation for Bid, to waive informalities or defects in bids, or to accept such bids as it shall deem to be in its best interest.

Published Date: June 24, 2015

Donald C. Hedden  
Donald C. Hedden, CPPO  
Director of Purchasing, City of Pueblo, Colorado

LS6462

DR SELLING



606@gmail.com

or SELLING



2@gmail.com

ETS

Puppies Sale

Daniel, Having Charles Daniel, Weimaraner Retriever, Soft Coated Weimaraner, Dachshund, Maltipoo, Shiba Inu U.S. 564-6191 10 Blvd. Way

her 2013 & 2014 of Pueblo [Jokennekclub.org](http://Jokennekclub.org) 15 N. Grand

ese/ Tabby, ach. Supplies 896, 671-6658.

og/pug mix, 2 nths, 1st shots, 569-0300.

o good homes. after 5 p.m.

o good home! 821-2613

to good home. 719-369-3313

bulldogge pup. 719-568-0407

s, 7 weeks, 1st