

STATE OF COLORADO

Colorado Water Conservation Board

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TO: Colorado Water Conservation Board Members

FROM: Kevin Reidy, State Water Conservation Specialist
Veva Deheza, Section Chief
Office of Water Conservation & Drought Planning
(OWCDP)

DATE: September 2, 2009

SUBJECT: **Agenda Item 14, September 15-16, 2009 Board Meeting**
Presentation on the Proposed Approach for the Water Conservation Strategy

Staff Recommendation

This is an *informational* item only and Board action is not required.

Background

The Colorado Water Conservation Board is continuing the process of developing strategies to meet Colorado's future water supply needs. Water conservation is a crucial element of this effort. Past efforts have provided some preliminary information on this however, this information needs to be clarified and validated to incorporate the best available information. Consequently the OWCDP has developed a proposed draft approach outlining necessary research and analysis required to develop a comprehensive water conservation technical platform.

This approach has four goals:

1. Identify and analyze the water conservation savings from Y2000 to present that are permanent versus temporary.
2. Identify current penetration rates for the best practice water conservation measures identified in the Best Practices Guide for Water Conservation in Colorado and forecast what they are expected to be through 2050.
3. Analyze and reevaluate the conservation levels from SWSI I.
4. Create a Best Practices Guide for Water Conservation in Colorado.

Achieving these goals will provide a more scientifically valid foundation to determine future demand levels. Furthermore, the roles of water conservation and demand management in the context of water resource management will be better defined.

Proposed Approach to the Water Conservation Technical Platform Colorado's Water Supply Future

INTRODUCTION:

The Colorado Water Conservation Board (CWCB) is continuing the process of developing strategies to meet Colorado's future water supply needs. Water conservation is a crucial element of this effort. Past efforts have provided some preliminary information on this. However, this information needs to be clarified and validated to incorporate the best available information. Consequently the CWCB's Office of Water Conservation & Drought Planning (OWCDP) has developed a proposed draft approach outlining necessary research and analysis required to develop a comprehensive water conservation technical platform.

The Front Range providers submitted a letter to the Interbasin Compact Commission outlining, among other issues, concerns they had with the potential for unintended consequences of proposed varying levels of conservation. The Colorado River District responded to the letter, but the response did not address the water conservation concerns raised in the Front Range provider letter. This proposed draft approach acknowledges the issues raised and seeks to identify reasonable water conservation savings potential for the State of Colorado.

To move water conservation forward on a foundation of scientifically valid data and methodologies, the water conservation portions of the Statewide Water Supply Initiative (SWSI) I (2004) & II (2007) will be reviewed and evaluated. The intent is to examine potential conservation savings that can be achieved by 2050 and the types of conservation best management practices that can be utilized to accomplish the savings. The two key questions that will be answered by this project are:

- 1) What amounts of water can M&I conservation provide to meet our 2050 water needs?
- 2) What is the best array of conservation measures to achieve these demand reductions?

This proposed draft approach will reevaluate the conservation savings since year 2000 to determine the nature and permanency of these savings; investigate penetration rates associated with water conservation best practices; and a thorough reanalysis of the SWSI I conservation levels.

In conjunction with this approach, the Colorado Water Wise (CWW), with a CWCB Water Efficiency Grant, is developing the Water Conservation Best Practices Guidebook for Colorado. This guidebook will inform and support the proposed studies outlined and ultimately a water conservation strategy for Colorado's water supply future.

Fully explaining these elements will provide a more scientifically valid foundation to determine future demand levels. Furthermore, the roles of water conservation and demand management in the context of water resource management will be better defined.

PROJECT DESCRIPTION:

This approach has four goals:

1. Identify and analyze the water conservation savings from Y2000 to present and determine if they are permanent or temporary.
2. Identify current penetration rates for the best practice water conservation measures identified in the Best Practices Guide for Water Conservation in Colorado and forecast what they are expected to be through 2050.
3. Analyze and reevaluate the conservation levels from SWSI I.
4. Create a Best Practices Guide for Water Conservation in Colorado.

APPROACH:

The portions of the plan that the consultant will be directly responsible for are outlined below. The consultant will be evaluated based on proficiency and proven success in the necessary areas.

NOTE: The ability to complete all objectives in this approach is contingent on available funding this fiscal year.

Objective 1: Permanency of post-2000 water conservation savings

CWCB Project Manager: Kevin Reidy; **Consultant Leader:**

Purpose:

The purpose of this objective is to identify and assess the permanency and nature of water conservation savings since year 2000. Understanding the mix of technical vs. behavioral, water conservation vs. drought changes is important to knowing the extent of the permanency of savings. The types and permanency of these water conservation savings are an unknown quantity and will be identified and analyzed to create a more accurate baseline for future municipal and industrial demand forecasts.

Approach:

CWCB staff will work with the consultant to identify and assess water conservation savings from 2000-2008 through a small number of representative utilities across the state. The approach will include collection of water use, demographic and weather data; assessment of water conservation programs and drought response over the Y2000-Y2008 time period; evaluation of water uses by customer sector; and identification and quantification of water use changes as permanent vs. temporary.

Objective 1.1-Collect data for time period of 2000-2008 to include water use data, demographic data and weather data

The consultant will collect data on;

- Water use pertaining to annual water consumption broken out by month and customer sector such as single family, multi-family residential, commercial, irrigation and municipal/other, number of water accounts, water use in drought defined period vs. outside of drought defined period
- Demographic data such as age, income, housing mix, average household size, housing age, employment numbers, growth, new housing starts
- Weather data (annual broken down by monthly reports) such as precipitation, temperature, ET rates. Preferably this data will come from a network of local weather stations.

Objective 1.2-Assess and record water conservation/demand management programs and drought response over time period of 2000-2008

The consultant will profile conservation and drought responses in terms of:

- Water Conservation programming
 - Summary of conservation programs and efforts (pre- and post 2000 to 2008) such as indoor and outdoor efforts as manifested through rebate programs, water conservation ordinances, pricing and rate structures, customer services, education programs
 - Annual budget and number of dedicated staff for conservation programs (pre-post 2000 to 2008)
 - Number of annual participants in programs
 - Estimated water savings from all programs on annual basis
- Water rate structures
 - Rate structure pre-2000(historical perspective)
 - Rate structure post -2000
 - Permutations of rate structure 2000-2008
- Drought response
 - What restrictions (if any) were in place during the drought response and how long were they in place for?
 - What kind of drought surcharges (if any) were in place in addition to the current rate structure? Were there fines associated with violations of restrictions?
 - Was there a drought plan enacted? Was there one created in reaction to the drought?
 - What was the severity of drought for the sampled providers?

Objective 1.3-Evaluate water use trends by sector

Based on data collected from objective 1.1, CWCB will identify historical trends among the sample utilities, including seasonal profiles of residential and nonresidential water use during the time period. Correlate changes in water use with conservation/demand management programs, drought response, water rate changes, weather and other demographic data. The trends will be identified using basic statistical techniques such as regression analyses.

Objective 1.4 Identify and quantify water use changes as permanent or temporary

Using data from objectives 1.1, 1.2 and 1.3, identify and quantify how much of the water savings falls under the permanent vs. temporary category. Additionally, create a matrix of the measures that attributes savings to each of these categories.

Objective 2: Penetration rates for water conservation measures

CWCB Project Manager: Kevin Reidy; **Consultant Leader:**

Purpose:

The purpose of this objective is to assess and analyze the current penetration rates of water conservation measures from the Best Practices Guide for Water Conservation in Colorado (Objective 4). Penetration rates are crucial to understanding the amount of water conservation savings potential but more importantly the timing and extent of when these savings will occur.

Approach:

CWCB staff will work with the consultant to access, analyze and project conservation measure penetration rates through the year 2050 planning period. This will be accomplished by surveying water provider customers as to their participation in their water provider water conservation programs as well as to the various technologies and water consuming appliances they have installed in their homes/businesses/schools etc. A small number of representative utilities across the state will be selected for this objective.

Objective 2.1-Collect customer data of water utilities

Consultant will collect data from water utility as to the number of water accounts, consumption per customer sector, housing stock data and demographic data. Understanding the housing stock age will assist in determining the number of new housing starts after 1992 EPA Act legislation that made lower flow fixtures mandatory.

Objective 2.2-Evaluate water conservation program participation

Consultant will assess the water utilities tracking data for customer participation in their water conservation programs. Using this data, the consultant will compare participation in each water conservation measure topic area to the total water customer base yielding a percentage of penetration due to programming. Examples of programs would be rebate programs for toilets, washing machines, Xeriscape conversion, irrigation technologies; showerhead, faucet aerator giveaways; educational class participation, etc.

Objective 2.3-Conduct survey and site visits

The consultant will then use the remaining “non-participant” pool to elicit a random sample for conducting phone surveys and/or site visits. Phone surveys will consist of asking what appliances and fixtures are present in the residence/business. Site visits will consist of going into the residence/business to take a physical inventory of the appliances and fixtures present. The number of random samples will be statistically sound as to extrapolate to the entire population. Surveys and site visits will address toilets, washing machines, showerheads, faucet aerators, existing landscape plant materials and square footage, landscape conversions, number of new housing/property starts influenced under new landscape codes, etc.

Objective 2.4-Project penetration rates

The consultant will use data from objectives 2.1, 2.2 and 2.3 to project out probable penetration rates out through 2050. Water conservation programming, existing “non-participant” pool and natural fixture replacement rates will be considered in formulating likely trends. Additionally, different scenarios will be run to show the effects on demand of varying penetration rates due to ramping up or down of water conservation programming (i.e. increasing budgets for rebate programs, curtailing rebate programs, offering less money per rebate, using likely terminal dates for rebate programs, shifts to high efficiency technologies).

Objective 3: SWSI Conservation Level Analysis

CWCB Project Manager: Kevin Reidy; **Consultant Leader:**

Purpose: The purpose of this task is to assess and evaluate the conservation levels that were developed as part of SWSI I. The purpose is two-fold; first, to determine at what level of water conservation Colorado water utilities have presently achieved; second, to reassess the classification used in SWSI I (levels 1-5) and the conservation measures within each category.

Approach:

CWCB staff will work with the consultant to analyze the result of the 2004 and 2007 Water Supply Assessment survey. These data sets have been previously examined for drought planning and other purposes but have yet to be analyzed for the purpose of reevaluating the SWSI conservation levels. These two surveys will provide insight into self-reported water conservation efforts of participating Utilities, how they fit into the SWSI conservation levels and whether or not the conservation levels should be refined to strengthen the usefulness of this conservation assessment tool.

Objective 3.1: Analysis of 2004 and 2007 Drought and Water Supply Assessment surveys

The consultant will analyze the survey results with a focus on the self-reported water conservation efforts of the participating utilities. The analysis will examine the self-reported conservation measures implemented during the survey time frames as well as the trends of conservation program activity at the utility level.

Objective 3.2: Analysis of the SWSI I conservation levels

The analysis from objective 3.1 will be utilized by the consultant to examine how the conservation levels were created in SWSI I, the assumptions behind those levels, and if the conservation levels should be revised to better reflect the current state of water conservation programming at the utility level.

RESOURCE LIST:

- Statewide Water Supply Initiative I (2004) & II (2007)
- Kenney, Douglas S., Christopher Goemans, Roberta Klein, Jessica Lowrey, and Kevin Reidy, 2008. Residential Water Demand Management: Lessons from Aurora, Colorado. *Journal of the American Water Resources Association (JAWRA)* 44(1):192-207. DOI: 10.1111/j.1752-1688.2007.00147.x
- Colorado's Water Supply Future reports
<http://cwcb.state.co.us/IWMD/COsWaterSupplyFuture/>
- 2002 East Bay Municipal Utility District Penetration Rate Study
http://www.ebmud.com/about_ebmud/publications/technical_reports/market_penetration_study.pdf