



Colorado's Water Plan – Urban Conservation White Paper

The Gap

Colorado faces a challenge in determining how to meet the future urban water demands of a rapidly growing population. Many stakeholders, with assistance from the State, have expended significant time and thought into how to solve this challenge – work remains ongoing and will continue into the future. Meeting our State's urban "gap" will require water providers to decrease demands, increase supply, and use existing supplies more effectively. Our human inability to control the climate, precipitation, or the decisions of all water actors should result in an immediate and long-standing focus on managing demands. Demand management solutions are cost-effective, incremental, and flexible – exactly the type of solutions needed to manage our urban water system in an uncertain future.

A Goal

The Governor can provide critical leadership in this arena by setting a statewide goal of saving 600,000 acre-feet (AF) of water through urban conservation by 2050. This effort will necessitate close coordination and partnership between state agencies, water providers, the conservation community, and the general public. Having a strong goal would change the tone of the conversation from "Can we do this?" or "Should we do this?" to "We must do this, let's figure out how." As the Governor has repeatedly stated, every conversation about water must begin with conservation.

Because urban conservation planning is conducted on a 10-15 year timeline, intermediary goals may be appropriate. A statewide 600,000 AF reduction in demand by 2050 is equivalent to reducing per capita water use at a rate of 1% per year, and is commensurate with CWCB's "high" conservation scenario. Therefore, a 15% reduction in statewide per capita use between 2010 and 2025 may be an appropriate mid-term goal. This level of reduction – 1% per year – is the *status quo*, consistent with the level of success achieved by Colorado's water providers over the past decade, by Colorado River water users across the Interior West over the past two decades, and is the average forecasted demand reduction for Colorado's providers over the next ten years.

How to Achieve the Goal

Colorado's Statewide Water Supply Initiative (SWSI) 2010 provides a wealth of information and approaches for how to maintain this level of water conservation savings into the future. Several key SWSI documents, including the *Conservation Levels Analysis* and *Conservation Strategies Report*,¹ are robust, peer-reviewed, and state-of-the-science reports on water conservation. Much of the information below is taken directly from these reports. In addition, many of the strategies described here are ones

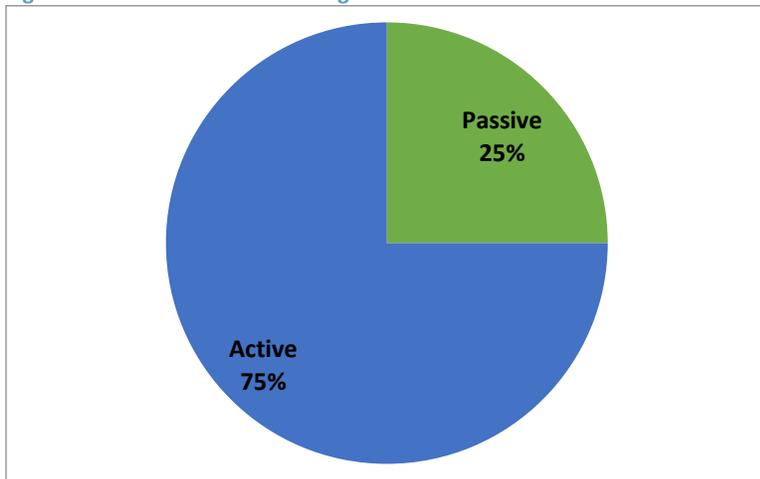
¹ These two reports are SWSI 2010 Appendix K and Appendix L, available at: <http://cwcb.state.co.us/water-management/water-supply-planning/Pages/SWSI2010.aspx>.

that the IBCC recommended in its *Letter to the Governors* and are detailed in the *No/Low Regrets Strategies*.

Achieving the goal of reducing demand by 600,000 AF requires analyzing the different, major sectors of urban water use and then identifying various options to achieve reductions in each sector, including both passive and active water conservation savings as well as water loss control.

Passive water conservation savings – reductions that will occur without active, or purposeful, conservation efforts on the part of towns, water providers, residents, or industry – will result in more than 150,000 AF of demand reduction by 2050. Said differently, one-quarter of the goal will be met as a result of technological improvements and state and federal policies that are already in effect (Figure 1). These passive savings accrue to both the residential and non-residential sectors described below. Active water conservation savings, on the other hand, will require an increase in purposeful effort by comparison to today’s levels to achieve the remaining 450,000 AF. Accordingly, more detail is provided below on the conservation savings achievable in the residential indoor, non-residential indoor, outdoor, and water loss sectors.

Figure 1. Passive and Active Savings at 2050.



Residential Indoor Use

To achieve the overall goal of 600,000 AF of conservation savings, indoor per capita use for both single-family and multi-family housing must be reduced to an average of 30 gallons per capita per day by 2050. Statewide, the current average is approximately 50 gallons, but many families today are already using less than 35. Getting to 30 gallons will require homes in 2050 to have high efficiency fixtures with toilets using 1 gallon per flush, clothes washers at 13.5 gallons per load, showers at 1.5 gallons per minute, lavatory faucets at 0.5 gallons per minute, and dishwashers at 7 gallons per load, on average. These efficient fixtures are already available in today’s marketplace, so future actions must focus on getting them installed.

For Colorado’s existing housing stock, reductions from passive savings, as old fixtures are replaced gradually over time with higher efficiency varieties, will achieve a significant portion of these savings. Overall however, the reduced level of use desired under this goal will require working with both existing

housing stock and new construction. For existing homes, water provider incentive programs (like rebates or direct install) are a common approach that should be bolstered with State support. Requiring home sellers to retrofit their water using fixtures before selling a home, sometimes called “retrofit on resale,” is an idea suggested by the IBCC conservation subcommittee and is currently in practice in other states. The recent point of sale legislation that limits the sale of some household fixtures at home improvement centers to high-efficiency, WaterSense models, is another option that is currently awaiting signature by Colorado’s governor. Phasing out the sale of inefficient bathroom faucets, showerheads, toilets, and urinals, is projected to save nearly 40,000 AF of water alone by 2050.

Forty percent of the homes that will exist in 2050 have yet to be built. Thus, new city or state ordinances, codes, and regulations that affect new construction present a significant opportunity for reducing water demand. For example, Colorado’s plumbing code should be updated to require that installed fixtures meet or exceed the US Environmental Protection Agency’s (EPA’s) WaterSense specifications, an option the IBCC conservation subcommittee recommended. Cities should use their land use approval and permitting authority to prioritize or expedite building permit process for homes that meet or exceed efficiency guidelines, as done in Westminster. Alternatively, water providers should charge a reduced tap fee for homes that meet efficiency guidelines, as done in Broomfield and Aurora.

In combination, these actions can provide 210,000 AF of water, representing 35% of the water conservation goal (see Figure 2 at end).

Non-Residential Indoor Use

To achieve the overall goal of 600,000 AF of conservation savings, non-residential indoor per capita water use must be reduced 30% by 2050. Again, passive savings will help achieve this goal. Such savings will accrue from the natural replacement of urinals, pre-rinse spray valves used in restaurants, and other institutional, commercial, and industrial equipment. Furthermore, as the cost of water rises over the next 40 years, non-residential customers are often concerned about how utility costs affect their bottom line and so have a natural incentive to reduce their use.

Regulations that eliminate single-pass cooling in HVAC towers and the establishment of non-residential efficiency benchmarks are two approaches that the State should lead to reduce water use in this sector. Given the State’s ownership and management of many buildings and properties (e.g., corrections and administrative buildings), direct investment in efficiency improvements is another place the State should take a leadership role. Requiring adherence with WaterSense through a commercial buildings program that specifies water-efficiency targets is another opportunity for both the State and local governments.² Auditing high demand customers (with follow-up efforts), designing water-budget based rates specific to non-residential users, providing rebates and incentives to high demand customers, and basing tap fees on anticipated demand are all important water provider-led options in the non-residential sector.

² Senate Bill 14-103, which phases in the sale of high efficiency WaterSense certified fixtures, applies to both residential and non-residential users.

In combination, these actions can provide 120,000 AF of water, representing 20% of the water conservation goal.

Outdoor Use

To achieve the overall goal of 600,000 AF of conservation savings, outdoor per capita use must be reduced 33% by 2050. Outdoor irrigation uses more than half of the annual urban water supply in Colorado. Fortunately, residents' landscape preferences have evolved over the past decade; recent legislation is supporting this trend, and the ongoing densification of urban areas will continue to further reduce future per capita outdoor water demands.

Similar to indoor use measures, new land use ordinances, codes, and regulations that affect new construction can play a significant role in reducing water demands for the 40% of homes that are yet to be built. Community planning efforts must begin to incorporate the direct connection between the form of new development and its water footprint. Improvements at the local government level must include regulations governing landscape and irrigation system design and installation, as well as the incorporation of greywater systems.

At the State level, the IBCC conservation subcommittee recommended that all new landscapes and major renovations adhere to EPA's WaterSense landscape specifications. Other State-led efforts should include adding rainwater harvesting to urban irrigation supply, assisting local communities in updating their land use codes to be more water-smart, developing best management practices for outdoor landscaping and irrigation, and certifying landscape professionals so that education and field experience – rather than “Chuck and a Truck” – become the norm.

Finally, there are initiatives that local water providers should undertake. These include: targeted irrigation efficiency evaluations (with follow-up), water budget-based water rates with a sharp increase in higher tiers, and incentives to replace existing turf with lower water requirement plantings.

In combination, these actions can provide 200,000 AF of water, representing one-third of the water conservation goal.

Water Loss

To achieve the overall goal of 600,000 AF of conservation savings, physical water losses from all water providers' distribution systems must be reduced to 6% of total system demand by 2050. Water loss control is more than just finding and fixing leaks at the individual homeowner or utility level. It also means system auditing, loss tracking, and infrastructure maintenance. Reducing utility water loss is a significant water savings opportunity for Colorado and will be necessary for more than 90% of Colorado's water providers.

The State can play a leadership role in reducing water loss by providing incentives and promulgating regulations to ensure that providers take the necessary steps to reduce losses in their system. Requiring providers to implement the *American Water Works Association M36 Manual's* approach to water loss, and providing grant assistance for implementing this approach (as suggested by the IBCC conservation subcommittee) are strong options. Over time, water loss audit results could be used to develop

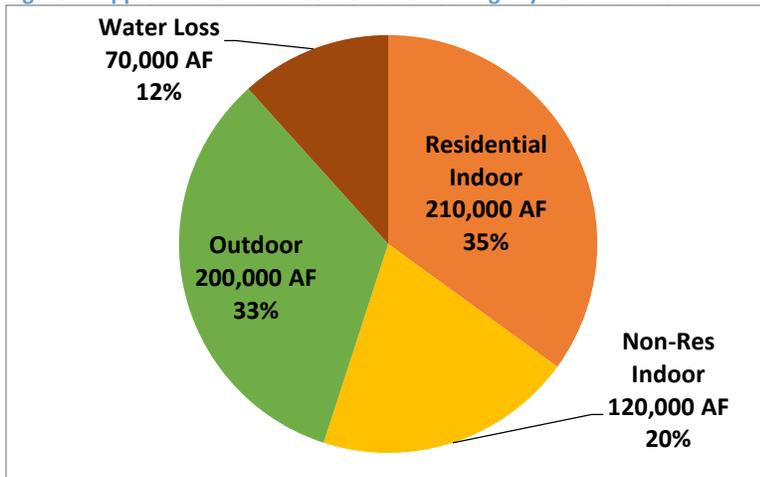
minimum water loss standards. At the water provider level, upgrading meter testing and repair programs, as well as completely funding capital replacement, and leak detection and repair programs are two additional options. It is worth noting that several billion dollars will be needed across the state in the next few decades to replace much of our aging water infrastructure, which presents an immense opportunity to upgrade in a manner that recognizes reductions in per capita demand – pumps can be smaller, pipes can be narrower, which will result in large cost-savings.

In combination, these actions can provide 70,000 AF of water, representing 12% of the water conservation goal.

Closing

Achieving 600,000 AF in conservation success will require simultaneous effort across the residential, commercial, and industrial sectors with a mix of strategies. The conservation portfolio discussed above provides this balance, gaining efficiency improvements across many different sectors (Figure 2).

Figure 2. Approximate Water Conservation Savings by Sector at 2050.



These conservation solutions will also take a balance of effort at the state, regional, and local levels from water providers and government. Beyond essential “foundational” programs (including pricing), water providers should utilize a mix of ongoing programs, regulation, and education to meet conservation goals – tailored to their community’s interests. The State should enable reducing demand by 600,000 AF through leadership and goal-setting, as well as providing funding, technical assistance, and political support. It is essential to set a clear path, and to spell out how we get there, together.