

PREPARING FOR AN UNCERTAIN WATER FUTURE: CONSERVATION, DEMAND PLANNING, AND CLIMATE CHANGE ADAPTATION



Blue Print Denver –

Task Force Meeting # 13

August 24, 2015

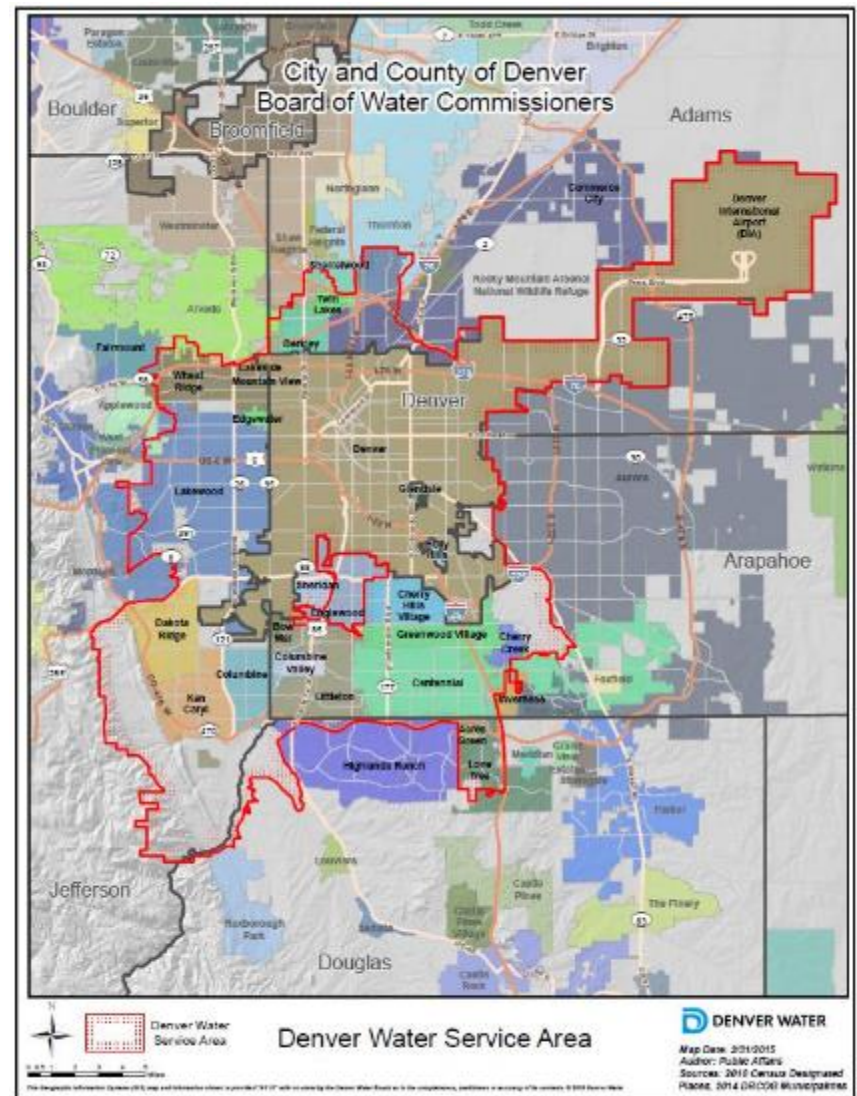
Presented By Austin Krcmarik, Conservation Specialist

What this Presentation will Cover

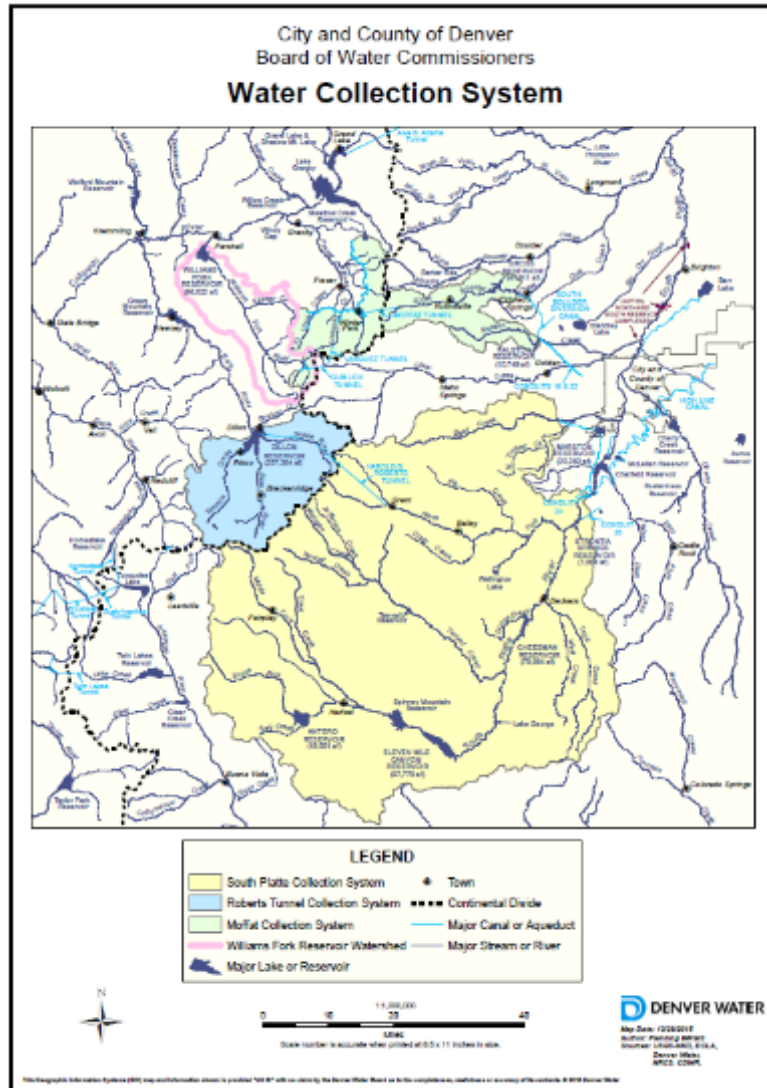
- Overview of Denver Water
 - Who we serve
 - Where our water comes from
- Provide brief overview of conservation/ efficiency best practices
 - Current demand patterns
 - Supply Issues and meeting future demand
- The impact of climate change on water resources
- Denver Water planning efforts and synergies

Denver Water Basics

- We serve 1.4 million people (in 5 counties)
- We serve 25% of the state's population with 2% of the water
- 80% of our water comes from snowpack
- We are separate from the City and County of Denver



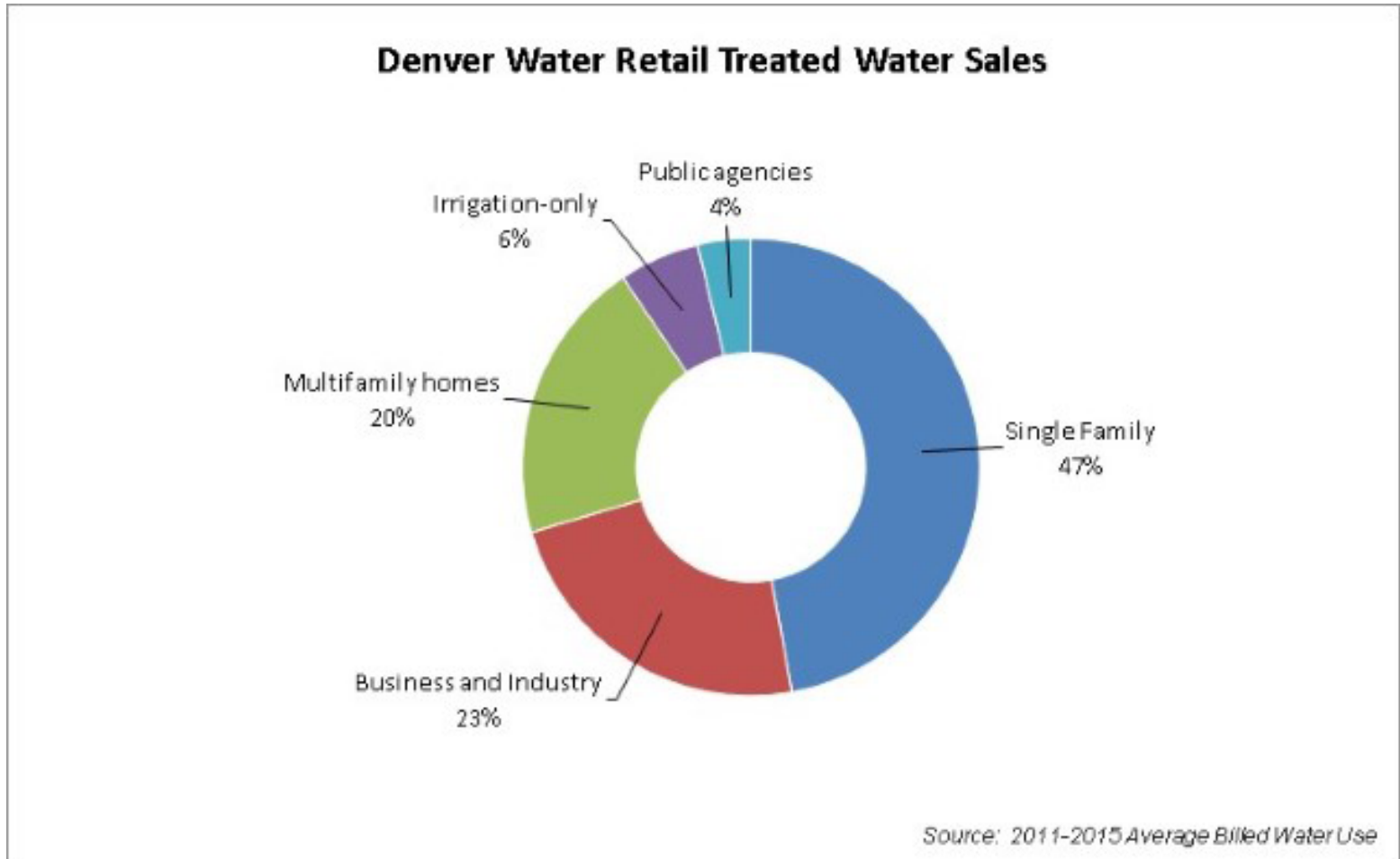
Where Our Water Comes From



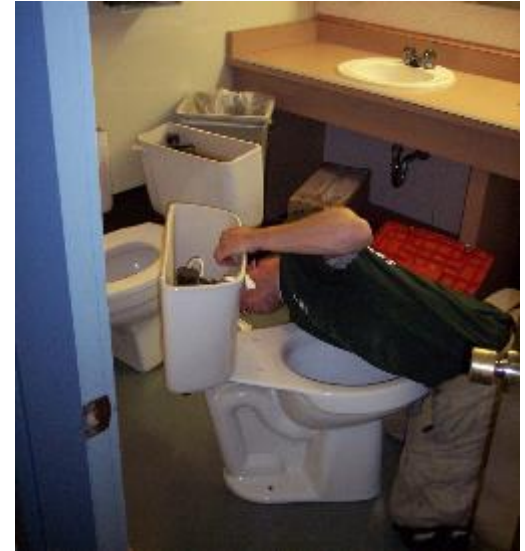
Water comes from 7 watersheds, 15 counties

- Major:
 - South Platte
 - Blue River
 - Williams Fork
 - Frasier
- Minor:
 - South Boulder Creek
 - Ralston
 - Bear Creek
- Share some reservoirs with other agencies

How Denver Water is Used

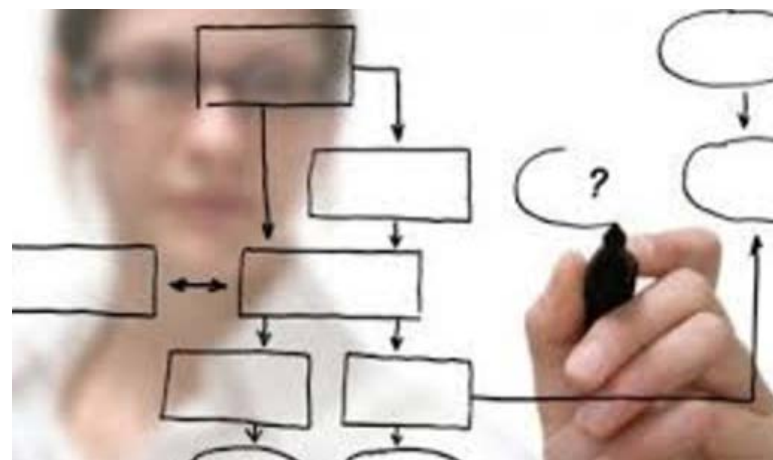


Conservation and Alternative Water



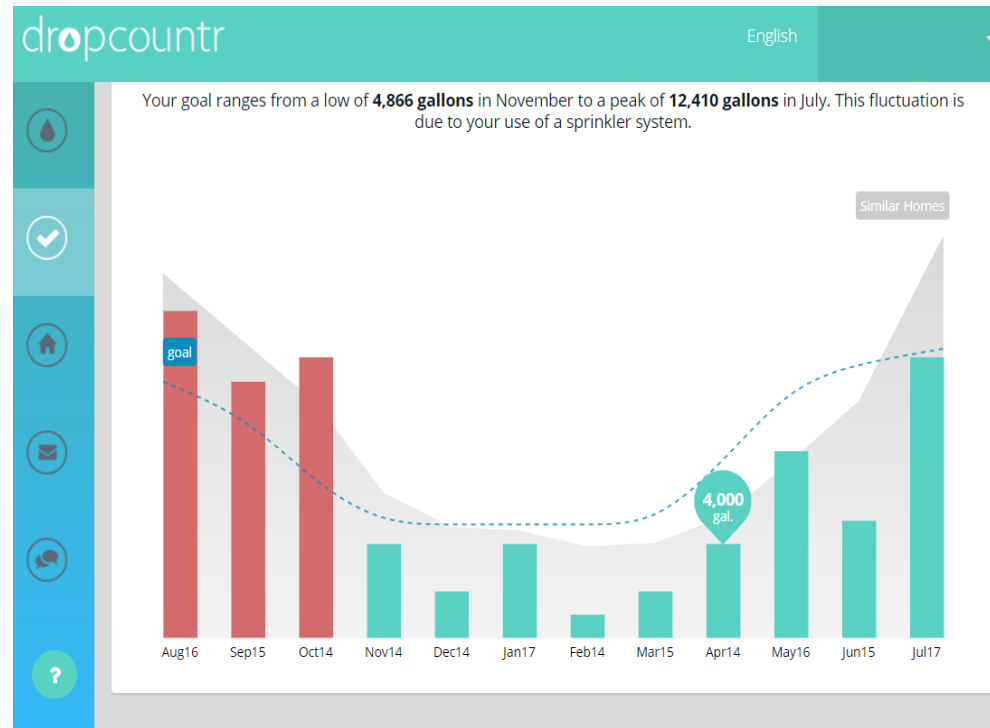
Conservation recently restructured to Water Efficiency and Recycled Water

- Reflect the One Water paradigm and recommendations of the Denver Water's Conservation plan update
- Aligns with industry best practices to obtain the greatest potable water savings
- New synergy of delivering the right water quality to the right place at the right time
- Reorganization allows for conservation messaging to be spread through out Denver Water



Conservation Plan Update

- Defines what efficient water use is for each customer class and which programs will help customers achieve efficient water use
- Example: Single Family Residential
 - Indoor benchmark: 40 gallons per person per day
 - Outdoor benchmark of 12 gallons per square foot of pervious space
- By focusing on efficiency Denver Water can target their rebates and programs to inefficient users
- Denver Water will also communicate to efficient customers so they continue to use water efficiently



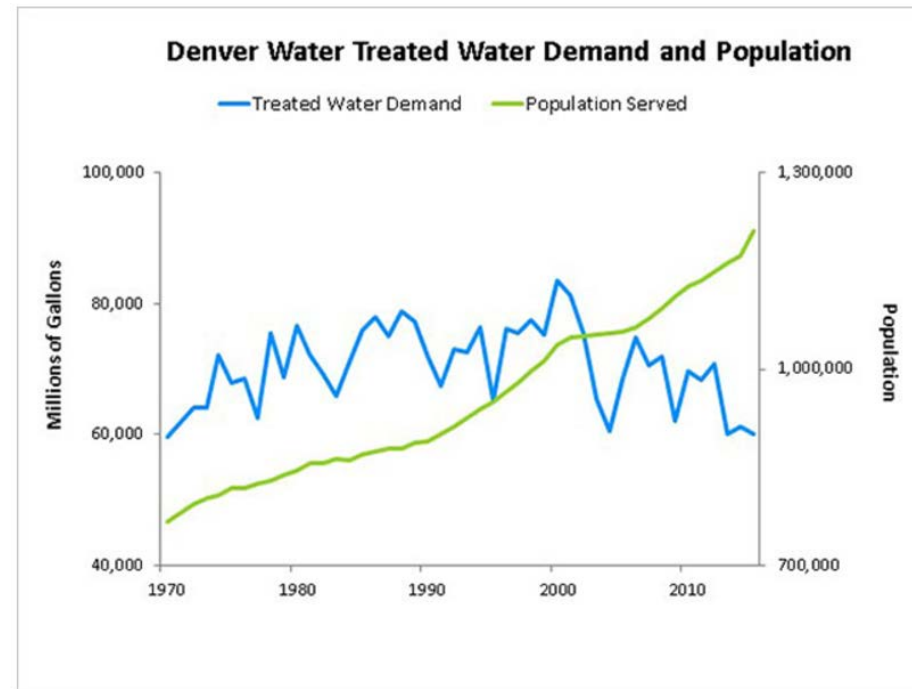
Conservation Programs



- Watering Rules May 1 – October 31
- High Bill Audits / Consultations to identify leaks
- Indoor Self Audit
- Rebates
 - WaterSense Toilets
 - Rotary high-efficiency sprinkler
 - WaterSense smart irrigation controller
- Landscape Change
 - Garden In a Box
 - Xeriscape Plans

Current Demand Patterns

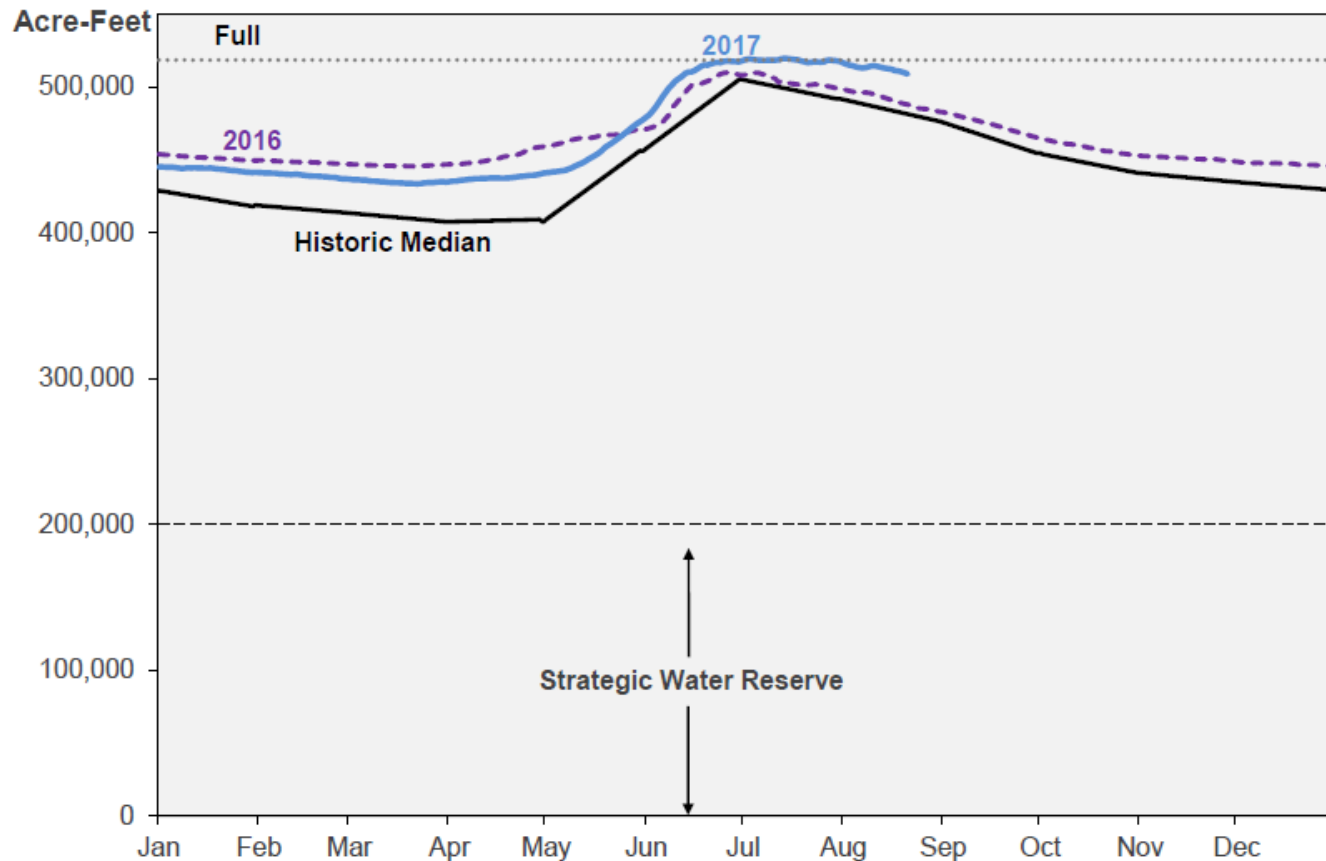
- Reduction from 211 gallons per person per day in 2007 to 165 gallons per person per day in 2015
- Water use demand in the summer time is over 2.5 times higher than the winter time
- Summer water use demand is primarily driven by irrigation and building cooling
- Customers do a good job of monitoring and reacting to the weather



Current Demand Patterns

August 21, 2017

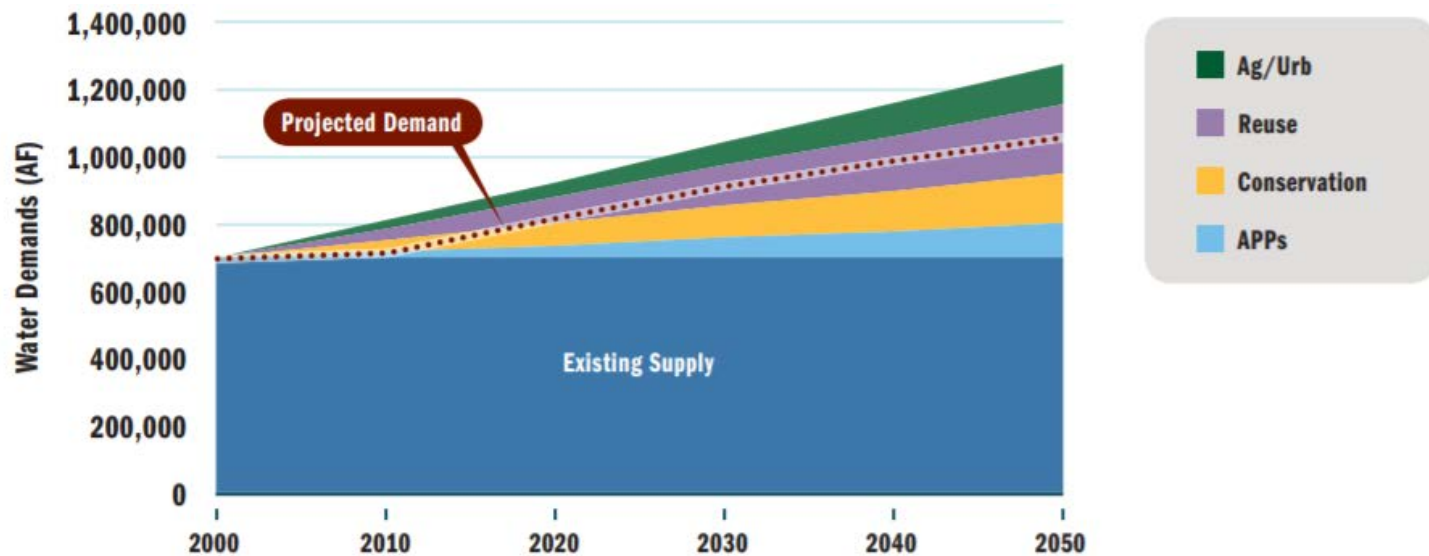
Supply Reservoir Contents



Note: The Board has designated 200,000 acre feet of stored water to protect against unforeseen circumstances such as a dam or tunnel failure, a water quality crisis, climate change or catastrophic drought.

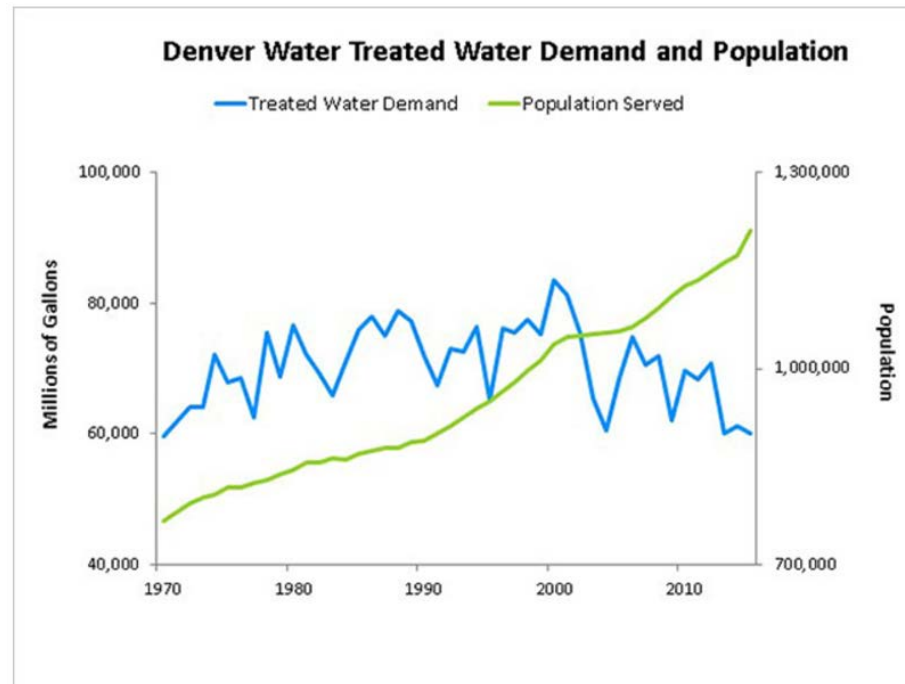
Long Term Supply Issues

- Denver Metro Population is increasing
- Potential water supply gap by 2050
- Where will growth be concentrated and how will this affect Denver Water
- Becoming harder to develop traditional supply
- Climate Change



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Alternate Sourced Water: Graywater and onsite treatment

Types of alternative water sources

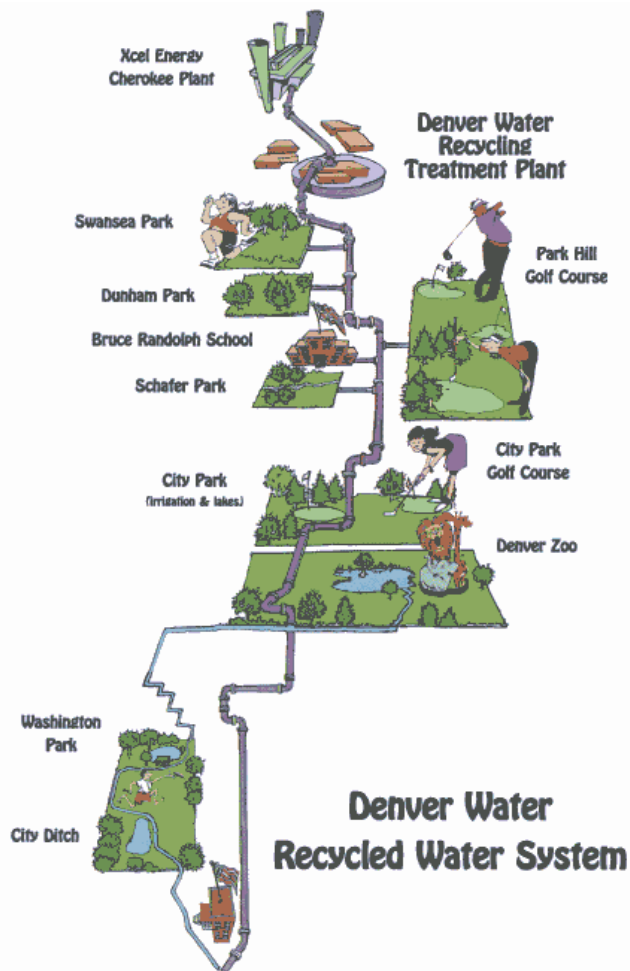
- Centralized
 - Municipal water reuse
 - Reclaimed or recycled water
- Decentralized
 - Graywater
 - Blackwater
 - Rainwater
 - Stormwater



Example of building reclaimed (Graywater) and potable water

Alternate Sourced Water: Grey water and onsite treatment

Alternative Sources: What Denver Water Provides



- Non-potable Reuse
 - Irrigation
 - Car washes
 - Toilet flushing
 - Industrial
- CO Regulation 84
 - Commercial/Industrial reuse
 - landscape irrigation

CLIMATE CHANGE AND WATER: PREPARATION AND MITIGATION



Climate Change and Water

- Drought
 - More frequent
 - Severity likely to increase
- Changes in Precipitation
 - Likely reduced but where it will be lower is uncertain
 - Earlier snowmelts
 - Collection system built with certain assumptions
 - Water rights, compacts and treaties also agreed upon under certain assumptions and historical patterns
- Forest Fires
 - Fires will likely become more extreme
 - Beetle kill is a major threat to forest (watershed) health

Prepare: Demand Planning Scenarios

- Hired a climate scientist in 2008 to lead efforts in updating projections
- Conduct scenario planning
 - No just every 5-10 years but continuously
 - Utilize research and institutional resources in these efforts (NREL, CU Boulder, MSU, etc)
 - Expand scope of integrated resource planning
- Determine how to be flexible in case of disaster
- Strengthened Conservation and Efficiency Planning



Mitigation: Forests to Faucets



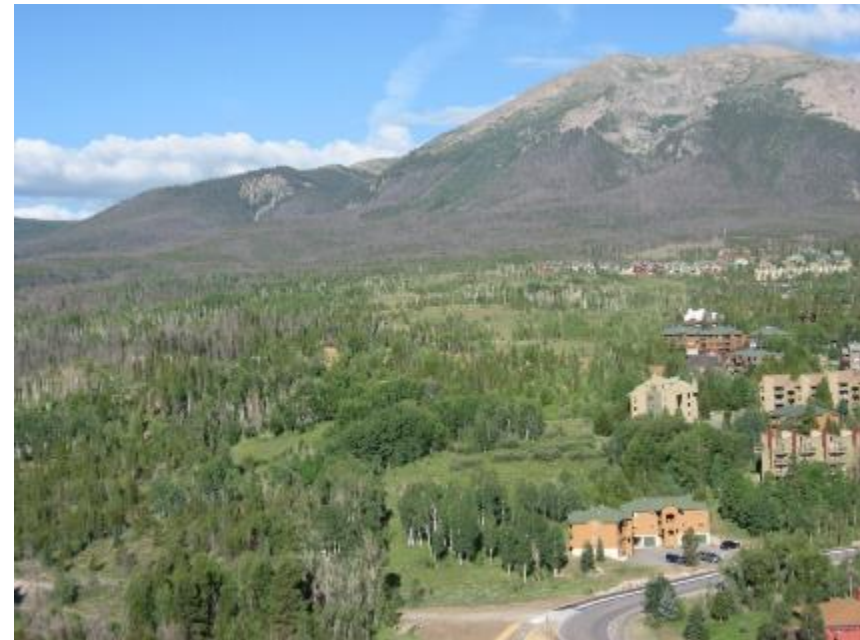
View of Lake Dillon, which is roughly 40% of Denver Water's storage capacity

- Between Denver Water and US Forest Service
- 5 year partnership from 2010-2015 (renewed Feb. 2017)
- \$33 million to treat 48,000 acres of forest
- Compare to \$27.7 million spent on restoration and repairs caused by the Hayman and Buffalo Creek fires

Mitigation: Forests to Faucets



White River National Forest, near Dillon Reservoir, before treatment in 2007.



White River National Forest, near Dillon Reservoir, after treatment in 2013.

Adaptation: Bolstering Partnerships: Water Utility Climate Alliance

- An example of partnering with other water agencies
- Collaboratively advancing water utility climate change adaptation
- Improve decision making processes for better response



[Central Arizona Project](#)



[Denver Water](#)



[Metropolitan Water District of Southern California](#)



[New York City Department of Environmental Protection](#)



[Portland Water Bureau](#)



[San Diego County Water Authority](#)



[San Francisco Public Utilities Commission](#)



[Seattle Public Utilities](#)




[Southern Nevada Water Authority](#)



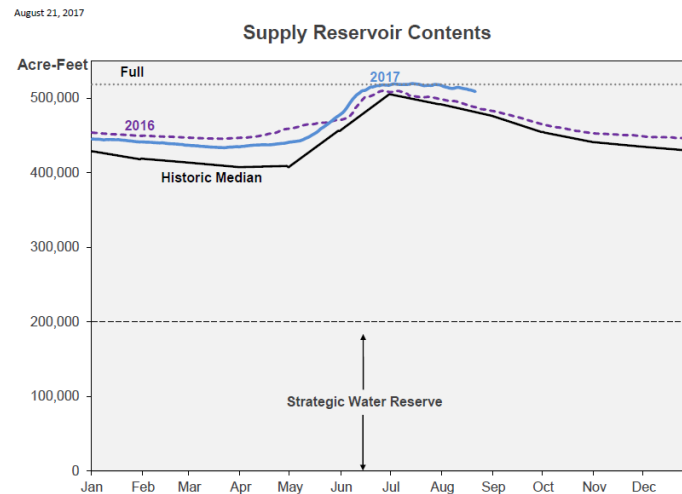
[Tampa Bay Water](#)

Adaptation - Emergency Management Response to Drought

Stages of Drought Response

Denver Water's  [Drought Response Plan](#) details drought severity indicators, response actions and program elements. Denver Water's primary response to drought is to restrict customers' water use so supplies will last as long as possible and be available for the most essential uses. Four different stages of drought response are outlined:

- **Drought Watch:** A Drought Watch will increase communication to customers that water supplies are below average, conditions are dry and continued dry weather could lead to mandatory watering restrictions.
- **Stage 1 Drought:** A Stage 1 drought response imposes mandatory watering restrictions and requires effort on the part of customers.
- **Stage 2 Drought:** A Stage 2 drought response imposes a ban on lawn watering for Denver Water's customers. Stage 2 drought restrictions are severe and will likely result in damage to or loss of landscapes.
- **Stage 3 Drought:** If conditions warrant, Denver Water may implement a rationing program for an indefinite period of time to ensure, to the extent possible, that there is adequate water for essential uses.



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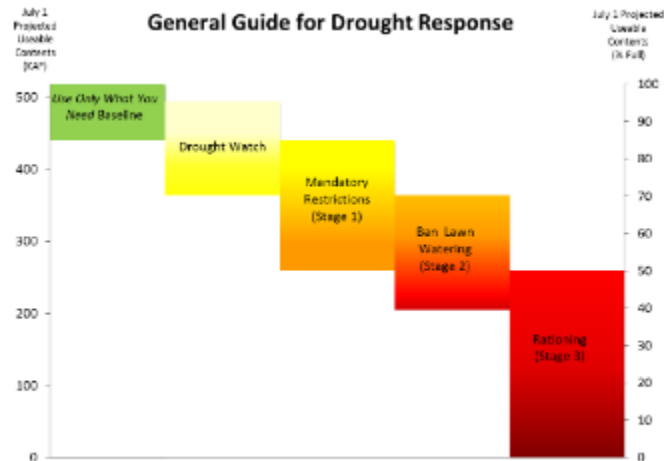
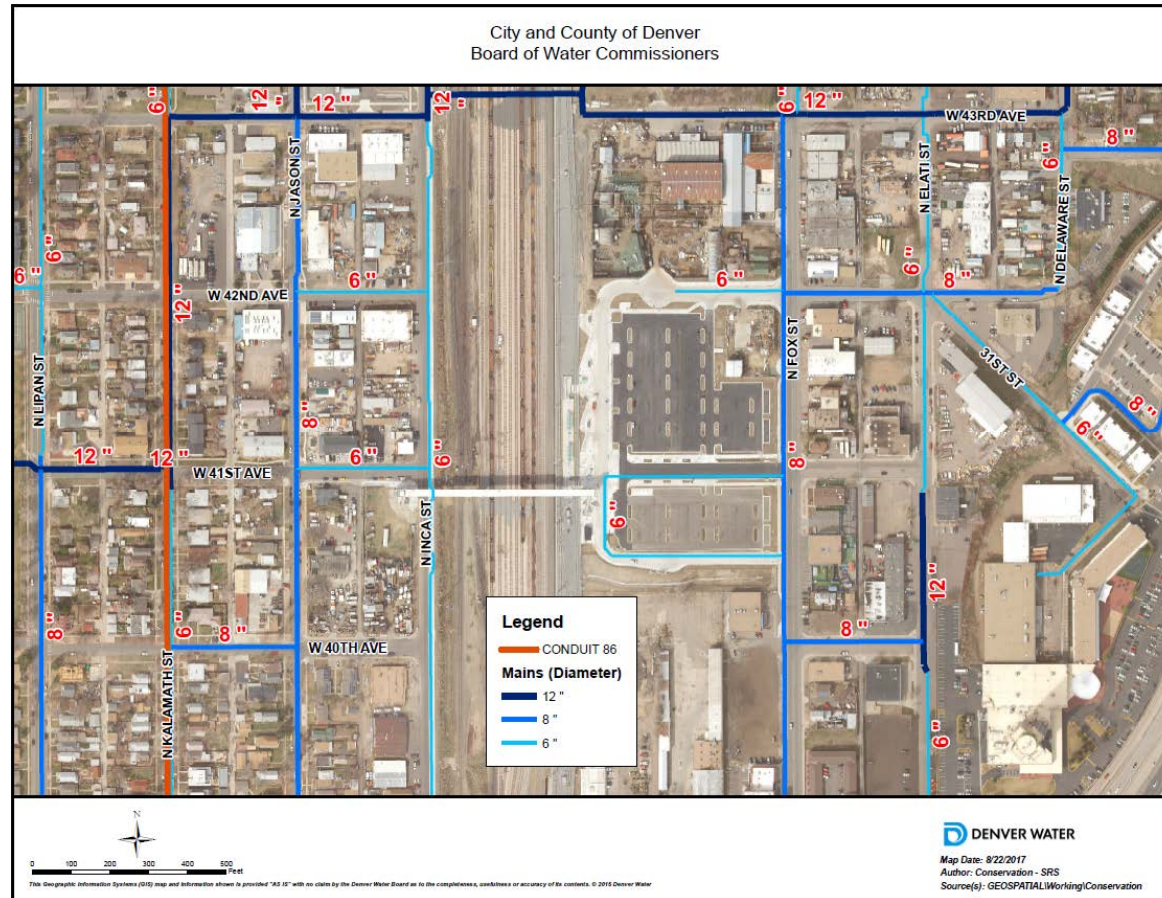


Figure 3. General guide for drought response using July 1 projected useable reservoir contents.

Existing Areas for Additional Capacity



- Zoning changes and existing Water Infrastructure
- Landscape and Irrigation codes 10.5.2 in the Denver Zoning Code
- One Water – Using the right water quality for the right use at the right time to reduce potable water use
 - Stormwater Harvesting
 - Rainwater Collection
 - Graywater
 - Recycled Water

QUESTIONS?

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[Denverwater.org/conservation](https://denverwater.org/conservation)