



**Metro Mayors Caucus  
Water/Climate Committee  
May 24, 2016 — 8:00 AM to 9:30 AM  
Thornton Civic Center — City Council Conference Room**

**Agenda:**

- 8:00 AM Welcome and Introductions**
- 8:10 AM Colorado Climate Action Plan — Overview and Roles for Local Government**
  - Taryn Finnesey, Climate Change Risk Management Specialist, CWCB
- 8:50 AM Climate Work Program Discussion**
  - Water Climate Committee activities
  - Full Caucus Presentation
- 9:30 AM Adjourn**



**Metro Mayors Caucus  
Water/Climate Committee  
May 24, 2016**

**Meeting Notes**

**Attending:**

Mayor Heidi Williams

Mayor Dan Dick

Mayor Suzanne Jones

Mayor Joyce Jay

Mark Koleber

Catherine Marinelli

Peter Kenney

Taryn Finnessey, Colorado Climate Office, DNR

**Taryn Finnessey, CDNR**

- **See attached PowerPoint**
- Colorado Climate Action Plan
  - 13-1293 - Mandate to create a climate plan
  - Mitigation and adaptation
  - Available on line - Colorado Climate Plan
  - Multi-sectoral state level policies
  - 2014 Climate Change in Colorado Report - Water Resource Focused - but covers other areas
  - 2015 Climate Change Vulnerability Study - CSU and CU
  - Colorado has always had variable weather - but predict continued warming 2-6 degrees and more extreme temperatures
  - Paleo record shows more long-term and sustained droughts
  - Transportation and electric generation are Colorado's two largest GHG contributors
  - Clean Power Plan attempt to address this - implementation has been stayed by the Supreme Court
  - Colorado looking at how to meet goals of reducing GHG while stay is in place
  - Xcel is on track to meet its 35% clean energy by 2020 goal
  - Energy cost is 2nd lowest and 7th most efficient - transition to energy efficient - overall 7th in combined efficiency - wallet hub
  - Drought combined with heat stress is the. most costly type of natural disaster -

- but not on most people's radar
  - Every dollar put toward mitigation save \$4 in response
- 5 scenarios of variability in long term water planning - 3 are hot and dry
- Arkansas, Rio Grande and South Platte - not enough to meet existing demand
  - Multi-sectoral approach to addressing climate change
  - First time we brought state agencies together in this fashion
  - Prior plan had broad objectives and goals but only Governor's staff worked on it
  - Agencies were resist Ent at first not seeing the nexus with their work
- Scientific approach
  - Use the models
  - What we think will happen in Colorado due to climate change
  - Largely focused on water resources
  - Climate change vulnerability study
    - Water, energy, public health, transportation, ecosystems,
- Why worry about this in Colorado?
  - National focus, lots of data
  - Colorado has variable climate already
    - Need to understand the norms and extremes
- Plan looks closely at 4 river basins
  - Colorado, Arkansas, Rio Great Anderson, South Platte
  - Looking at paleo records for historic data
    - Need to plan for long term severe drought cycles

### **Cross Issue Impacts**

- Public health problems:
  - Air quality concerns
  - Water quality
  - Increased vector borne disease
  - Frequency and intensity of extreme weather events
  - Temperature requirements for discharge creates problems for utilities
  - Greenhouse gas inventory
- Clean power plan
  - Requires state reduce greenhouse gas emission from energy production by 2030 to 1174 lb of CO2 per MWH
  - 38% reduction
- Energy
  - Reduced water availability, shift in timing of availability, increased demand, disrupted operations,
  - Moving toward clean energy in Colorado since 2005
  - XCEL on track to exceed their goals by 2020
  - Cost is the biggest concern
    - Especially in rural areas
    - Colorado efficiency is 7<sup>th</sup> best in US

- Cost of energy is 2<sup>nd</sup> lowest in US
- Agriculture
  - Decreased water availability, increased drought, Increased crop demand, increased heat stress, decreased crop yield, increased weed and pests
  - Drought is most costly and deadly natural disaster in the country
    - Least prepared for
    - 2<sup>nd</sup> economic driver so significant implications
- Tourism & recreation
  - 3<sup>rd</sup> economic driver
  - Less snow in shoulder seasons, warmer temps affect snow making, earlier melt, seasonal shifts, more avalanches
  - Wildfire danger
  - Rafting community changes
- Transportation
  - Heat stress and damage to infrastructure, higher snow removal cost, increased snow slides, degraded operations, washouts, changes in air density
- Ecosystems
  - Susceptibility to insects, wildfire, decline in habitat suitability, drought stress
- Water
  - Changes in streamflow, peak runoff, etc.

### **Three pronged approach**

- Drought mitigation and response plan
  - Most comprehensive in the nation
- Colorado Water Plan
  - What does hot and dry mean?
  - Climate variability plays a large role in long-term water planning & Colorado Water Plan — 3 levels: hot and dry, between current observed and h&d, 20<sup>th</sup> century observations
    - We will not have enough water supply to meet demand in hot and dry conditions in Ark, SoPlatte,
- Colorado Climate Plan

### **Local Climate Action**

- State has no funding
- Lots of action at local level
- Fort Collins has toughest standards
- Garfield County
- Denver
- Boulder
- Grand Junction
- Governor's support is strong

## Questions:

- Legislation about measurable objectives as part of climate plan?
  - Opted to try to achieve as much as they can
  - Debate about whether goals are floors or ceilings
  - Understand that goals can spur action
  - Former plan had a big goal but no clear strategy
  - We do have measurable objectives
    - 2030 reductions
    - Renewable energy share
  - Plan took 9 months to complete
  - Do have objective of 35% reduction of GHG by 2030
- Still need to deal with waste management - not dealt with in current plan
- Working to operationalize climate change in state's day to day decision making
- DOLA toolbox has climate change element
- Colorado Communities for Climate - working to push Feds and State to do more
- Collaborative effort among Ament, Stulp and Brown(?) to create an agriculture sustainability initiative with CSU
  - Working with Vilsac
  - Much being done at Federal level
- Measurable objectives
- What is state government doing to meet goals
  - Water plan sets out significant conservation goals
  - Energy efficiency goals getting stronger
  - Trying to operationalize climate change awareness like every other variable people consider
  - DOLA climate change toolbox and trainings
- How do we support the state
  - Voice concerns
  - Let policy makers know you want them to act
  - Taryn is the Colorado climate change effort
    - Funding is needed
- Colorado Communities for Climate is forming
  - Boulder, Pitkin, San Miguel, Fort Collins, others

## MMC Role

- Pub Safety wants to make presentation in Aug.
- Need to make a presentation in October
  - Focus on what impacts cities
    - Water
    - Transportation
  - Adopting goals - cities need to lead in order to get to broader solution
  - Everyone should be able to coalesce around adaptation
  - Presentation of report that mark shared

- Cities want to lead
- We need to set goals
- We can present to the Caucus in October leaving us time to prepare
- Do we want to present on water or more broadly about emissions
  - Issues for climate discussion
    - Transportation
    - Water
    - Air quality
    - Renewable energy
- XCEL wants to host us at their facility
- NREL would host us again certainly

**Doodle Poll for next meeting around June 28**



  
**Colorado Climate Plan**  
 Metro Mayors Caucus  
  
**Taryn Finessey**  
 Climate Change Risk Management Specialist  
 Colorado Water Conservation Board


**COLORADO**  
 Department of Natural Resources

## HB 13-1293

*“The general assembly hereby declares that climate change presents serious, diverse, and ongoing issues for the state’s people, economy, and environment...ensure that the state is apprised of the threats that climate change poses to Colorado and the progress made to mitigate and address those threats...”*

- Development of a Plan
- Collaboration with other entities regarding climate change preparedness studies.
- Annual Report to legislature
  - Efforts to reduce emissions of gasses and to reform practices known to exacerbate climate change
  - Efforts (proposals) to prepare the state for the effects of climate change







Mutli-sectoral state level policies and recommendations

Includes mitigation and adaptation

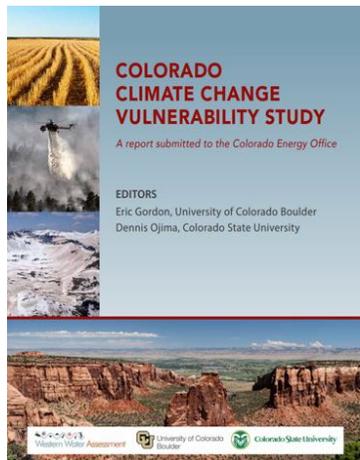
Collaborative effort by state agencies

## Climate Change in Colorado

*A Synthesis to Support Water Resources Management and Adaptation*

- A synthesis of climate change science important for Colorado’s water supply.
- Observed trends, modeling, and projections of temperature, precipitation, snowmelt, and runoff.
- Colorado-specific findings from peer-reviewed regional studies.
- Presents new graphics derived from existing datasets.
- Released August 2014

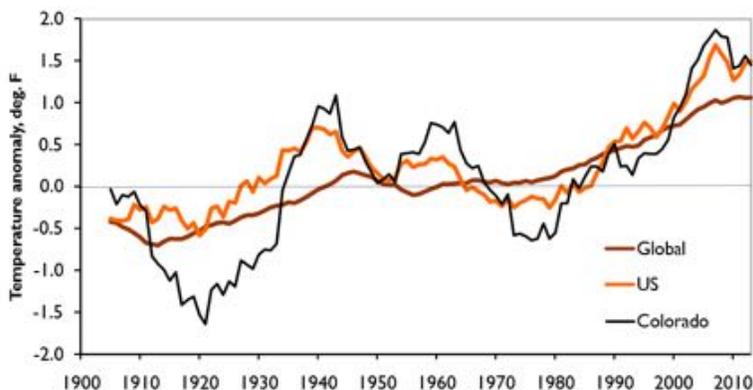
## Climate Change Vulnerability Study



- Lead Agency: CEO
- Project Goal: To provide an assessment of the key climate change vulnerabilities facing Colorado's economy and resources.
- Qualitatively assesses vulnerabilities in the following sectors:
  - Water
  - Ecosystems
  - Energy
  - Agriculture
  - Public Health
  - Tourism
  - Transportation
- Conducted by researchers at CU & CSU
- Released February, 2015



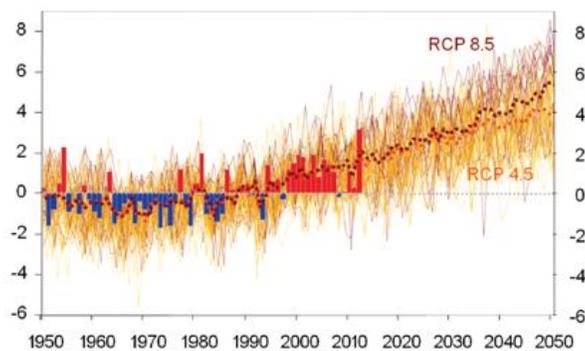
*Observed temperature departures for Colorado, the US, and globally, smoothed with a 10-year running mean*



*Climate variability is relatively larger at smaller scales, as seen in the US and Colorado time-series. You shouldn't judge the global trends from what is going on in Colorado. But all three records have followed a similar trajectory since 1900.*



### Observed & Projected Annual Temperatures



### 2050 Temperature Projections in Context

2°F: Denver's seasonal temperature cycle will become more like Pueblo today



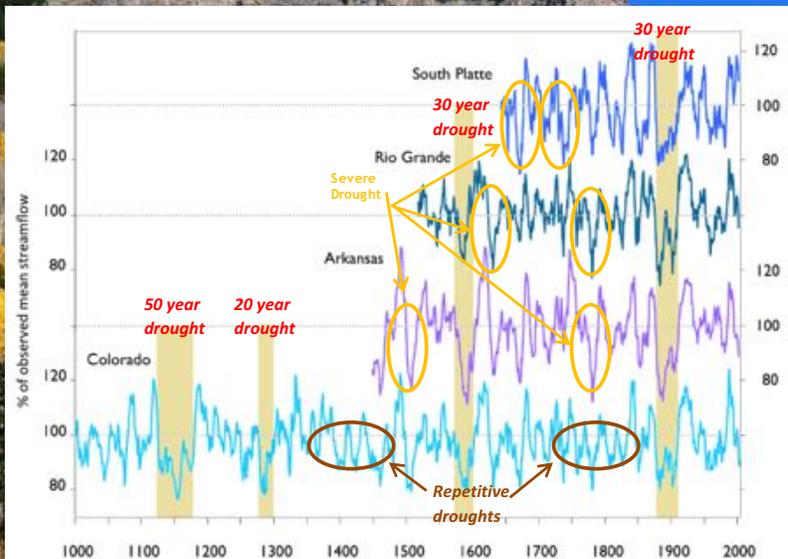
4°F: Denver's seasonal temperature cycle will become more like Lamar today



6°F: Denver's seasonal temperature cycle will become more like Albuquerque today



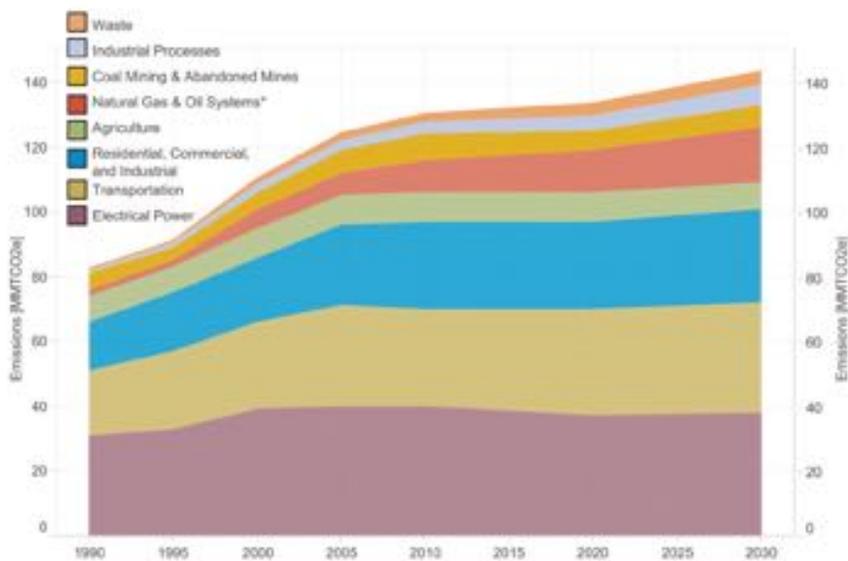
# Colorado has a variable climate...



## Public Health

Vulnerabilities: decreased air quality, water quality, increased vector-borne disease, and frequency/intensity of extreme weather events



Summary of Colorado GHG Emissions by Sector (MMTCO<sub>2</sub>e)

## Clean Power Plan

Colorado must reduce CO<sub>2</sub> emissions from existing fossil fuel fired Electric Generating Units (EGUs) by 2030

- to 1,174 pounds of CO<sub>2</sub> per megawatt hour of electricity
- OR reduce the mass of carbon dioxide emissions to 29,900,397 short tons per year

*represents a 38% reduction in the rate of CO<sub>2</sub> emissions or a 31% reduction in the mass of emissions*



# Energy

Vulnerabilities: reduced water availability and quality, shift in timing of water availability, increased energy demands, disruptions to operations, decreased reliability



## Colorado Energy Efficiency Legislation (since 2005)

### 2005

- SB05-143 Amendment 37 Renewable Energy Standards (adoption)
- HB05-1162 Energy Efficiency Standards Appliances
- HB05-1133 Energy Efficiency Program Funding
- SB05-001 Optional Low Income Energy Assistance

### 2006

- HB06-1200 Low-income Energy Assistance Funding
- HB06-1147 Gas Utility Energy Efficiency

### 2007

- SB07-246 Create Clean Energy Fund
- HB07-1281 Increase Renewable Energy Standard
- HB07-1146 Energy Conservation Building Codes
- SB07-051 High Performance State Buildings
- HB07-1037 Natural Gas Utility Energy Efficiency
- HB07-1309 Oil & Gas Interest School Energy Efficiency

### 2008

- HB08-1387 Low-income Energy Assistance Funding
- HB08-1350 Facilitate Financing Renewable Energy Projects
- SB08-184 Colorado Clean Energy Finance Program
- SB08-147 Increase Energy Efficiency State Buildings
- HB08-1270 CICs Allow Energy Efficiency Measures
- SB08-078 Energy Efficiency Historical Preservation Grant

### 2009

- HB09-1350 New Energy Jobs Creation Act
- SB09-039 Conserve Energy Tiered Rates Incentive
- HB09-1126 Encourage Solar Thermal Installations

### 2010

- SB10-207 Finance State Energy Efficiency Projects
- HB10-1365 Clean Air Clean Jobs
- HB10-1331 Governors Energy Office Green Building Incentive Program
- HB10-1328 New Energy Jobs Creation Act
- HB10-1333 Green Job Colorado Training Pilot Program

### 2011

- HB11-1160 Governors Energy Office Green Building Incentive Program

### 2012

- HB12-1315 Reorganization of Governor's Energy Office
- HB12-1028 Continue Low Income Energy Related Assistance

### 2013

- SB13-279 K-12 School Energy Resource Efficiency
- SB13-212 Energy District Private Financing Commercial Buildings
- HB13-1105 Energy Savings Mortgage Program
- SB13-028 Track Utility Data High Performance State Buildings

### 2014

- SB14-202 Funding For Energy Efficiency In Schools
- SB14-186 Efficient School & Community Performance Contract

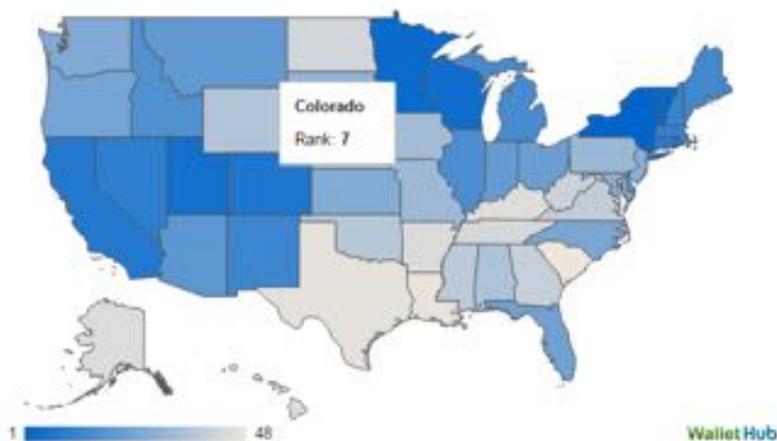


## Xcel Energy CO2 Emission Reductions in Colorado



## How Energy-Efficient Is Your State?

A new report lists America's most and least energy-efficient states.



## *Agriculture*

Vulnerabilities: decreased water availability, increased drought, increased crop demands, increased heat stress, decreased crop yield, increased weeds & pests



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## *Tourism and Recreation*

Vulnerabilities: Warming in the shoulder seasons & decreased cold snaps may effect snow-making operations, earlier melt, temperature & seasonal shifts, occurrence of avalanches,



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## *Transportation*

Vulnerabilities: heat-related infrastructure stress & damage, higher winter snow removal, increased snow slides & mudslides, increased delays, degraded operations, increased washouts, increased wildfires/ closures, changes in air density, increased costs.



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## *Ecosystems*

Vulnerabilities: increased susceptibility to insect and pathogen invasions, phenology shifts, wildfire, decline in habitat suitability, drought stress



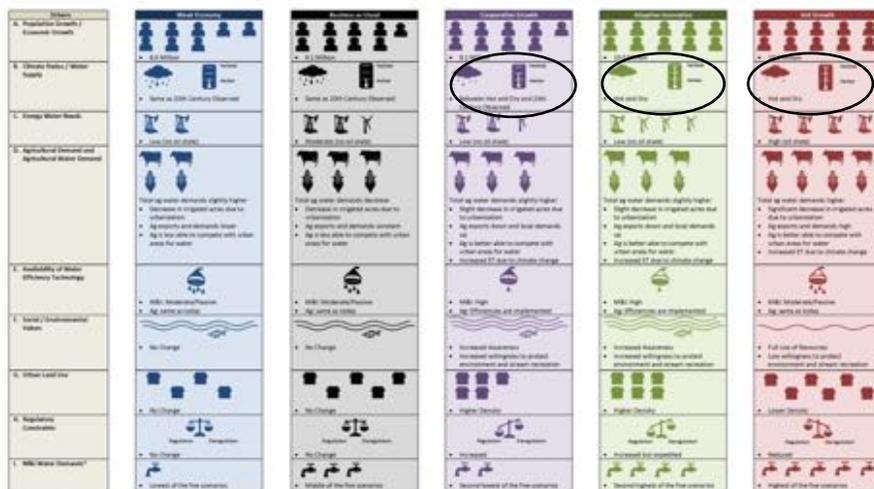
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# Water

Vulnerabilities: Changes in streamflow, peak runoff and crop demands. Decreases in Snowpack. Increases in drought. Increased water temperatures. Decreased water quality.



## The Role of Climate Variability in Long Term Water Planning & Colorado's Water Plan



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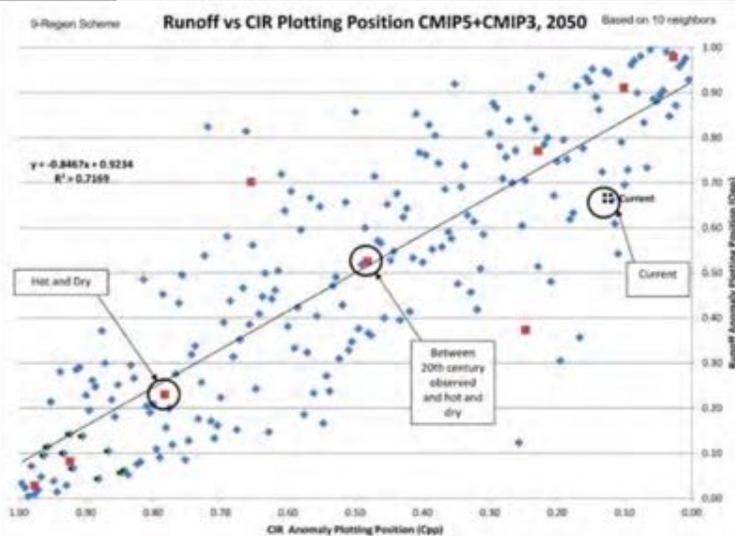
### Projected climate and hydrology changes

- Annual streamflow** decreases in majority of projections
- Peak runoff timing** earlier in all projections
- Crop water use** increases
- April 1 snowpack** decreases in most projections
- Palmer Drought Index** more drought
- Heat waves** more frequent
- Cold waves** less frequent
- Frost-free season** longer
- Wildfires** more frequent

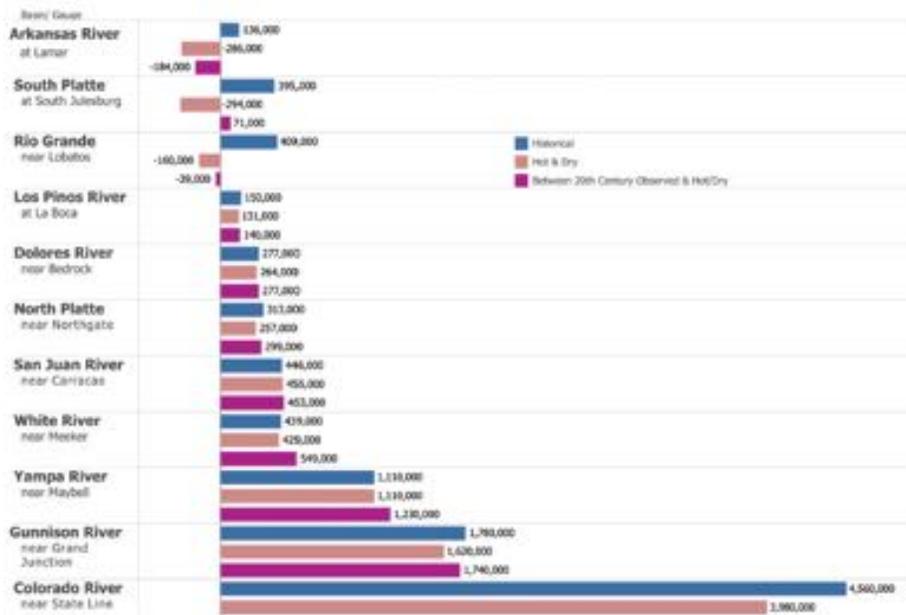
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Projected

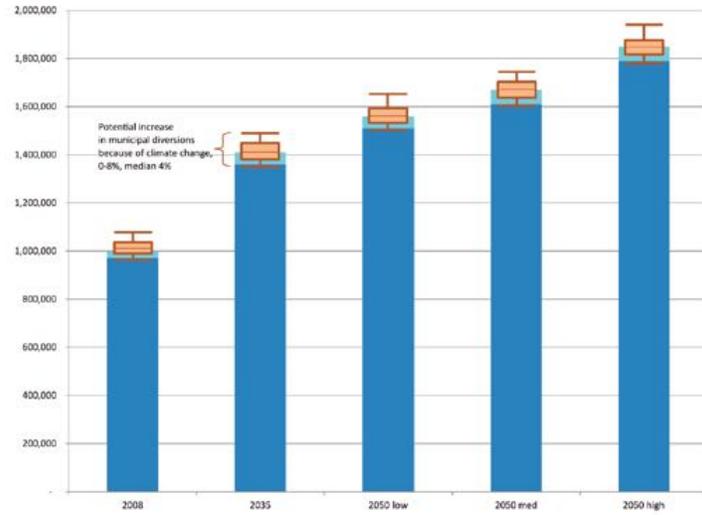
**FIGURE 4-9** PLOT OF RUNOFF CROP IRRIGATION REQUIREMENTS USING THE BUREAU OF RECLAMATION ARCHIVE



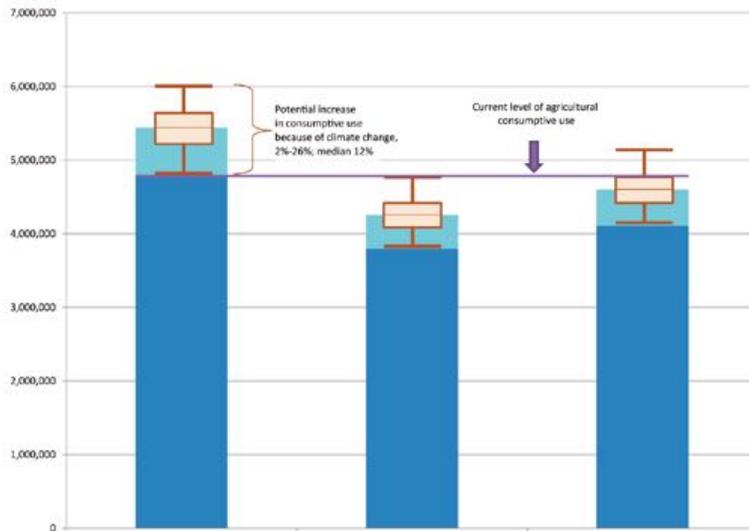
"Hot and dry" is defined as the 75th percentile of climate projections for crop irrigation requirements (water use), and the 25th percentile for natural flows. In other words, only 25 percent of projections have lower natural flows and 25 percent of projections have higher crop irrigation requirements. "Between 20th century-observed and hot and dry" is defined as the 50th percentile for both natural flows and crop irrigation requirements. This scenario represents the middle of the range in terms of severity. Historical or current conditions, which represent no-change in runoff or in crop irrigation requirements, fall at roughly the 95 and 67th percentiles; this means that 95 percent of runs show increases in crop irrigation requirements and about two-thirds show reductions in runoff.



### Projected change in municipal water diversions(AF) with range of climate change increases



### Projected agricultural water demands (AF) with range of climate change increases



# Local Climate Action

A map of Colorado showing major cities and highways. Several areas are highlighted with yellow ovals: Fort Collins, Loveland, Boulder, and the Front Range area (including areas around Denver and Golden). The map includes a legend for Interstate Highways and US Highways, and a scale bar at the bottom.

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## Questions?

**Taryn Finnessey**  
 Colorado Water Conservation Board  
 303.866.3441 X3231  
 taryn.finnessey@state.co.us

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