Water Supply Vulnerability Study
Meagan Smith, Water Resources Division
Water Supply
Vulnerability
Study

Increasing
Uncertainties

Regional
Resource
Water Supply & Demand Management Policy

Water Efficiency Plan

Water Supply Vulnerability Study 2017-2019

Water Shortage Action Plan
MANAGE
raw water supplies

PROTECT & DEVELOP
water rights

PLAN
for future water supply needs
Current Long-Term Planning

- Future demand
- Single planning drought
- Emergency reserve

- Yield-based
- Single-future
Why Change?

01 Changing Climate

02 Assess Other Vulnerabilities

03 Industry Best Practice
Future Direction of Long-Term Planning

• Risk-based planning
• Scenario planning
• Embrace uncertainty

Graphic source: Denver Water
New Tools and Data

**Water Supply Forecasts**
- Observed historical record
- Tree-ring data
- Climate change

**Water Demand Forecasts**
- Zoning and development density, weather, economic conditions and historical use
- Two future development scenarios

Temperature and Precipitation Offsets used to develop climate impacted hydrology compared to range of selected GCMs.
Simulated native flows for Cache la Poudre River at the canyon mouth

### Average annual native flows (ac-ft/year)

<table>
<thead>
<tr>
<th>Temperature Change</th>
<th>Precipitation Change</th>
<th>-10%</th>
<th>-5%</th>
<th>0%</th>
<th>+7%</th>
<th>+15%</th>
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### % Change from non-climate adjusted flows

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Simulated native flows for Lake Granby gage

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Historical C-BT Quotas

~30% of Quotas less than 70%
No Quotas less than 50%
Climate Impacts – C-BT Quotas

- Temp and Precip offset: 0 deg F, 0% P
  - ~30% of Quotas less than 70%
  - ~10% of Quotas less than 50%

- Temp and Precip offset: +5 deg F, 0% P
  - ~40% of Quotas less than 70%
  - ~15% of Quotas less than 50%

- Temp and Precip offset: +5 deg F, -5% P
  - ~60% of Quotas less than 70%
  - ~30% of Quotas less than 50%
Identifying Vulnerabilities

Water Board
CSU
Water Districts
Northern Water
City Depts.
• **Reliability:** HOW OFTEN conditions occur
• **Resilience:** HOW LONG conditions persist
• **Vulnerability:** HOW SEVERE conditions are

Chart source: Colorado Springs Utilities
Percent of Years on Restrictions

Current Planning
- Expected future demands
- Halligan expansion in place

Colorado-Big Thompson Long-Term Reduction
- Expected future demands
- Halligan expansion in place

No Halligan Expansion
- Expected future demands
Some Key Findings – Most Impactful

- Warmer / drier climate poses largest risk to long-term planning
- Adequate storage is crucial to meet current policy criteria
- Long-term reduction in Colorado-Big Thompson supplies impacts ability to meet demands
Next Steps – Policy Update

Iterative Process

Planning Futures

Solutions

Service Levels
THANK YOU!

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