

# Jobs, Careers & Leadership at Northern Water

Grad 592 Seminar Series  
September 23, 2024

Esther Vincent, P.E.

Environmental Services  
Director, Northern Water





Overview of Northern Water, its  
operations, and career opportunities

# Overview



WHO WE ARE



WHAT WE ARE UP  
AGAINST



WHAT WE DO



NORTHERN  
WATER CAREERS



MY CAREER PATH



LEADERSHIP  
INSIGHTS



RESOURCES



# Northern Water

Two Campuses

- Berthoud
- Willow Creek



# Northern Water Today



District population 1,021,000



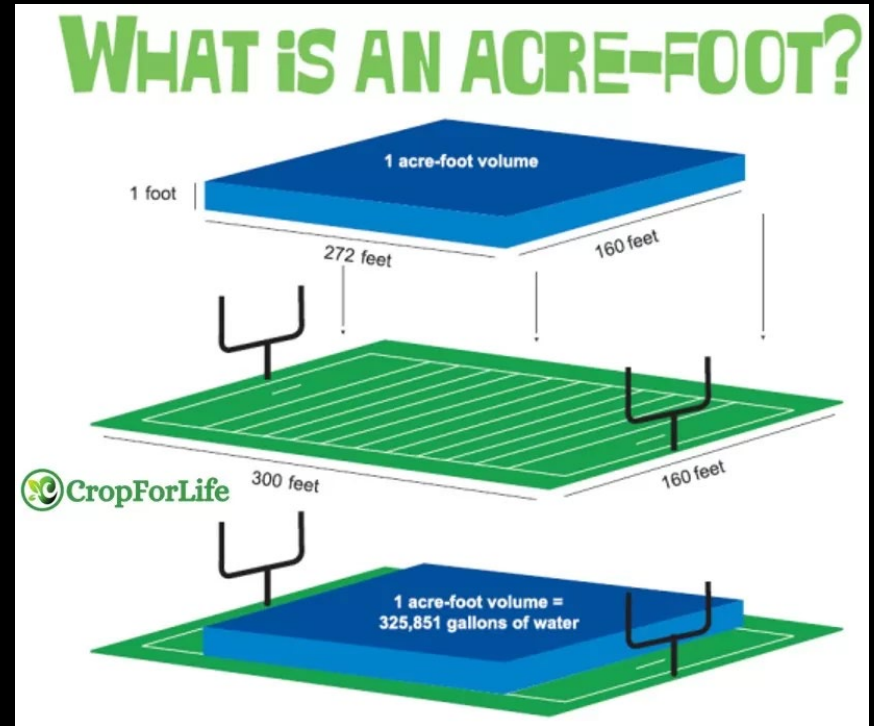
Ownership  
Ag: 29%  
M&I: 71%



Deliveries (2020)  
Ag: 40%  
M&I: 60%



Raw Water Provider 210,000 acre-foot/year

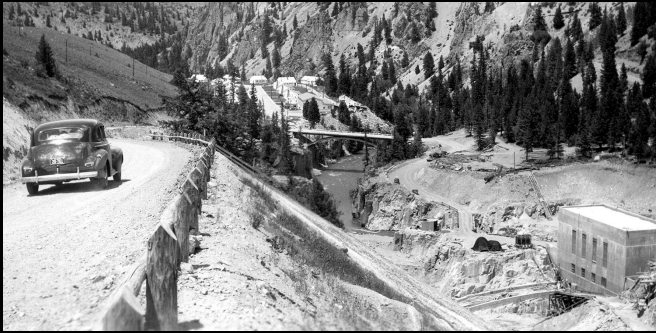


C-BT is a Supplemental Supply

# Northern Water History

**1935**

Northern Colorado  
Water Users  
Association  
established



**June 24, 1937**

Congress approves  
Senate Document 80,  
authorizing  
construction of C-BT  
Project



**Dec. 1, 1938**

Construction begins  
on Green Mountain  
Reservoir Dam.



**1947**

First water flows through  
the Adams Tunnel

**1957**

C-BT Project declared  
complete & fully  
operational.

# Operations

Northern Water jointly administers, operates, maintains & funds the federally-owned C-BT Project with the U.S. Bureau of Reclamation.



— BUREAU OF —  
RECLAMATION

# Mission

To provide water resource management leadership to the region while seeking a secure water future with a commitment to delivering a reliable, sustainable, high-quality water supply in an environmentally responsible manner.



**Values**

# Stewardship



## Protect...

...Northern Colorado's water supply for current and future generations.



## Ensure...

...efficient and thoughtful use of our scarce water resources.



## Commit...

...to environmental stewardship, sustainability and safeguarding natural resources.



## Invest in and engage...

...with the communities we both serve and affect to protect the resources on which we collectively depend.

# Collaboration



## Lead...

...through partnerships to address water challenges throughout the region and the West.



## Build...

...relationships and work with all stakeholders to achieve common goals.



## Work...

...cross functionally, both internally and externally to leverage expertise and resources.



## Inform and educate...

...our constituents and the public on water-related matters.

# Excellence



## Ensure...

...safety of our employees and of the community.



## Maintain...

...transparency of operations and accountability to allottees and taxpayers.



## Provide...

...a reliable and cost-effective water supply while maintaining financial strength and fiscal responsibility.



## Foster...

...a culture and work environment that attracts and retains engaged and committed staff while promoting diversity and inclusivity.



## Embrace...

...cutting-edge technology and innovative ideas.



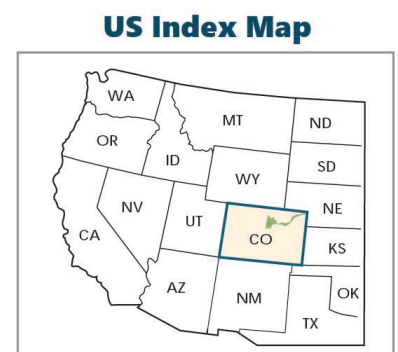
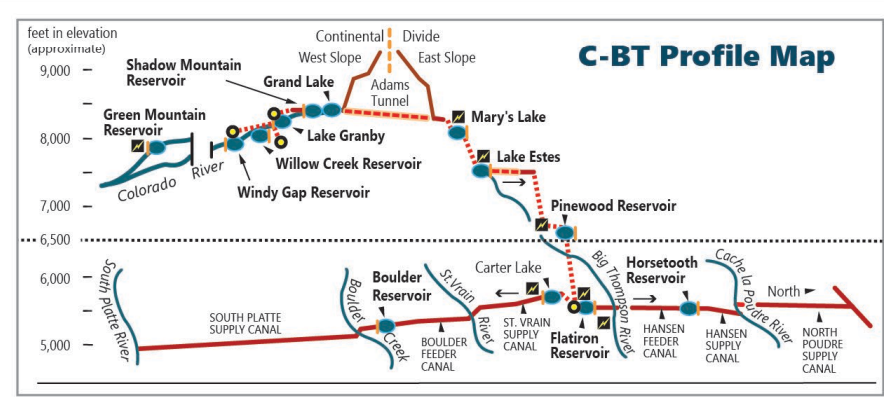
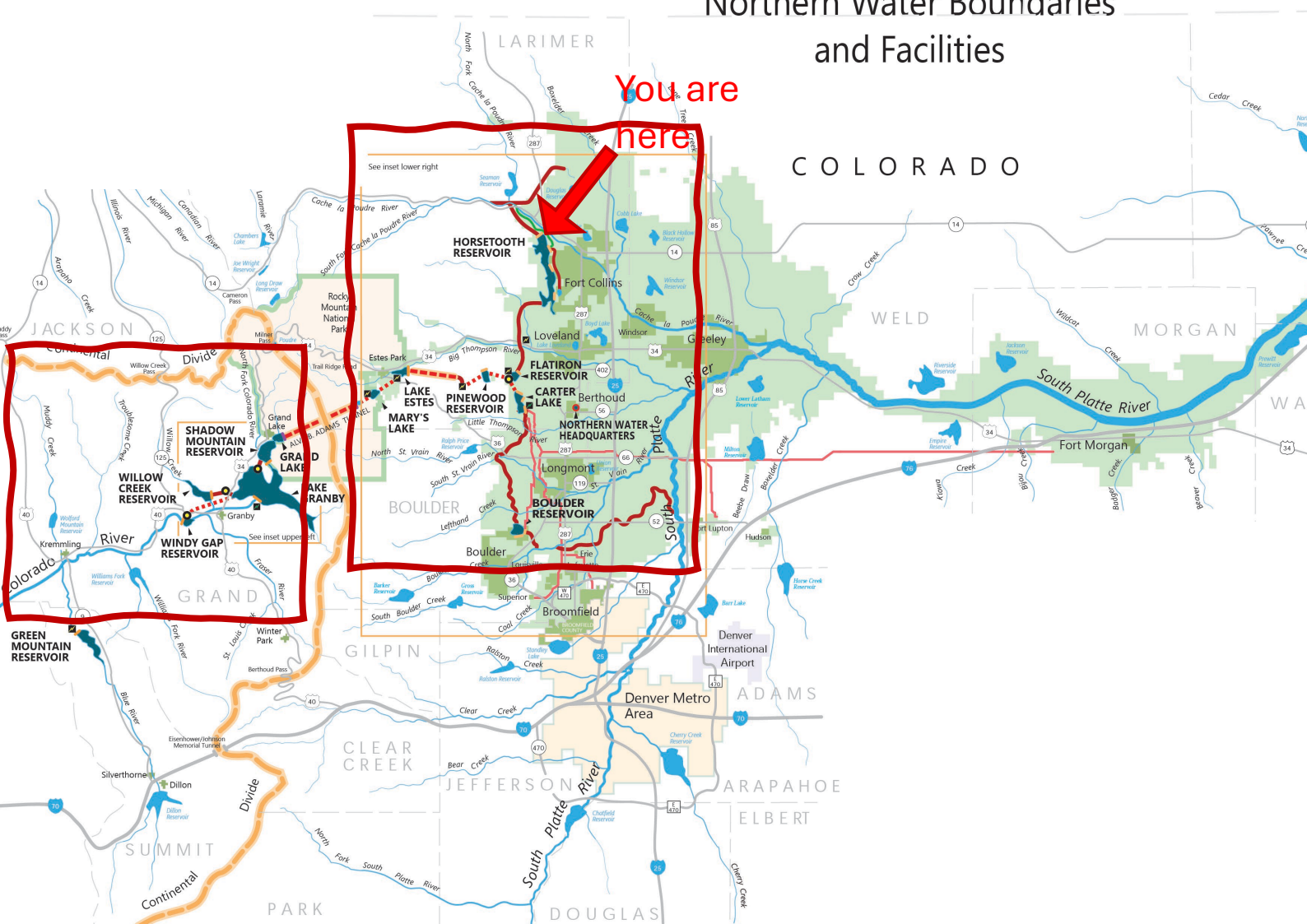
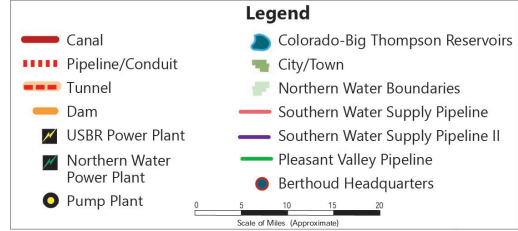
## Invest in...

...the maintenance and modernization of infrastructure and facilities to provide reliable and efficient water delivery.

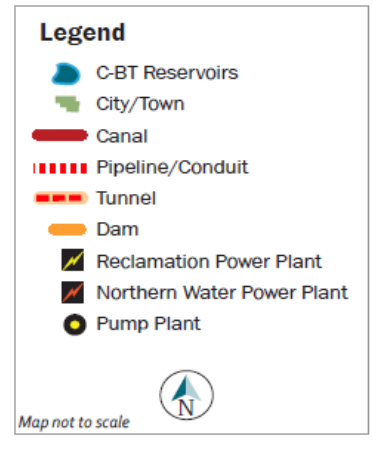
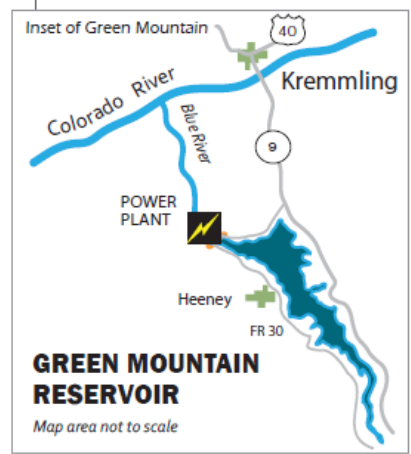
# Northern Water

## Colorado-Big Thompson Project

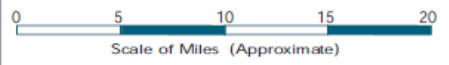
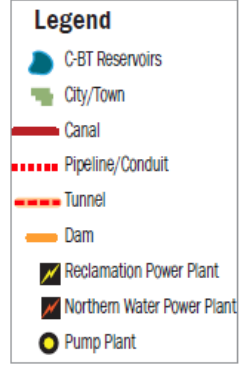
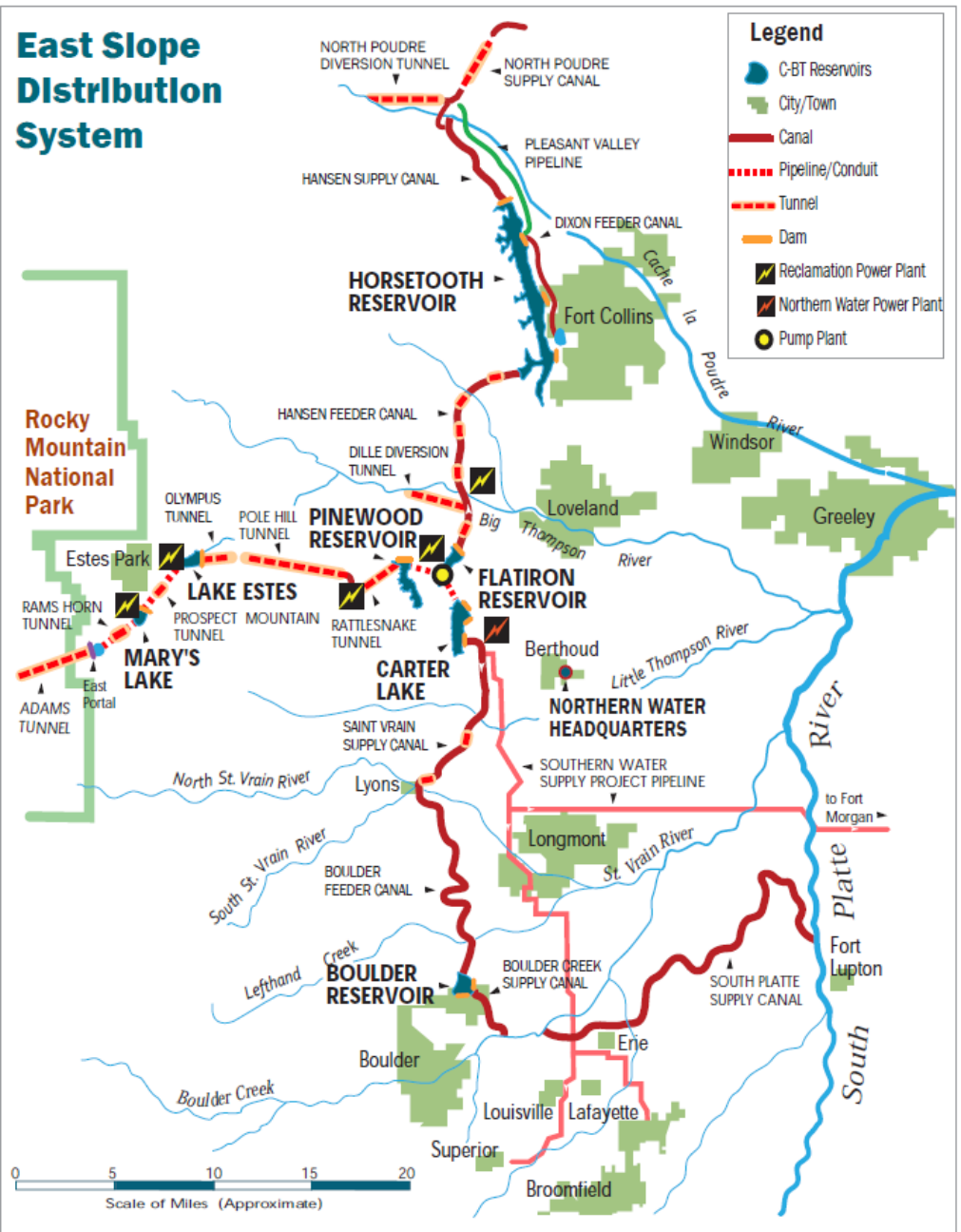
### Northern Water Boundaries and Facilities



# West Slope Collection System



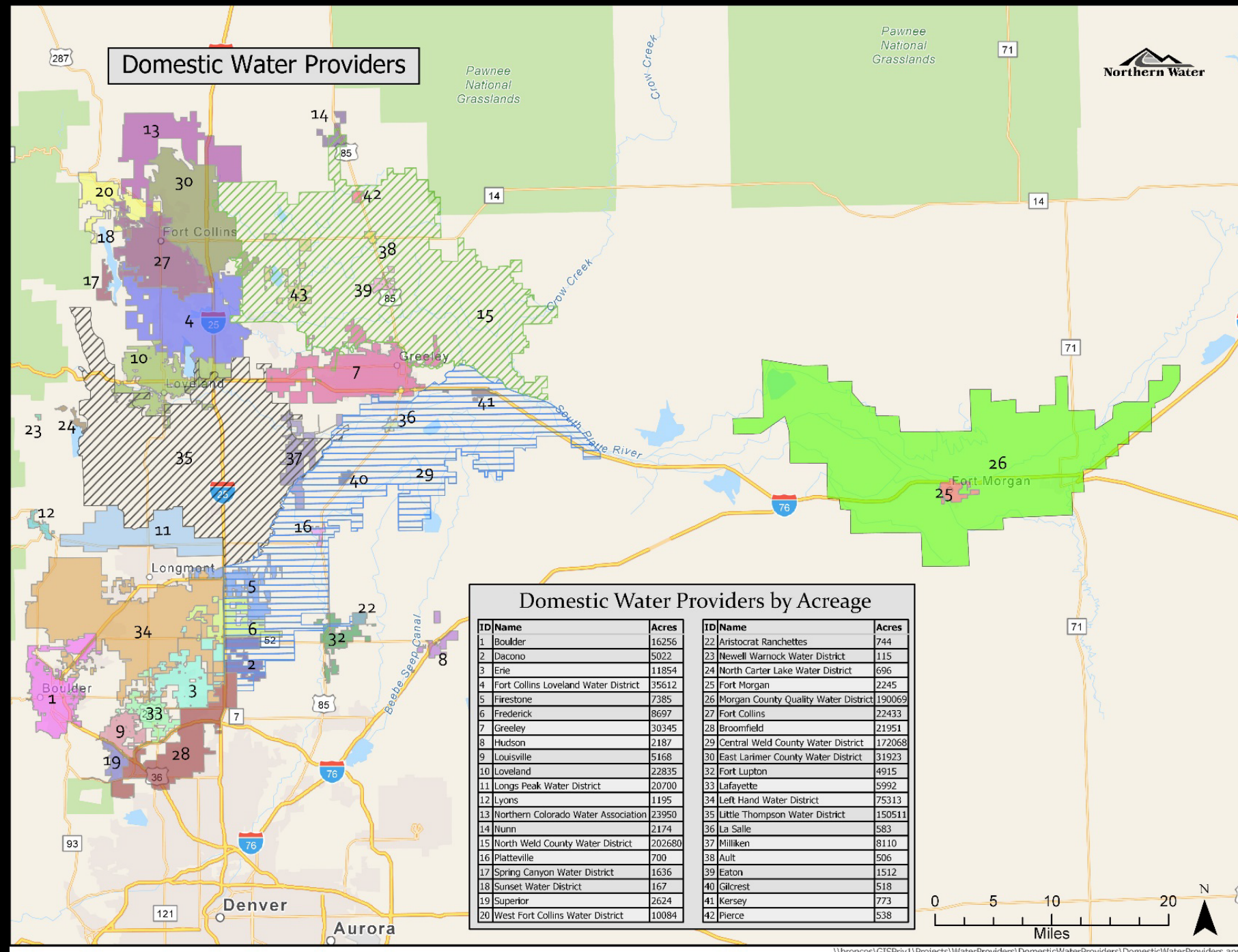
# East Slope Distribution System



# Project Allottees

33 municipalities & 120 water, ditch and irrigation companies

615,000 acres of irrigated farmland



# Northern Water Leadership



Board President  
*Dennis Yanchunas*



General  
Manager  
*Brad Wind*

## 13 Board Members

- Larimer County (3)
- Boulder County (3)
- Weld County (3)
- Sedwick & Washington (1)
- Broomfield County (1)
- Morgan County (1)
- Logan County (1)
- Director Emeritus



Engineering  
Division Director  
*Jeff Drager*



Operations  
Division Director  
*Jerry Gibbens*

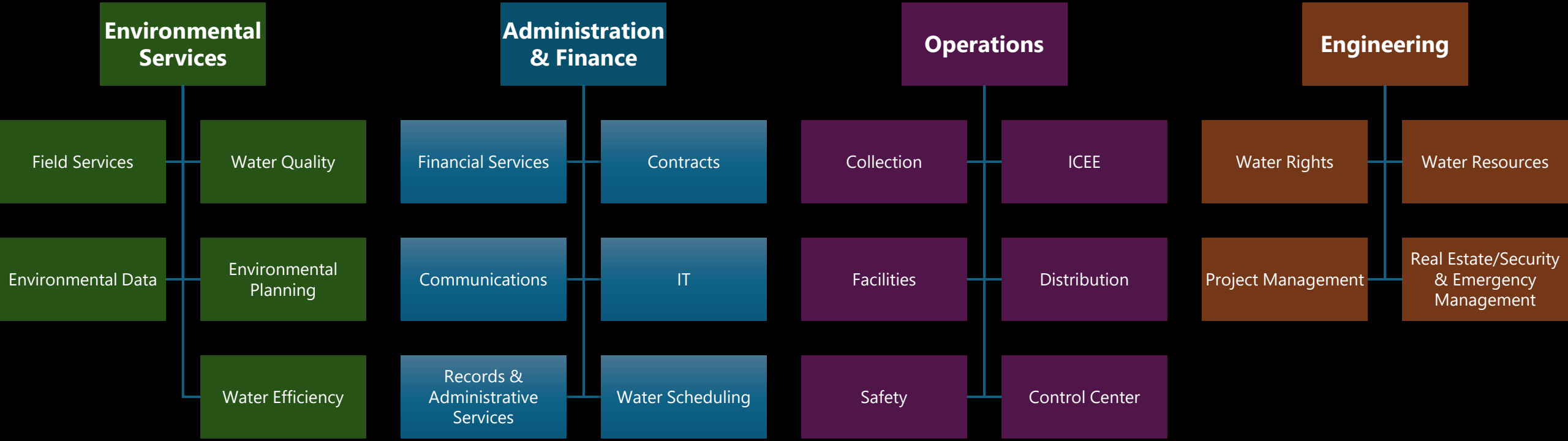


Administration  
& Financial  
Services  
Division Director  
*Sander  
Blackburn*



Environmental  
Services  
Division Director  
*Esther Vincent*

# Organizational Chart



# Themes



Limited Resource



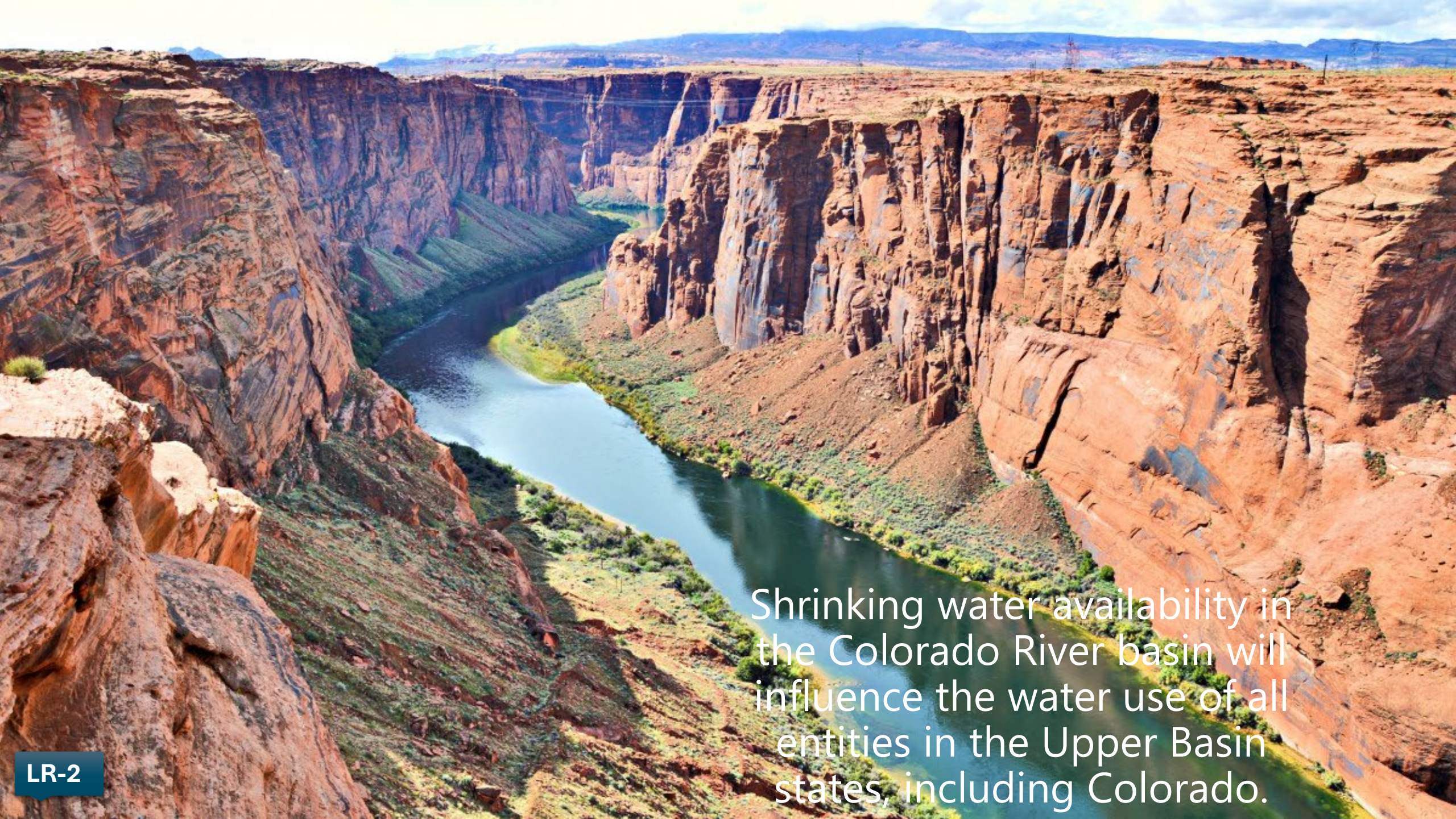
Operations



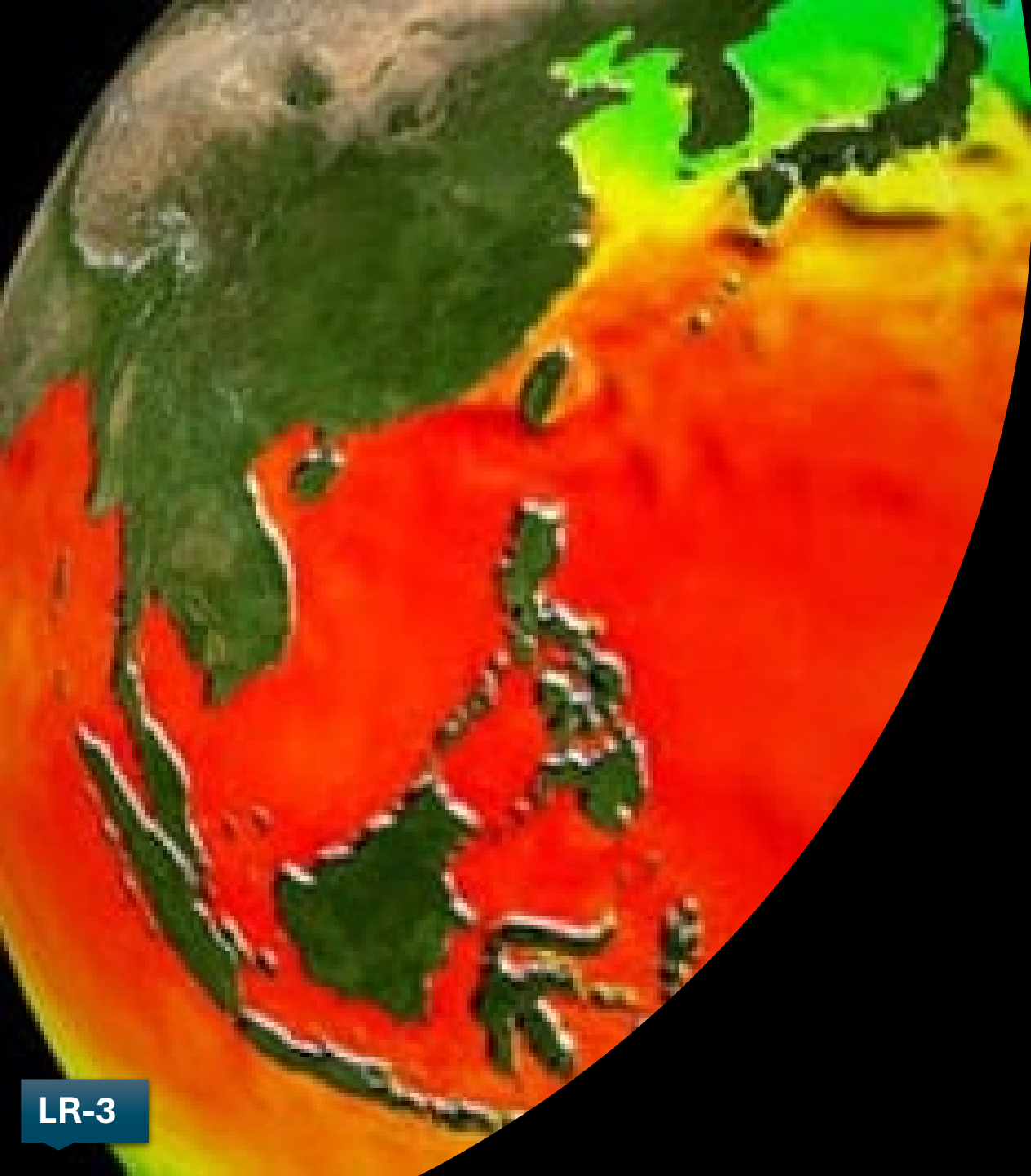
Environmental



Water is at the crossroads of many essential values and functions our societies depend on: economic vitality, recreation, food production, residential needs, environmental health etc....

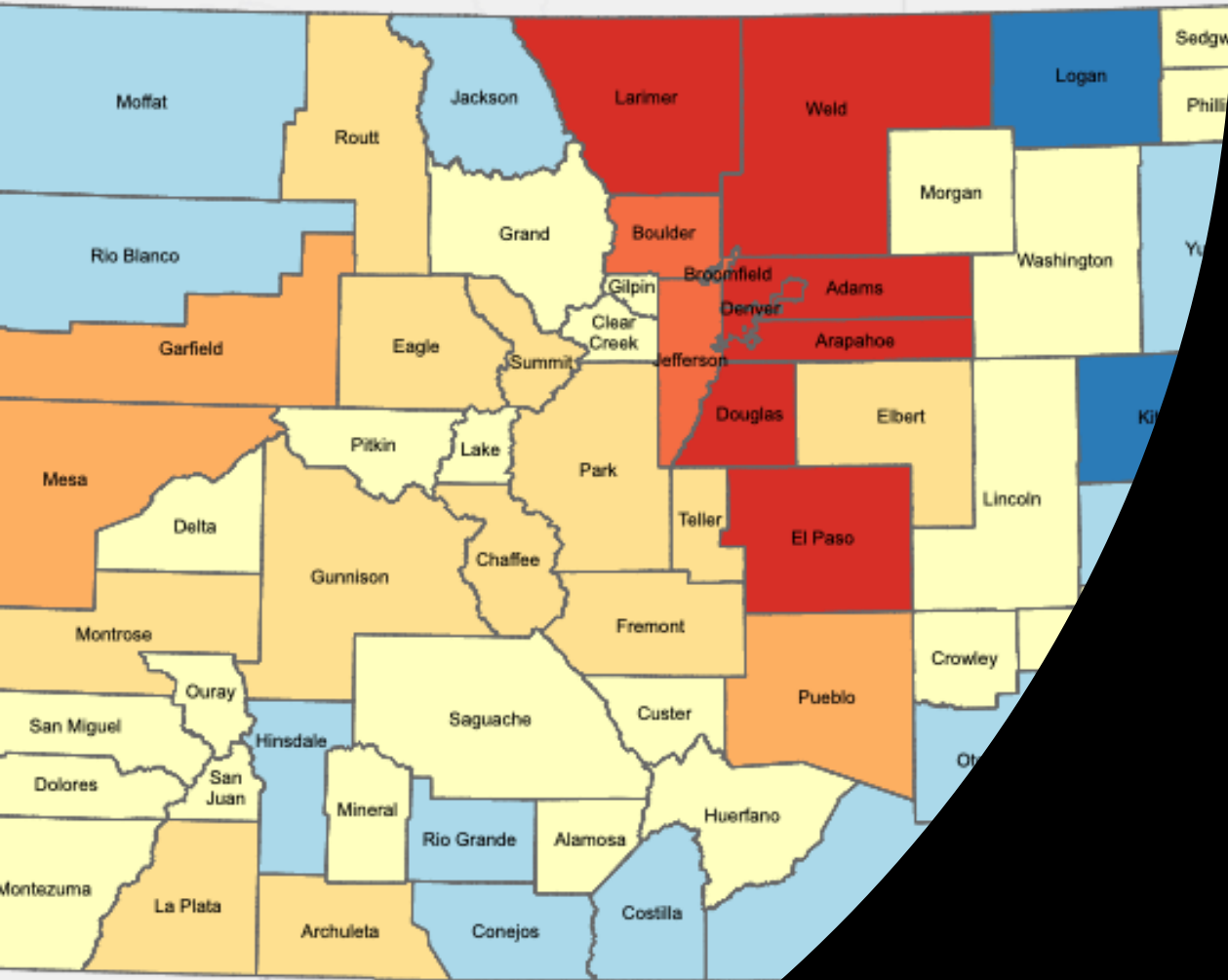


Shrinking water availability in the Colorado River basin will influence the water use of all entities in the Upper Basin states, including Colorado.



Climate change is simultaneously causing increasing uncertainty, decreasing availability, and greater water needs, thereby exacerbating pressures on an already scarce resource.

# Population Change by County 2010 to 2020




Population growth and contemporary water needs are exceeding available supplies.

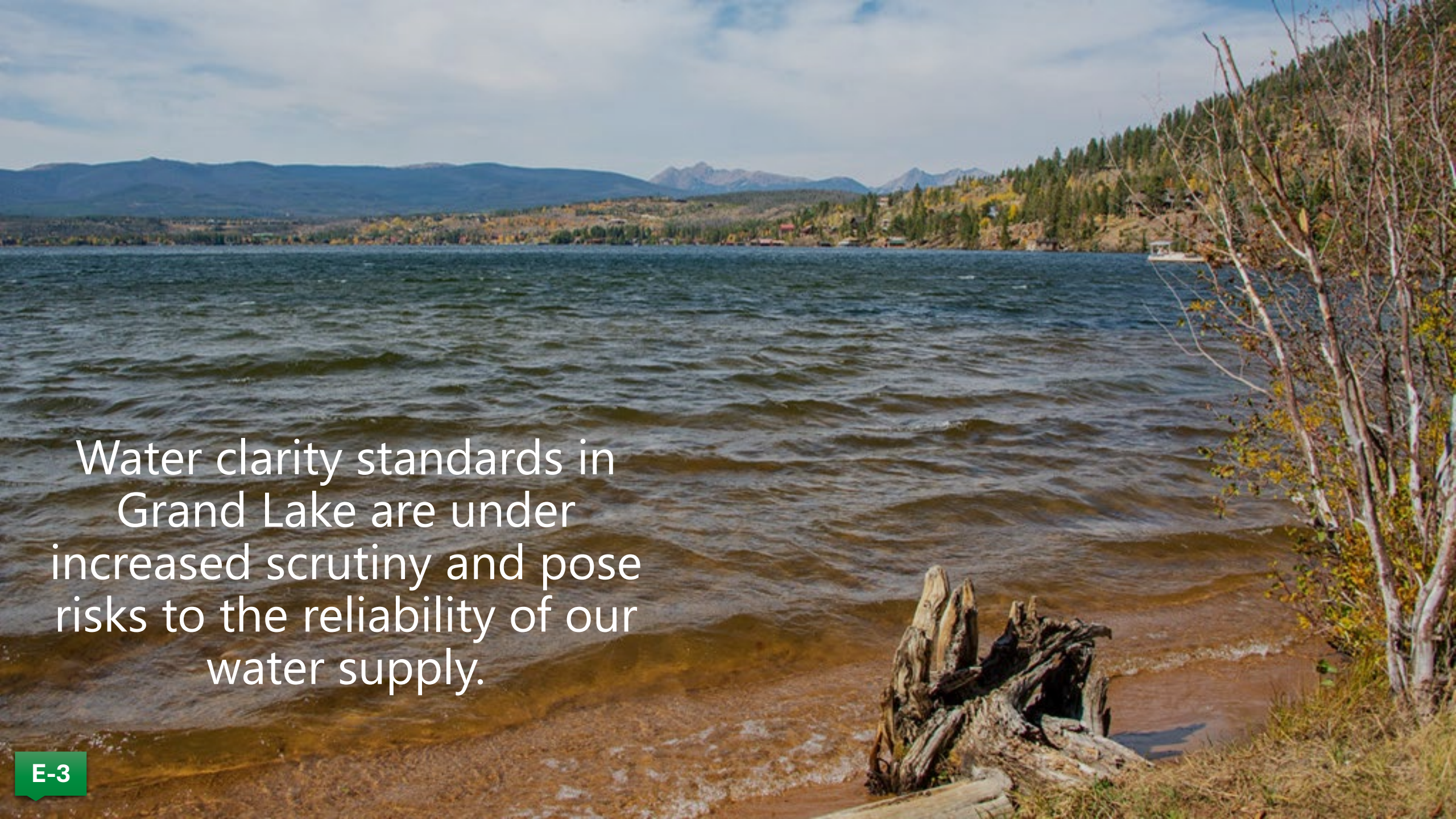
Increasing water demands from within Northeastern Colorado, and beyond, threaten base water supplies and the region's long-standing agricultural economy.



Moving large amounts of water across watersheds and jurisdictions comes with an environmental footprint.

A photograph of a volcanic eruption at sunset. A large, billowing plume of ash and smoke rises from the volcano, illuminated by the warm, golden light of the setting sun. The sky is a mix of orange, yellow, and blue. The foreground shows the dark, rugged terrain of the volcano.

Wildfires over the last several years have threatened our ability to deliver water and maintain superior water quality, and increasing risks exist of similar events in the future.



Water clarity standards in Grand Lake are under increased scrutiny and pose risks to the reliability of our water supply.

# Fort Collins staff give preview of new 1041 regulations for water, highway projects



**Jacy Marmaduke**

Fort Collins Coloradoan

Published 5:00 p.m. MT July 8, 2022

[View Comments](#)




Fort Collins is zeroing in on a new set of regulations that will give the city more oversight of high-impact water, sewer and highway projects.

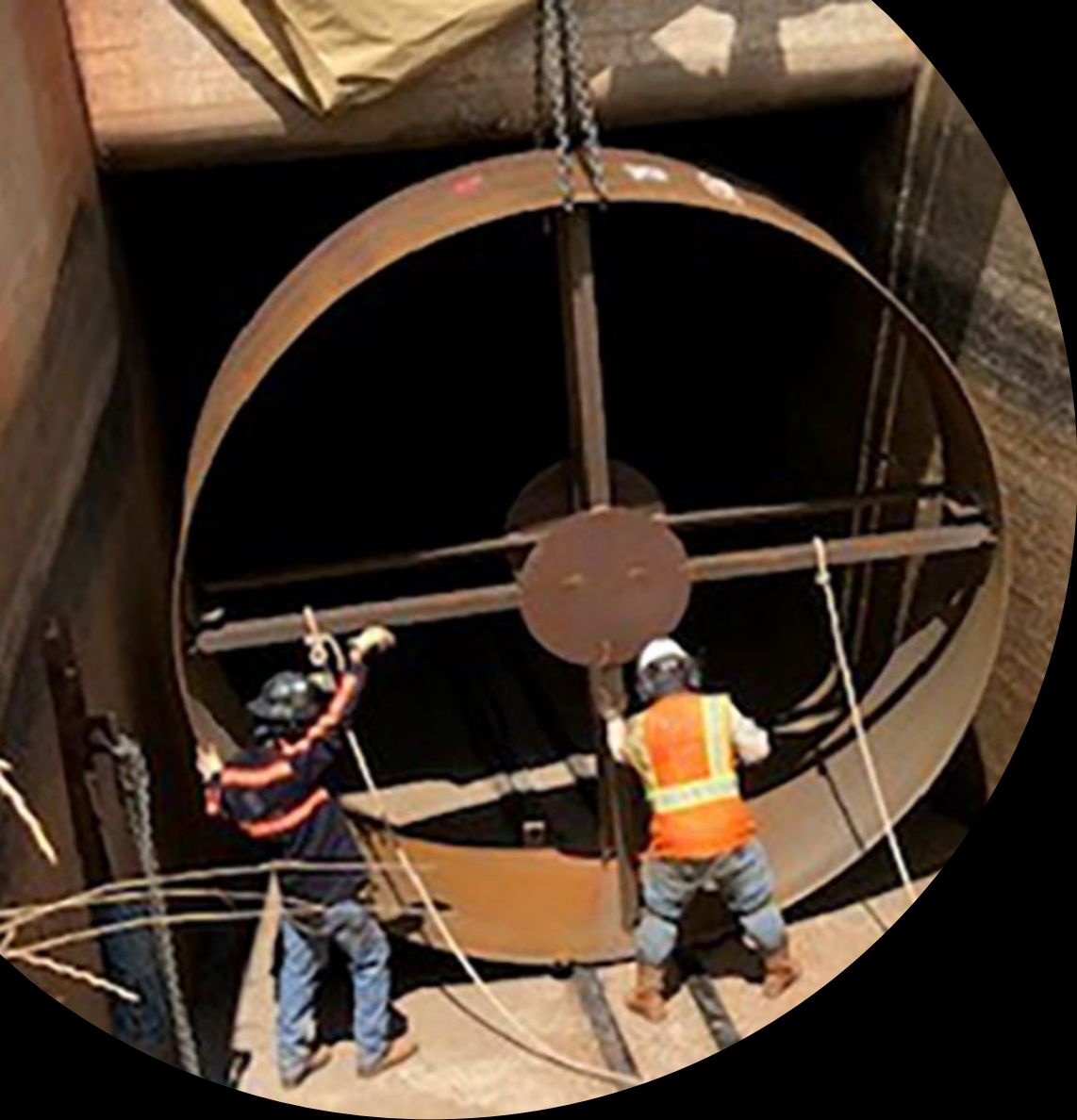
Staff gave Fort Collins City Council an [overview of the city's draft 1041 regulations](#) at a recent work session. The regulations, named for the state law that created the local authority, give local governments permitting power over development projects – even projects with statewide impacts where local governments might otherwise have limited oversight. Local

Changing regulatory and political environments influence the work we do, how we do it, and implementation timelines.

# EVERY DROP COUNTS!



Educating the public to a heightened awareness of water conservation and water ethic.



Our infrastructure is aging, with many of our facilities constructed over 70 years ago.



There are increasing needs for redundancy throughout the system to ensure uninterrupted delivery.

A large concrete dam with a spillway is the central focus, situated in a valley. In the foreground, a dirt road curves through a grassy area. The background features a large, calm lake with a small boat, surrounded by rolling hills and mountains under a clear sky.

Co-operation and management of a Federally owned project creates a web of obligations and complexities.



Protecting the organization against physical and cybersecurity threats.



Maintaining an organizational culture that fosters employee retention while reflecting the organization's mission and values.



**We Deliver Water**



12 reservoirs



35 miles of tunnels



95 miles of canals



6 hydroelectric power plants



700 miles of transmission lines

# Farr Pump Plant

Water is lifted from Lake Granby by the Farr Pump Plant into the Granby Pump Canal. From there water flows through Shadow Mountain Reservoir and into Grand Lake before making its way to the East Portal of the Adams Tunnel.



# Alva B. Adams Tunnel

- 13.1 mile Alva B. Adams Tunnel took 7 years to build
- Cost: \$12.8 million
- Size of tunnel: 9-feet 9-inches in diameter
- The first C-BT Project water flowed through the Adams Tunnel on June 23, 1947



# Flowing By Gravity

Water flows by gravity through the Adams Tunnel to the East Slope passing through a series of conduits, siphons, tunnels, penstocks and power plants.



An aerial photograph of a large reservoir nestled in a valley. The water is a deep blue, contrasting with the surrounding green and brown hills. A road runs along the edge of the reservoir, and a dam is visible in the foreground. The background shows rolling mountains under a clear sky.

# Reservoir Storage

Water is stored in several reservoirs along the foothills, including Carter Lake, Horsetooth Reservoir and Boulder Reservoir.

From the reservoirs, water is release for delivery through canals, pipelines and creeks, or directly into water treatment plants.

# Power Generation

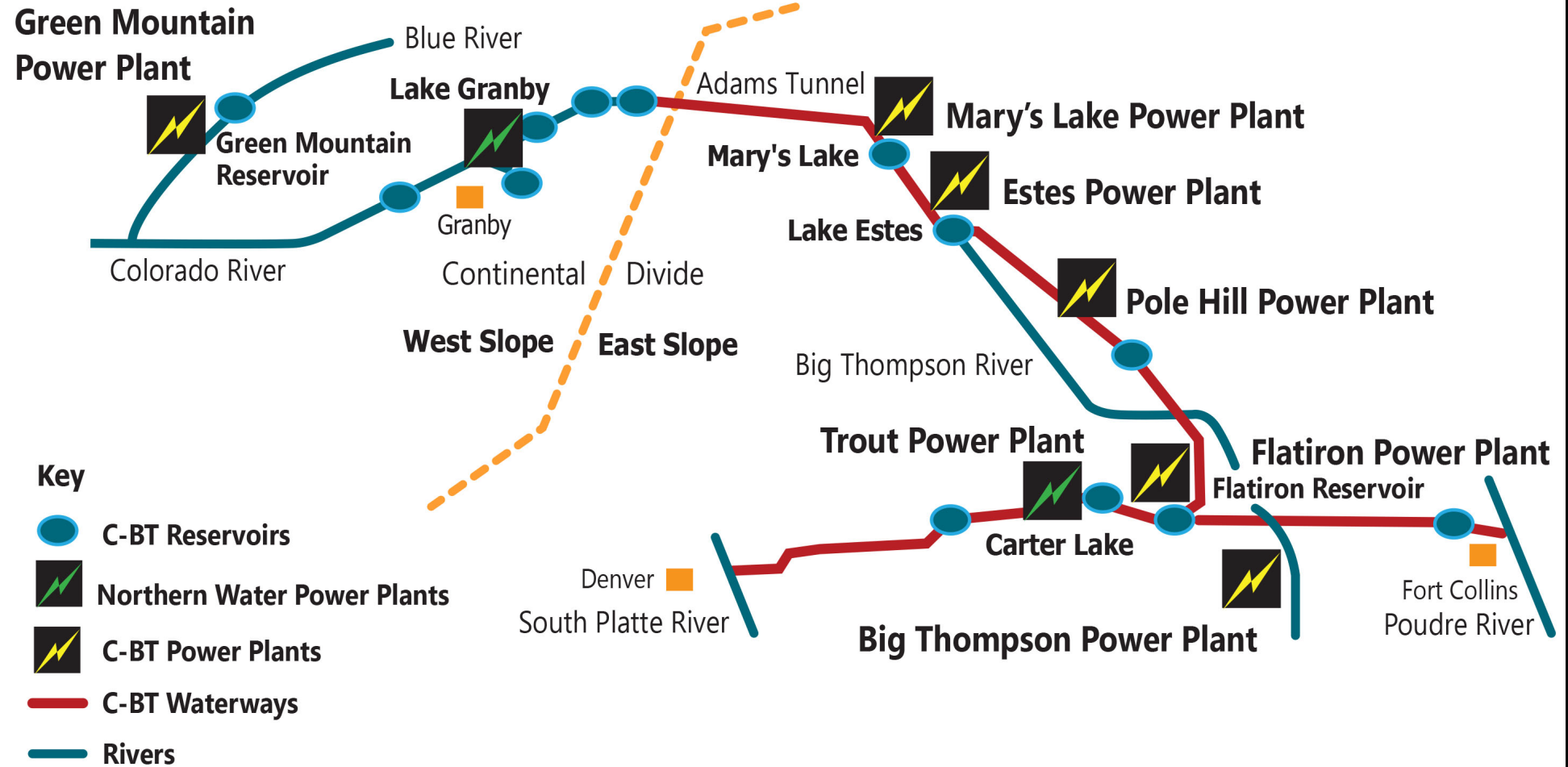


The C-BT Project generates electricity by water flowing through power plant turbines to produce hydroelectricity.

- Power sold annually supplies 68,000 homes
- Six original power plants generate an average of 770 million kilowatt-hours of renewable energy per year.

# C-BT Project Hydropower

6 power plants generate power as water moves across the Continental Divide to Northeastern Colorado



# Northern Water Power Plants



Robert V. Trout  
Hydropower Plant  
at Carter Lake



Granby Hydropower  
Plant at Lake Granby



# We Plan Future Water Supplies

Windy Gap  
Firming Project  
Northern  
Integrated  
Supply Project  
Water  
Conservation

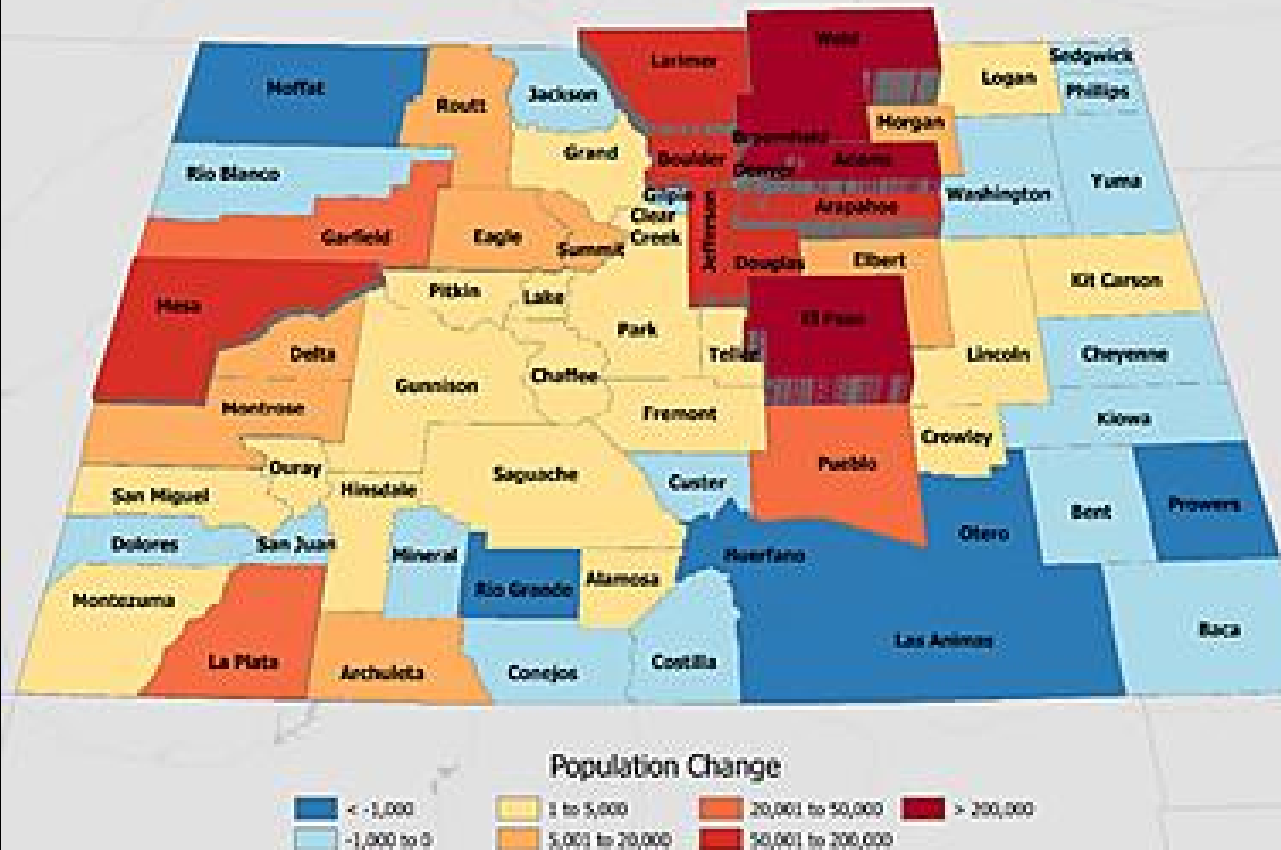


# Context

Climate Change &  
Population Growth



# Projected Population Change 2020 - 2050



Change 2020-2050  
 State: 1.8 million  
 Front Range: 1.6M  
 Western Slope: 190K  
 Central Mtns: 1K  
 San Luis Valley: -2K  
 Eastern Plains: 7K

REGIONS	SDO Proj. July, 2020	SDO Proj. July, 2030	SDO Proj. July, 2040	SDO Proj. July, 2050	Change 2020-50
<b>COLORADO</b>	5,762,915	6,499,600	7,156,625	7,564,742	1,781,826
<b>FRONT RANGE</b>	4,856,634	5,492,190	6,066,392	6,423,328	1,566,692
<b>Denver-Bldr Region</b>	3,240,895	3,610,182	3,921,819	4,074,915	834,020
Denver PMSA	2,910,035	3,255,440	3,539,971	3,678,150	768,115
Boulder PMSA	330,860	354,742	381,848	396,765	65,905
<b>North Front Range</b>	690,885	842,747	996,052	1,130,507	439,622
Fort Collins MSA	359,701	412,954	465,224	510,880	151,179
Greeley MSA	331,184	429,793	530,828	619,627	288,443
<b>Colo. Springs MSA</b>	756,420	859,427	958,942	1,023,342	266,922
Pueblo MSA	163,434	179,833	189,578	194,563	26,129

Source: Colorado State Demography Office

October 2021







Food

Quality of life

**Competing Forces**

Urban & Industrial Development

Environment

Tourism

# Further change to come

Earlier springs

Earlier snowmelt and runoff

Hotter summers

More frequent and severe heat waves

Longer growing season

Greater evapotranspiration

Net water budget deficit

Longer fire season

## Statewide Average Annual Temperature

+ 2 F over the past 30 years

GCMs predict + 2.5 F – 6.5 F by 2050





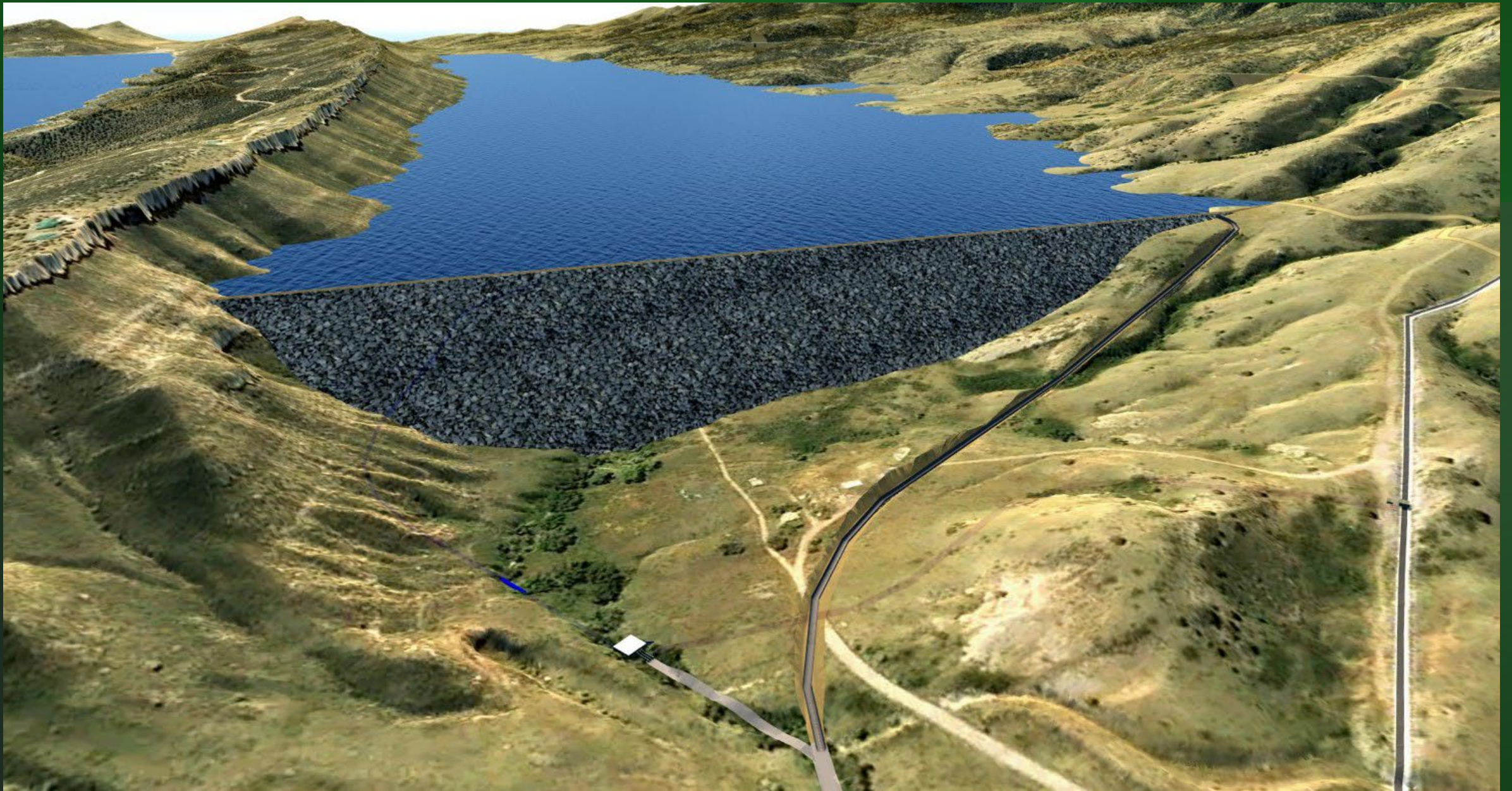
# Windy Gap Firming Project

- Build Chimney Hollow Reservoir
- 12 participants
- 30,000 acre-feet/year reliable yield
  - Yield now: zero
  - Junior rights to divert and store
- Estimate Cost: \$620 million
  - \$47.5 million so far
- Permitting started in 2003
  - concluded 2014



# Chimney Hollow Reservoir

- 90,000 acre-feet capacity
- 740 surface acres
- Located west of Carter Lake in southwest Larimer County
- Uses established Colorado River rights
- Ties into the C-BT Project

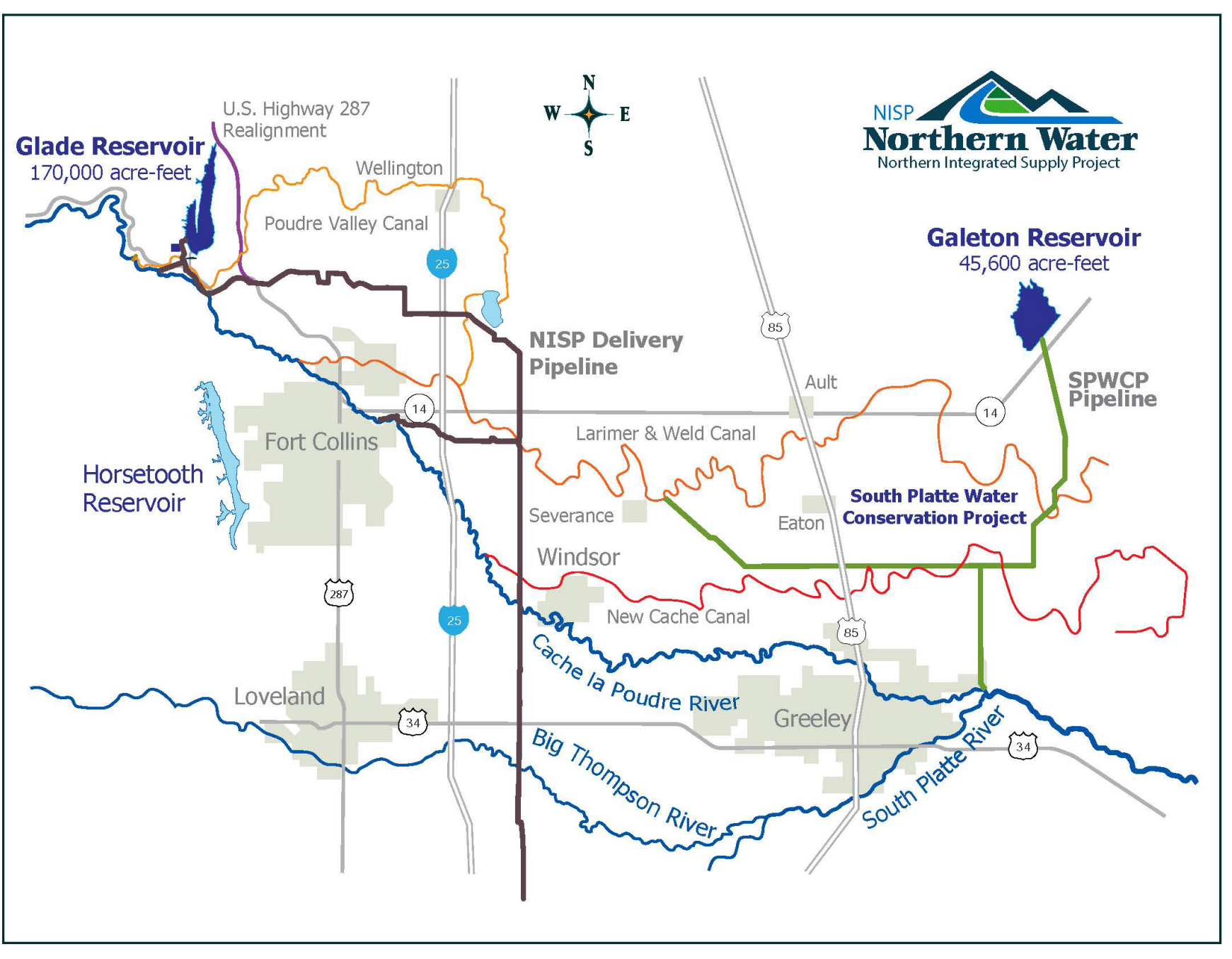



Chimney Hollow Reservoir (computer rendering)



# Northern Integrated Supply Project

- Build Glade and Galetton reservoirs
  - Also: pipelines, two pump plants, canal improvements
- 15 participants
- 40,000 acre-feet/year new yield
- Estimate Cost: \$1.2 billion
  - \$18 million so far
- Junior water rights From the Poudre and South Platte rivers



A wide-angle photograph of a large reservoir, likely the Glade Reservoir, with a prominent dam structure in the foreground. The water is calm and reflects the sky. The dam is a long, low wall made of grey rocks. In the background, there are rolling green hills under a clear blue sky. A small structure is visible on the water's surface near the dam.

## Glade – By the Numbers

---

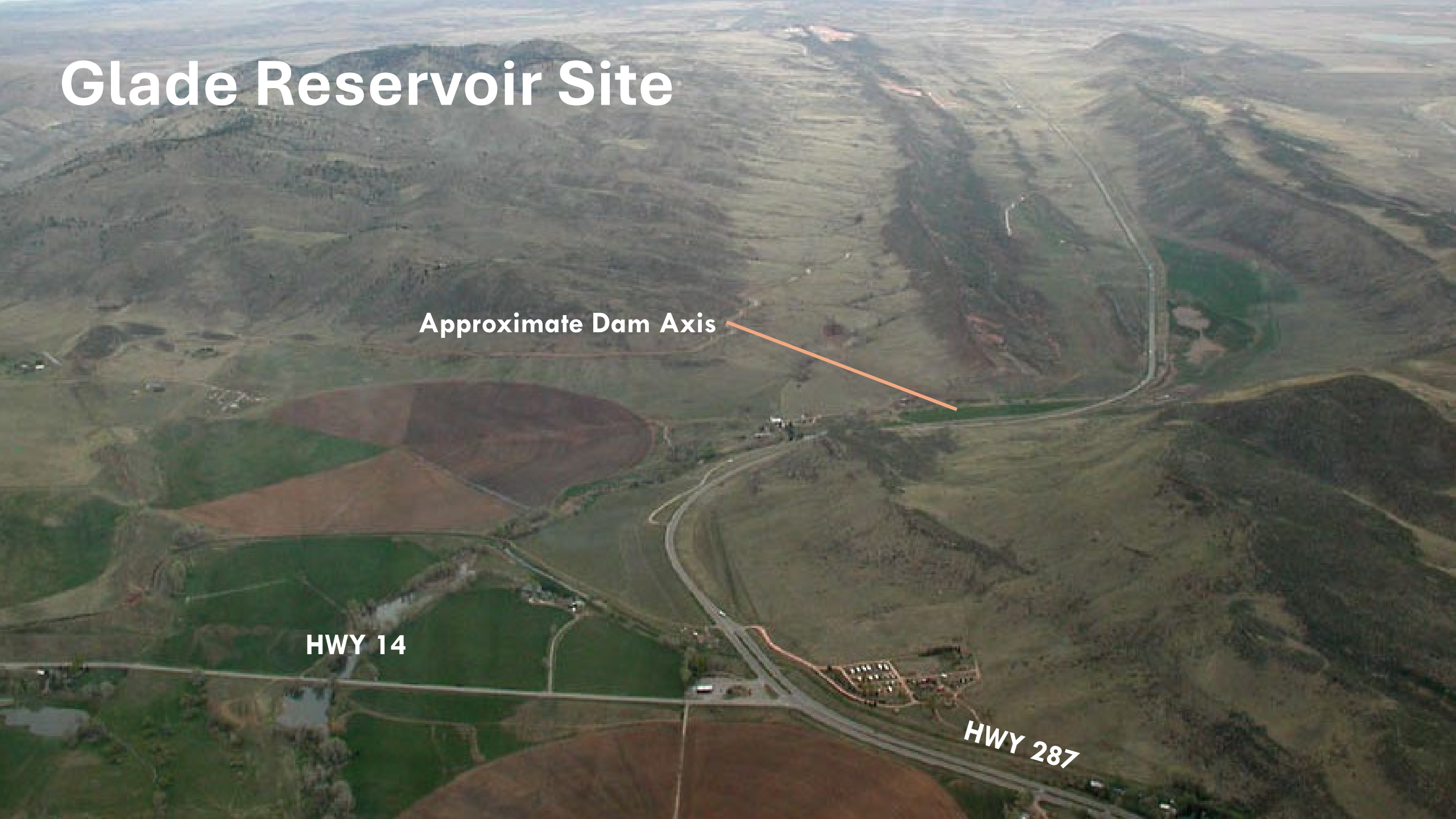
- 170,000 acre-feet of storage
- 40,000 acre-feet of firm annual yield
- 270-foot-tall dam
- Max Depth: 260 feet
- 5-mile-long reservoir, slightly larger than Horsetooth Reservoir
- 22 million cubic yards of placed material (14,000 acre-feet)

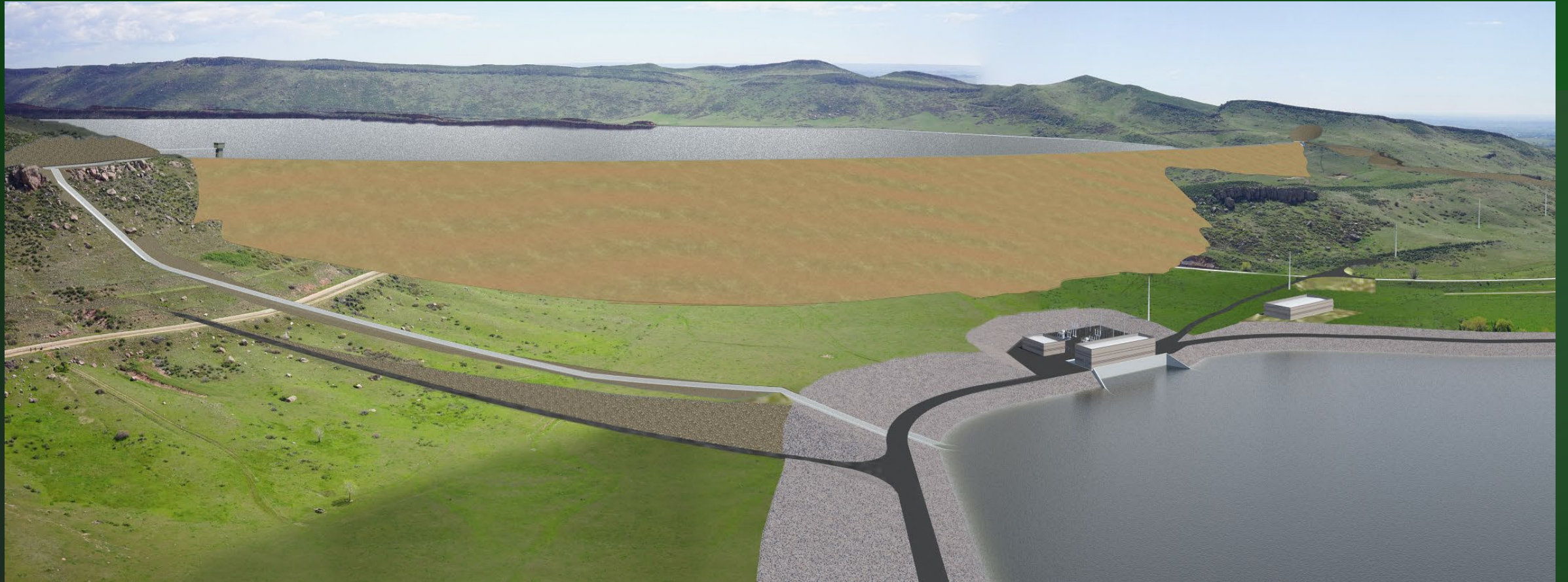
# Glade Reservoir Site


Approximate Dam Axis

HWY 14

HWY 287





An aerial photograph of a large, dark blue reservoir situated in a rural landscape. The surrounding land is divided into agricultural fields, some of which are green and others brown. A network of roads and power lines is visible across the terrain. The reservoir is the central focus, with its irregular shape and deep blue color contrasting with the lighter, textured ground.

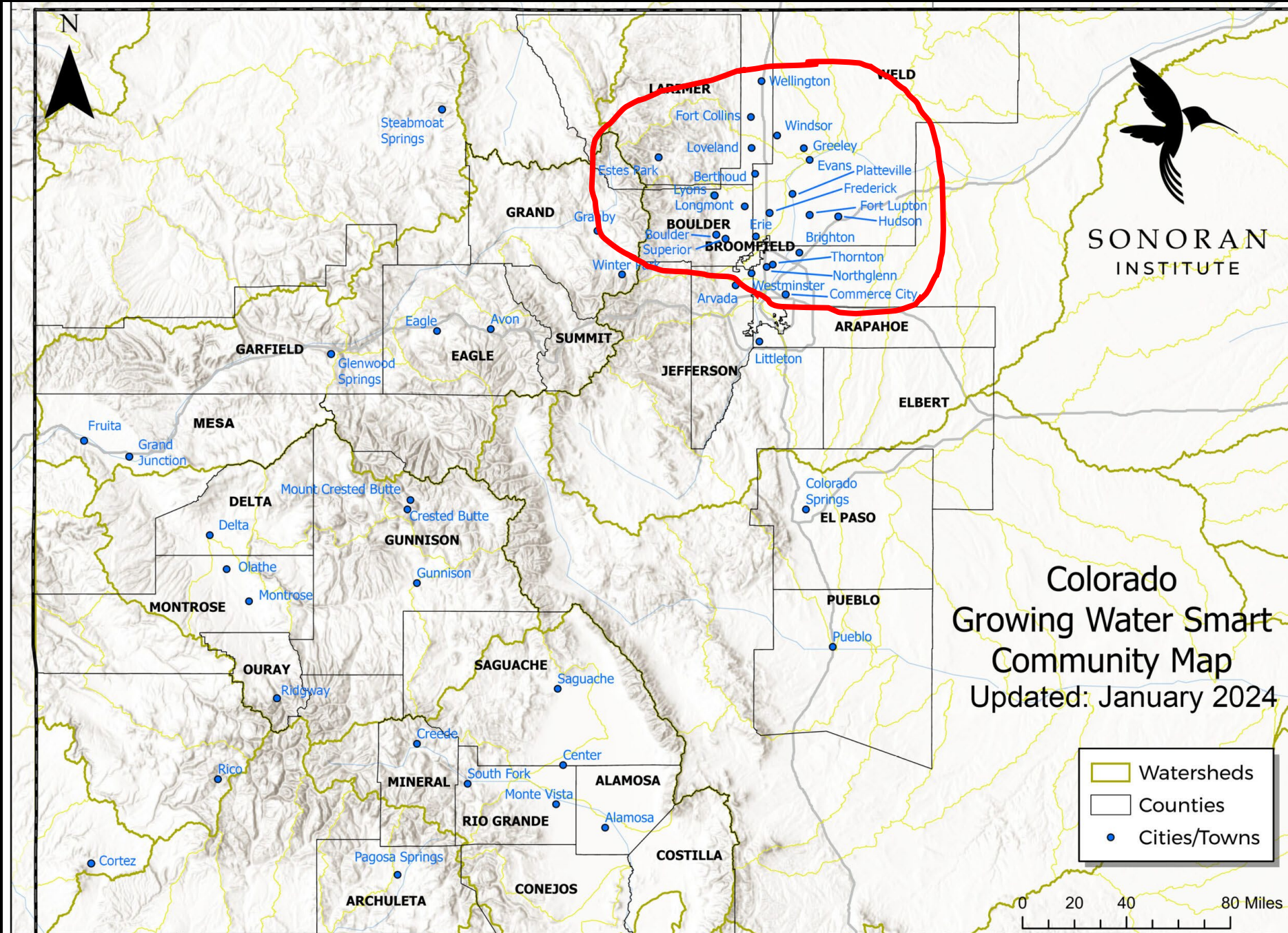
## Galeton – By the Numbers

---

- 45,600 acre-feet of storage
- 200 cfs diversion from South Platte River
- 30 miles of pipeline
- 16,000 hp pumping
- Deliveries to New Cache, Larimer and Weld Ditch companies

# Growing Water Smart

## Water Supply and Land Use Planning Integration



Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson,











Commissioner Carmine Touton  
U.S. Bureau of Reclamation  
1849 C Street, NW  
Washington, DC 20240-0001

Director Rebecca Mitchell  
Colorado Water Conservation Board  
1313 Sherman Street, Room 718  
Denver, Colorado 80203

Subject: Advancing System Resiliency and Responsible Use of Northern Water's Colorado River Water Supplies

Dear Commissioner Touton and Director Mitchell:

As you know better than anyone, the Colorado River is critically important to the 1.1 million people and 600,000 acres of irrigated land in Northern Colorado. Northern Colorado Water Conservancy District and its Municipal Subdistrict (collectively "Northern Water") recognize that the Colorado River Basin is experiencing severe drought conditions and that these conditions may continue for the foreseeable future. Northern Water also recognizes that these conditions require a sustained and expanded commitment to using its available Colorado River water supplies in a manner that conserves and protects this critically important resource.

**Colorado River Water Use is Limited by Northern Water.** Water conservation and water use efficiency have been a

as is demon  
water  
avail  
amo  
water  
Sout  
C-BT  
signi  
again

**Northern Water's 30% turf removal  
commitment**

Targets a 30% reduction in non-essential irrigated turf and the increase in xeric concepts in existing and future communities

Mun  
for n  
supp  
ther

its service area, and to work in collaboration with its water suppliers, Northern Water has its own water use efficiency program. In fact, Northern Water received EPA's WaterSense Award in each of the past three years in recognition of its water conservation efforts. Going forward, Northern Water will coordinate



## Water Efficiency Program

# 2023

*Overview & Accomplishments*

### AWARDS



The U.S. Environmental Protection Agency honored Northern Water with a WaterSense Sustained Excellence Award for its work promoting WaterSense and water efficiency in 2022. Northern Water was one of 13 Sustained Excellence Award winners nationwide, and this was the fourth year that Northern Water was a recipient of a WaterSense award. Northern Water was recognized for helping commercial customers save water. In the past year, Northern Water performed 48 landscape consultations, inspecting landscape conditions and irrigation components, and recommending WaterSense labeled irrigation controllers and sprinkler components to help improve efficiency.



### PROGRAMS



#### Consultations & Audits

- 55 Consultations Completed**  
*Free service for non-residential water users examining landscape management, design, irrigation systems, plant selection, soil management, overall health, goals and opportunities for improvement.*
- 35 Basic Audits Completed**  
*A general irrigation assessment providing irrigation system status and recommendations.*  
*Partner: Resource Central*
- 2 Advanced Audits Completed**  
*In-depth and applied to complex landscapes with very technical irrigation systems.*  
*Partner: Aqua Engineering*
- 4 Commercial Indoor Assessments Completed**  
*Free service to identify ways to maximize indoor water use efficiency and offer recommendations to save both water and money.*  
*Partner: Brendle Group*



#### Water-Efficient Landscape Grants

Program promoted the transformation from high-water use landscapes to Colorado climate-friendly models that include irrigation technology, native plants and sustainability.

- 15 Projects Completed for \$251,826 Across 933,507 Square Feet of Landscapes**



**Estimated Water Savings:**  
4.6 Million Gallons

### EDUCATION & OUTREACH



#### Trainings

- 15 Trainings Provided**  
*Partners: Associated Landscape Contractors of Colorado, Irrigation Association, Sonoran Institute and The Bees Waggle LLC.*



#### Events & Tours

- 48 Tours, Events and Presentations Accomplished**

### TOOLS & RESOURCES



#### Guides & Templates

- 1 Collaborative Native Grass Guide Website Underway**
- 6 Residential Sustainable Landscape Templates Created for Marshall Fire Recovery and New Developments**



### REPORTS & RESEARCH



#### Collaborative Reports

Northern Water's Water Efficiency Department supported several research reports in 2023 including:

- Colorado Water Conservation Board Urban Landscape Conservation Task Force Report
- Western Resource Advocates: Waterwise Landscapes: A Cost-Effective HOA Investment in Resilience
- Pacific Institute: Diversifying Colorado's Water Portfolio: The Potential for Stormwater Capture and Use to Contribute to a Water Resilient Future



[northernwater.org/efficientwateruse](http://northernwater.org/efficientwateruse)

### COLLABORATIONS



#### Landscape Design

- 7 Designs Completed**  
*Partner: Denver Botanic Gardens*



#### Indoor Retrofits

Program to upgrade homes to efficient WaterSense fixtures.

- 1,078 Faucet Aerators Installed**
- 456 Showerheads Installed**
- 192 Toilets Installed**
- 177 Toilet Tank Banks Installed**

*Partners: Energy Resource Center and Larimer County Conservation Corps*



**Estimated Water Savings:**  
3.1 Million Gallons



#### Drought & Water Stewardship

- 7 Colorado Drought Coordination Group Meetings Co-Facilitated**  
*Partner: Aurora Water and Fountain Utilities*
- 8 Regional Water Stewardship Messaging Focus Groups Hosted**

### CONSERVATION CAMPUS



#### Pre-Planned Gardens and Street Strips

- 12 Pre-Planned Gardens Installed**
- 1 Low-Water Street Strip Demonstration Installed**



#### Sustainability Efforts

The Northern Water Willow Creek Campus in Grand County near Granby received a LEED Silver certification for its environmentally sustainable design and construction.



# We Protect the Environment



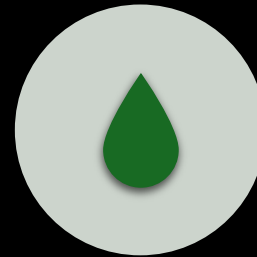
ENVIRONMENTAL  
COMMITMENTS &  
MITIGATION



ENVIRONMENTAL  
COMPLIANCE



SOURCE WATER  
PROTECTION &  
FOREST HEALTH



WATER QUALITY  
MONITORING



RECOVERY  
PROGRAMS



EXISTING SPILLWAY

MODIFY BANK STABILIZATION AS NEEDED FOR DIVERSION STRUCTURE

SIDE CHANNEL 2 DESIGN ALIGNMENT

PROPOSED DAM CREST

CRCC CHANNEL DESIGN ALIGNMENT

COLORADO RIVER  
~1,256 LF

SEGMENT #2  
~2,600 LF

SEGMENT #1  
~4,650 LF

FRASER RIVER  
~1,740 LF

SIDE CHANNEL 1 DESIGN ALIGNMENT

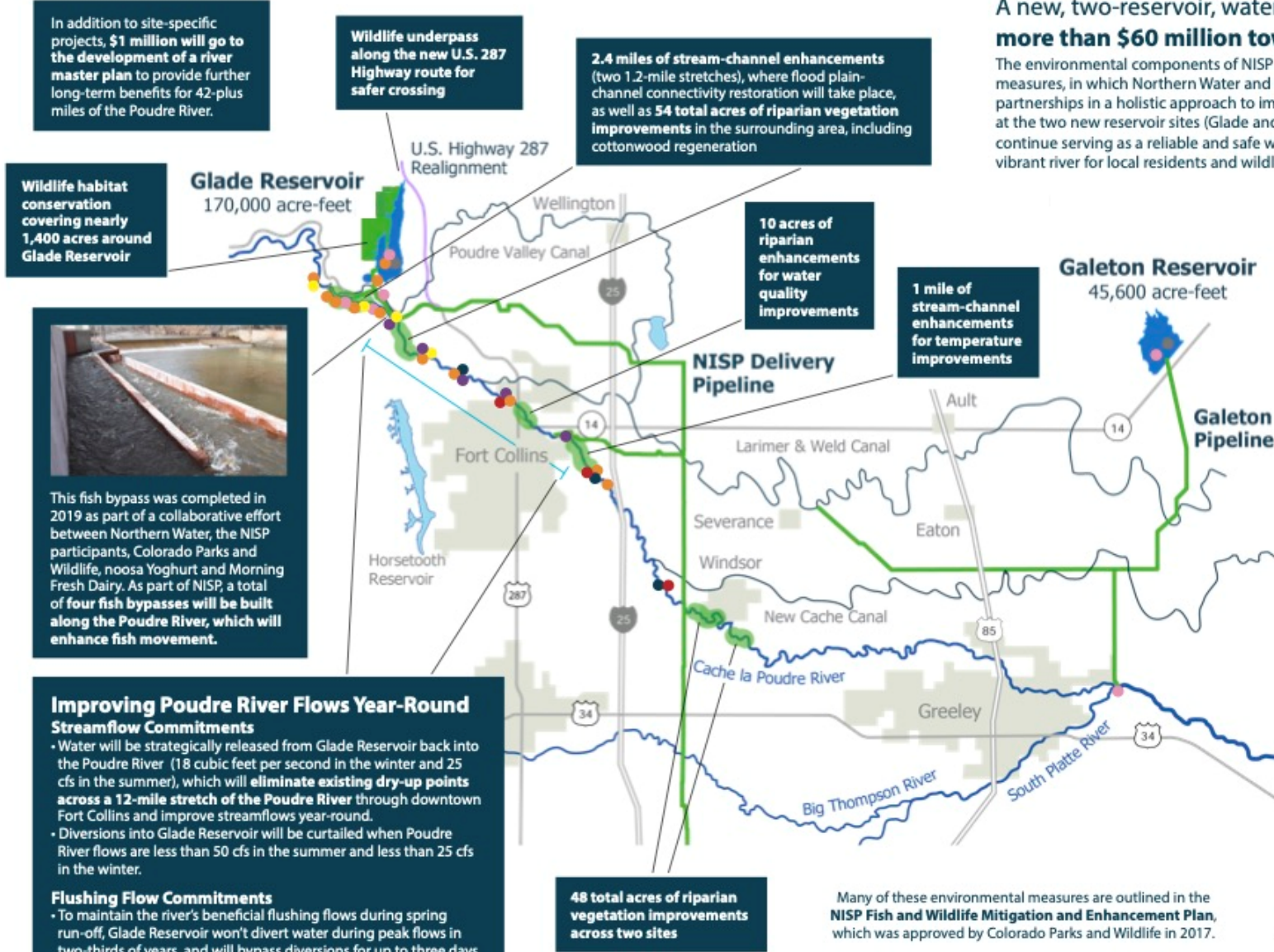
FRASER RIVER GAGE REMOVAL



## THE NORTHERN INTEGRATED SUPPLY PROJECT:

### A new, two-reservoir, water-supply project with more than \$60 million toward environmental measures

The environmental components of NISP will include a variety of mitigation and enhancement measures, in which Northern Water and the NISP participants will utilize existing and new partnerships in a holistic approach to improve local ecosystem health. These efforts will take place at the two new reservoir sites (Glade and Galeton), as well as along the Poudre River, so it can continue serving as a reliable and safe water supply for years to come, and remain an ecologically vibrant river for local residents and wildlife.



### NISP's Water Quality Monitoring Commitments

- Temperature monitoring sites (12)
- Arsenic and copper monitoring sites (5)
- E. coli monitoring sites (3)
- Aquatic life monitoring sites (4)
- Nutrient monitoring sites (3)
- Mercury fish tissue sampling sites (2)
- New reservoir routine monitoring sites (6)  
(2 forebay sites, 2 reservoir sites and 2 river sites)

Some of these monitoring sites will remain in operation for decades.

Along with these monitoring sites, other NISP water quality commitments include:

- \$1.5 million for E. Coli reduction measures and studies
- \$925,000 for nutrient reduction measures and studies
- Water quality stormwater system upgrades along the Poudre River

Many of these water quality commitments come in addition to extensive ongoing measures. Northern Water, for example, already collects about 250 samples each year as part of its regular Poudre River monitoring efforts, with an annual cost of approximately \$450,000.

In addition to site-specific projects, \$1 million will go to the development of a river master plan to provide further long-term benefits for 42-plus miles of the Poudre River.

Wildlife habitat conservation covering nearly 1,400 acres around Glade Reservoir



This fish bypass was completed in 2019 as part of a collaborative effort between Northern Water, the NISP participants, Colorado Parks and Wildlife, noosa Yoghurt and Morning Fresh Dairy. As part of NISP, a total of four fish bypasses will be built along the Poudre River, which will enhance fish movement.

### Improving Poudre River Flows Year-Round Streamflow Commitments

- Water will be strategically released from Glade Reservoir back into the Poudre River (18 cubic feet per second in the winter and 25 cfs in the summer), which will eliminate existing dry-up points across a 12-mile stretch of the Poudre River through downtown Fort Collins and improve streamflows year-round.
- Diversions into Glade Reservoir will be curtailed when Poudre River flows are less than 50 cfs in the summer and less than 25 cfs in the winter.

### Flushing Flow Commitments

- To maintain the river's beneficial flushing flows during spring run-off, Glade Reservoir won't divert water during peak flows in two-thirds of years, and will bypass diversions for up to three days – equivalent to as much as 6,000 acre-feet in most years.
- NISP's various flushing flow commitments will result in little to no diversions during peak flows in 90 percent of years.

Many of these environmental measures are outlined in the NISP Fish and Wildlife Mitigation and Enhancement Plan, which was approved by Colorado Parks and Wildlife in 2017.

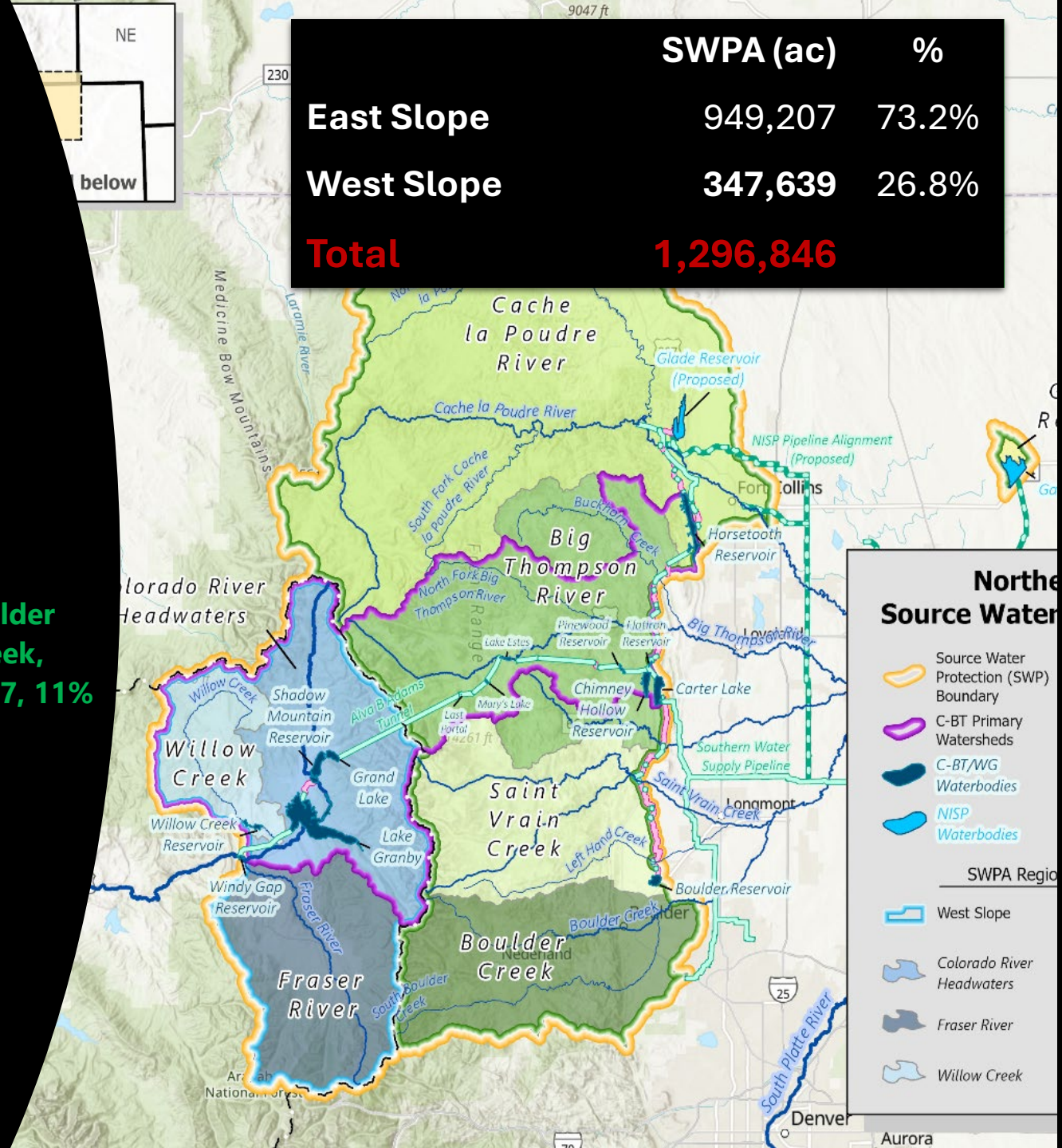
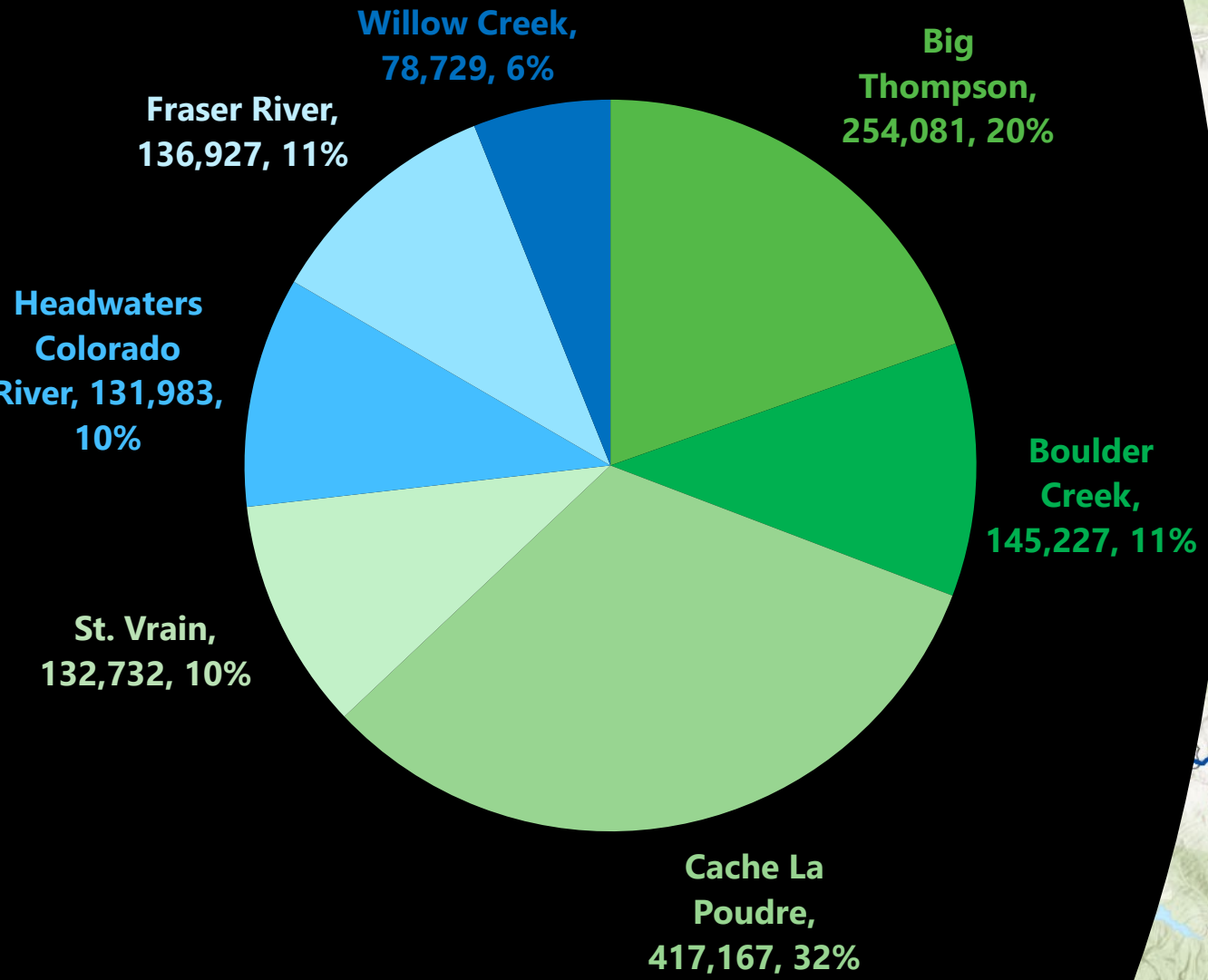
Other measures fall under commitments outlined in NISP's 401 Water Quality Certification, which was granted by the Colorado Division of Public Health and Environment in 2020.

**Improved Water Quality • Better Aquatic Health • Enhanced Poudre River Recreation**  
**Increased Flood Resilience • Improved Wildlife Habitat**



# Forested Acreage within SWPA (East and West Slope)

	SWPA (ac)	%
East Slope	949,207	73.2%
West Slope	347,639	26.8%
<b>Total</b>	<b>1,296,846</b>	



# Challenges



Tree mortality



Fire  
Suppression



Climate  
Change



September 11, 2005

September 28, 2011



# Bark Beetle Epidemic

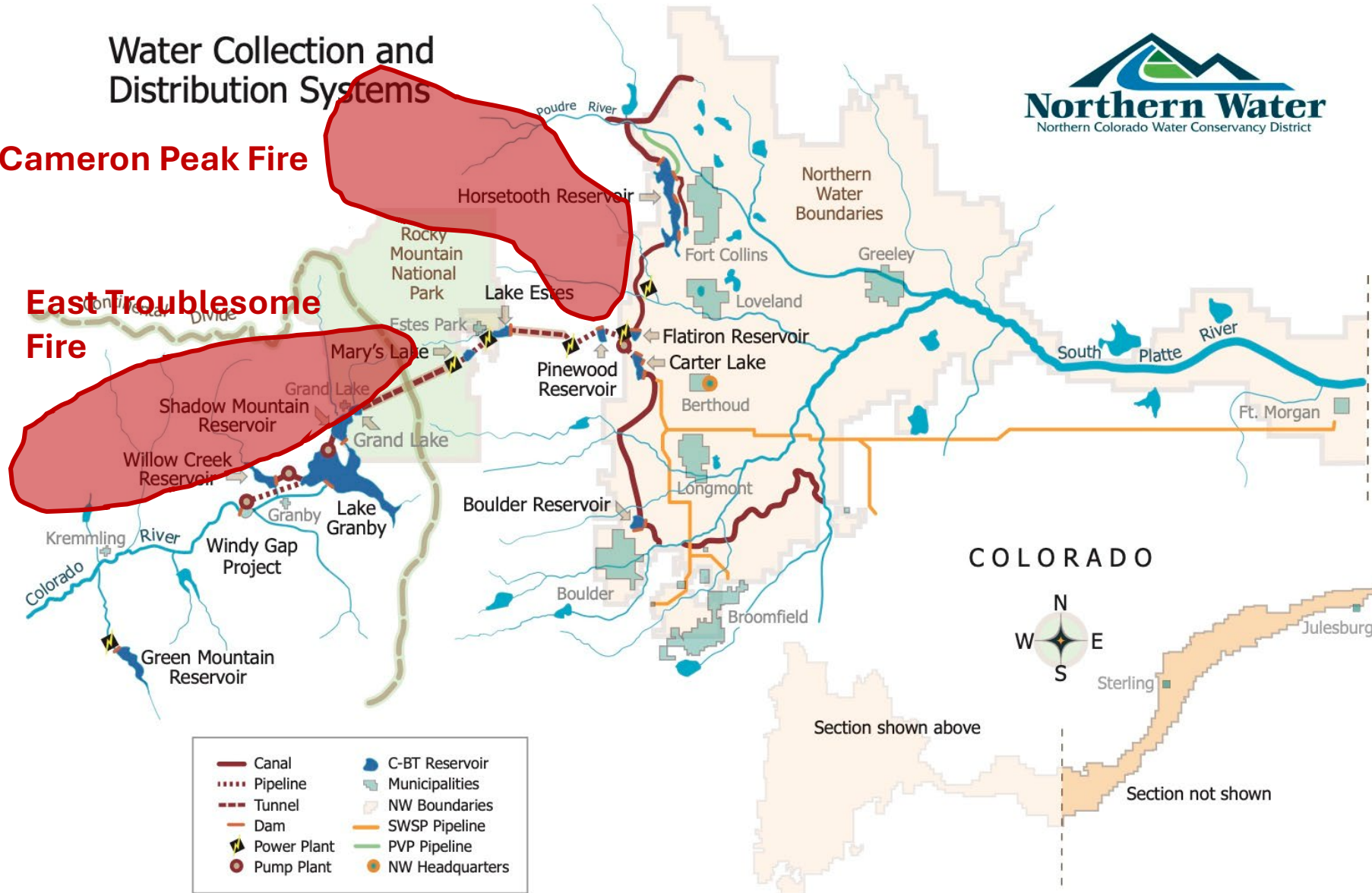


# Water Collection and Distribution Systems

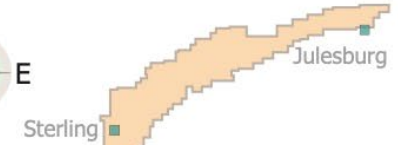


**Cameron Peak Fire**

**East Troublesome Fire**



COLORADO









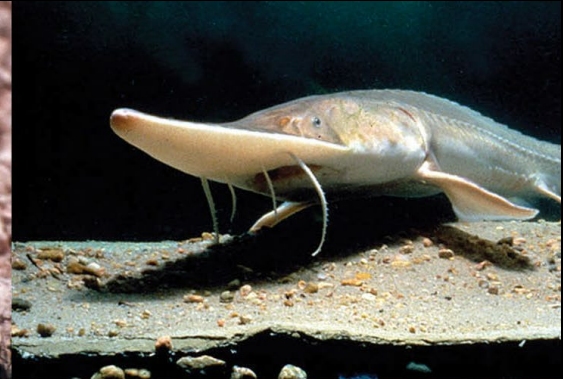


# Recovery Programs

UPPER COLORADO RIVER



PLATTE RIVER



# Careers and Professions



## Engineers

Civil  
Geotechnical  
Environmental  
Electrical



## Scientists

Watershed  
Aquatic Ecology



## Technicians & Specialists

Electronics  
Electrical  
Watershed  
Data Management  
Monitoring and Instrumentation  
Horticulture  
Irrigation



## Business Functions

Administration  
Finance  
Accounting  
Procurement  
Contracts  
Information Technology  
GIS  
Communications/Marketing



## Operators

Fieldmen  
Mechanics  
Civil  
Water Runners  
Control Center Operators



## Regulations/Legislative

Environmental compliance  
Regulatory affairs  
Policy

# Career Development at Northern Water



Internships, entry-level opportunities,

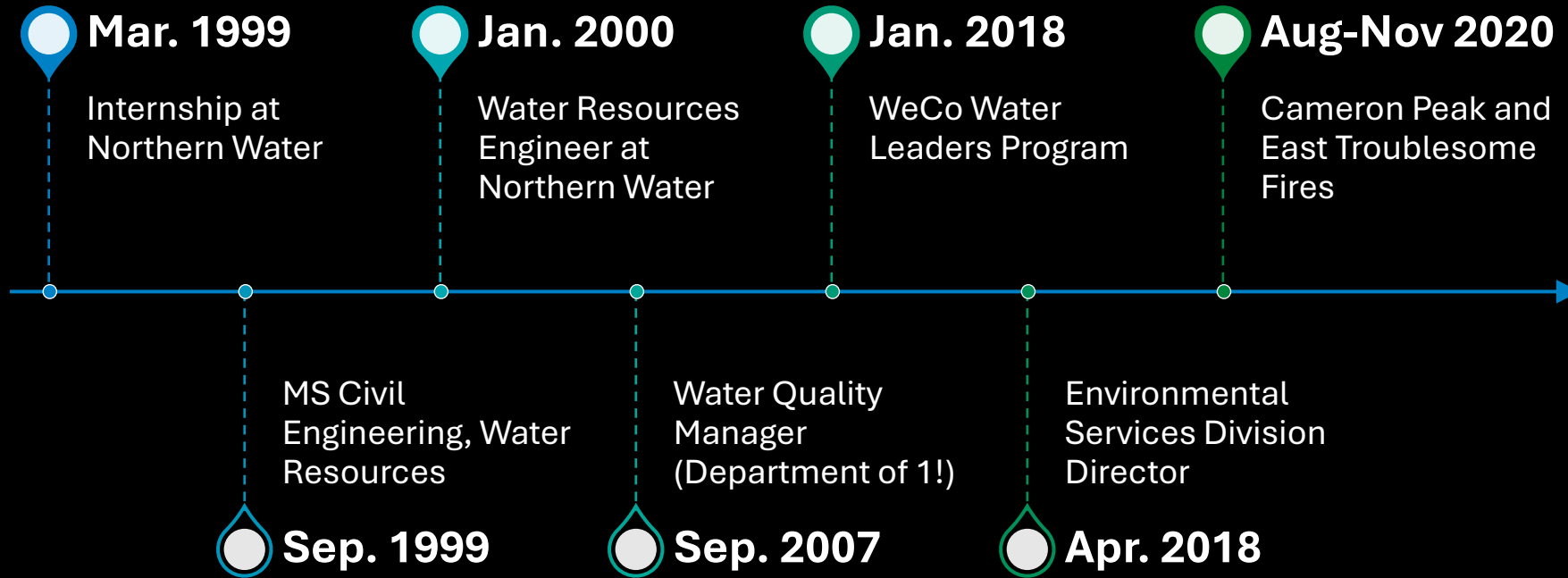


Professional Growth: Training, certifications, and leadership development



Work Culture: Collaboration, innovation, and sustainability focus

# My Personal Story



# Leadership Insights



BE WILLING TO WORK  
HARD



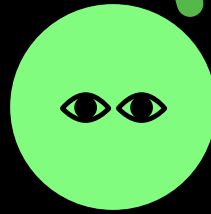
FOCUS ON WHAT  
YOU LOVE AND CARE  
ABOUT



KNOW YOUR WHY



LISTEN BEFORE YOU  
TALK



PAY ATTENTION,  
LOOK AROUND YOU



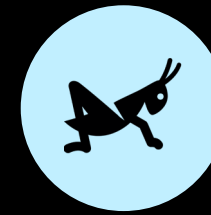
DON'T BE ATTACHED  
TO YOUR PLAN



LOOK FOR AND  
CEASE  
OPPORTUNITIES



BUILD  
RELATIONSHIPS



DON'T BE A  
GRASSHOPPER

# Join Our Team

<https://www.northernwater.org/about-us/careers>



# Questions? Comments?

---

Esther Vincent, P.E.  
[evincent@northernwater.org](mailto:evincent@northernwater.org)

970.692.7465