



ABOUT NORTHERN
WATER



CONTEXT



WHAT HAPPENED



WHY IT MATTERS



HOW WE ORGANIZED
OUR RESPONSE



GETTING TO WORK



BEYOND EWP

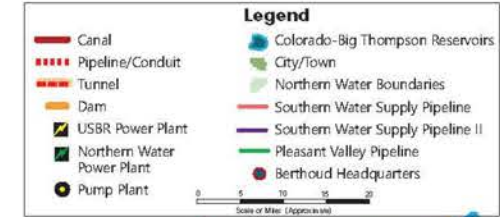


PREPARING FOR THE
FUTURE

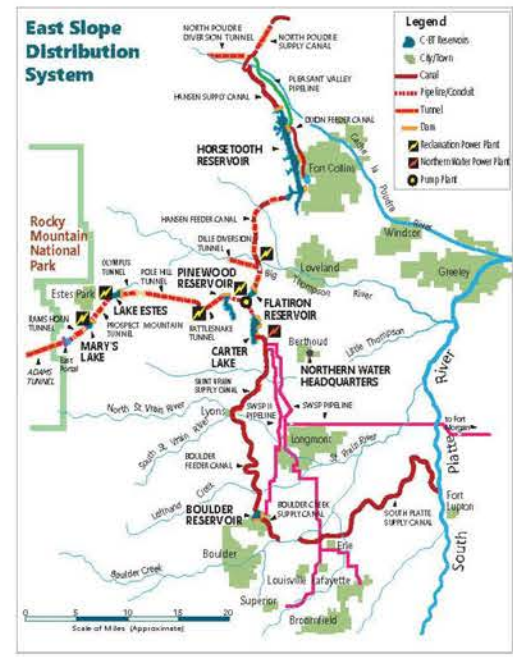
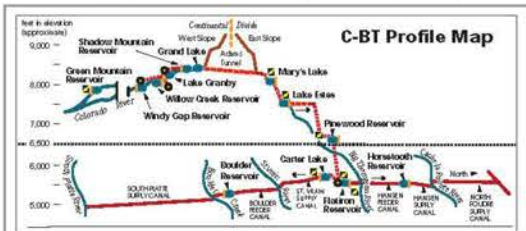


Northern Water

Colorado-Big Thompson Project



Northern Water Boundaries and Facilities



Scale of Miles (Approximate)

Scale of Miles (Approximate)

Northern Water & the C-BT Project

Supplemental Water Supply

Municipal, ag, industrial
and domestic water
users

Service Area

1.6 million acres
8 counties

Irrigated Land

615,000 acres

1,000,000+ residents

Constructed
1938-1957

Average deliveries
215,000 acre-feet/year



Northern Water Today



District population

1,021,000



Ownership

Ag: 30%

M&I: 70%

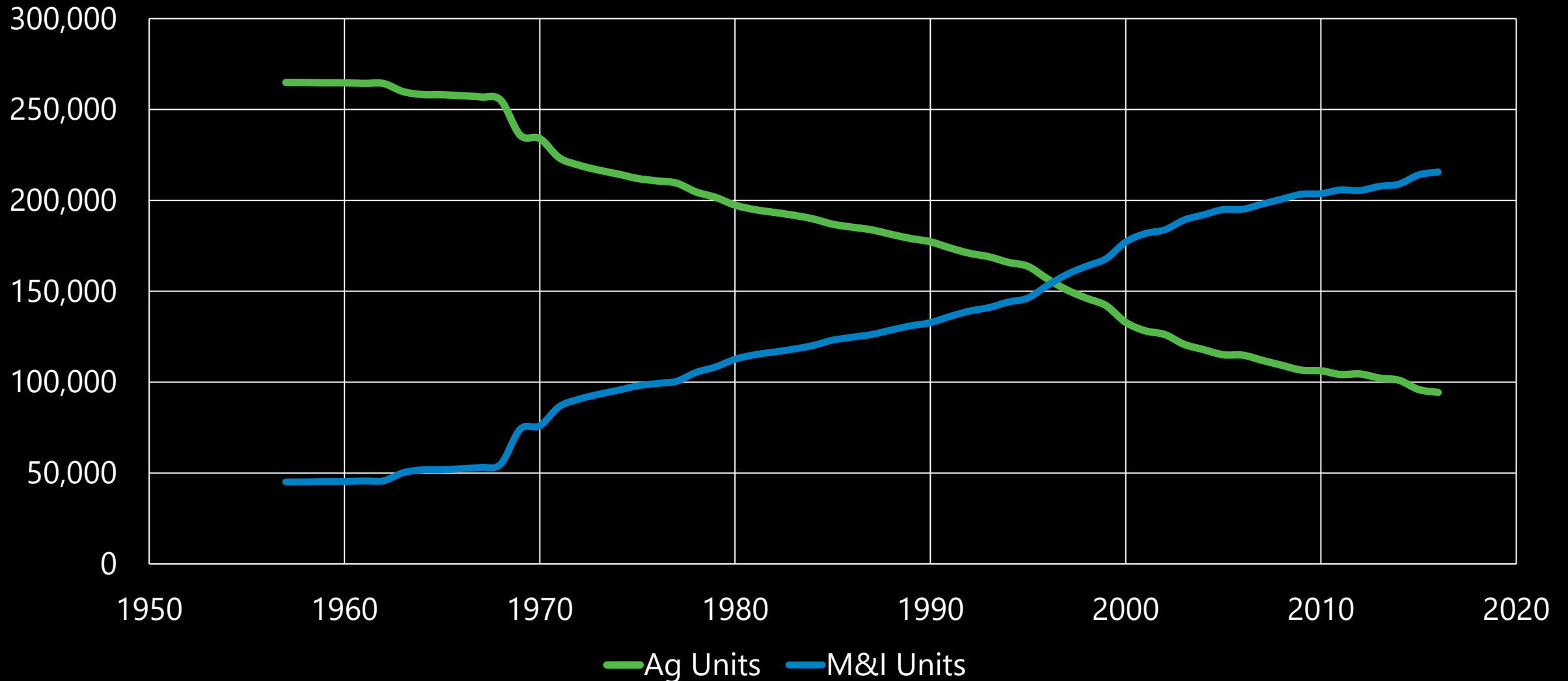


Deliveries (2020)

Ag: 48%

M&I: 52%

C-BT Ownership Trends





Context

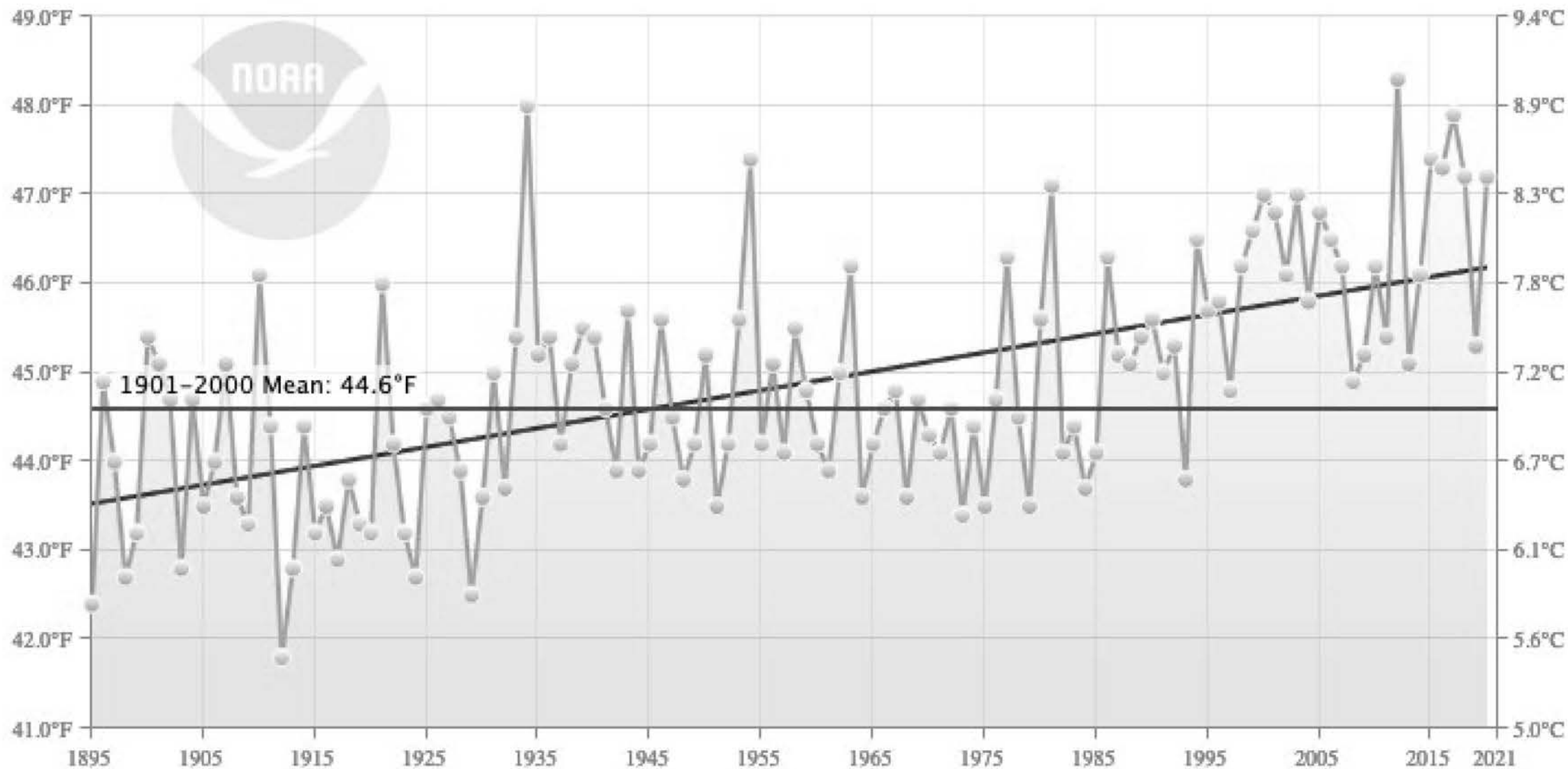
Climate Change and Compromised Forest Health



Colorado Average Temperature

January-December

1895-2020 Trend
(+0.2°F/Decade)



Statewide Average Annual Temperature

+ 2 F over the past
30 years

GCMs predict +
2.5 F – 6.5 F by
2050





Further change to come

Earlier springs

Earlier snowmelt
and runoff

Hotter summers

More frequent and
severe heat waves

Longer growing
season

Greater
evapotranspiration

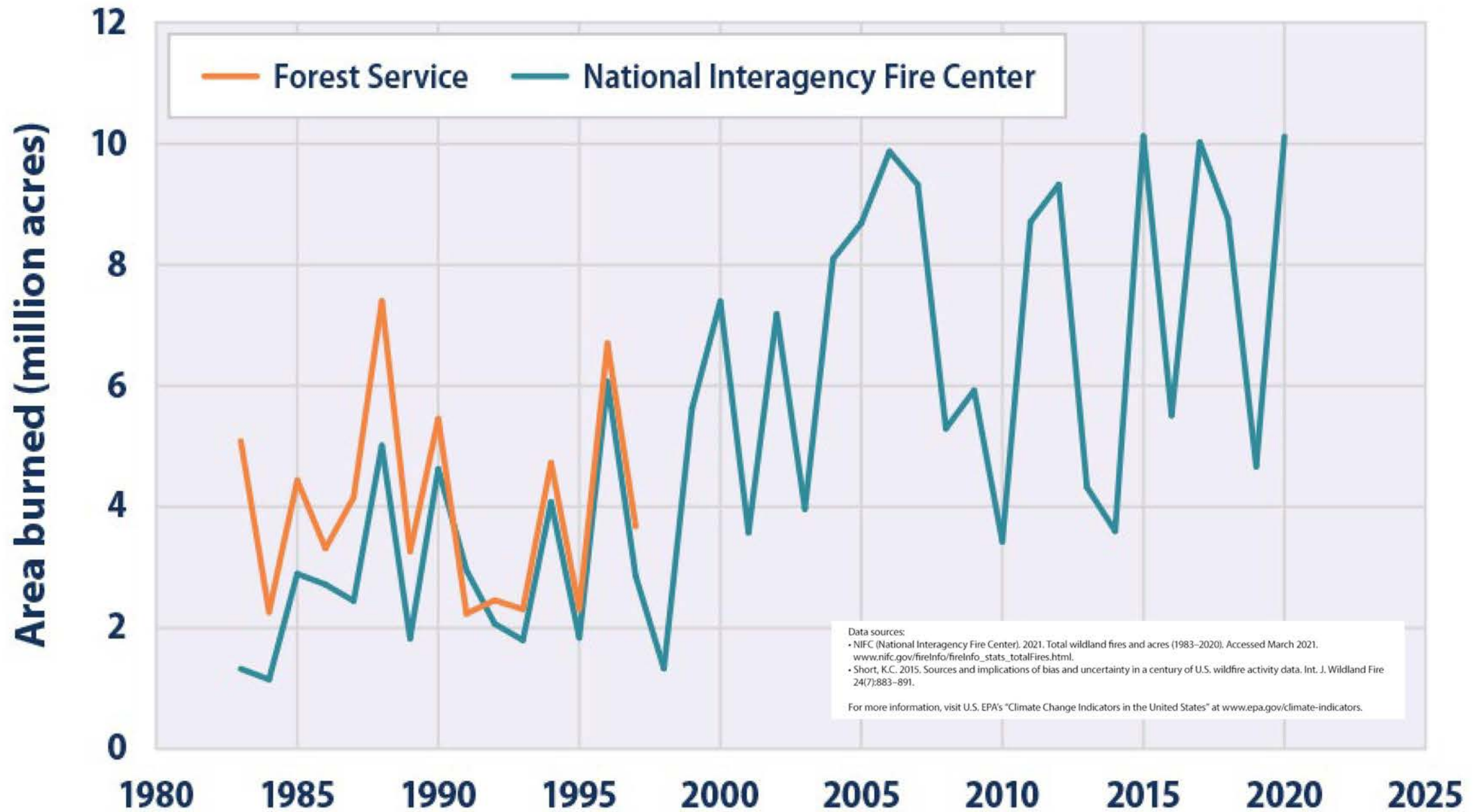
Net water budget
deficit

Longer fire season



Extensive Mountain Pine Beetle Kill

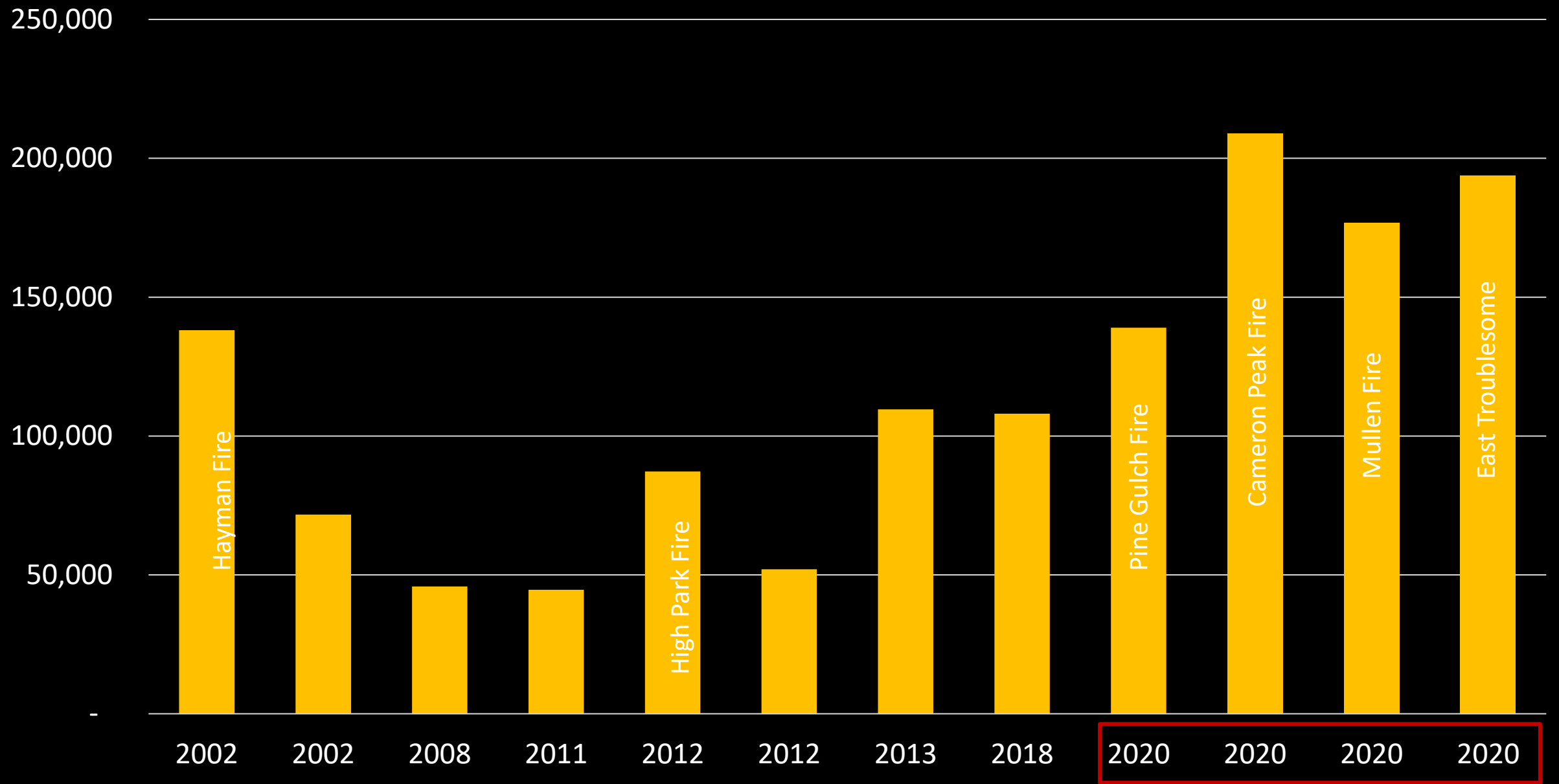
Wildfire Extent in the United States, 1983–2020



Data sources:
• NIFC (National Interagency Fire Center). 2021. Total wildland fires and acres (1983–2020). Accessed March 2021. www.nifc.gov/fireInfo/fireInfo_stats_totalFires.html.
• Short, K.C. 2015. Sources and implications of bias and uncertainty in a century of U.S. wildfire activity data. *Int. J. Wildland Fire* 24(7):883–891.
For more information, visit U.S. EPA's "Climate Change Indicators in the United States" at www.epa.gov/climate-indicators.



Largest Wildfires in Colorado - Burn Area (ac)





2020 Wildfires

What happened

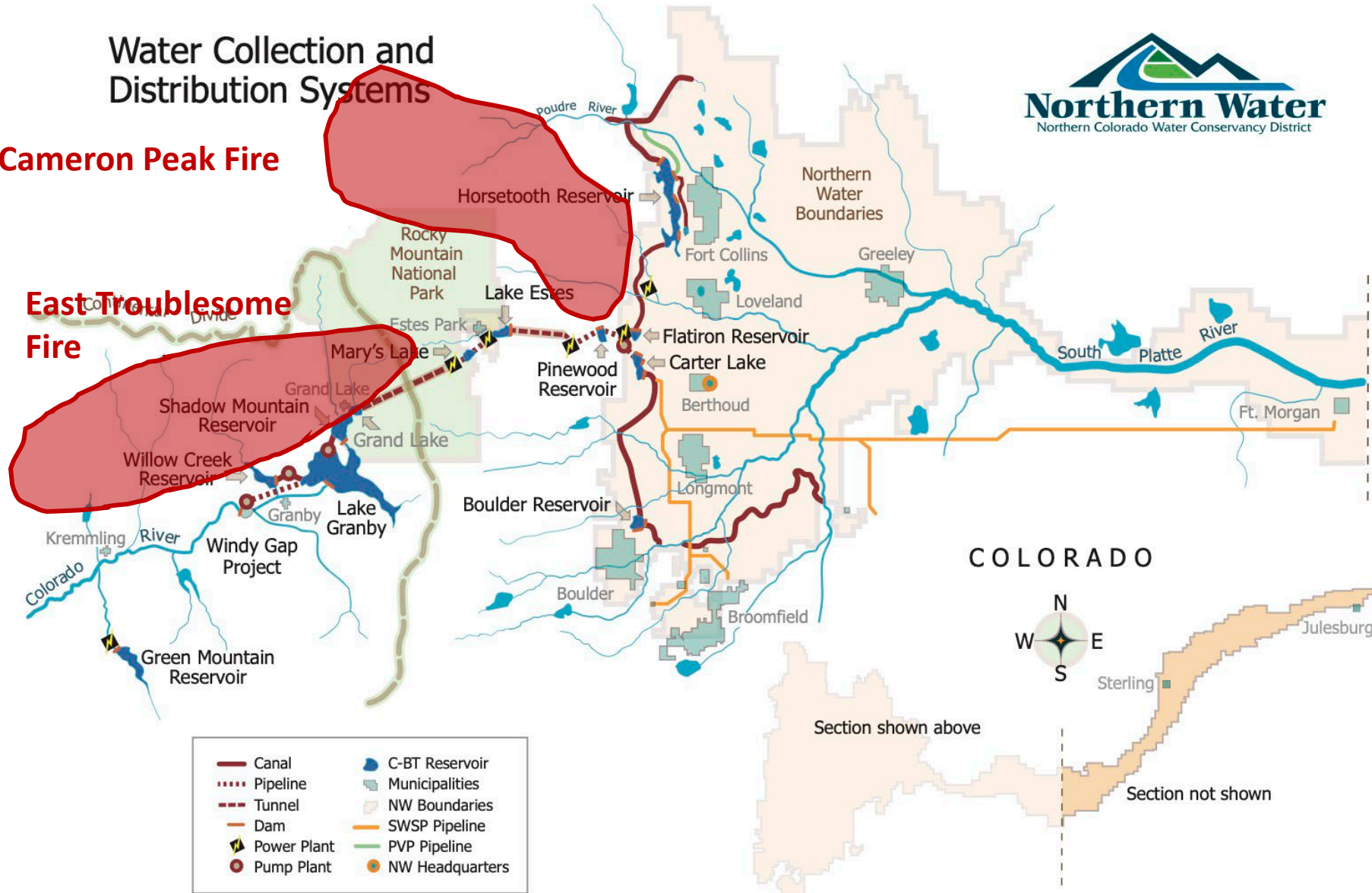


Water Collection and Distribution Systems



Cameron Peak Fire

East Troublesome Fire



- Canal
- Pipeline
- Tunnel
- Dam
- Power Plant
- Pump Plant
- C-BT Reservoir
- Municipalities
- NW Boundaries
- SWSP Pipeline
- PVP Pipeline
- NW Headquarters

COLORADO

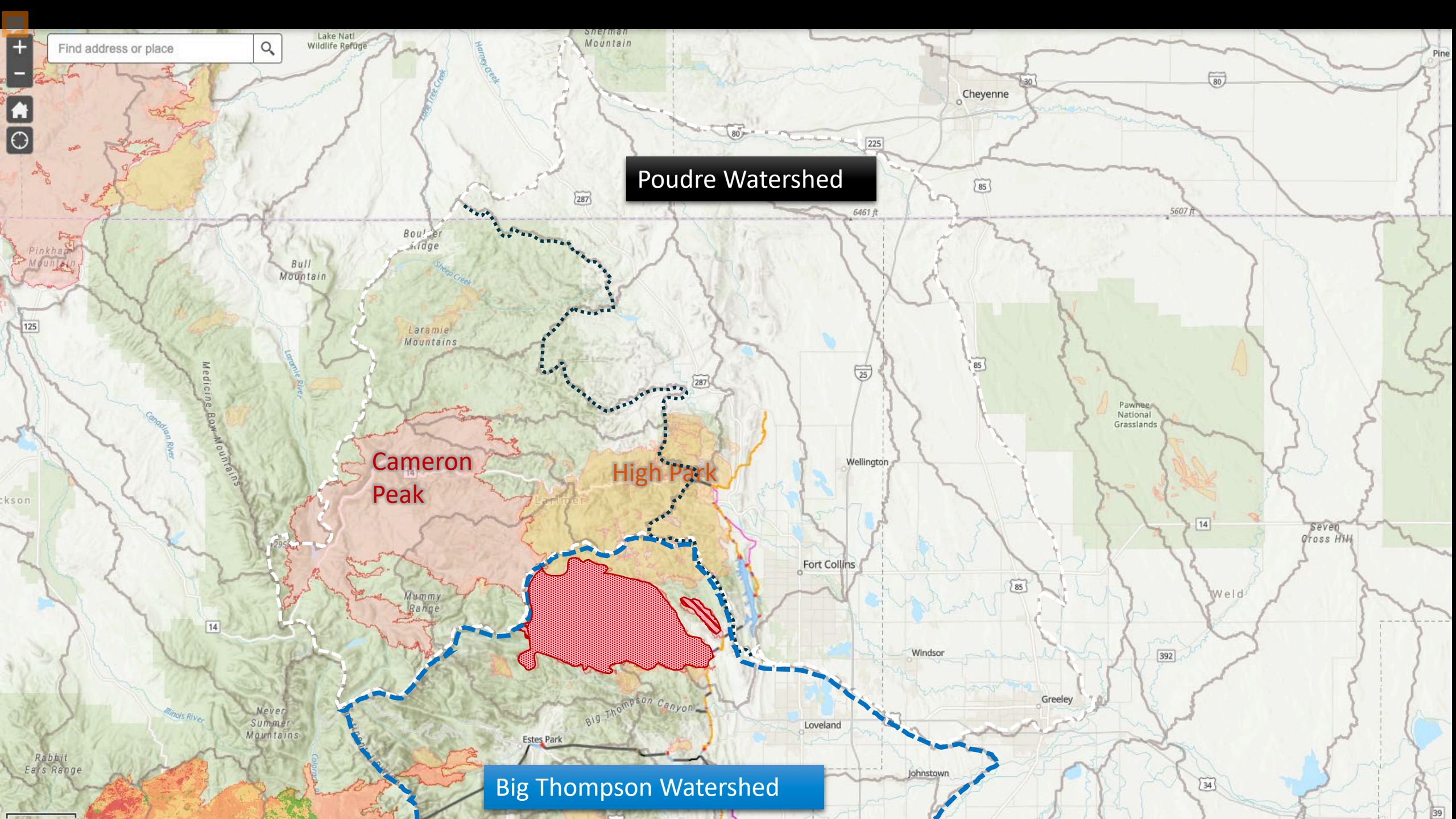


Section shown above

Section not shown

**Chambers Lake (Cameron
Peak Fire)**





Poudre Watershed

Cameron Peak

High Park

Big Thompson Watershed

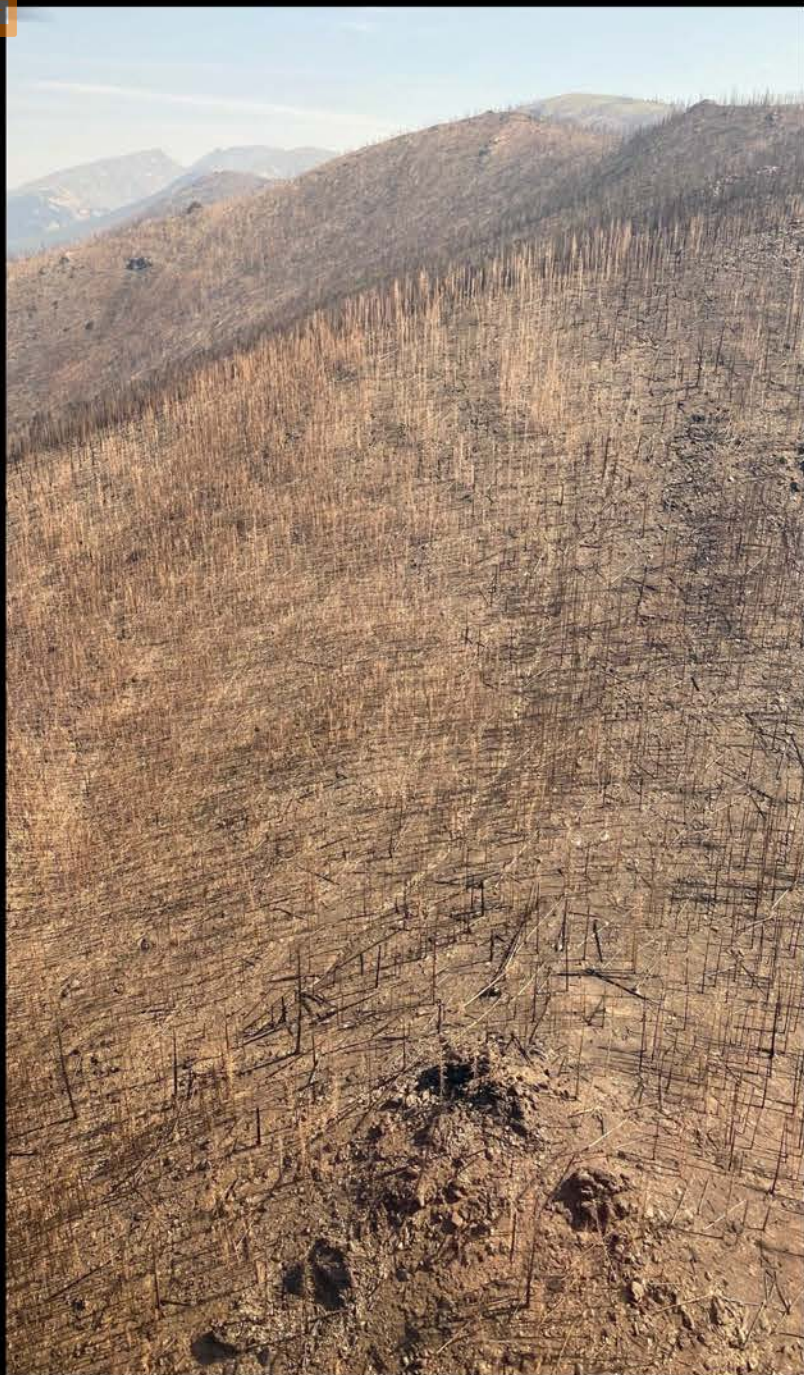
Oct 22, 2020 Evening
Credit: Jeff Stahla





Kawuneeche Valley (East Troublesome Fire)



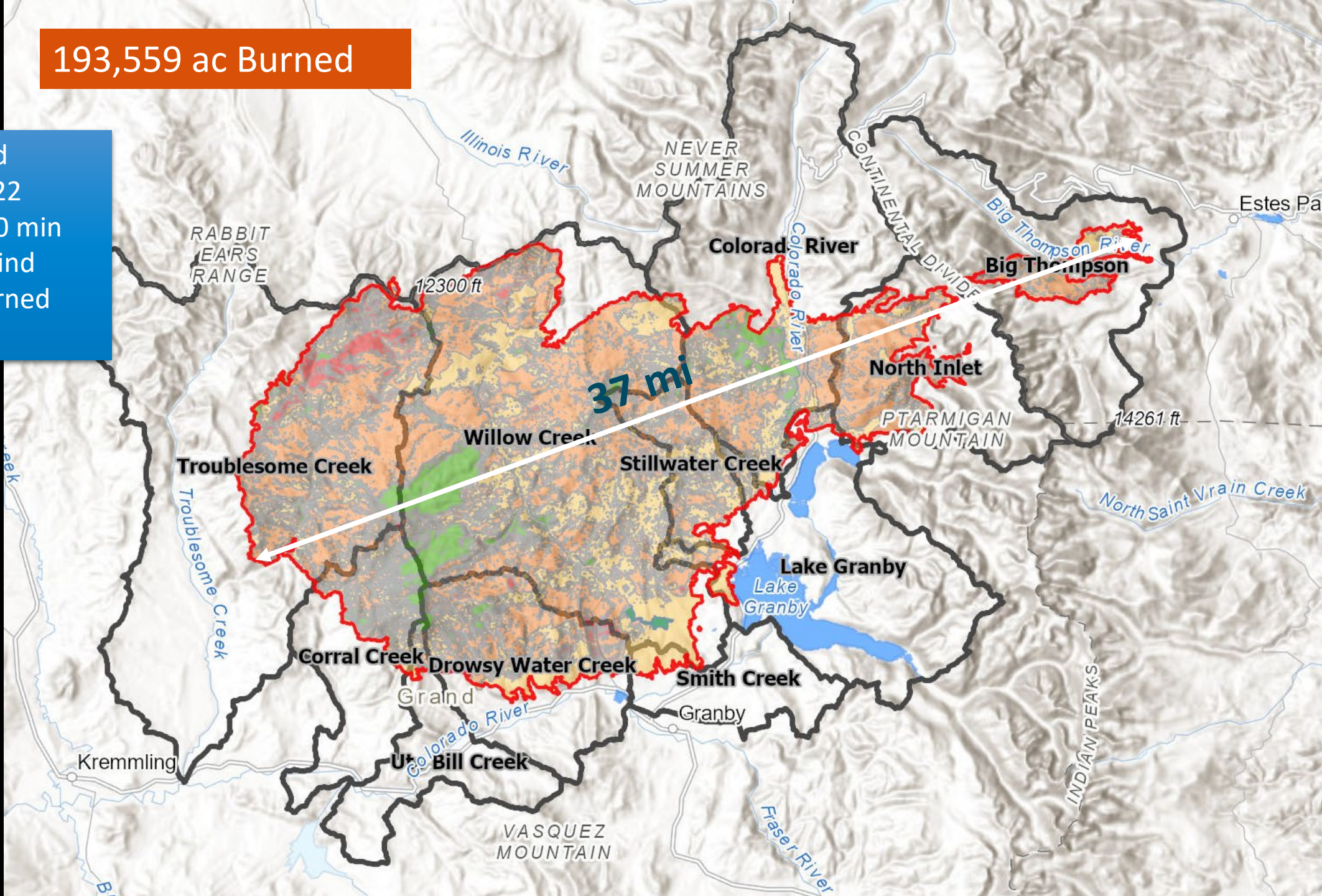


193,559 ac Burned

- 100,000 ac burned overnight on Oct 22
- 17 mi growth in 90 min
- Hurricane force wind
- 589 structures burned
- 4,000 evacuees

Soil Burn Severity

- High
- Moderate
- Low
- Unburned/Very Low
- Burn Area









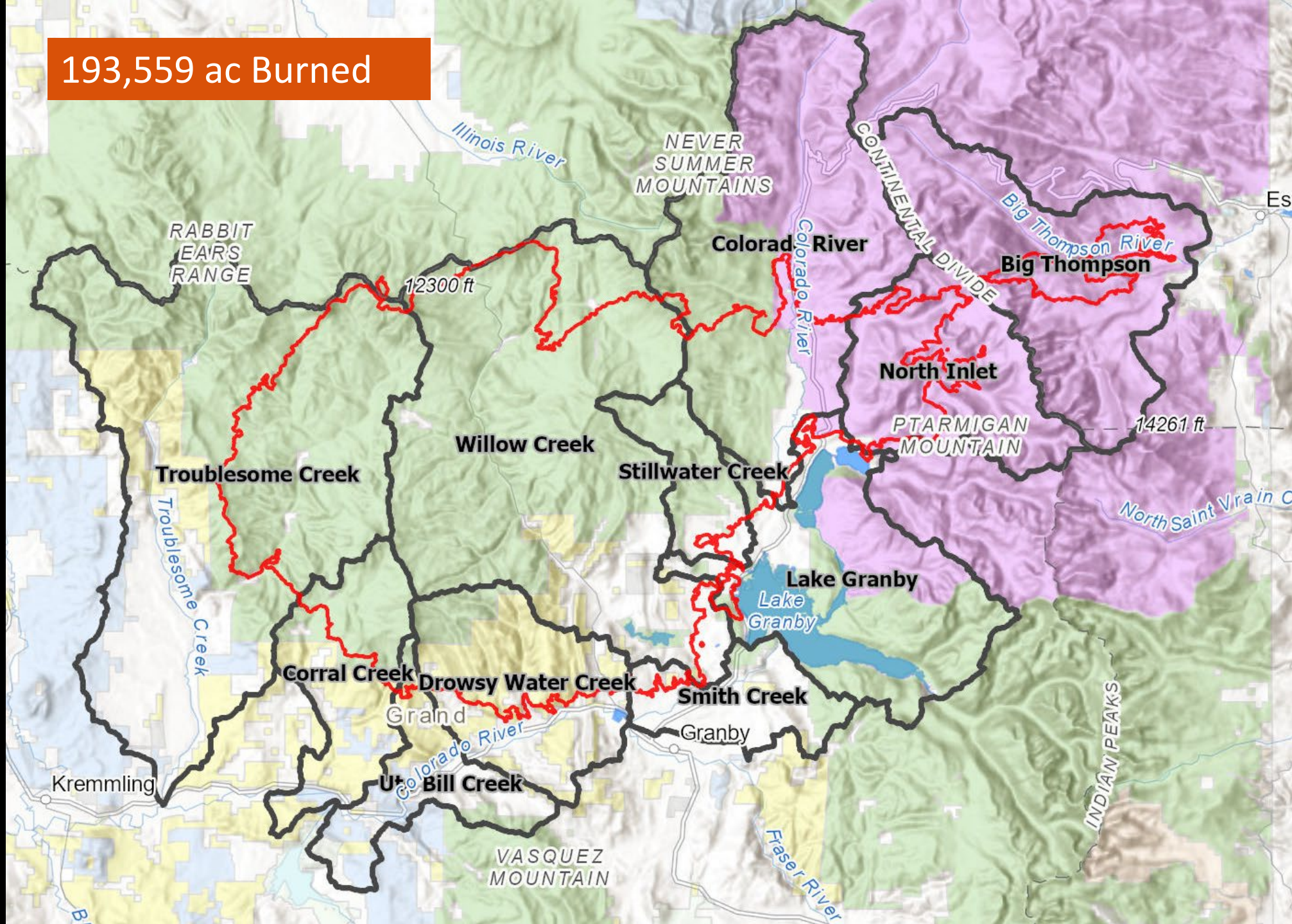
PRIVATE LAND
19,757 ac (10%)

FEDERAL LAND
168,908 ac (90%)

193,559 ac Burned

Land Ownership

-  RMNP (12%)
-  USFS (68%)
-  BLM (9%)
-  State Land Board
-  Private
-  Burn Area



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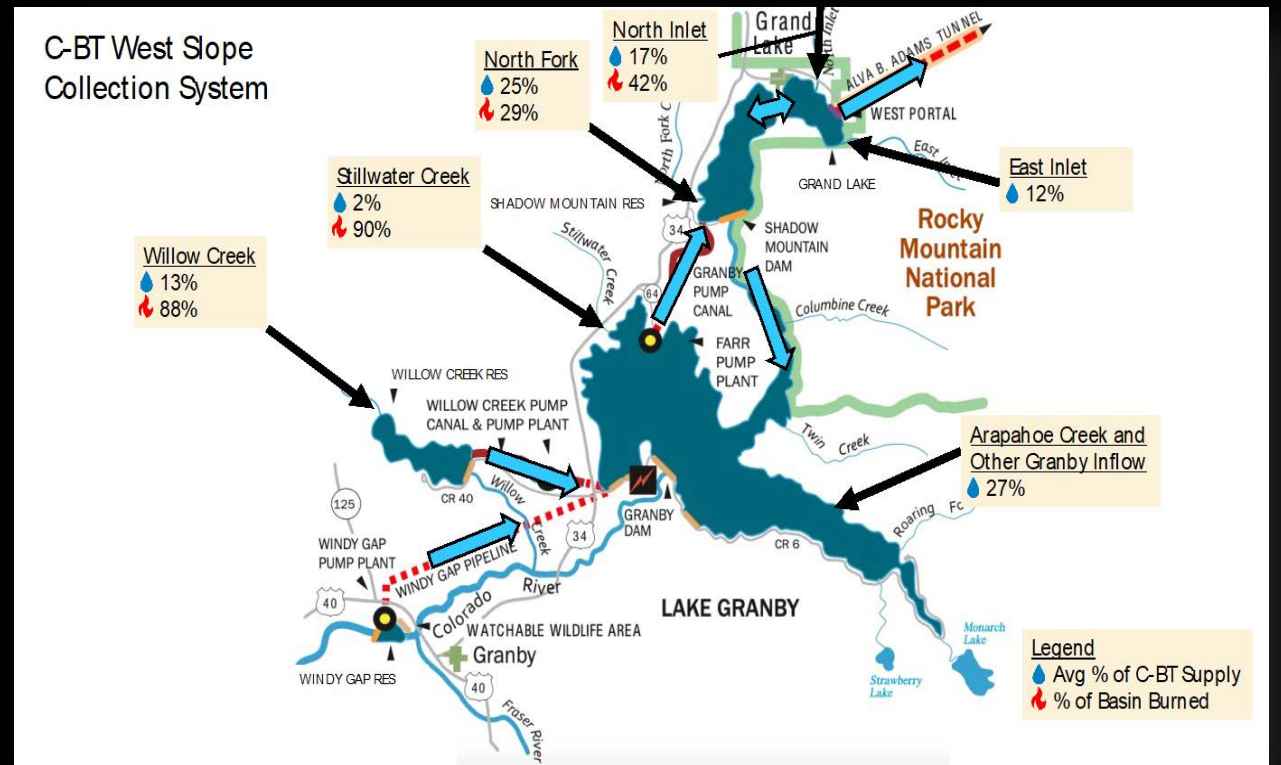
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Why it matters

Post-Fire Impacts



Post Wildfire Impacts



SEDIMENTATION



DEBRIS FLOWS



HARMFUL ALGAE
BLOOMS



WATER
TREATMENT



FLASH FLOOD

Snowmelt and Storm Events: Peak Flow Multipliers

N. Fork Colorado at Shadow Mnt. REs

Snowmelt: 1.1

5-yr Storm: 1.3

N. Inlet at Grand Lake

Snowmelt: 1.4

5-yr Storm: 1.6

Stillwater Creek at Granby Res

Snowmelt: 1.4

5-yr Storm: 2.8

Willow Creek

Snowmelt: 1.5

5-yr Storm: 3.2



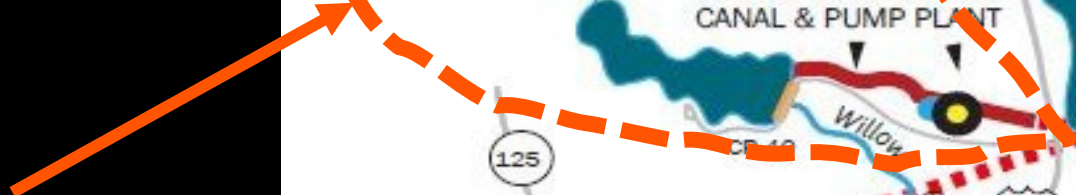


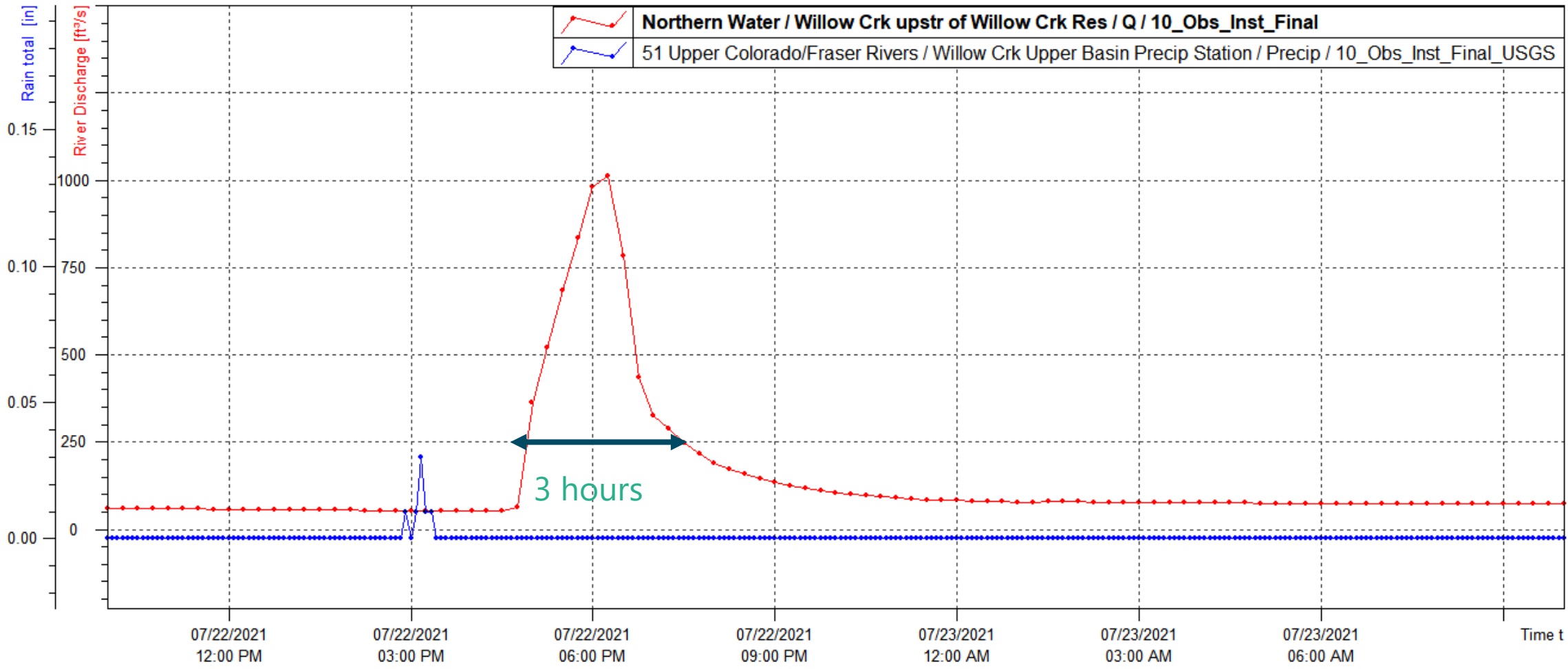
West Slope Collection System

North Inlet



Willow Creek







WILLOW CREEK UPSTREAM
OF
WILLOW CREEK RESERVOIR



July 22, 2021



Jul 7, 2021 Hwy 125 - Mudslides





Willow Creek @ C-Lazy U Ranch – July 22, 2021



Highway 125 along Willow Creek – July 27, 2021



August 4, 2021

Highway 125 Willow Creek Bridge



July 5, 2021

August 5, 2021
Willow Creek Reservoir Inlet



Willow Creek Reservoir
August 9, 2021





August 17, 2021
Willow Creek Reservoir Debris Removal



DANGER

LAKE IS CLOSED TO FULL-BODY CONTACT

Toxic algae may be present! Water contact can cause illness



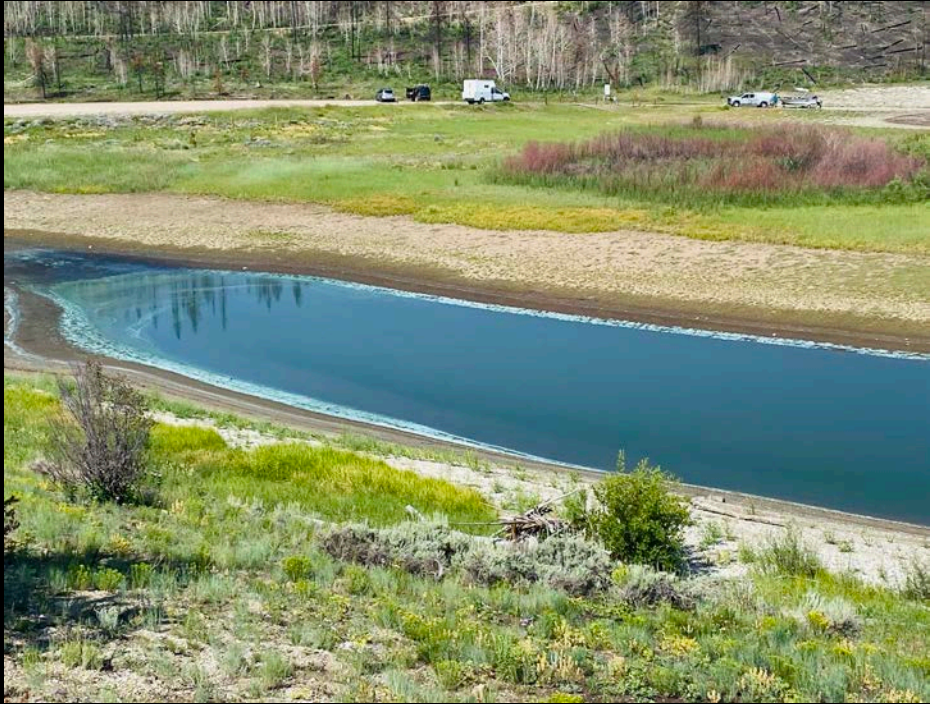
- ▶ Keep kids out
- ▶ No pets in water (death may occur)
- ▶ Do not drink water
- ▶ No water recreation (swimming, skiing, paddle-boarding, wading, etc.)
- ▶ If exposed, shower immediately

Fishing permitted - rinse fish with clean water and properly dispose guts

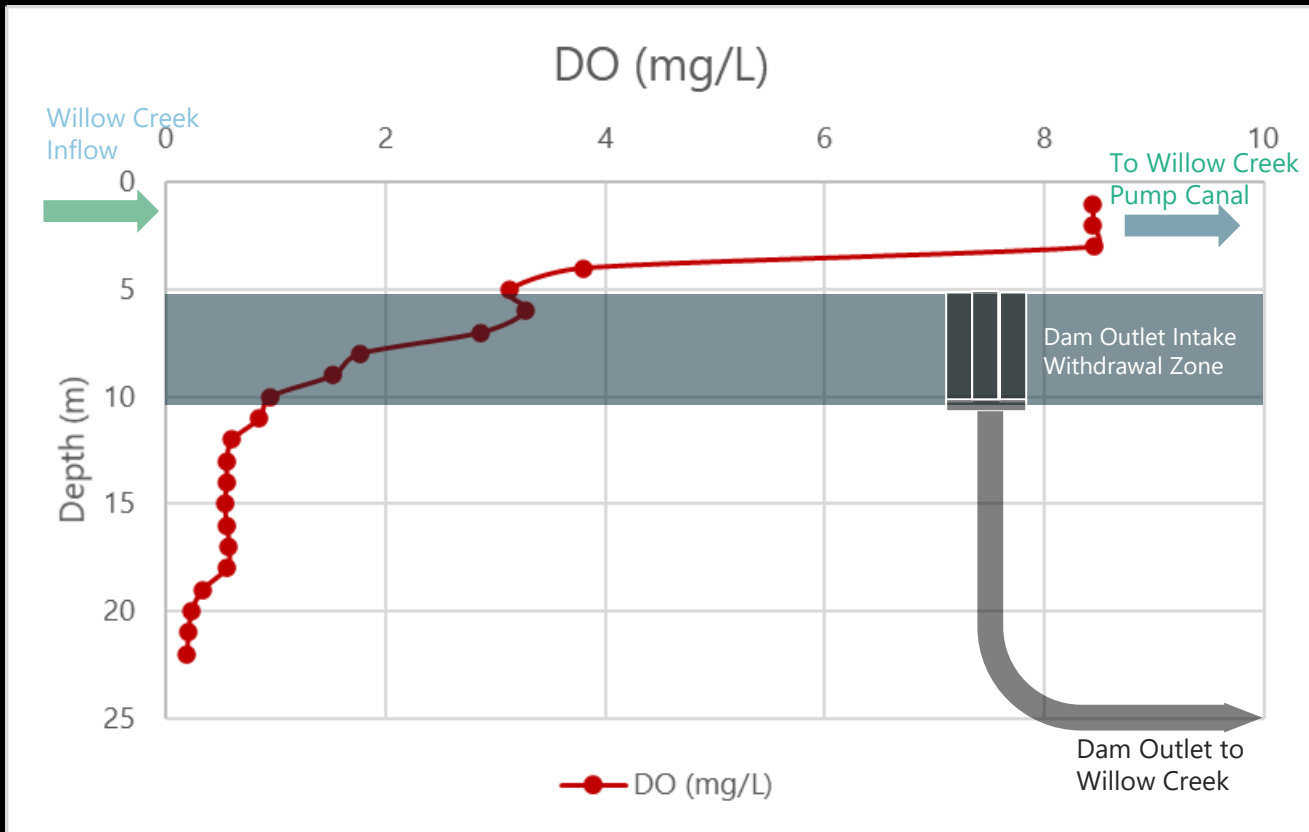
Boating permitted - avoid algae



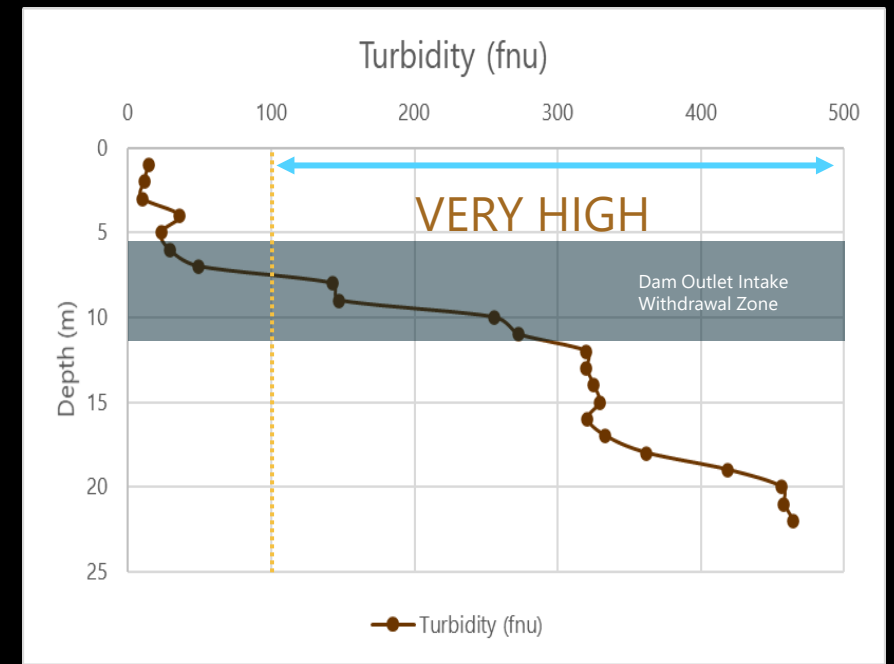
If you or your animals have nausea, vomiting, diarrhea, rash, irritated eyes, seizures or breathing problems, call Poison Control: **1-800-222-1222**



Willow Creek Reservoir - July 27, 2021



Dissolved Oxygen < 6 mg/L
= Impacts to Aquatic Life





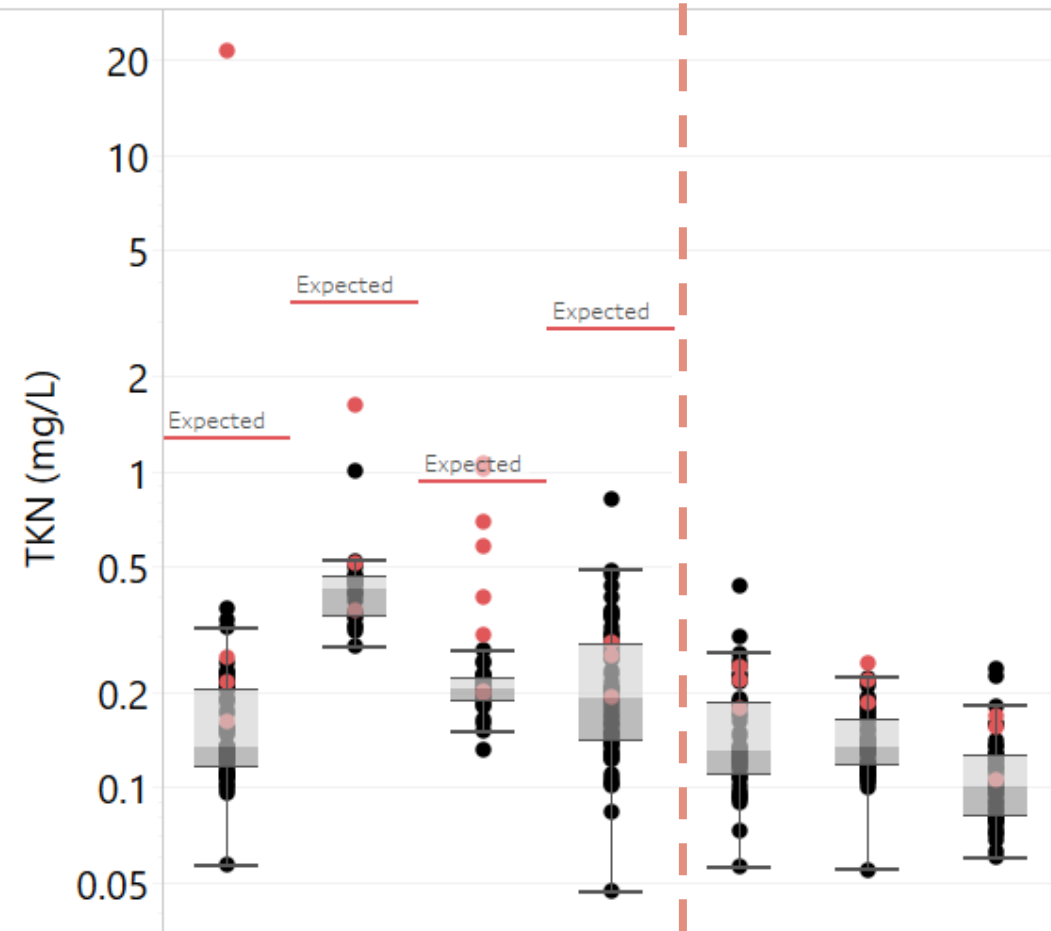
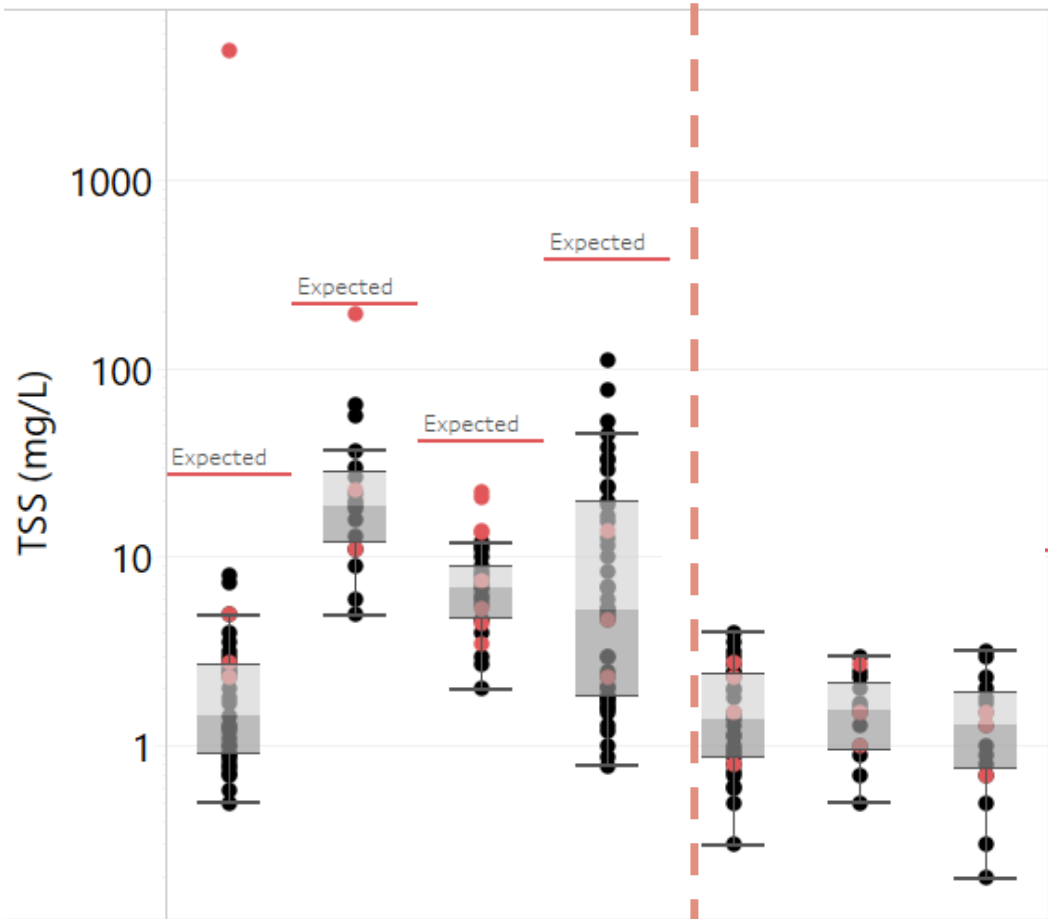
North Inlet
Aug 3, 2021



North Inlet Samples,
Aug 4, 2021



Aug 4, 2021
Grand Lake Beach



% watershed burned

42%

90%

89%

29%

0%

0%

0%

42%

90%

89%

29%

0%

0%

0%

+

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How we got organized

Partnerships and Collaboration





40+ Agencies

150+ Members



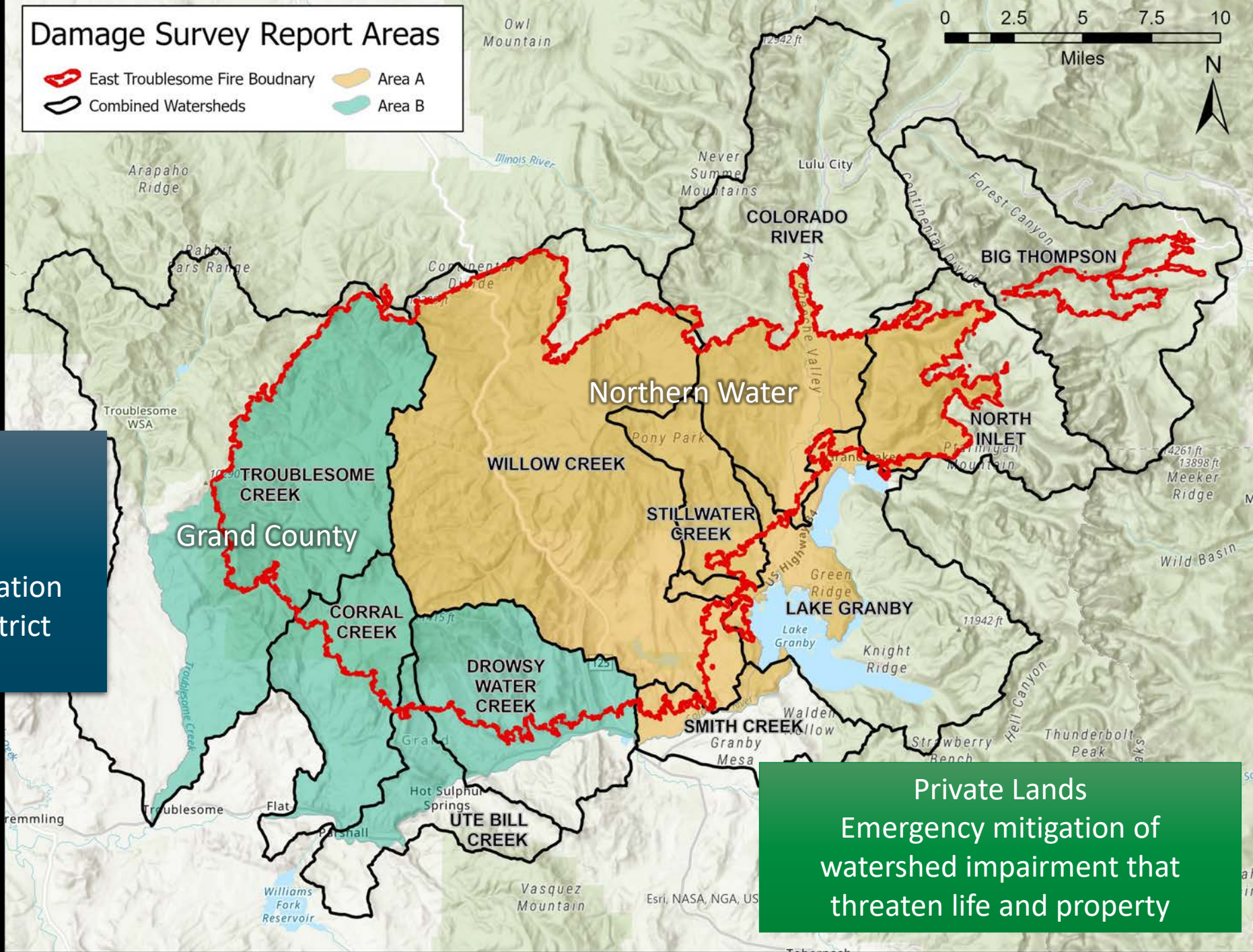
BLM	CDOT	CDPHE-WQCD	CFRI	Colorado Coalitions	CDNR	Colorado Trout Unlimited
Colorado Water Center	CPW	CRWA	CRWCD	CSFS	CWCB	DHSEM
DNR	DOLA	Enginuity	Grand County	Grand County CSU Extension	Grand County Wildfire Council	Grand Fire Protection District #1
JW Associates	Middle Park Conservation District	Middle Park Water Cons. District	Northern Water	National Park Service	NRCS	National Weather Service
Outstanding Grand Lake	RMNP	Senator Bennett's Office	Three Lakes Watershed Association	Town of Estes Park	Town of Grand Lake	Town of Hot Sulphur Springs
Trout Unlimited	UCRWG	USACE	USBR	USFS	USGS	

Emergency Watershed Protection Program Sponsorship

Partners

Northern Water
Grand County

Three Lakes Watershed Association
Middle Park Conservation District
River District



Private Lands
Emergency mitigation of
watershed impairment that
threaten life and property

A helicopter is flying in the upper left quadrant of the image. A white horizontal line spans across the top of the image. The background is a green-tinted landscape with rolling hills and a body of water.

Watershed Restoration Projects

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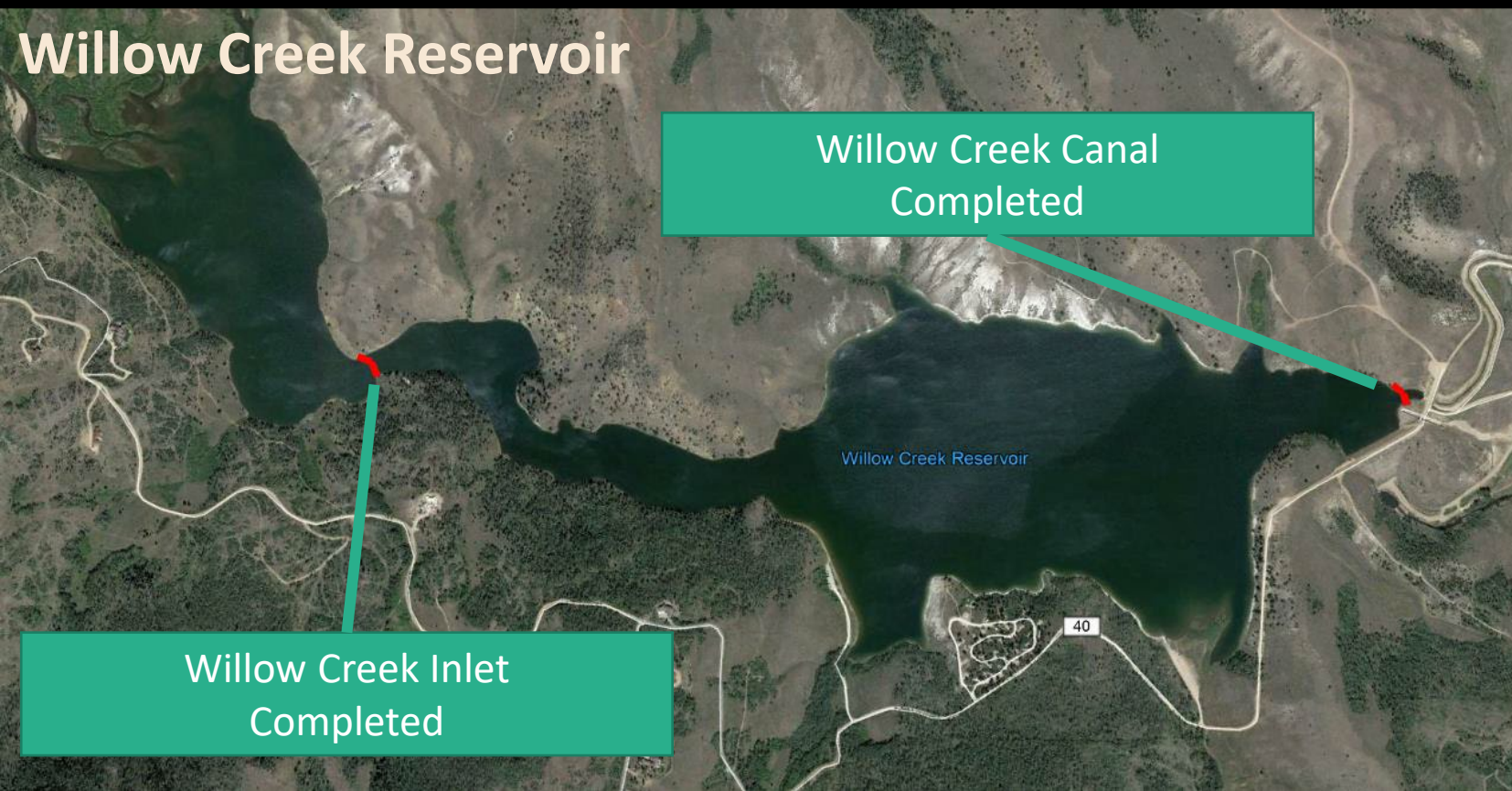
Debris Booms

Grand Lake



West Portal Completed

Willow Creek Reservoir



Willow Creek Canal Completed

Willow Creek Inlet Completed

Grand Lake debris boom at
Adams Tunnel West Portal



06/21/2021

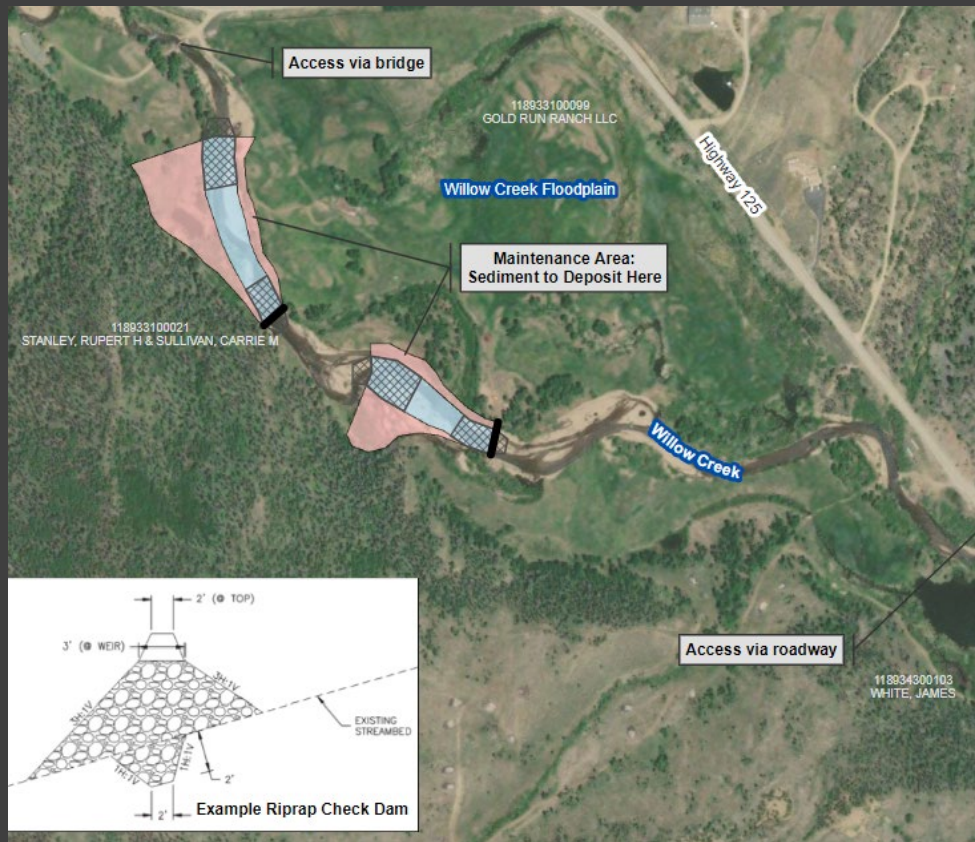
LEGEND
Active Debris Removal at Existing Riprap Check Structure



Pre-Existing Debris Removal



New Debris Removal



Sediment Management



5,027 ACRES



660+ SEMI
LOADS



41 DAYS



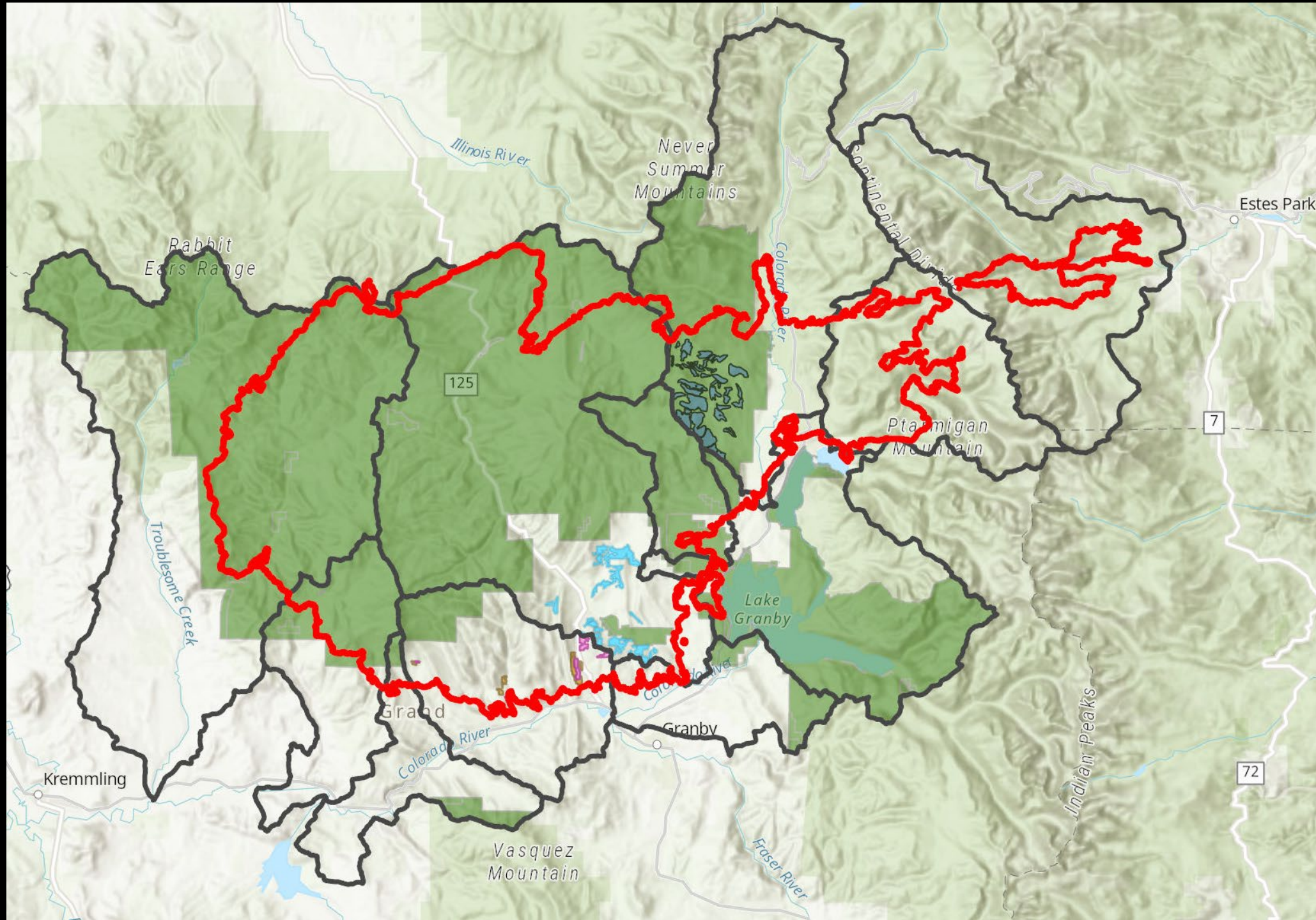
\$9.9 MILLION

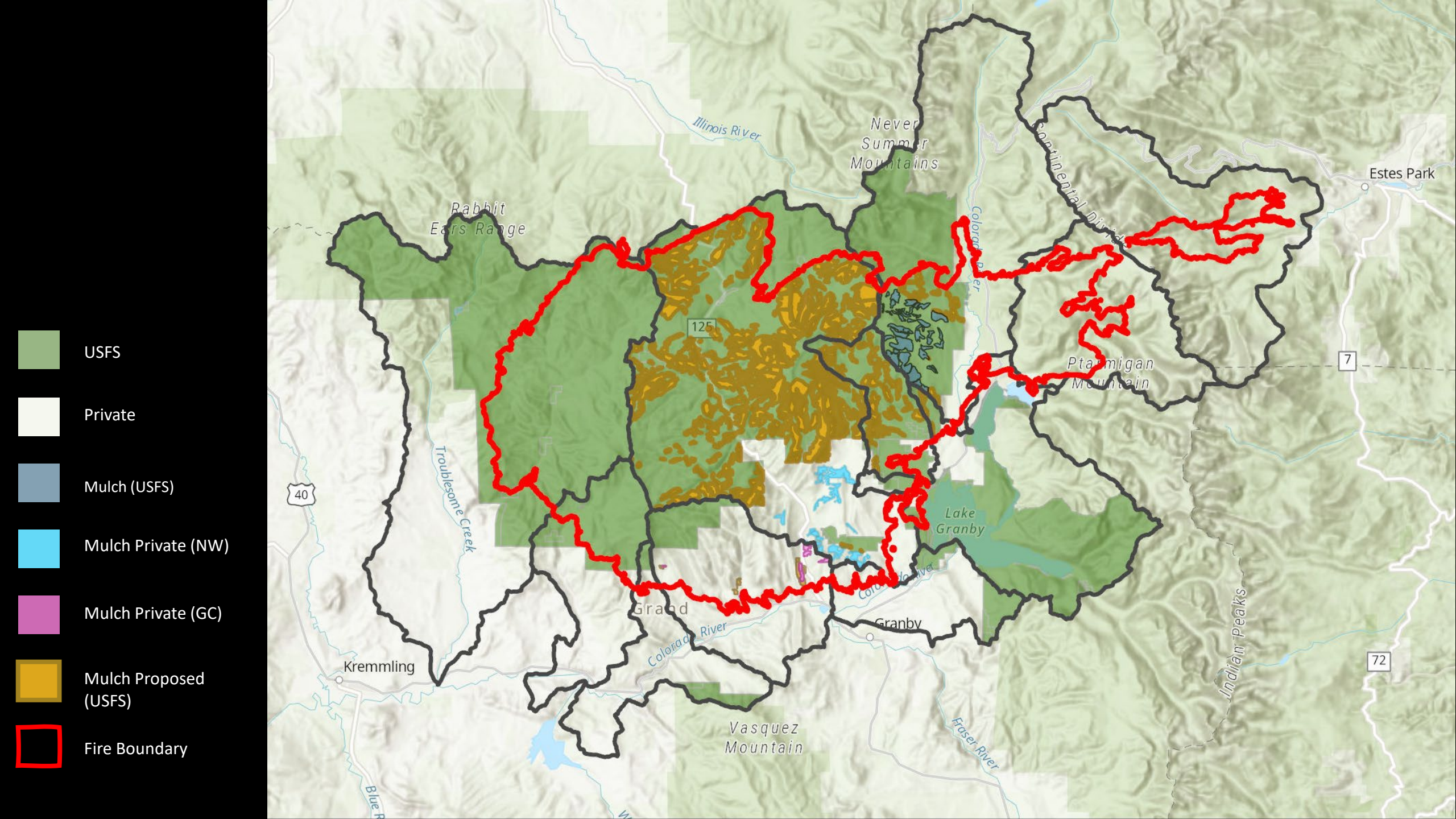


12,800+
DROPS



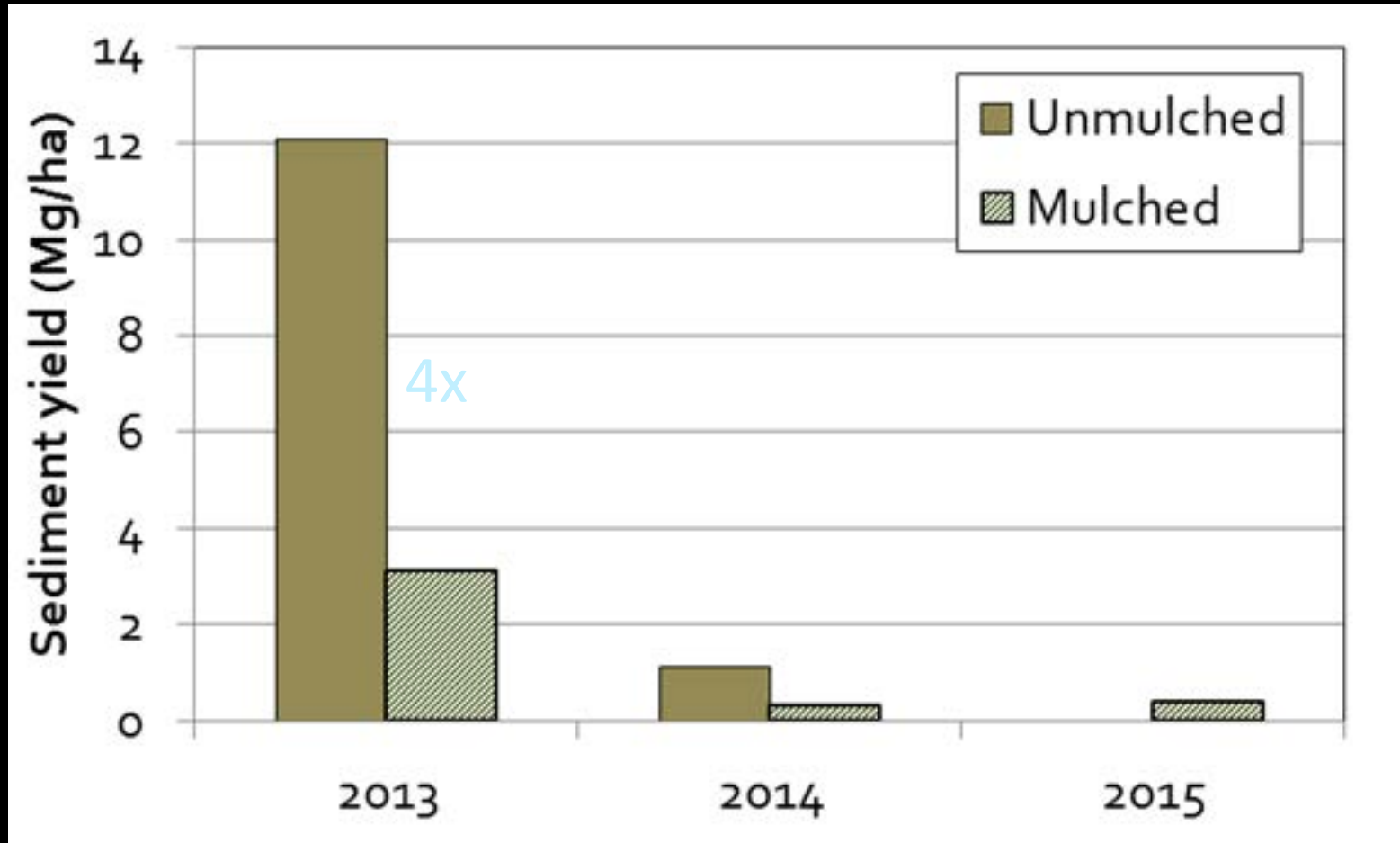
-  USFS
-  Private
-  Mulch (USFS)
-  Mulch Private (NW)
-  Mulch Private (GC)
-  Fire Boundary





2012

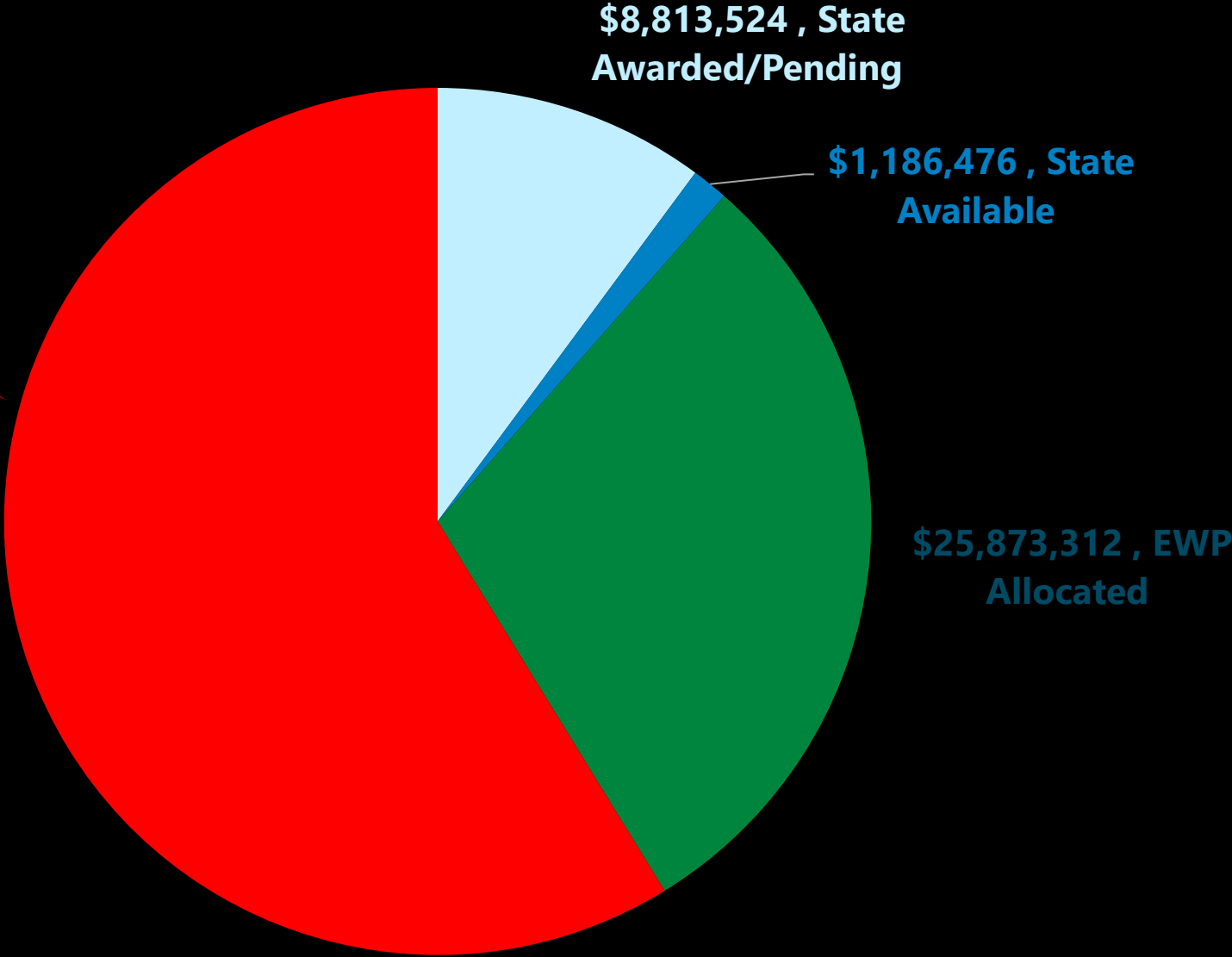
High Park Fire Study Sites



WILDFIRE RECOVERY FUNDING NEEDS EAST TROUBLESOME

EWP Additional?
USFS Funding?
State Additional?

**\$51,130,784 ,
Outstanding Funding
Need**



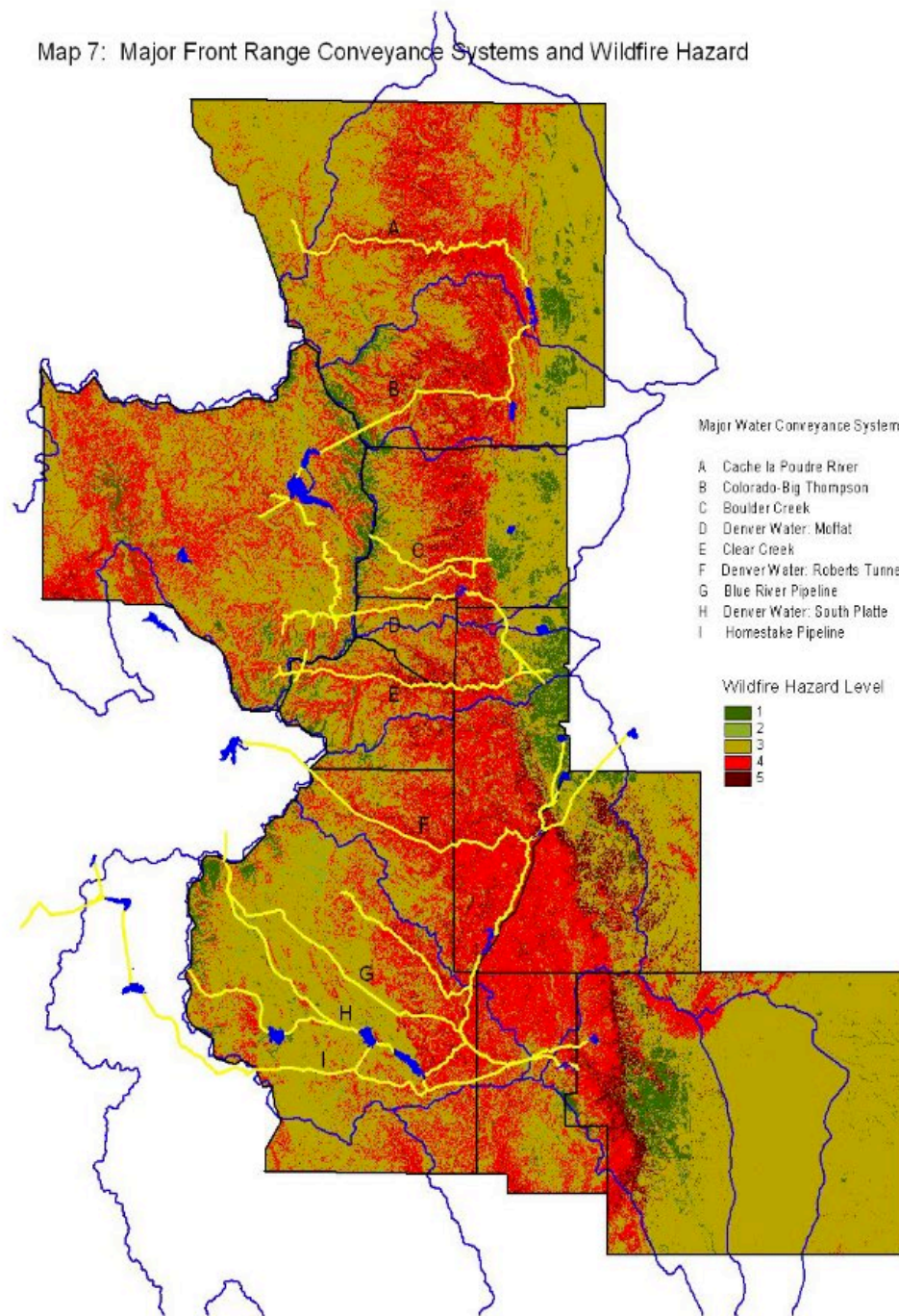


Planning for the Future

Adaptation and Resilience
Building



Map 7: Major Front Range Conveyance Systems and Wildfire Hazard



Collaborative Forest Landscape
Restoration Program (CFLRP):
Arapaho and Roosevelt National Forests
Planned Projects

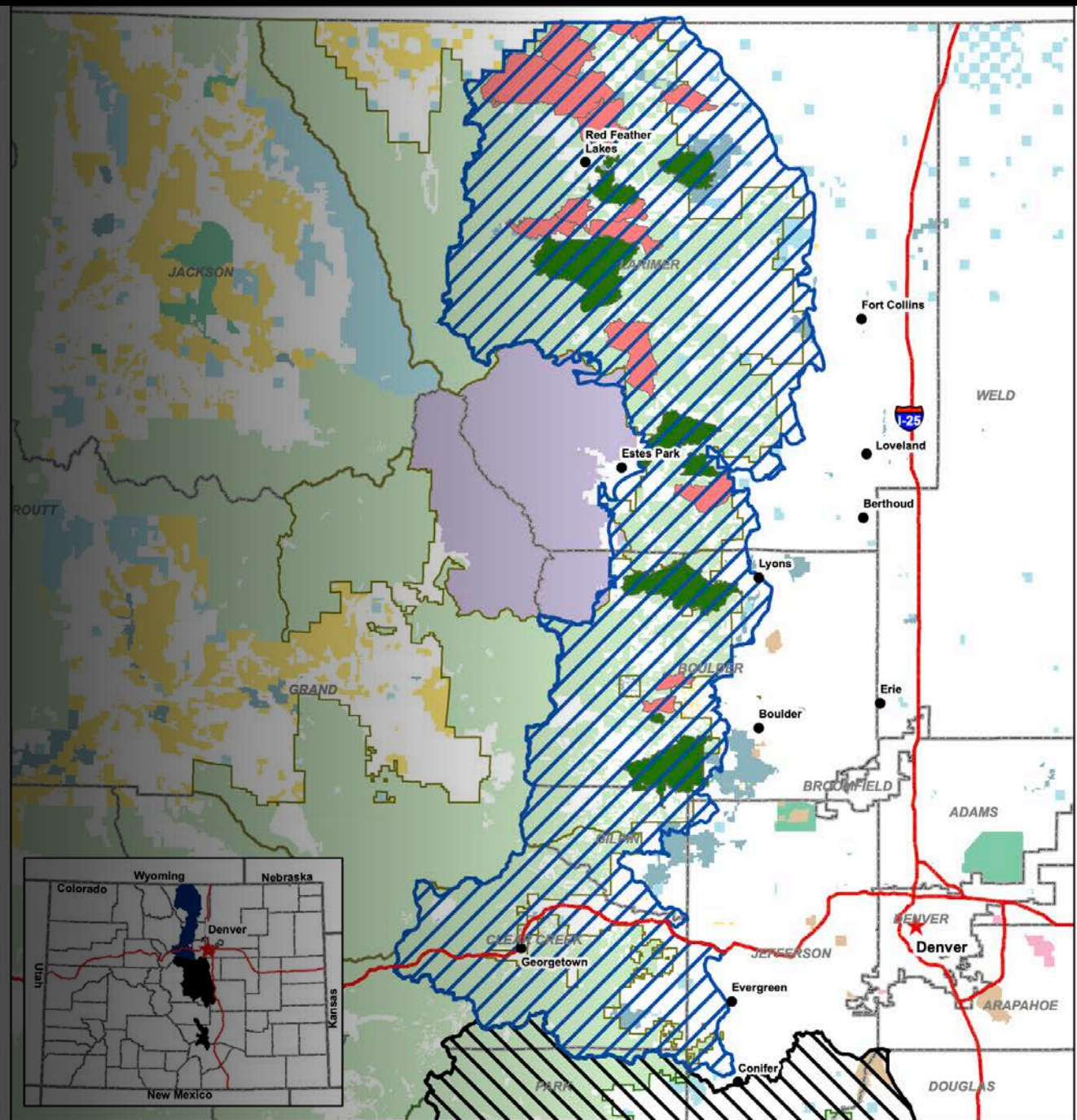
LANDSCAPE SCALE FOREST RESTORATION



Planned yr 5-10

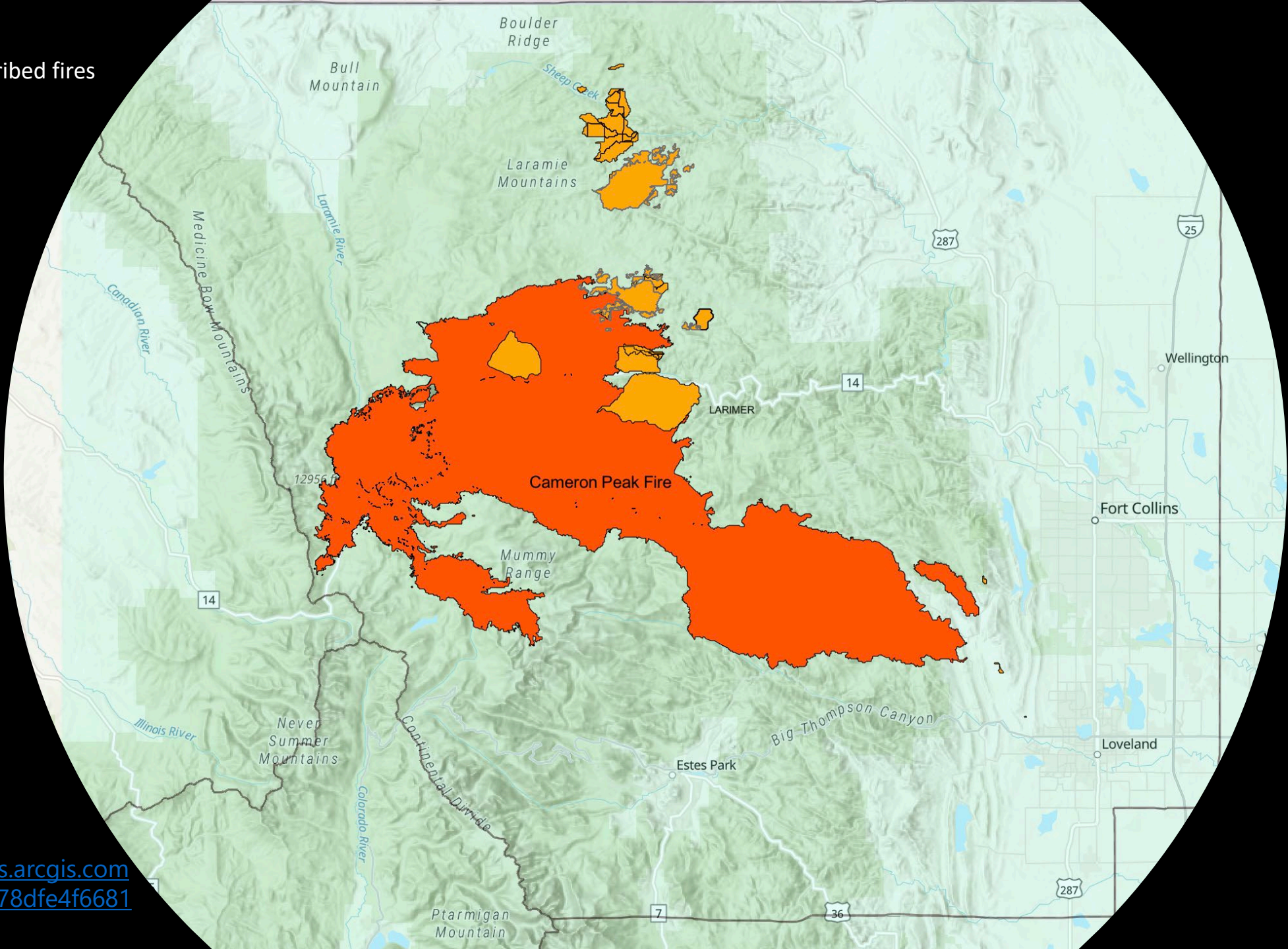


Planned yr 1-4

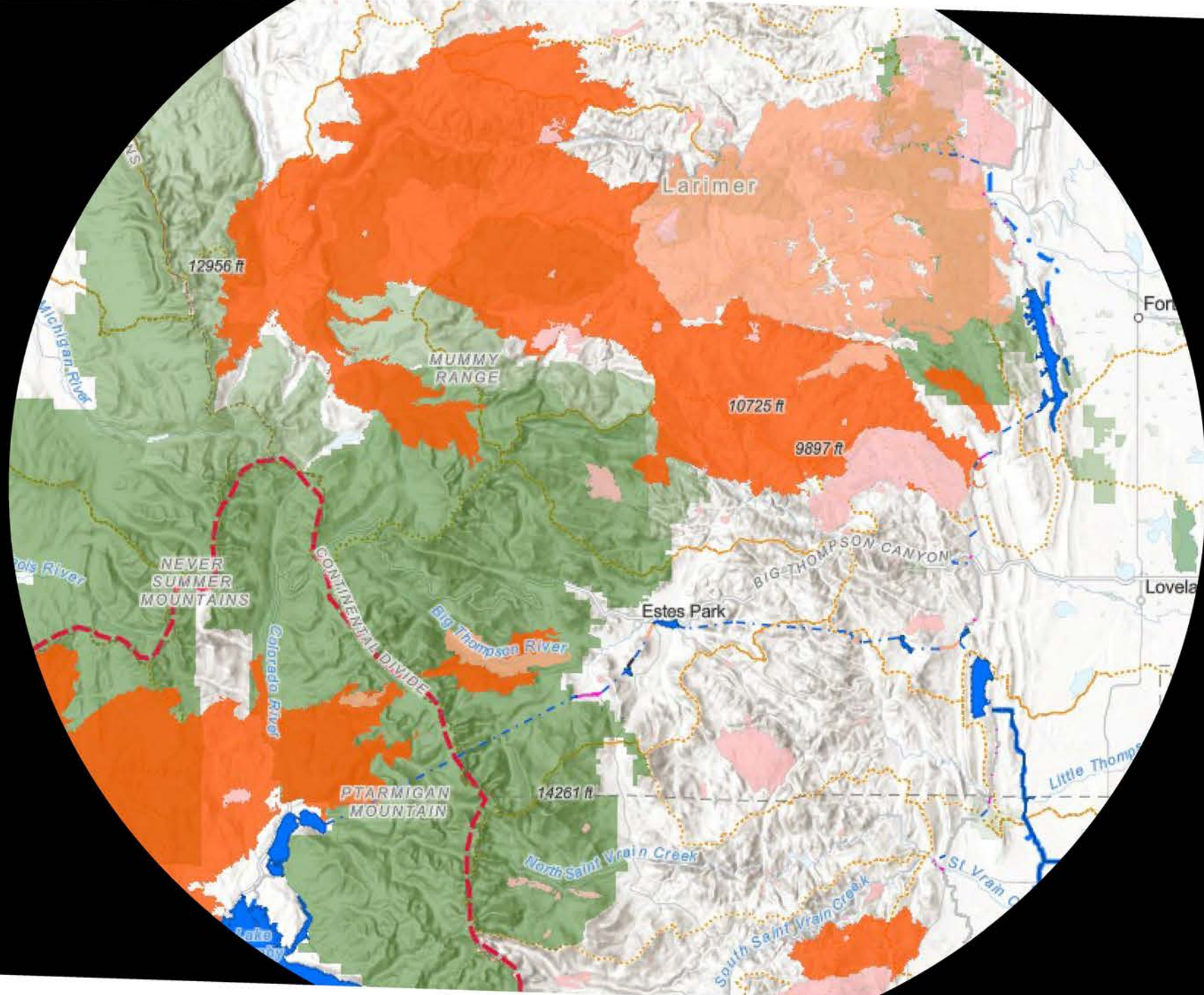




Prescribed fires



<https://storymaps.arcgis.com/stories/1d03a9c78dfe4f6681ab4eef4240356d>





Strategies

Landscape scale
forest health
management

Social
infrastructure
development

Relationship
Building

Funding and
Capacity

Preparing for
scarcity

Water supply
storage and
portfolio
diversification

Getting really good
at post-fire
restoration

Questions & Comments



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