

Grizzly Creek Fire and City of Glenwood Springs Raw/Treated Water Projects and Drought Resiliency



Credit Whitewater Rafting LLC

10/24/2022



**Matthew Langhorst, Director of Public
Works - Glenwood Springs**

GRIZZLY CREEK FIRE SUMMARY

- Latest and largest Glenwood Springs area wildfire
- Ignited August 10, 2020
 - on steep slopes near I-70 & the Colorado River
 - between River's confluences with No Name & Grizzly Creeks
 - City's primary raw water sources
- 32,631 acres burned through November 2020. Rugged terrain.
- Fire threatened City intakes and exposed raw water lines.
- Firefighting heroes limited watershed burns above City's intakes:
 - 9.2% of the No Name watershed above intake
 - 2.9% of the Grizzly Creek watershed above intake
- City's response: "The Project"
 - Restoration & intake protection
 - Treatment system improvements
 - Alternate raw water supply system improvements



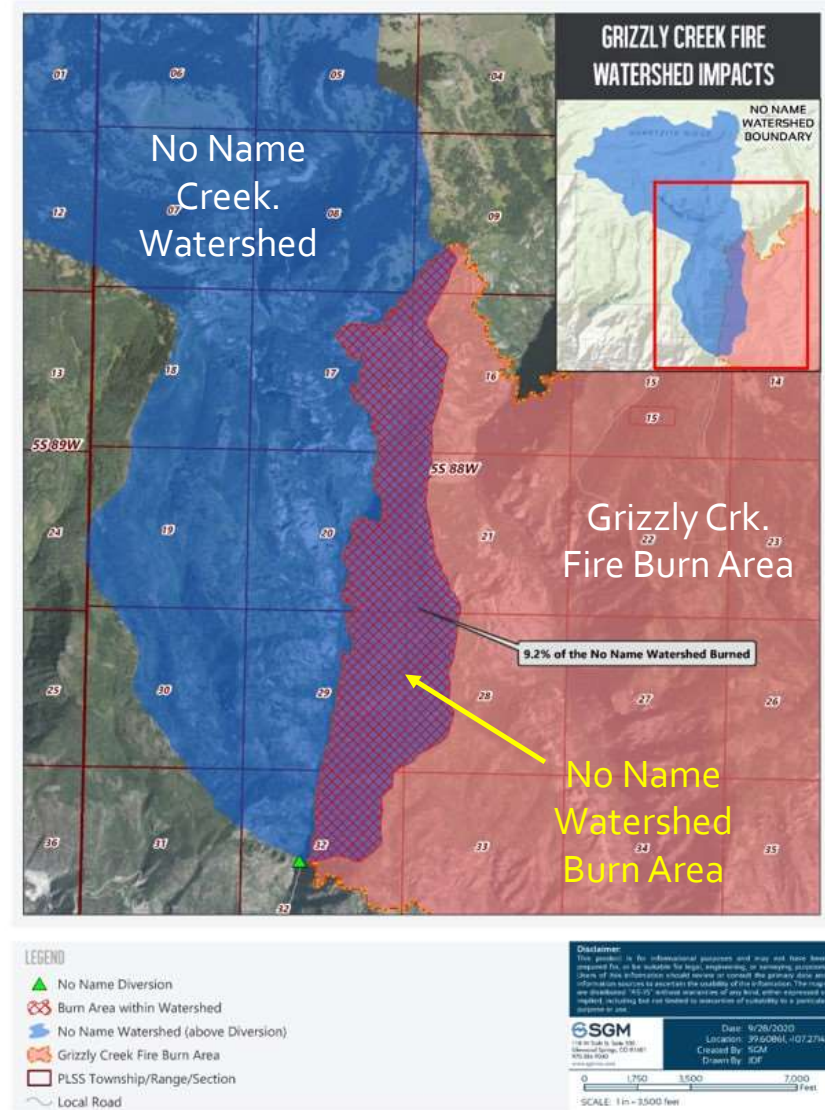
No Name Creek Basin

No Name Creek Basin:

12,826 acres

1,181 acres burned (9.2%)

Main water intake is adjacent to and below main burn area.



Mapping Image Created by SGM

10/24/2022

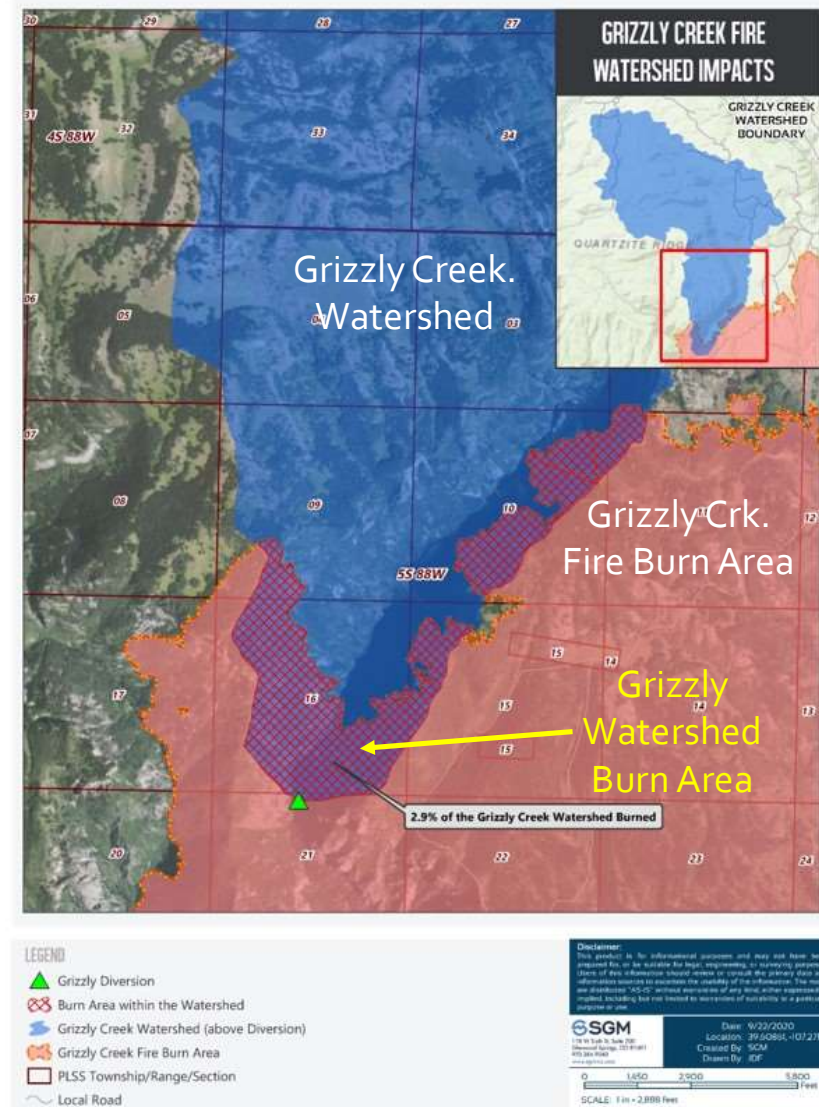
Grizzly Creek Basin

Grizzly Creek Basin:

21,535 acres

614 acres burned (2.9%)

Water intake is adjacent to and below the burn area.



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City of Glenwood Springs Raw Water System

- 6.5 miles long water transfer system from Grizzly Creek diversion to Red Mountain water treatment plant.
- Grizzly Creek Delivery System
 - Small diversion dam 4.1 miles up Grizzly Creek
 - 900 LF of above-grade 24" steel pipe
 - 3,000-LF tunnel to No Name Creek basin (1906)
- No Name Creek Delivery System
 - Small diversion dam at No Name Creek Trailhead
 - (Originally) an exposed flume (1904) suspended on mountainside
 - 3,000-LF No Name Tunnel constructed (1929) through the mountain
 - 900 LF of 24" above-grade steel pipe (1997)
 - 500,000 gallon Canyon Tanks
 - 13,500 LF of 24" buried DI pipe (1975-76) with two river crossings
 - Red Mtn WTP (1976)
- No Name Treatment/Pre-treatment Works
 - Microstrainers installed (1962-68) - part of original treatment system
 - Required widening of first 80 LF of No Name Tunnel
 - Decommissioned in 1993 - pretreatment added at Red Mtn WTP



City of Glenwood Springs Water System



Mapping Image Created by Carollo Eng.

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Current Water System Overview at the Plant:

Filters installed in 1976 – minimal updates

Installed pre-treatment /building/equipment in 1993

History of exceptional water quality (Nephelometric Turbidity Unit and Total Organic Carbon Loads)

Annual average source water turbidity: < 0.3 NTU

Run off source water turbidity: < 15 NTU

Annual average source water TOC: < 1 mg/L

Maximum source water TOC: < 4 mg/L

First SCADA system in 2019, 90% manual operation to that point

Solids discharge to WW EQ tank before collection system to WWTP

Expected NTU and TOC Levels after the Fire:

Anticipated source water turbidity: ~ 100-200 NTU

Anticipated source water TOC: ~ 10-15 mg/L

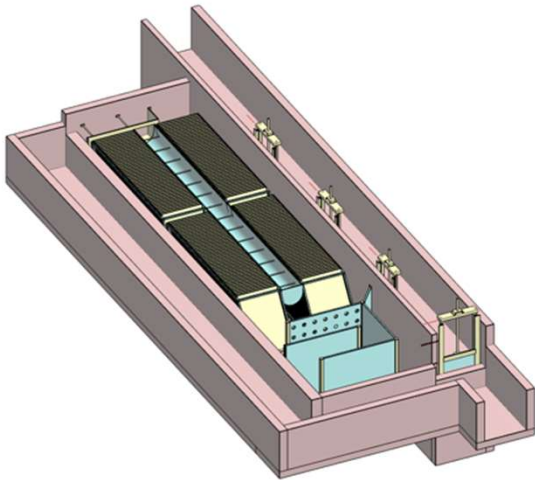


The City's "Project" Consists of 4 Phases

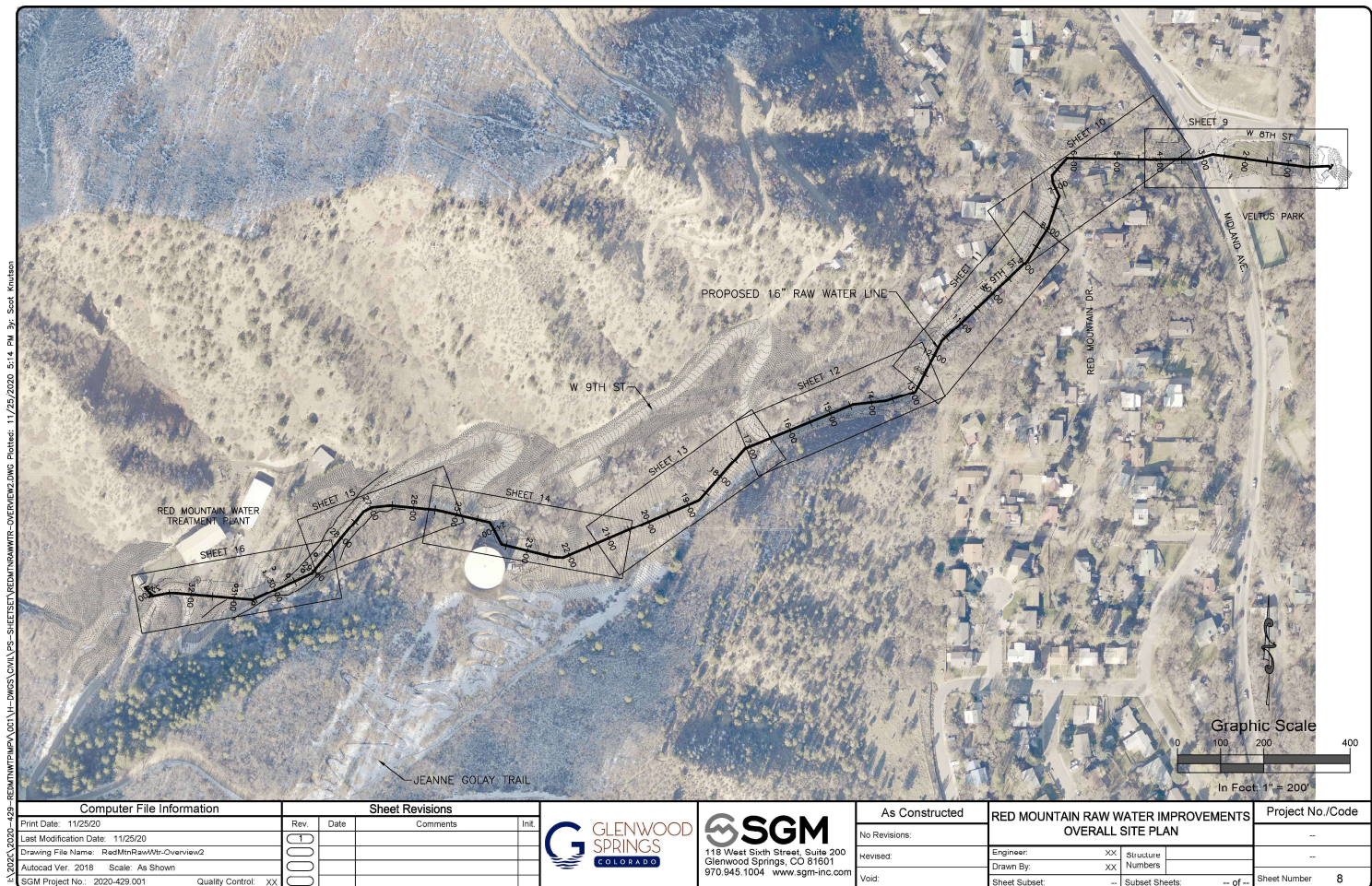
Phase One (2020) – Intakes Protection: completed by City & Gould Construction; - Stream dredging at intakes, streambank armoring, metal plating on/above intakes to protect valve stems & grates, pipe stabilization and structures protection.

Phase Two (2021) - Red Mountain WTP Process Upgrades: Plate settlers addition, improved solids removal capabilities, filter media upgrades, improved chemical pre-treatment (polymer addition).

Phase Three(2021) - No Name Tunnel Facilities Upgrades: Removal of micro-screens & associated concrete, new plate settlers and polymer feed addition, discharge points to send sediment back to No Name Creek. Protects raw water delivery system and improves plant performance.



Phase 4 – 3,316LF of 16" DIP and Mixing Vault



Phase Four (2021-22): Raw Water Line from Roaring Fork River Pump Station to the Red Mtn WTP

Benefits of this 2nd transmission line:

- 1.) Achieves a truly redundant third water source. The Roaring Fork Pump Station was designed and built to complete pipe, tank and intake construction in 1997 and to be used as an emergency backup.
- 2.) Variable speed pump upgrades will allow delivery of range of Roaring Fork River water flows up to 5 MGD to the Red Mtn WTP.
- 3.) Mixing vault near WTP will allow blending of pumped River water and gravity-fed Creek water. Improves operational flexibility to manage water quantity and quality during drought and/or degraded raw water quality conditions.
- 4.) New line provides redundancy to allow maintenance of 44-year-old, 24" raw waterline. Old line can be off-line for inspection, addition of new valve or review of the raw water pipe bridge. Currently, this is nearly impossible to accomplish.
- 5.) Lastly, as we saw in 2020, if the last 3,300 LF of the 24" line breaks, as it did in 2020, there is no way to get water to the plant via pump or gravity.



Cost of Projects:

- Intake protection has been completed: \$245,000 with NRCS – EWP Grant Paying 80%.
- Water Treatment Plant designed and bid in 6 weeks: Cost of \$3.8 Million paid for with Improvement Fees and a Local Lender.
- No Name Tunnel upgrades: \$500,000
- Roaring Fork pipeline and mixing vault: Paid for with CWCB Low Interest Loan, Colorado River District \$300,000 grant and a DOLA \$500,000 Grant. Project Cost \$4.0 Million.



Status of Projects:

- No Name tunnel, intakes and water treatment plant projects all complete and working well.
- Pump station secondary line is under construction, expected to be completed 2022.

Other Resiliency Projects in the Works:

- Raw water intake on south side of town being recommissioned. Water samples being taken in river and intake/wet well design being reviewed.
- Well field review and planning in early stages.
- Storage capacities being looked at.
- Water sustainability and conservation program being created for citizens to take advantage of.



Lessons Learned Are Driving Improved Water System Resiliency

Aging Infrastructure Warrants Increased Redundancy

Past 3 years: Two raw waterline & One communication line break, each causing a City water system shut down.

System upgrades will reduce impacts of these events.

Frequent Large Fires May Be the New Normal

Past 20 years: 10 fires in GWS area with 5 of those in 2020.

Multiple redundant water sources, improved treatment processes and well-protected facilities are critical.

If you don't know who owns the land under your watershed, learn who they are and start a relationship with them.

Drought Creates Additional Risks to Manage

Past 5 years have shown that a 3rd fully redundant water source will help keep production at a normal volume even with reduced flows out of the main watersheds.

Irrigation moved to raw water sources. Start planning and move toward that supply.

