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







Matthew Langhorst, Director of Public Works - Glenwood Springs

Karl Hanlon – Karp Neu and Hanlon Mountain Law Firm

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GRIZZLY CREEK FIRE SUMMARY

- Latest and largest Glenwood Springs area wildfire at 32,631 acres.
- 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
- The fire burned through November 2020. Rugged terrain.
- Fire threatened City intakes and exposed raw water lines.
- Firefighters' limited watershed burns above City's intakes to:
 - 9.2% of the No Name watershed above intake
 - 2.9% of the Grizzly Creek watershed above intake
- Existing Water rights from No Name and Grizzly we temporarily transferred up stream on the Roaring Fork River to City pump station.
- City's response: "The Project 4 Separate Phases of work"
 - Restoration & intake protection
 - Treatment system improvements
 - Alternate raw water supply system improvements
 - Completion Date: May 31st, 2021, pre-runoff.



No Name Creek Basin

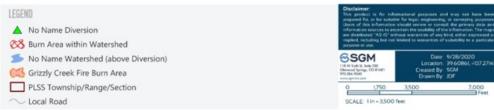
No Name Creek Basin:

12,826 acres 1,181 acres burned (9.2%)

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

Priority #1359, Adjudication Date 1907, 12 CFS.







Grizzly Creek Basin

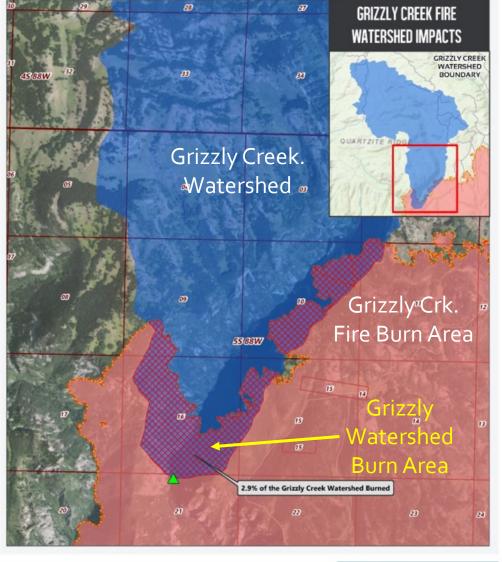
Grizzly Creek Basin:

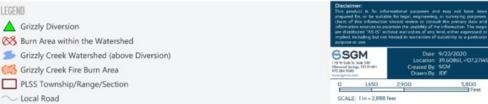
21,535 acres614 acres burned (2.9%)

Priority #1359, Adjudication Date 1907, 8 CFS.

Water intake is adjacent to and below the burn area.

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SPRINGS
COLORADO





City of Glenwood Springs Raw Water System

- 6.5 miles long from Grizzly Creek diversion to Red Mountain WTP
- Grizzly Creek Delivery System
 - Small diversion dam 3.8 miles up Grizzly Creek to
 - 900 LF of above-grade 24" steel pipe to
 - 3,000-LF tunnel to No Name Creek basin (1906)
- No Name Creek Delivery System
 - Small diversion dam at No Name Creek Trailhead to
 - (Originally) an exposed flume (1904) suspended on mountainside
 - (Now) to the No Name Tunnel (1929) through the mountain to
 - 900 LF of 24" above-grade steel pipe from end of tunnel (1997) to
 - 500,000 gallons of storage capacity at the Canyon Tanks to
 - 13,500 LF of 24" buried DI pipe (1975-76) to
 - Red Mtn WTP (1976)
- No Name Treatment/Pre-treatment Works
 - Micro-strainers installed (1962-68) part of orig. 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





Current Water System Overview at the Plant:

Mixed Media Filters installed in 1976 — minimal updates since

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 waste water storage tank before sewer collection system outlet to WWTP

Expected NTU and TOC Levels after the Fire:

Anticipated source water turbidity during runoff: ~ 100-200 NTU

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

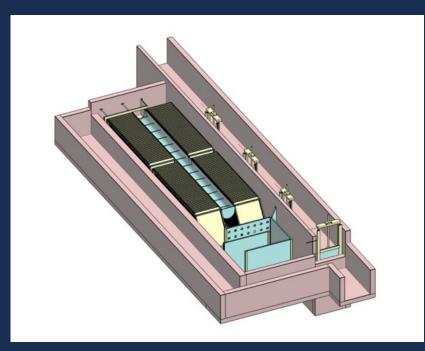


The City's "Project" Consists of 4 Phases

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.

<u>Phase Two (2021) - Red Mountain WTP Process Upgrades</u>: Plate settlers addition, improved solids removal capabilities, filter media upgrades, improved chemical pretreatment (polymer addition).

<u>Phase Three(2021) - No Name Tunnel Facilities Upgrades</u>: 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.

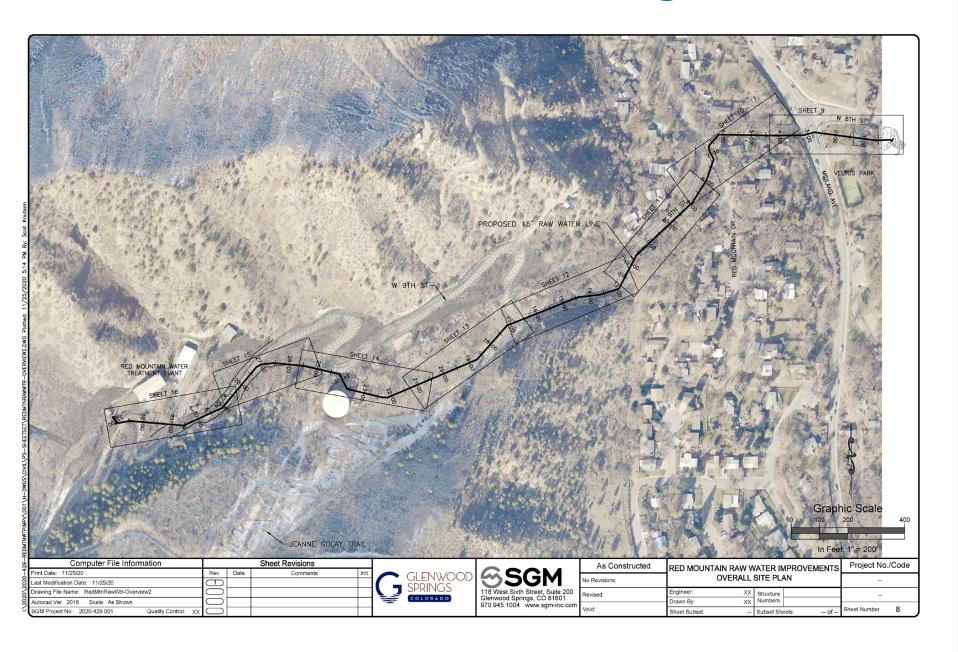






Phase 4-3,316LF of 16" DIP and Mixing Vault



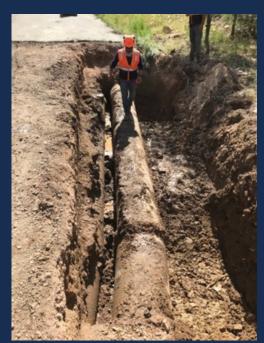


<u>Phase Four (2021-22): Raw Water Line from</u> <u>Roaring Fork River Pump Station to the Red Mtn</u> <u>WTP</u>

Benefits of this 2nd transmission line:

- 1.) Achieves a truly redundant third water source.
- 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.
- 4.) New line provides redundancy to allow maintenance of 44-year-old, 24" raw waterline.
- 5.) Ability to for City to utilize our 500-acre-foot stored water right from Ruedi Reservoir to water treatment plant.
- 6.) If a section of line within the last 3,300 LF of the existing 24" DIP were to break, as it did in 2020, we would have a way to transfer water to the plant.







Cost of Project:

- Intake protection has been completed: \$245,000 with NRCS EWP Grant Paying 80%.
- Water Treatment Plant designed and bid in 6 weeks: Cost of \$3.6 Million paid for with System Improvement Fees and a Local Lender.
- Roaring Fork pipeline and mixing vault: Paid for with CWCB Low Interest Fire Emergency loan and \$500k DOLA grant at an Estimated Cost of \$3.2 million. Construction to Start in July of 2021, completed by winter 2021.
- Due to the time frames with the project USDA, FEMA, Power Authority Lending and Grants were not Available.



Status of Project:

- Intake protection has been completed.
- Remote turbidimeter installed for mountain water sources.
- Red Mountain and No Name Tunnel Portion of the Project is completed on schedule
- New RF pipeline and mixing vault in construction Fall of 2021.



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.

Drought Creates Additional Risks to Manage and Water Needs

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.

Next process for City to investigate with the Forest Service is our 1960 Appropriation dated Grizzly Creek Reservoir, 1967 decree No 1416. This reservoir would allow a storage capacity of 3,879.8 acre feet of water for Municipal purposes.

