East Troublesome Fire Watershed Recovery

Final Report

CTGG1 2023*3149

Prepared for:

COLORADO
Colorado Water Conservation Board
Department of Natural Resources

Colorado Watershed Restoration Program

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Background

On Oct. 14, 2020, the East Troublesome Fire (ETF) was reported northeast of Kremmling on the Arapaho National Forest. With high winds and low humidity in the following weeks, the fire's final acreage reached 193,812 acres by the time it was fully contained on Nov. 30. See **Figure 1** for a general location of the ETF burn scar. Grand County and Northern Water at once began collaborating with partners on watershed restoration and planning of projects to mitigate threats to life and property due to post-fire flood, sediment, and debris.

East Troublesome Fire October 22, 2020

Initial restoration efforts were primarily focused on implementing projects through the USDA Natural Resources Conservation Service (NRCS) Emergency Watershed Protection (EWP) Program. However, the EWP Program is restricted to private lands, and can only be used on federal lands in specific special scenarios where federal lands are immediately upstream and directly connected to protection of private lands. As approximately 90% of the ETF burn scar is within federal lands, Northern Water, in coordination with Grand County, contracted with the United States Forest Service (USFS) under a Participating Agreement (PA) and the Bureau of Land Management (BLM) under a cooperation agreement to provide restoration activities on USFS and BLM lands.

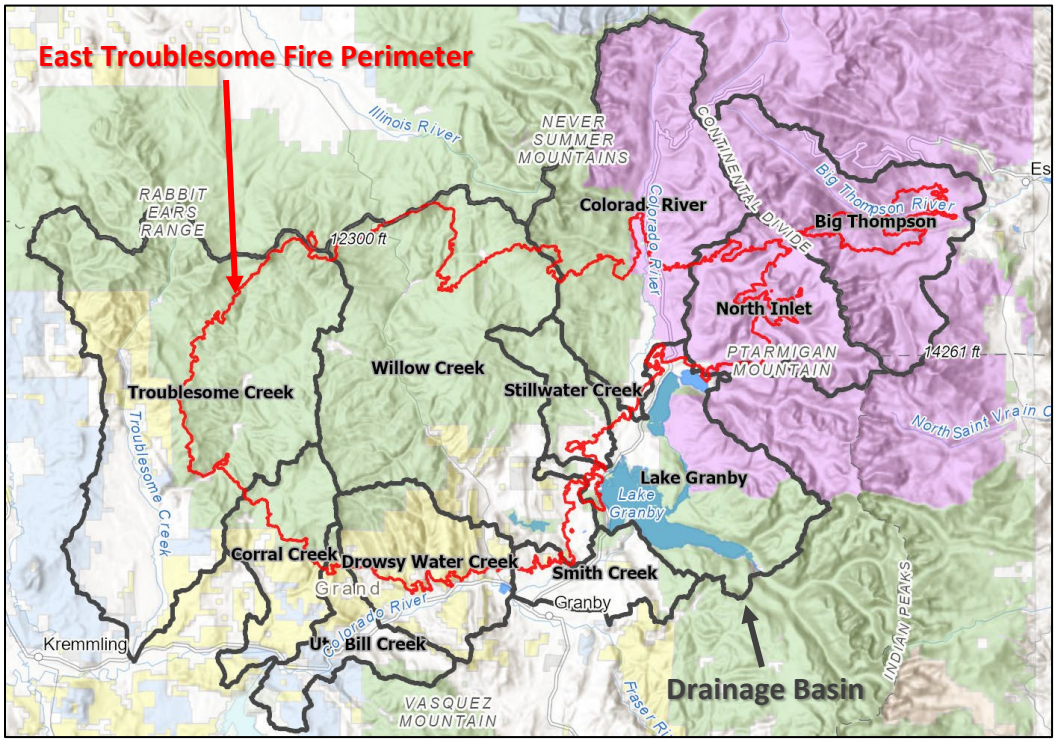

Figure 1 – East Troublesome Fire Location Map

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CWCB ETF Grants Summary

CWCB contracted with Northern Water for four grants, all related to the ETF Watershed Restoration Efforts. Both 2021*3428 and 2022*2360 are primarily focused of funding the local match requirement for EWP projects. Of those, 2021*3428 has already been fully disbursed and closed out. 2023*2041 was focused on supplying matching funds to the USFS and BLM for mulch treatment on federal land. That grant has been fully disbursed and closed out. 2023*3149 was focused on providing funding towards planning, designing, and implementing point treatments within the ETF burn scar.

CWCB ETF Grant Summary

CONTRACT NO.	MAX CWCB AWARD	FEDERAL MATCH	PRIMARY FOCUS
CTGG1 2021*3428	$4,150,000	$11,907,078	EWP Local Match
CTGG1 2022*2360	$4,663,524	$12,297,884	EWP Local Match
CTGG1 2023*2041	$4,300,000	$12,895,685	USFS/BLM Match
CTGG1 2023*3149	$426,113	$1,342,072	USFS Match
TOTAL	$13,539,637 (26%)	$38,442,719 (74%)	

This Final Report is specific to CWCB grant 2023*3149 which is supplying funds primarily focused on planning, designing, and implementing point treatments within the ETF burn scar. **Figure 2** shows the general area receiving point treatments under this grant.

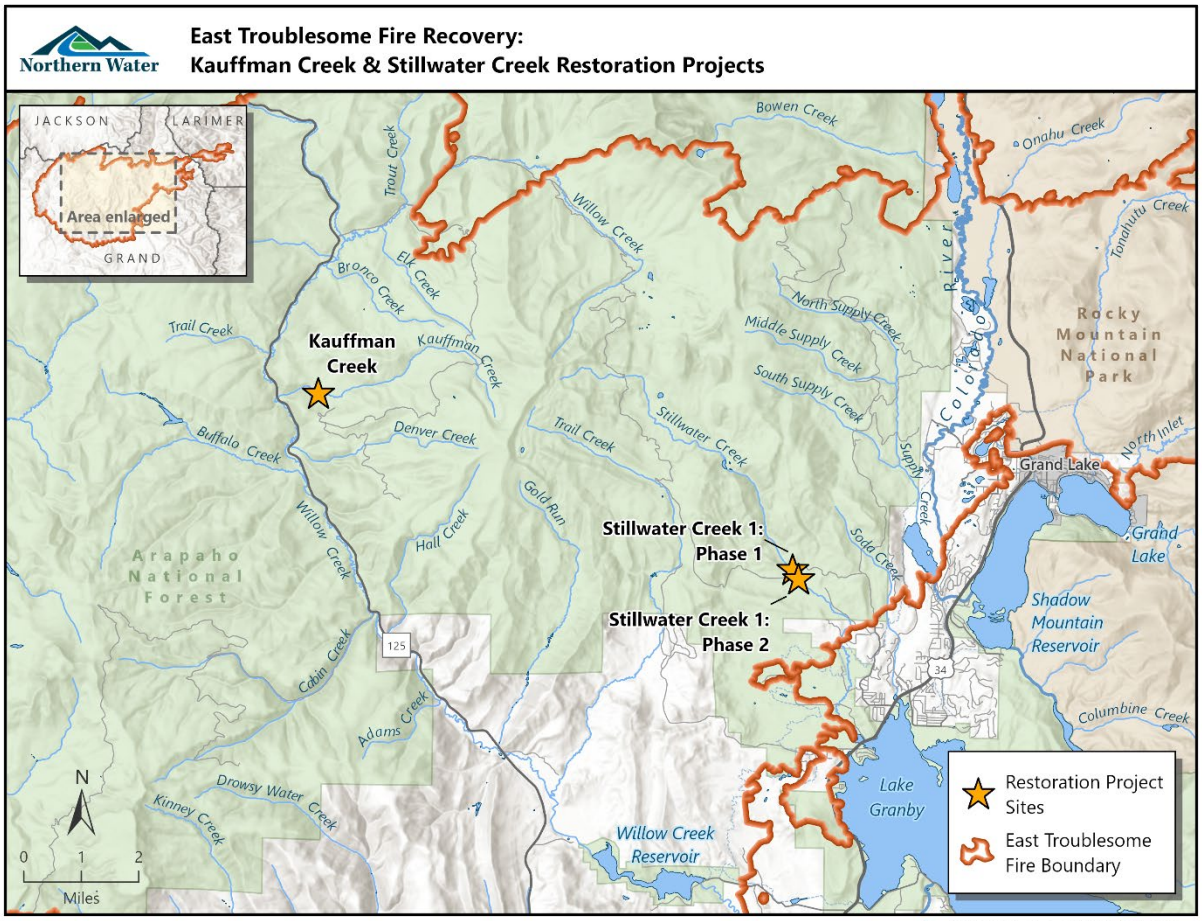

Figure 2 –Location of Point Treatments installed under this grant

Task 1 – Point/Linear Projects Planning, Design, and Permitting

Purpose: This task identified, prioritized, designed, and permitted stream stabilization and restoration projects in the East Troublesome Fire burn area. It involved assessing stream systems for stability and sediment loading, ranking their conditions, and determining appropriate interventions such as streambank stabilization and floodplain connectivity. Roads and culverts are also evaluated for their impact on stream instability. The selected projects underwent detailed engineering analysis, permitting, and design before advancing to construction under subsequent tasks.

Matrix Design Group was procured to provide initial planning services, using existing data, modeling, and assessments to evaluate stream conditions. Northern Water collaborated with partners to integrate local knowledge and technical data for a comprehensive understanding of stream stability. A ranking system identifies areas requiring treatment, and potential projects are prioritized based on feasibility, benefits, and impacts. CWCB grant funds, matched with federal grants where possible, support the implementation of the projects.

Result: Work under this task began in 2023 with Matrix Design Group, Kleinfelder, and GEI Consultants for planning and design services related to USFS project planning and for the culvert washout on Stillwater Creek, known as Stillwater Creek 1, Phase 1. This culvert replacement was the only USFS project that occurred in 2023. Matrix Design Group and GEI Consultants also worked on the Stillwater Creek 1, Phase 2 project and the Kaufman Creek project, both of which were approved and implemented in 2024. Each project that was designed and advanced to implementation is described below.

> ***Stillwater Creek 1, Phase 1:*** This project is located where Stillwater Pass Road crosses Stillwater Creek. Stillwater Pass Road is a major through route for Grand County residents and national forest users. The road washed out in May 2023 at the Stillwater Creek crossing, leaving the route impassable and damaged or destroyed the existing culverts. To restore access and reduce sedimentation in the creek and Lake Granby caused by the recent debris flow and washout events, Northern Water coordinated with USFS and hired Concrete Express Inc (CEI) and in September CEI installed a new Aquatic Organism Passage (AOP) culvert, as well as adjacent stream improvements.
>
> ***Stillwater Creek 1, Phase 2.*** This project is at Stillwater Creek where in the fall of 2023 Northern Water worked with the USFS to install an Aquatic Organism Passage (AOP) culvert where the road had washed out in May 2023 (Stillwater Creek 1, Phase 1 Project). The purpose of this project is to leverage the benefit of the culvert and reduce instream erosion and downstream water quality impacts to Stillwater Creek and the Three Lakes system. By restoring a balanced sediment regime, water quality will improve while also improving aquatic and terrestrial habitat.
>
> Installation of post assisted log structures (PALS) on the downstream side will trap and hold sediment within the stream system and minimize future erosion that could negatively impact the ecological health of the stream and result in sedimentation in Lake Granby, a critical Colorado-Big Thompson Project storage reservoir. By installing PALS, the overall slope of the creek can be reduced, thereby reducing energy during runoff events and providing ecological uplift. The PALs

also offer sediment storage locations within the system which prevents sediment from collecting in downstream waterbodies.

Kauffman Creek. This project is at Kauffman Creek, a tributary to Willow Creek. The purpose of this project is to prevent future instream erosion, increase floodplain connectivity and decrease negative water quality impacts to Kauffman Creek and ultimately to Willow Creek. Left unchecked the stream system is likely to degrade due to the increased hydrology in a post burn scenario, negatively impacting both aquatic and terrestrial habitats. By restoring a balanced sediment regime and allowing the stream to more frequently access the floodplain, water quality will improve while also improving aquatic and terrestrial habitat. Improvements will also protect Gravel Mountain Road which has significant recreational value to the overall forest.

Gravel Mountain Road crosses Kauffman Creek in the project reach, and the valley naturally widens at the upstream end of the proposed project, providing a suitable location to install PALS. PALS will reduce the overall slope of the creek thereby reducing energy during runoff events and provide ecological uplift by allowing increased access to the floodplain, encouraging the stream to braid.

Planning originally included Gravel Mountain Road improvements including upsizing the existing culvert to an 81" x 59" AOP (using standard pipe arch sizing) to reduce the long-term wear on the road due to fewer events overtopping the road. The culvert would also be aligned with the natural stream alignment to decrease risk of culvert failure. In addition, re-grading the road to direct overtopping flows toward downstream stabilized embankments would improve the resiliency of the roadway system. Stabilizing the road using USFS techniques would help improve the long-term stability of the road and the channel as well. These improvements were unable to be completed in 2024 in large part to limited staff capacity at the USFS, specifically their resource staff to review designs and perform necessary permitting work. This work is still a priority and planned for 2025.

Task 1 Expenses and Reimbursements

VENDOR	EXPENSES	
MATRIX DESIGN GROUP	$604,269.30	(84%)
GEI CONSULTANTS	$67,705.35	(10%)
KLIENFELDER	$40,621.57	(6%)
TOTAL	***$712,596.22***	

FUNDING SOURCE	AMOUNT	
USFS	$410,180.75	(57%)
CTGG1 2023*3149	$191,106.94	(27%)
CDPHE	$110,000.00	(15%)
NORTHERN WATER	$1,308.53	(1%)
TOTAL	***$712,596.22***	

Deliverable: Copies of engineering services contracts have been provided to CWCB.

Task 2 – Point/Linear Project Construction

Purpose: This task was to implement and construct point and linear type projects identified in Task 1.

Results: Concrete Express Inc was selected for the contractor for Stillwater Creek 1 Phase 1, completed in 2023, and JHL Contractors was selected for the contractor for Stillwater Creek 1, Phase 2 and Kaufman Creek Projects

Stillwater Creek 1, Phase 1. This project is located where Stillwater Pass Road crosses Stillwater Creek. Stillwater Pass Road is a major through route for Grand County residents and national forest users. The road washout in May 2023 at the Stillwater Creek crossing, leaving the route impassable and damaged or destroyed the existing culverts. To restore access and reduce sedimentation in the creek and Lake Granby caused by the recent debris flow and washout events, Northern Water coordinated with USFS and hired Concrete Express Inc (CEI) and in September CEI installed a new Aquatic Organism Passage (AOP) culvert, as well as adjacent stream improvements.

The stream crossing can now handle post-fire flows and improves water quality and reduces sedimentation in Lake Granby because of the rehabilitated riparian habitat, including allowing aquatic organism passage.

Stillwater Creek 1 Phase 1, Before

Stillwater Creek 1 Phase 1, After

Stillwater Creek 1, Phase 2. JHL Contractors was selected through a competitive bid to implement this project. Matrix Design Group and its subcontractor, Anabranch Solutions, provided construction oversight of the project. Construction occurred in September 2024 and ultimately included a total of thirty-nine (39) PALS that were installed along Stillwater Creek. Thirty-one (31) PALS were installed in-stream within the active channel, eight (8) PALS were installed outside of the active channel along a relic channel. The PALS structures were installed along 2,000-linear feet of Stillwater Creek's stream length. The instream PALS are generally 3-feet tall, 15-feet wide, and 5-feet long. The floodplain PALS are generally 2.5-feet tall, 20-feet wide and 2.5-feet long.

Constructed PALS on Stillwater Creek

Kauffman Creek. JHL Contractors were selected through a competitive bid to implement this project. Matrix Design Group and its subcontractor, Anabranch Solutions, provided construction oversight of the project. Construction occurred in September and October 2024 and included a total of thirty-four (34) PALS that were installed along Kauffman Creek. Twenty-five (25) PALS were installed in-stream within the active channel, nine (9) PALS were installed on the floodplain outside of the active channel. The PALS structures were installed along 1,700-linear feet of Kauffman Creek's stream length. The instream PALS are generally 3-feet tall, 5-feet wide, and 3-feet long. The floodplain PALS are generally 2.5-feet tall, 40-feet wide and 2-feet long.

Installation of PALS on Kauffman Creek

Constructed PALS on Kauffman Creek

Task 2 Expenses and Reimbursements

VENDOR	EXPENSES	
CONCRETE EXPRESS, INC	$928,792.61	(66%)
JHL	$402,792.57	(28%)
MATRIX DESIGN GROUP	$85,312.31	(6%)
TOTAL	***$1,416,897.49***	

FUNDING SOURCE	AMOUNT	
USFS	$931,891.43	(66%)
NFWF	$250,000.00	(18%)
CTGG1 2023*3149	$235,006.06	(16%)
TOTAL	***$1,416,897.49***	

Deliverable: The deliverable for this task is this Final Report.

Conclusions and Discussion

Preliminary GIS-based assessments identified broad restoration needs, but field verification and design refinement concentrated efforts on accessible reaches to align with practical feasibility. Collaboration with the US Forest Service (USFS) played a pivotal role in shaping project goals, as their limited review and permitting capacity necessitated adjustments to the scope and timeline. This refinement prioritized watershed resilience and riparian vegetation enhancement while ensuring projects matched USFS priorities and resource availability.

The implementation phase, which concluded initial physical work on October 3, 2024, was successful due to the expertise of designers who trained contractors in low-tech, process-based restoration techniques. These dynamic stream systems required onsite adaptability to field conditions. Monitoring efforts, beginning after the 2025 runoff season and continuing for three years, will quantify the ecological benefits, such as riparian vegetation growth, and provide critical data for evaluating restoration impacts and guiding future projects.

For projects on federal land, additional time for USFS design review and permitting should be factored into planning to account for limited agency capacity. Despite these challenges, the focused approach ensured high-quality restoration outcomes tailored to accessible areas.

Attachment A

Stillwater Creek 1, Phase 1 Construction Report

Attachment B

Stillwater Creek 1, Phase 2 Construction Report
(Section 404 Initial Monitoring Report)

Attachment C

Kauffman Creek Construction Report
(Section 404 Initial Monitoring Report)