USDA Forest Service
U.S. DEPARTMENT OF AGRICULTURE

CAMERON PEAK FIRE

WATERSHED RESTORATION PROJECT

STATEMENT OF WORK

ARAPAHO AND ROOSEVELT NATIONAL FORESTS AND PAWNEE NATIONAL GRASSLAND

&

GREELEY WATER

OVERVIEW

This document provides a description of the preliminary work to be accomplished through the partnership with the Forest Service and Greeley related to the watershed restoration in the Pouder River Watershed.

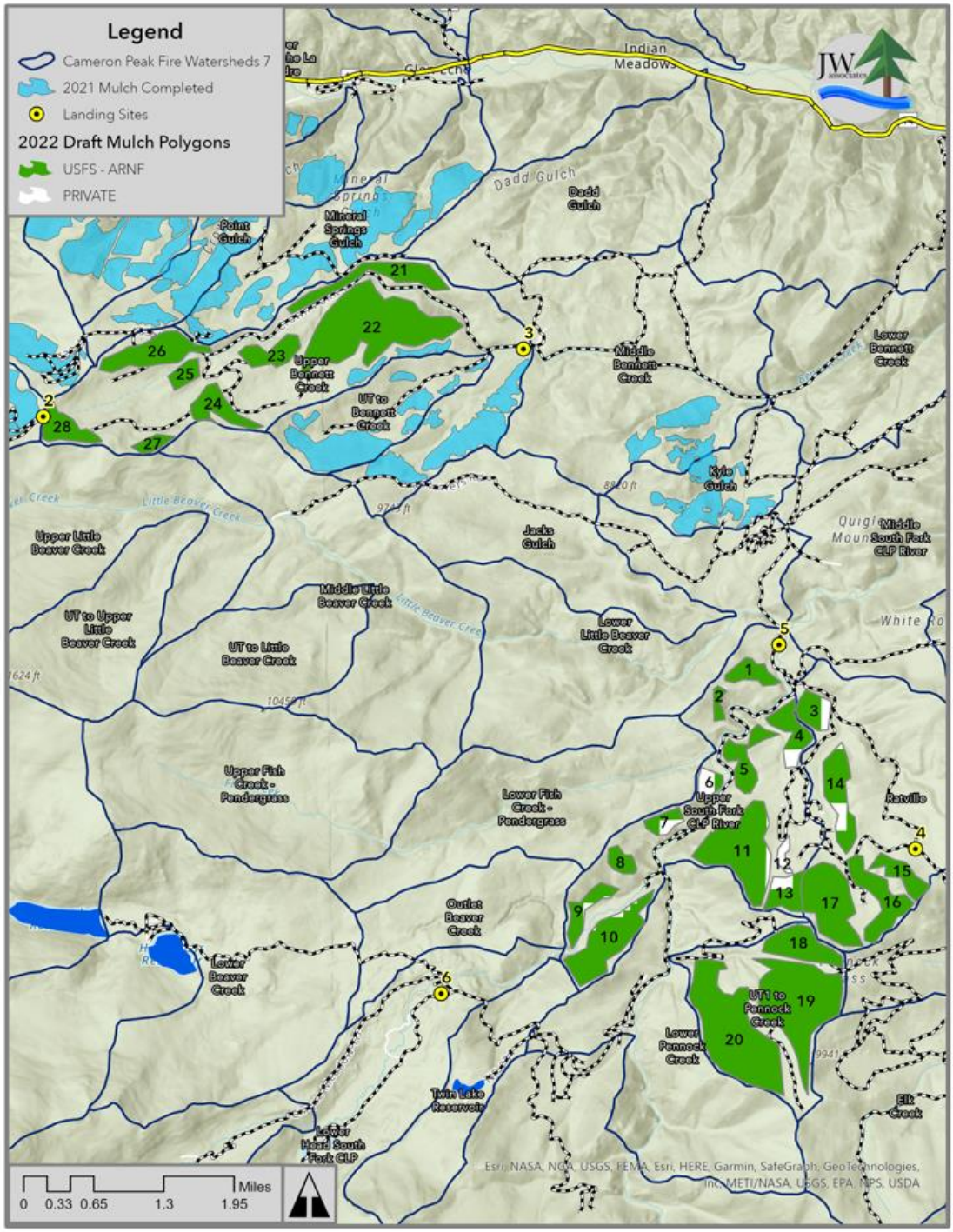
TASK 1: DATA ANALYSIS, DATA COLLECTION, ANALYSIS AND PLANNING: $122,000

Contract expert consultant(s) to complete the following tasks:

1) Analyze existing data, including but not limited to Soil Burn Severity Mapping, US Geologic Survey Debris Flow Study, Colorado Forest Restoration Institute Sediment Loading Study, Colorado Water Conservation Board Hydrologic Analysis, Composite Hazard Ranking, Disaster Survey Report, other USFS data sets, water quality, and precipitation data analysis. Identify data gaps. Conduct supplemental data collection to fill the gaps.
2) Identify watersheds (HUC 14) and stream reaches that are currently or likely to become unstable in post-fire hydrology and contribute sediment transport that would degrade water quality and/or damage infrastructure in Greeley's water supply system (also known as 'zones of concern').
3) Field verify mulch polygons that were identified as high priority and adjust prioritization based on findings. Inspect polygons after mulch has been distributed.
4) Coordinate and cooperatively plan projects that will prevent or mitigate instream and hillslope erosion and sediment transport that would degrade water quality and/or damage infrastructure in Greeley's water supply system to create the most effective and beneficial approach for all parties involved. Collaborate to develop common goals for point mitigation projects, as well as develop clear guidelines for the different mitigation features that are being proposed for future point mitigation projects and complete design of these features. Identify several point mitigation projects to evaluate for approval and start preliminary design for this season.

TASK 2: AERIAL MULCHING OF: APPROXIMATELY 2,939 ACRES =$5,878,000

Of the 18,000 acres identified in need of soil stabilization, approximately 2,900 acres have been identified as the highest priority and are illustrated on the attached map on units 1-28:



IMPLEMENTAITON CRITERIA FOR AERIAL MULCHING

Wood Shreds/Wood Strands for Mulching

Description: Wood shreds serve to disperse rain drop energy and hold burned soil in place on moderate slopes. Wood shreds are created by mechanically grinding logs and limbs, using equipment such as a horizontal grinder and a chipper. See Figures 1 and 2 at end of this document.

Discussion: Research has shown wood shreds to be moderately effective in reducing hillslope erosion in the post-fire environment when applied as prescribed below (Robichaud 2013, 2010). Wood shred mulch also tends to increase soil moisture (Jonas et al. 2019). Aerial mulching is logistically demanding and expensive. See Figure 3.

Guidelines/Protocols:

- Wood shred mulch shall only be applied to slopes in the range of 20 to 60 percent.
- Wood shred mulch shall only be applied to areas that experienced moderate to high soil burn severity based on the most recently published fire soil burn severity map. Areas of lesser burn severity will recover quickly naturally.
- Wood shred mulch shall be applied to a depth of 1-3 inches. Deeper layers of material will hinder natural revegetation, and lighter layers are ineffective at holding soil.
- The most effective woods shreds are ground to create an average piece size of 4 inches.
- Aerial treatments are feasible on polygons greater than ten acres. Hand application may occur on smaller parcels.
- Aerial treatments must be coordinated directly with the Forest Service and will require safety documentation. The Permittee must submit a project map with times and locations of planned flights to Fort Collins Dispatch (FTC), and provide aircraft identification (make, model, color, tail number). Provide a ground contact for dispatch if airspace deconfliction is needed.
- The Permittee must call FTC at 970-295-6800 prior to flight and close out with FTC and the end of flight operations that day.
- The helicopter flight path from staging area to aerial application area must not cross a road open to the public. Landing areas must be approved by the Forest Service.
- Avoid visible raptor nests while dropping mulch loads.
- Avoid aerial application of mulch directly into or immediately adjacent to perennial or intermittent streams
- Staging areas shall be no larger than ten acres and must undergo soil rehabilitation when operations are completed. Allowable staging areas for use in wood shred creation shall be determined on a case-by case basis.
- Staging areas and mastication units shall be at least 150 feet from perennial streams, wetlands or fens.
- Burned trees may be used for the creation of wood shreds **if the product does not leave NFS lands**. Stands of dead trees to be used in the creation of mulch shall be designated solely by the Forest Service.

- Skid trail locations shall be identified by FS personnel to ensure no more than 15 percent detrimental soil disturbance in the activity unit. Dedicated skid trails will be no less than 100 feet apart.
- Skid trails shall be rehabilitated by placing woody debris on the trail.

ACTIONS NOT ALLOWED

Application of agricultural products and seed is not permitted authorized

Agricultural straw is not allowed to be applied as mulch, wattles, or bales for checkdams due to the likelihood of introducing invasive and/or non-native species. Further, straw mulch has a much lower efficacy rate than wood shred mulch and is easily displaced by wind (Robichaud 2021).

REFERENCES

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Hubbert, Ken R.; Wohlgemuth, Pete M.; Beyers, Jan L. 2012. Effects of hydromulch on post-fire erosion and plant recovery in chapparal shrublands of southern California. International Journal of Wildland Fire 21(2):155-167.

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Robichaud, Peter R.; Ashmun, Louise E.; Sims, Bruce D. 2010. Post-fire treatment effectiveness for hill-slope stabilization. Gen. Tech. Rep. RMRS-GTR-240. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 62 p.

Robichaud, Peter R.; Ashmun, Louise E.; Foltz, Randy B.; Showers, Charles G.; Groenier, J. Scott; Kesler, Jennifer; DeLeo, Claire; Moore, Mary. 2013. **Production and aerial application of wood shreds as a post-fire hillslope erosion mitigation treatment.** Gen. Tech. Rep. RMRS-GTR-307. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 31 p.

Stella, K.A., Sieg, C.H., and Fule´ P.Z. 2010. Minimal effectiveness of native and non-native seeding following three high-severity wildfires. *International Journal of Wildland Fire* volume 19, 746–758

FIGURES

Figure 1. Mulch created by wood shredder

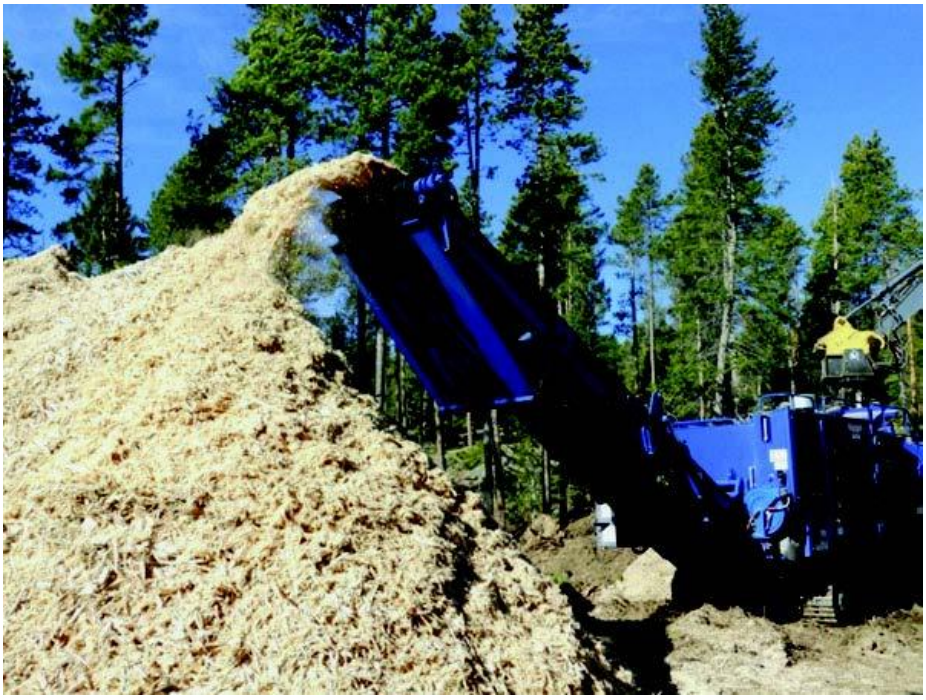

Figure 2. Wood shreds mulch

Figure 3. Mulch being applied by helicopter.

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