COLORADO FOREST
RESTORATION INSTITUTE
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Sand Springs Prescribed Fire: Post-Burn Monitoring Summary

In July 2023 the South Platte Ranger District completed 250 acres of broadcast burning as part of the Sand Springs Prescribed Fire Project. The project was intended to reduce wildfire hazard and increase forest resilience at a heavily used trailhead and recreation area in the Pike National Forest. Additionally, the project is part of a larger landscape spatial strategy in the Buffalo Creek area that aims to leverage adjacent forest management activities and areas burned by previous wildfires to create a large, continuous landscape where forest conditions support lower fire intensity and provide increased opportunities for successful wildfire management. In 2017, the area was thinned to meet objectives that included creating forest and fuel conditions that facilitate the use of prescribed fire (Slack et al. 2021). Broadcast burning in 2021 and 2023 has reintroduced fire to nearly 400 acres of ponderosa and dry mixed conifer forest. This monitoring summary presents data on changes in surface fuel conditions and immediate post-fire effects for units burned in 2023. The Sand Springs prescribed fire project builds off the Buffalo Creek Fire (1996) and Deckers Road in Jefferson County, Colorado (Figure 1).

Prescribed Fire Goals & Objectives: 1) Reduce wildfire risk to human life, property, and water resources, 2) promote forest diversity and wildlife habitat, 3) protect recreational resources.

The Colorado Forest Restoration Institute (CFRI) partners with the Pike National Forest and Denver Water to collect long-term monitoring data that provides information on the outcomes of successive forest management activities in the Buffalo Creek area. Field data was collected pre- and post-thinning (2017, 2018), and pre- and post-prescribed fire (2022, 2023; Figure 2) to monitor changes in forest overstory, tree regeneration, surface fuels, and understory plant communities. In the future, monitoring crews will collect additional 1-, 3-, and 5-years post-burn data.

Figure 2. Photo time series of a CFRI monitoring plot showing conditions in 2017 prior to forest thinning (A), reduced tree density and increases in surface fuels after thinning (B), vegetation recovery in the understory before prescribed fire (C), and crown scorch in the midstory and burned surface fuels after prescribed fire (D).

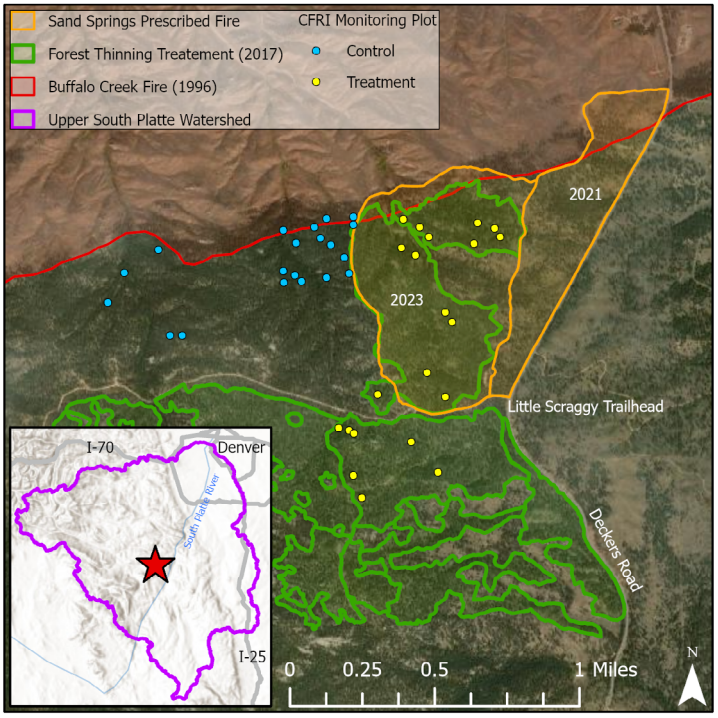

Figure 1. Map of Sand Springs prescribed fire project area, which is located in the Upper South Platte watershed to the southwest of Denver, Colorado.

Figure 3. Photo of the Sand Springs prescribed fire actively burning in July of 2023.

Methods: Field data was collected at 13 plots that were established within three of the five Sand Springs burn units. Fire effects on the forest floor were classified in 12 subplots within a 1/10th acre area at each plot (156 total).

Highlights: The Sand Springs prescribed fire successfully met project goals, and reduced wildfire hazard to resources further than post-thinning conditions. After the burn, surface fuel loading was reduced to pre-thinning levels for fine woody fuels and to the lowest level of any phase for litter and duff (Figure 4). All 13 monitoring plots showed signs of fire, and there was a wide range of area burned creating variability in post-burn understory conditions (Figure 5). The percent crown scorch was higher in saplings, which may indicate higher mortality, and that firing operations successfully targeted pockets of younger trees (Table 1). Forty seven percent of the burn severity subplots were unvegetated, and over 73% of vegetation was unburned (Figure 6A). In general, a higher burn severity was observed in non-vegetation surface fuels (i.e. substrate burn severity; Figure 6B) that indicates the prescribed fire burned more effectively when live vegetation was not present.

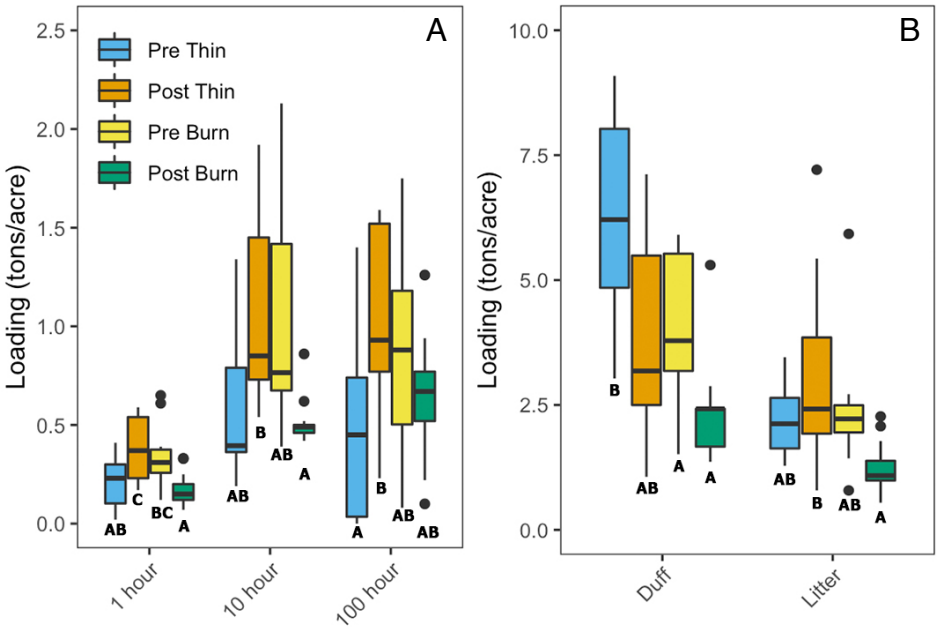

Figure 4. Surface fuel loading for fine woody fuels (i.e. 1-,10-,100-hour fuels, A), and litter and duff (B). The letters below the boxplots indicate statistical differences in fuel loading between phases for each type of surface fuel. When two phases include the same letter there is no difference.

Table 1. Percent of crown volume scorched and the max stem char height (feet). The standard deviation is in parentheses.

	Crown Volume Scorch (%)	Stem Char Height (ft)
Saplings	31 (41)	1 (2)
Trees	13 (17)	6 (9)

*Saplings are < 5 inches DBH and ≤ 4.5 feet tall

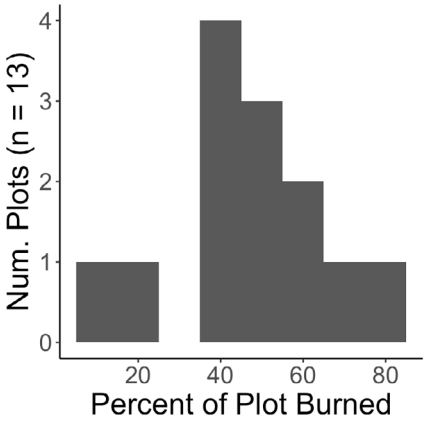

Figure 5. Distribution of area burned. Area burned ranged from 10-80% across all plots, with 7 plots recording greater than 50% area burned.

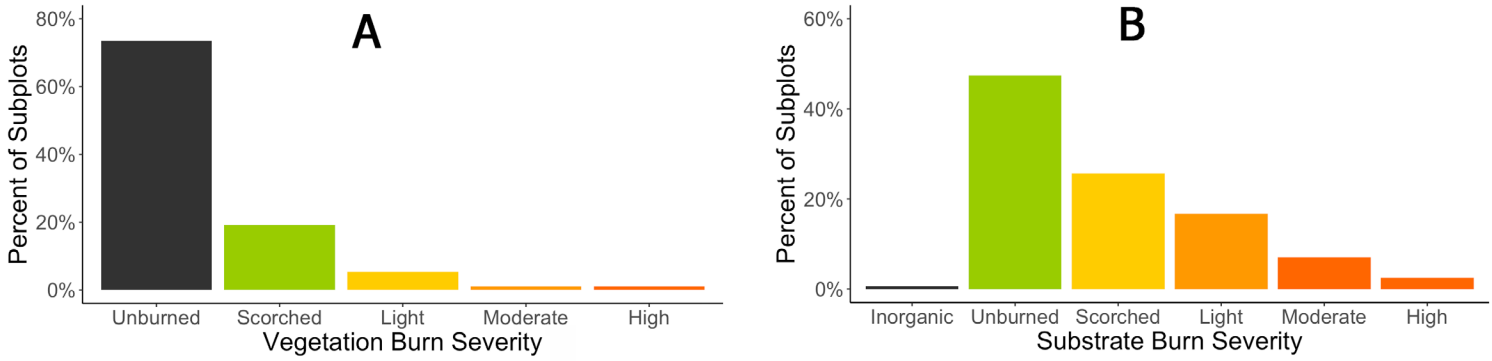

Figure 6. Burn severity for vegetation (A) and nonvegetative substrates (e.g. litter, fine woody fuels; B). See the USDI National Park Service Fire Monitoring Handbook for detailed descriptions of each burn severity class.

Authors: Andrew Slack[1], Kevin Barrett[1], Kat Morici[1], Brett Wolk[1], and Hannah Brown[1]

1. Colorado Forest Restoration Institute, Department of Forest and Rangeland Stewardship, Colorado State University, Fort Collins, CO

COLORADO FOREST RESTORATION INSTITUTE
COLORADO STATE UNIVERSITY

Contact: andrew.w.slack@colostate.edu cfri.colostate.edu • November 2023 • CFRI-2318

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Literature Cited: Slack, AW, Wolk, BH, Stevens-Rumann, CS, Brown, HLC, Barrett, KJ, Mueller, SE, Hunter, TM, Morici, KE, & Warnick, KJ (2021). Upper South Platte Watershed Monitoring Report: Learning from forest restoration projects to advance landscape resilience and collaboration. CFRI 2103. https://cfri.colostate.edu/wp-content/uploads/sites/22/2021/04/Upper-South-Platte-Monitoring-Report-2021_Web.pdf