



Silver Trident Prescribed Fire: 1-Year Post-Burn Addendum

Summary

In September 2023, the Pikes Peak Ranger District conducted over 2,000 acres of broadcast burning as part of the Ensign Gulch and Trident Prescribed Fire Project. The Colorado Forest Restoration Institute (CFRI) monitored 660 acres and reported on initial [post-mechanical thinning results](#) in 2023 and [immediate post prescribed fire results](#) in 2024. Results from immediate post-prescribed fire monitoring showed the burn met goals to reduce fuel loadings, though fire was introduced to only 34% of the monitored burn area, below the target of 50%. Results from 2023 monitoring after mechanical thinning showed a large component of Douglas-fir in the seedling community, and an increase in crown base height (CBH), although neither of these metrics were statistically significant. Additional specific objectives of the prescribed fire included reducing conifer regeneration and increasing CBH of mature trees by at least 10% beyond post-mechanical conditions. To account for post-fire mortality, these metrics were measured 1 year following the prescribed burn, and results are presented in this addendum.

Results

Average tree CBH increased as a result of the burn by 15% from 12.4 to 14.3 feet across the site, though this result is marginally significant ($p=0.10$). On dry aspects, CBH increased 22% from 12.5 to 15.4 feet. This increase is not statistically significant, though it does represent a statistically significant change from the pre-thinning CBH of 10.6 ($p=0.04$). CBH did not change on wet aspects (Table 1).

Seedlings per acre—especially aspen—increased across the site after mechanical thinning and prescribed fire on both wet and dry aspects, though none of the increases were statistically significant. Relative to pre-burn conditions, seedling densities increased 89% on dry aspects, 32% on wet aspects, and 75% site-wide (Table 1). Figure 2 indicates that increases in seedling density are attributable to aspen resprouting; aspen density generally increased across all size classes from pre-thinning to post-burn conditions across wet and dry aspects, and all aspects combined. Most notable are the large increases in taller aspen regeneration on wet aspects (> 18.1 inches tall). Douglas-fir density generally decreased or remained the same across size classes. Regeneration from other species was negligible. Table 2 shows a decline in Douglas-fir on all aspects, while aspen increased dramatically across the site from pre-thinning to post-burn.



Figure 1. Immediate post-burn (A) and one-year post-burn (B) photos highlighting the aspen response to the prescribed burn.

Table 1. Seedling density and CBH (mean ± standard deviation). Superscripts indicate statistically distinct groupings at the $\alpha=0.05$ level as applicable

Site Conditions	Phase	Seedlings per Acre	Crown Base Height (ft)*
Dry	Pre Thin	809 ± 1089	10.6 ± 2.9 ¹
	Post Thin	1021 ± 1022	12.5 ± 4.7 ^{1,2}
	Post Burn	1929 ± 1593	15.4 ± 4.8 ²
Wet	Pre Thin	4992 ± 5518	11.5 ± 4.4
	Post Thin	5383 ± 5082	11.8 ± 5.0
	Post Burn	7127 ± 6387	11.4 ± 3.1
Combined	Pre Thin	1924 ± 3322	10.8 ± 3.2
	Post Thin	2184 ± 3204	12.4 ± 4.7
	Post Burn	3818 ± 4542	14.3 ± 4.7

* Small discrepancies in crown base height relative to the previous report are attributable to the inclusion of additional trees that were measured by field crews during the most recent survey, which were not captured in the earlier dataset.

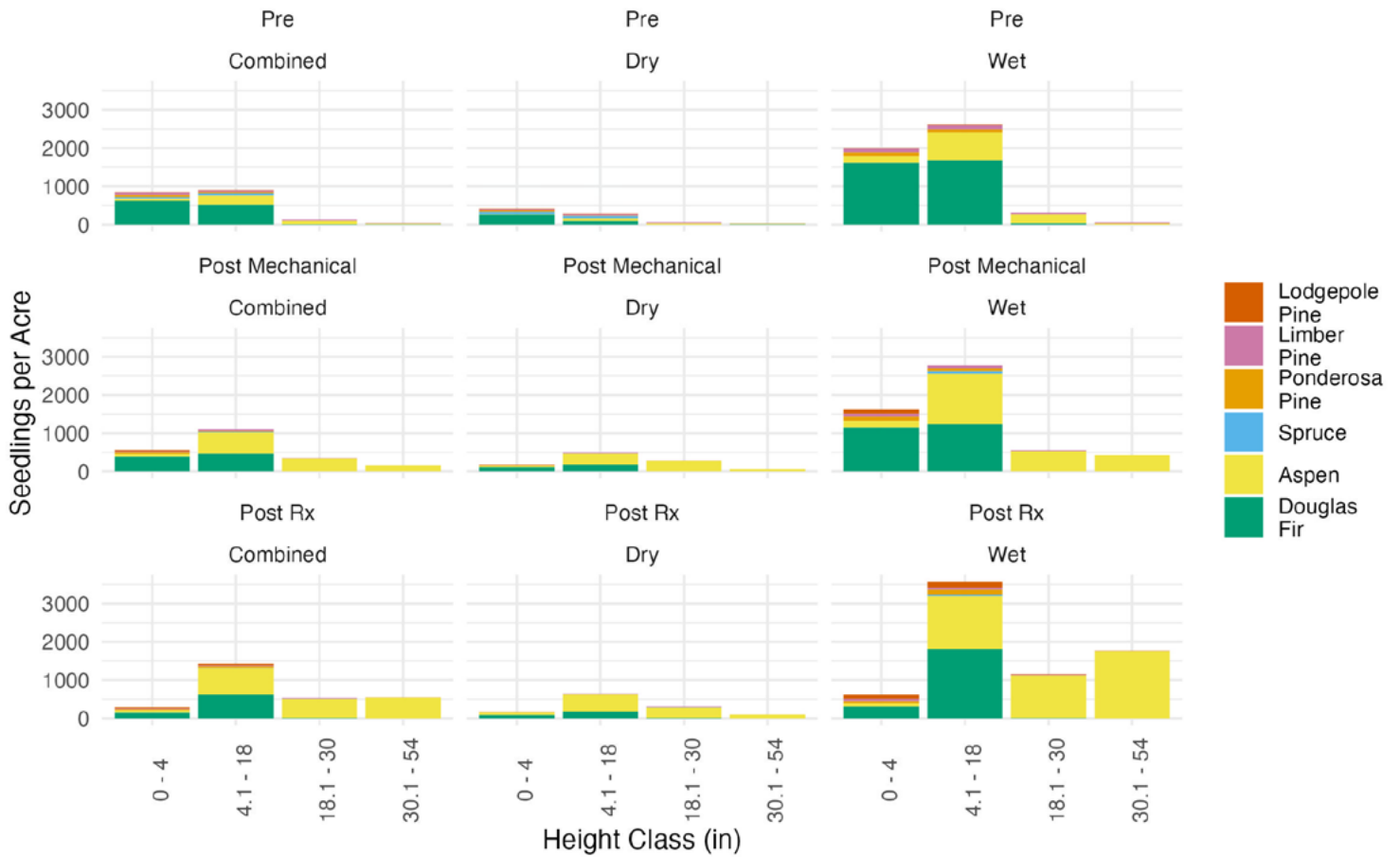


Figure 2. Seedling Density by Size Classes

Table 2. Douglas-fir and aspen seedling density (mean ± standard deviation).

Site Conditions	Phase	Douglas-fir per acre	Aspen per acre
Dry	Pre Thin	361 ± 625	124 ± 168
	Post Thin	293 ± 649	648 ± 847
	Post Burn	279 ± 629	872 ± 1306
Wet	Pre Thin	3325 ± 4738	1158 ± 1211
	Post Thin	2383 ± 3265	2450 ± 2577
	Post Burn	2133 ± 3079	4342 ± 4230
Combined	Pre Thin	1151 ± 2632	400 ± 747
	Post Thin	851 ± 1870	1129 ± 1617
	Post Burn	773 ± 1741	2752 ± 1798

Conclusions

One-year post-burn monitoring indicates that the prescribed fire was successful at meeting most project objectives. CBH was not affected by the burn on wet aspects, indicating lower fire intensity on more mesic aspects. However, CBH increased 22% on dry aspects and 15% site-wide, so the burn objective of increasing CBH by at least 10% was met. Although regeneration density increased after prescribed fire, much of this is attributable to increases in aspen regeneration in larger size classes. Conifer regeneration—primarily Douglas-fir—should continue to be monitored as changes in density were marginal after the burn, but results indicate management is resulting in a release of aspen at the site.



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