

Background

Collaborative forest management that includes monitoring and adaptive management processes can inform and enhance local, on the ground management, while also providing lessons for management in similar forest types. In Colorado, forest restoration treatments, monitoring, and adaptive management have occurred since 2010 as part of the Collaborative Forest Landscape Restoration Program on the Uncompahgre Plateau National Forest in a dry mixed conifer forest, and have included mechanical and prescribed (Rx) burning treatments.



Pre- (left) and post- (right) photos of a mechanical treatment area on the Uncompahgre National Forest. Prior to treatment, this stand had high densities of fire-intolerant species, such as Englemann spruce, Douglas fir, and subalpine fir. Following treatment, densities were dramatically reduced, and fire-tolerant species such as ponderosa pine and aspen were retained, with some retention of Douglas fir.

Monitoring Questions

- 1) Have treatments reduced fire-intolerant species (spruce & fir) while retaining fire-tolerant species (ponderosa pine & aspen)?
- 2) How have treatments influenced surface fuels and potential surface and crown fire risk?
- 3) What were the impact of treatments on regenerating trees?

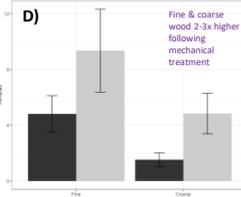
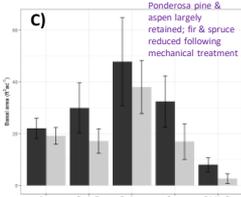
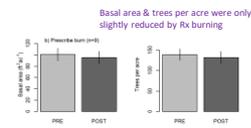
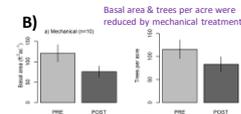
Methods and Results

Methods:

Data is collected by high school interns from Montrose High School (Fig. A) in Rapid Assessment plots and supplemental regeneration plots. Results reflect one year post-treatment or prescribed burning monitoring.

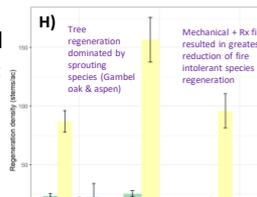
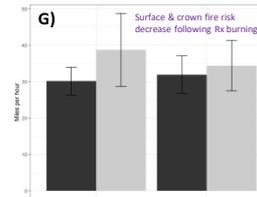
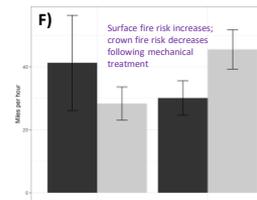


Forestry Internship Program crew 2018, based out of Montrose High School, Montrose, CO, USA.



Results:

- 1) Mechanical and Rx burning treatments reduced tree basal area and trees per acre (Fig. B)
- 2) Mechanical treatments reduced spruce and fir species while retaining ponderosa pine and aspen (Fig. C)
- 3) Fine and coarse surface fuels doubled during mechanical treatments (Fig. D), but were reduced following Rx burning (Fig. E);
- 4) Wind speeds necessary to carry a surface fire decreased while wind speeds necessary to carry a crown fire risk were reduced following mechanical treatments (Fig. F);
- 5) Wind speeds necessary to carry surface or crown fire were increased slightly following Rx burning (Fig. G);
- 6) Tree regeneration is dominated by Gambel oak; fire tolerant species are regenerating, but in similar numbers to fire intolerant species. Mechanical + Rx burn areas had the smallest densities of spruce and fir regeneration (Fig. H).



Discussion

- Mechanical and Rx burning treatments reduced tree densities while retaining fire tolerant species (ponderosa pine & aspen) in the overstory (Fig. B & C)
- Surface fuels increased following mechanical treatments (Fig. D), but continued Rx burning can reduce fuel loadings (Fig. E);
- Surface fire risk increased while crown fire risk was reduced following mechanical treatments (Fig. F);
- Surface fire and crown fire risk were reduced slightly following Rx burning (Fig. G);
- Mechanical and Rx burn treatments reduced fire-intolerant tree species regeneration more than in just mechanically treated areas (Fig. H).

Next steps

- Mechanical treatment and Rx burning will continue on the Plateau until 2021. Monitoring will continue annually until 2024 to examine long-term impacts of treatments, and will include 5- and 10-year post-treatment impacts.