SOUTHERN Fire Exchange

Association for Fire Ecology

2017 FIRE CONGRESS

Research Highlight

Effects of forest restoration treatments and wildfires on tree spatial patterns in the Colorado Front Range

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Main questions or issues that you addressed

- Large-scale initiatives to increase scale of restoration treatments have been enacted in response to large severe wildfires in the western U.S.
- Several economic, technological, social, challenges constrain the extent to which mechanical restoration treatments can be applied.
- Recent calls for new approaches to fire management advocate for increased "managed fire use" arguing that moderate-severity wildfires may achieve positive restoration outcomes
- In this study, we document how restoration treatments alter fine-scale forest spatial patterns and compare these outcomes to those from low- to moderate severity portions of wildfires.

Location and ecosystem investigated

- The study was completed in ponderosa pine dominated forests of the Colorado Front Range.
- We examined changes in forest spatial patterns as a result of ten restoration treatments completed as part of the Front Range Collaborative Forest Landscape Restoration Program.
- We compared outcomes of mechanical restoration treatments to low- and moderate-severity portions of two Front Range wildfires

Key Findings of Your Research

- Both mechanical restoration treatments and low- and moderate severity portions of wildfires enhance the spatial mosaic present in forests by increasing coverage, size, and variability of gaps
- Low- and moderate severity portions of wildfires resulted in lower canopy cover and higher gap cover than the majority of restoration treatments.

How Did You Answer the Main Questions or Inform the Issues?

- Low- and moderate-severity portions of wildfires were identified as those containing no high severity gaps > 120 ha, as determined using MTBS fire severity data.

This research was presented at the 7th International Fire Ecology and Management Congress, which was held in Orlando, Florida, November 28-December 2, 2017 and was hosted by the Association for Fire Ecology, in cooperation with the Southern Fire Exchange.

- In order to answer these questions, we used supervised classification to identify canopy and openings in pre- and post-disturbance satellite images in treated areas and in those experiencing low- to moderate-severity wildfire.
- We used a patch detection algorithm to identify “large gaps”, areas with < 10% canopy cover over 0.045 ha (12 m2 radius).
- We compared changes in gap metrics such as canopy cover, gap area, shape, arrangement, and core area.

How Might/Will It Influence Fire Management Decisions or Practices?

- Fire mitigation and restoration treatments in ponderosa pine forests often seek to mimic complex spatial patterns created by disturbance from fire.
- Information on the spatial patterns resulting from mechanical treatments and how these compare to natural disturbances can help inform silvicultural prescriptions in these forests.

Who Is the Main End-user of Your Research?

- This research is useful to forest managers, silviculturalists, and forest and landscape ecologists seeking to understand the outcome of restoration treatments and natural disturbances.
- Better understanding of the spatial patterns resulting from natural disturbances and management actions can inform management decisions on restoring ecological function in Front Range ponderosa pine forests.

Congress Session

Restoration & Resiliency