

Variation of Fire Severity and Its Effects on Post-Fire Forest Composition in Central-Southern Oregon



Devin Rodriguez, Maureen Kennedy

INTRODUCTION

- > Fire severity: a measure of the effect of fire on vegetation and soils through the loss of organic matter.
- > Current forest structure supports extreme wildfire behavior, resulting in large patches of high severity wildfire.
- > The current understanding of effects of high severity fire on forest composition and fuels needs to be improved.
- > Wildfire today costs the U.S. millions of dollars in suppression and remediation calling for a change to forest landscape management.

The goal of this project is to create better understanding as to how mixed-conifer subalpine forest composition is affected by different severities of wildfire, and consequently allow fire ecologists to know when a forest may be at high risk for severe and catastrophic wildfires to occur and to mitigate those risks accordingly.

RESEARCH QUESTIONS:

- > How does post-fire regrowth change based on fire severity?
- > How does fuel loading across forests change with fire severity?
- > How does post-fire regrowth vary from pre-fire species composition trends?

METHODS

- > Study conducted across the Bootleg-Fire Complex.
- > Field data collected across randomly chosen GIS plots at severe, moderate, minor, and no-burn severities.
- > Analysis conducted on dead woody fuels (post-fire), tree composition (pre/post-fire), and seedling composition (post-fire).
- > From this data pre- and post-fire forest compositions were compared.
- > ANOVA statistical analysis of variance across fuel loadings and severity was conducted.

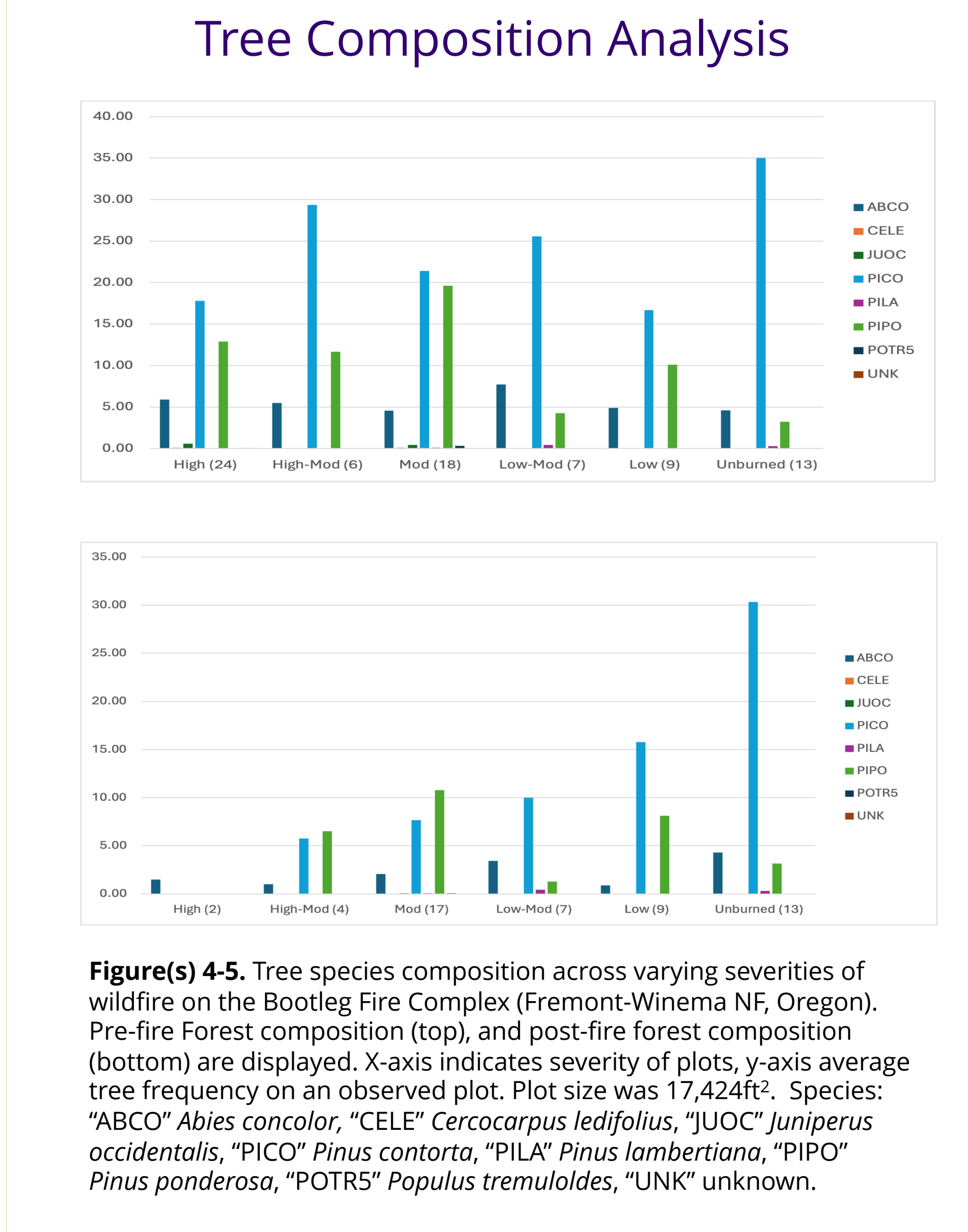
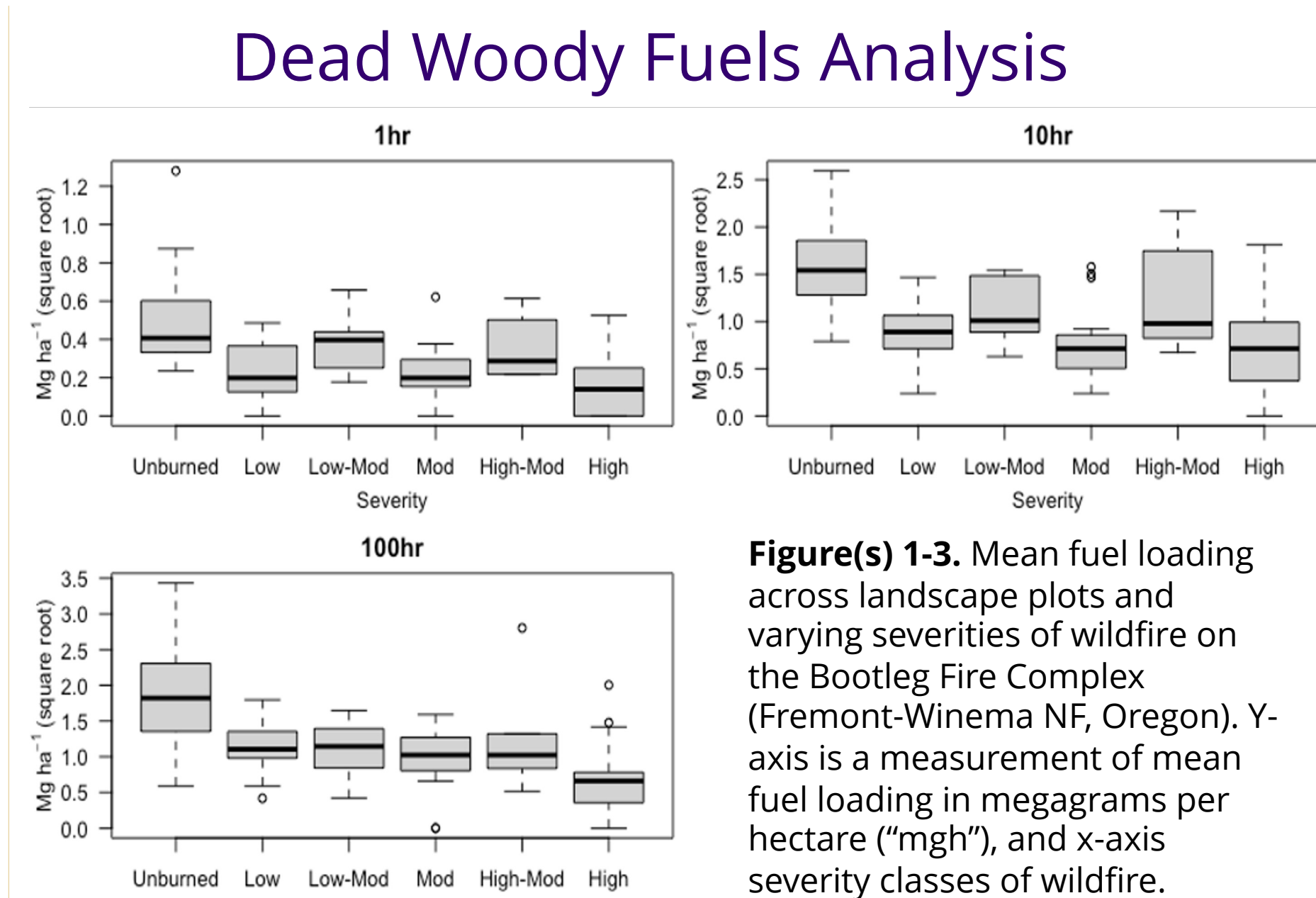


Figure 6. Picture of a randomly chosen GIS high-severity plot on the Bootleg Fire Complex (Oregon). The Bootleg fire burned from July 6th, 2021, to August 5th, 2021, and consumed 413,000 acres and stands as the third largest blaze in Oregon state history. (Picture credit, field technician Devin Rodriguez)

RESULTS

- > Post-fire fuel loading significantly decreased with increasing fire severity.
- > Pinus contorta, Pinus ponderosa, and Abies concolor dominated pre-fire composition (Figure 5).
- > Low to no-severity fire had little to no effect on forest tree species composition.
- > Density of all species decreased in higher severity wildfire, with Ponderosa pine increasing in dominance relative to Pinus contorta.
- > Seedling abundance became increasingly evenly distributed across species as fire intensity increased.
- > Abies concolor saw an increasing trend in seedling abundance as fire intensity increased.
- > Pinus contorta had a continued trend as the predominant seedling species in both pre- and post-fire plots across all severities

MAIN TAKEAWAYS

- > Under none, low, and low-moderate severity fires, forest composition showed continued trends as pre-fire.
- > Moderate, moderate-high, and high severity fires showed shifts in forest compositions.
- > Avoiding high severity fires should continue to be pursued by fire managers as to prevent severe landscape alterations.

FUTURE ENDEVEARS

- > Expand upon previous research by resurveying landscape at future time intervals.
- > Simulate forest growth through computer models to predict the landscape compositions
- > Simulate fire at set time intervals in forest regrowth from initial fire to analyze what fire does as a forest ages.
- > Incorporate understandings of disease factors in how they affect the forest composition overtime.

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REFERENCES

