

Quantifying fuel management in Northern California industrial forests



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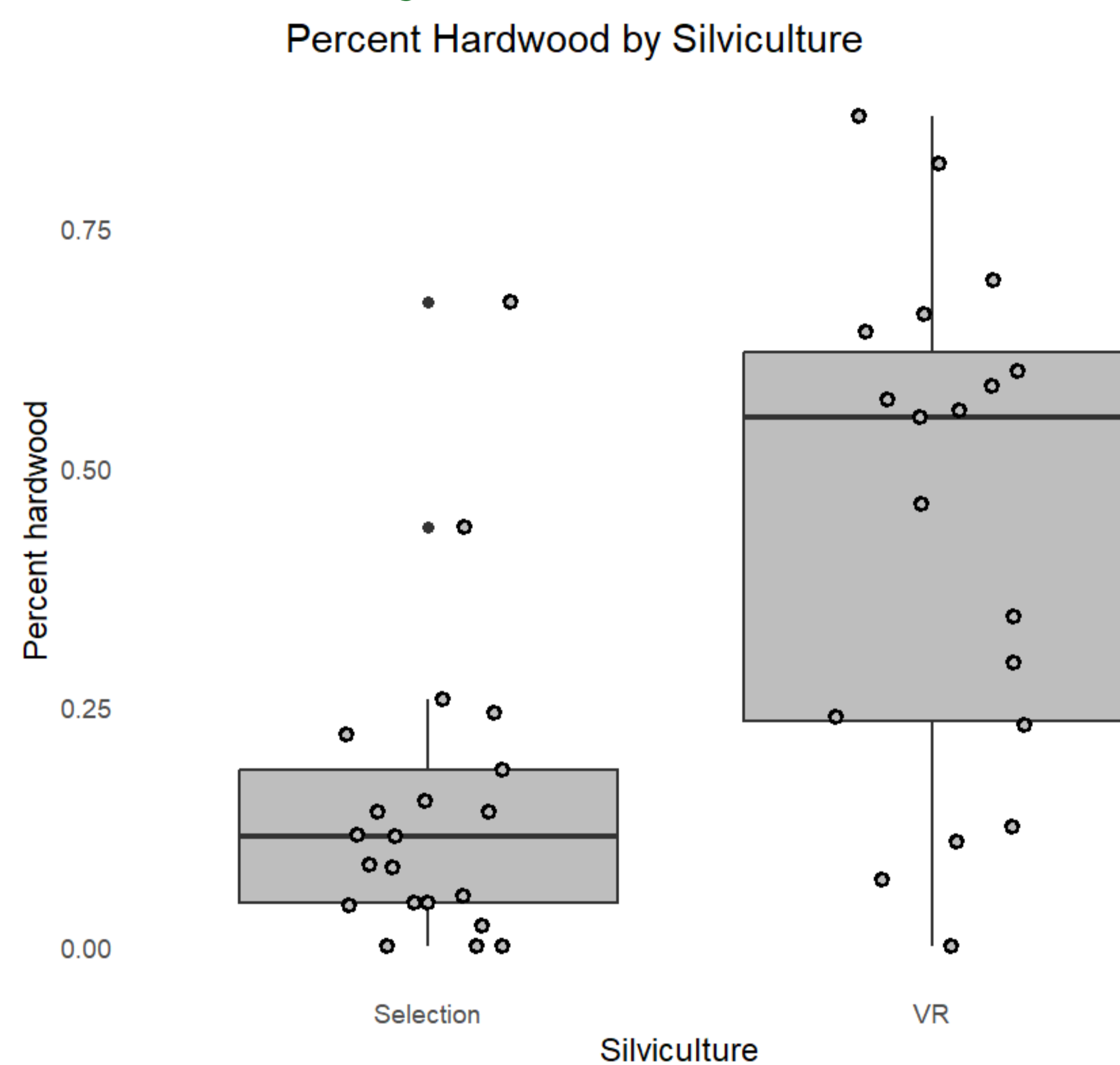
Background

- Large, severe wildfires impact timber companies by reducing wood supply, damaging infrastructure, and decreasing timberland value¹
- Residual slash from harvesting operations heightens wildfire hazard by increasing surface fuels²
- Fuel management aims to reduce wildfire hazard and losses³
- Effectiveness of current fuel management practices is unclear

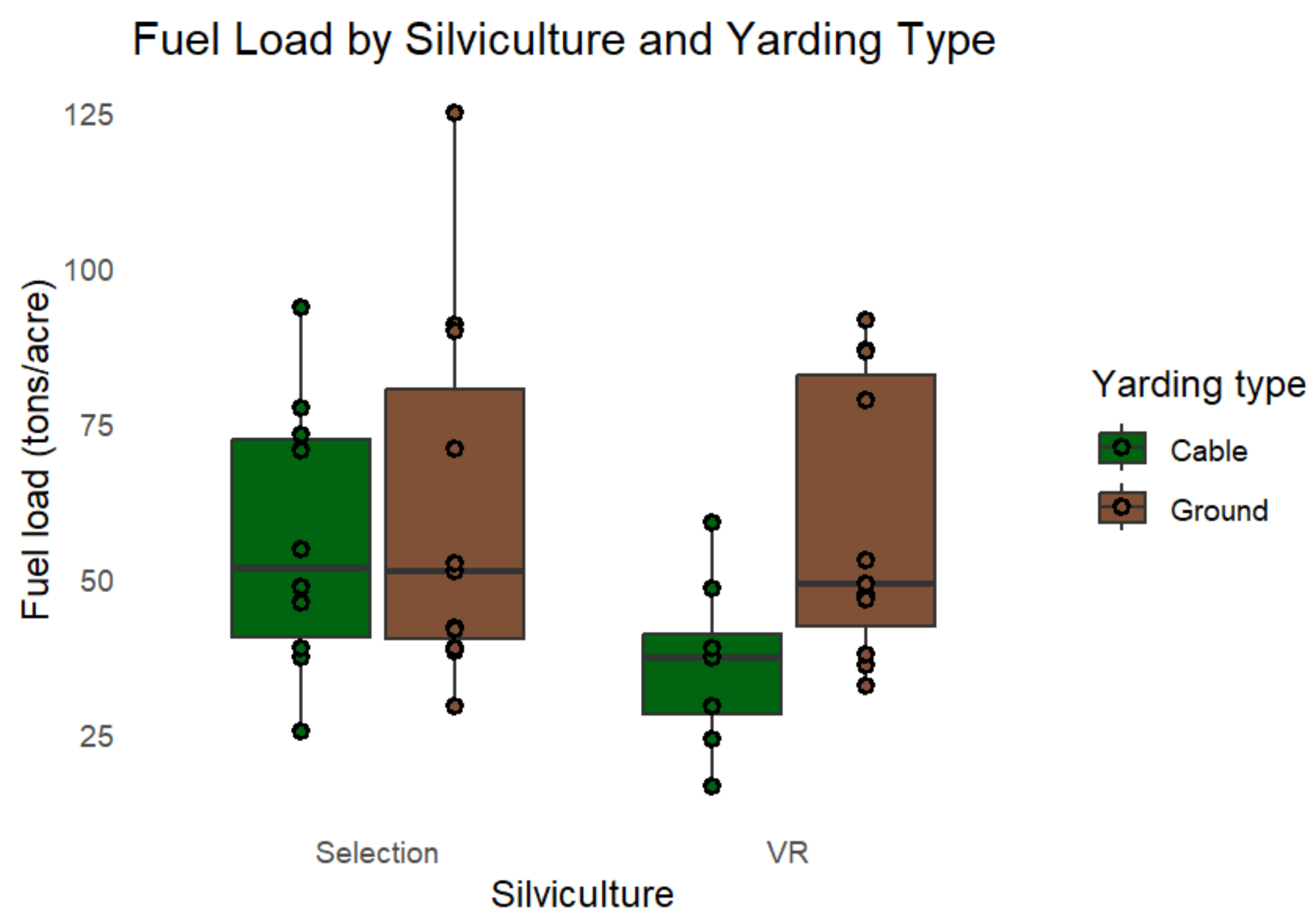
Research Questions

1. How does fuel load differ between common silvicultural regimes pre- and post-harvest?
2. Are fuel management practices effective at reducing wildfire hazard while also supporting site regeneration and productivity?

Preliminary Data



- Species composition differs between selection and variable retention (VR) sites based on mean percentage of hardwood trees



- Mean fuel load differs between selection and VR silviculture type in cable sites, but not in ground sites
- Difference in mean fuel load between cable and ground yarding in variable retention sites, but no difference in selection sites

Methods

- Study area is in moist redwood and mixed conifer forests in Northern California
- Pre-harvest data collected from sites with various harvesting systems and fuel treatments
 - Selection: harvesting individual trees or clumps to retain forest structure and promote stand complexity
 - Variable retention: retains structural elements and aims to restore conifers in hardwood-dominated stands
- Post-treatment data will be collected at the same sites and compared to pre-harvest data to assess impacts of silvicultural treatments on fuel load and forest growth

Conclusion

- As expected, tree species composition differs between silviculture types
 - Variable retention sites had a higher percentage of hardwood species
- Fuel load pre-harvest is different particularly on flatter ground and in variable retention site types
- After plot remeasurement, the differences between fuel load pre- and post-harvest across different levels of fuel treatments will be compared to quantify fuel treatment effectiveness

References

1. Wang, Y. & Lewis, D. J. Wildfires and climate change have lowered the economic value of western U.S. forests by altering risk expectations. *J. Environ. Econ. Manag.* 123, 102894 (2024).
2. Jacobson, K. W. & Dicus, C. Effects of Lop and Scatter Slash Treatment on Potential Fire Behavior and Soil Erosion Following a Selection Harvest in a Coast Redwood Forest.
3. Urza, A. K., Hanberry, B. B. & Jain, T. B. Landscape-scale fuel treatment effectiveness: lessons learned from wildland fire case studies in forests of the western United States and Great Lakes region. *Fire Ecol.* 19, 1 (2023).

Acknowledgments

This project is funded by CAL FIRE. I thank Mendocino and Humboldt Redwood Companies for providing field sites and logistical support, especially Jarran Tindle, Cody Easton, and Chris Hayter for their valuable insight into forest operations. I thank Josh Dulin for his assistance in fieldwork.