

TREE RESPONSES TO WILDFIRE AND DROUGHT

A McIntire-Stennis supported project
(2022-2025)



Wildfires and drought are increasingly common natural disturbances that can negatively impact forests in the western US. Following decades of fire suppression, many western landscapes have high levels of fuel accumulation. The combination of this legacy effect with contemporary increases in natural fire ignitions, fire season duration, temperature, and aridity has notably increased wildfire severity in many forest types. Due to a large fire deficit, limited fire-fighting resources, and logistical constraints, many forest managers are adopting pyrosilviculture - the use of wildfire as a tool to help reduce fuels and modify forests. In concept, these wildfire treatments should reduce competition for residual trees and therefore reduce drought vulnerability. However, field-based data are needed to confirm this relationship.

Set in the diverse conifer region of northern California, our study used dendrochronological analyses to quantify drought resistance and resilience in sugar, Jeffrey, and ponderosa pine trees that had and had not experienced moderate-severity wildfire in the past 50 years. Our preliminary findings indicate that indeed, exposure to wildfire increases forest drought resistance and resilience.



About McIntire-Stennis

The McIntire-Stennis program, a unique federal-state partnership, cultivates and delivers forestry and natural resource innovations for a better future. By advancing research and education that increases the understanding of emerging challenges and fosters the development of relevant solutions, the McIntire-Stennis program has ensured healthy resilient forests and communities and an exceptional natural resources workforce since 1962.



COLLABORATION



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Research permits were secured from six National Forests in northern California: Klamath, Lassen, Plumas, Shasta-Trinity, Six Rivers, and Tahoe.

Undergraduate and graduate students gained experience and training in field and lab work.

IMPACT

Findings will provide needed field data to improve our understanding about the influences of wildfire on forest drought responses. Knowledge gained from this work will provide a useful evaluation of the potential for wildfires to serve as an effective management tool to decrease forest drought vulnerability.



200

Trees were cored and measured for growth trends.



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Master of Science student used these data for their thesis research.



29,200

Annual growth rings were measured and analyzed to quantify drought responses.