Managing Southwestern Forests in a Changing Climate

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Fire used to maintain the forest

1890s

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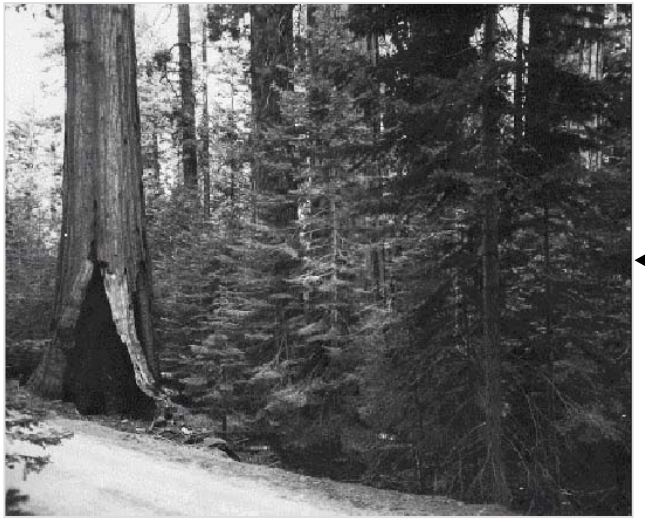
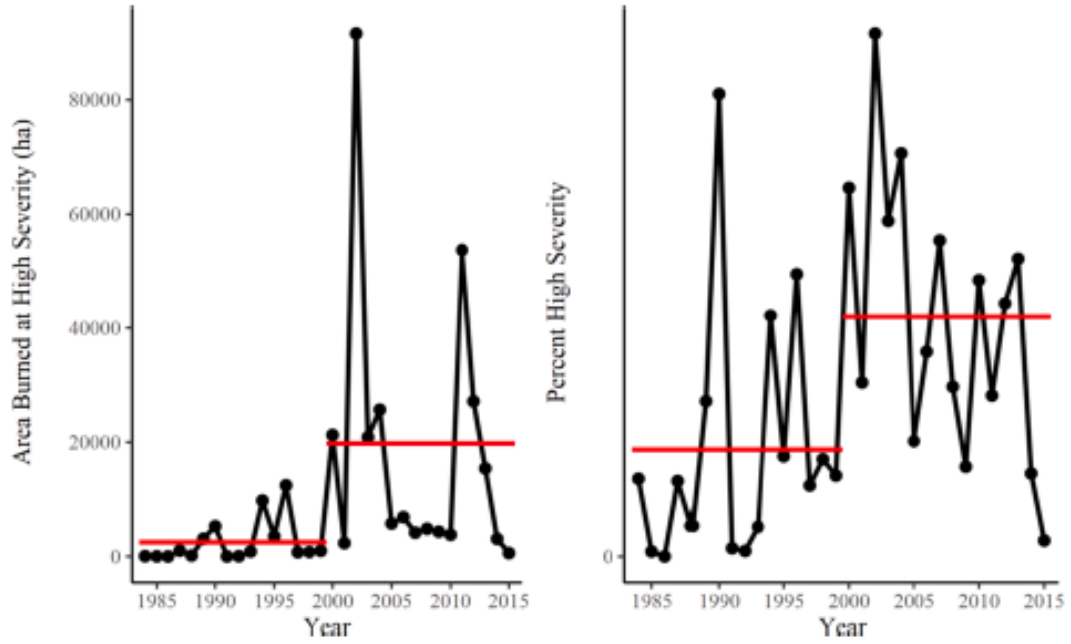


1970s

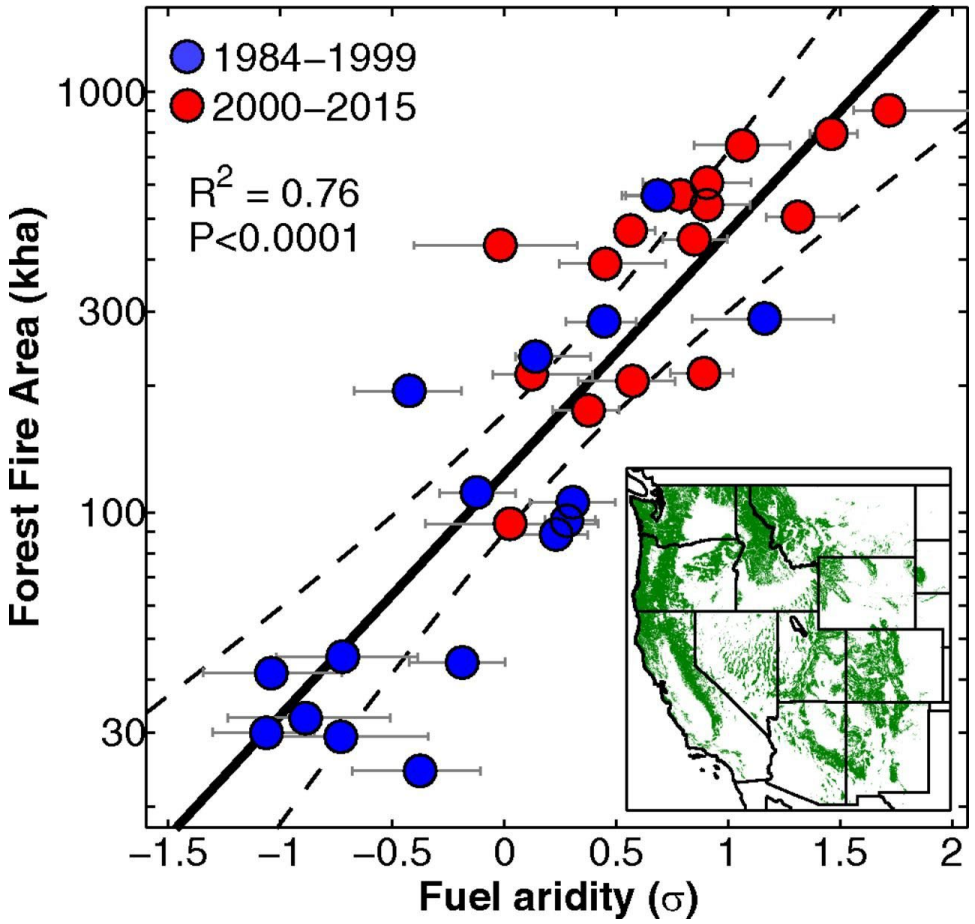
Fire used to maintain the forest

Severe Weather + Fire-Exclusion = More High-Severity Fire



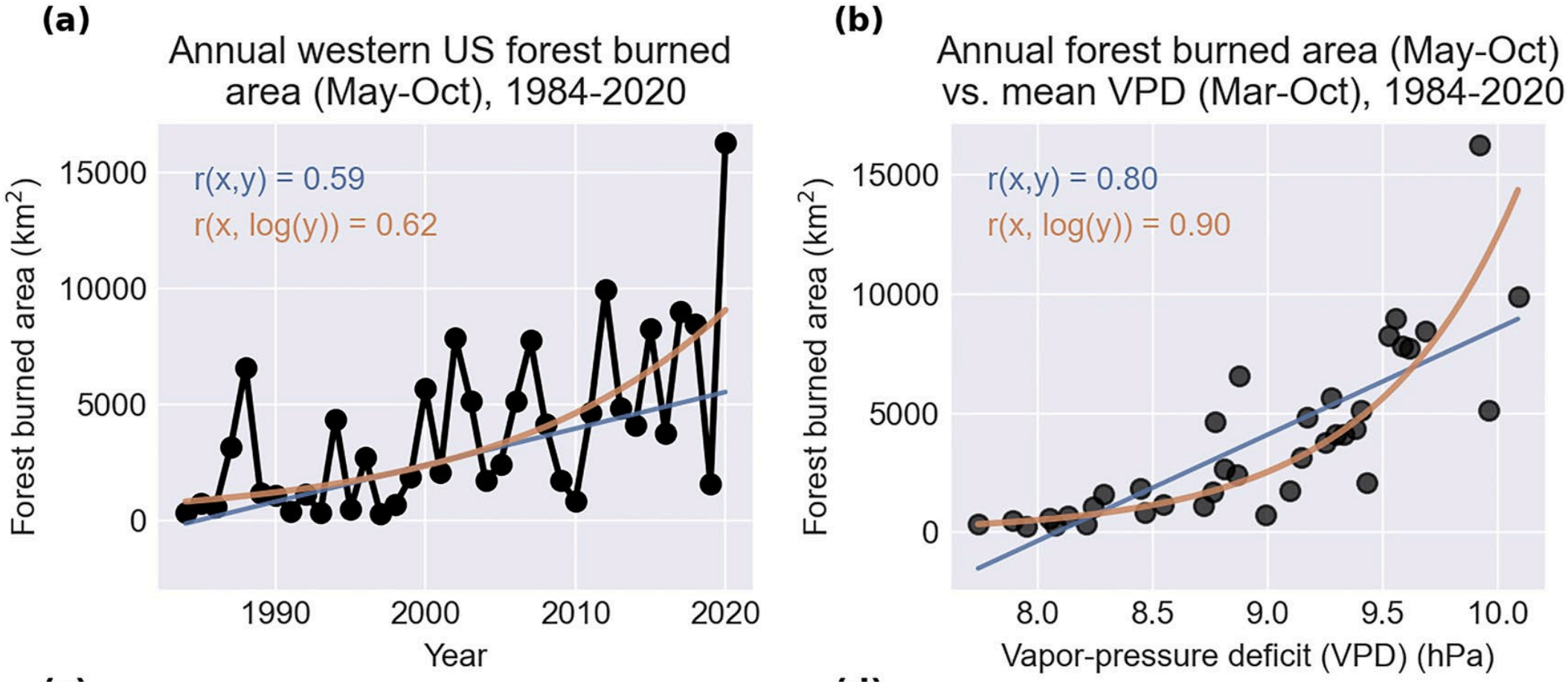
Mueller et al. (2020)

CC Fuel dryness explains ½ area burned



Abatzoglou and Williams (2016)

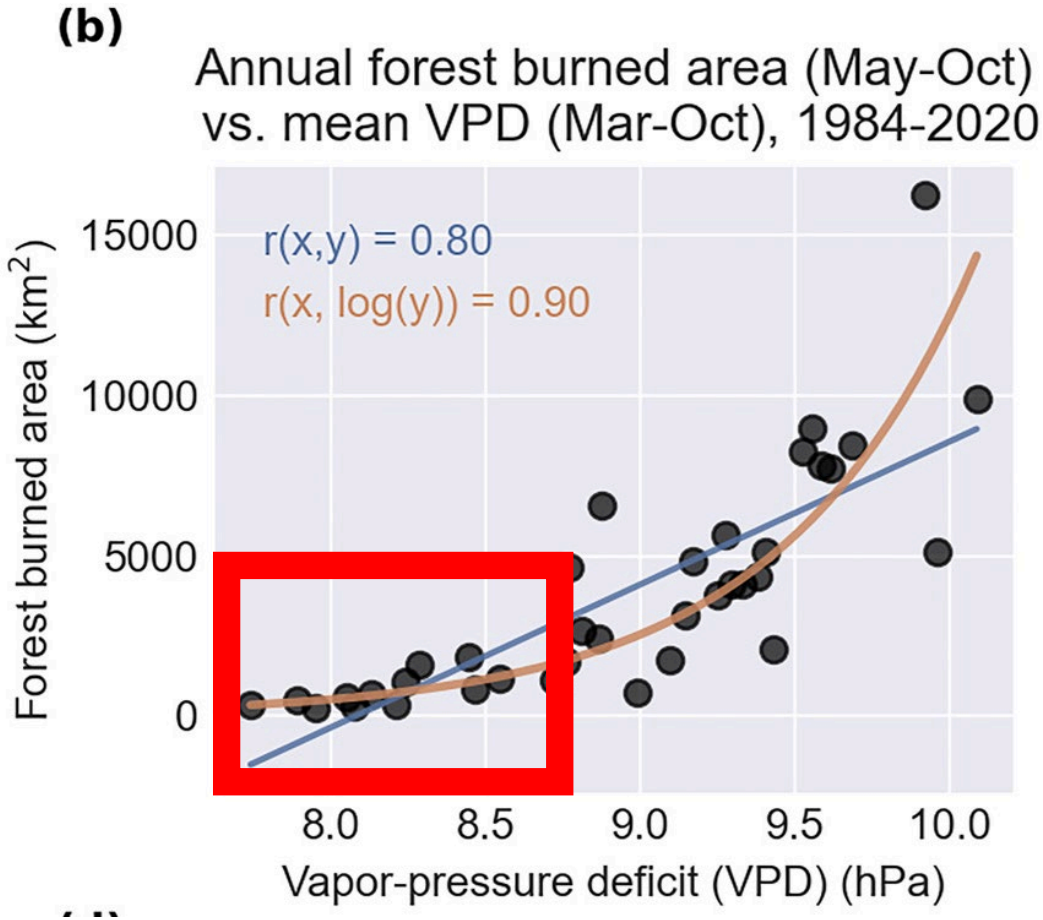
Exponential increase in forest area burned



Juang et al. (2022)

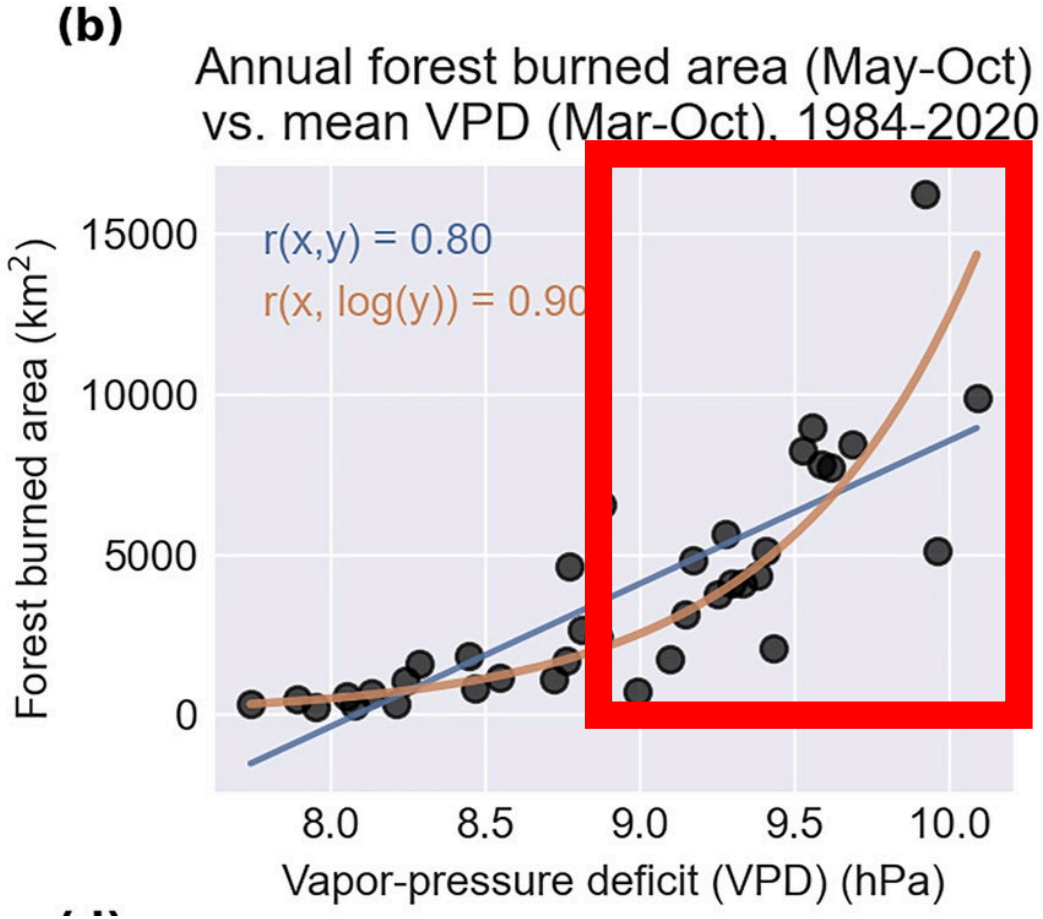
We are now in a nonlinear part of the system

Conditions when models were developed



The times they are a changing…

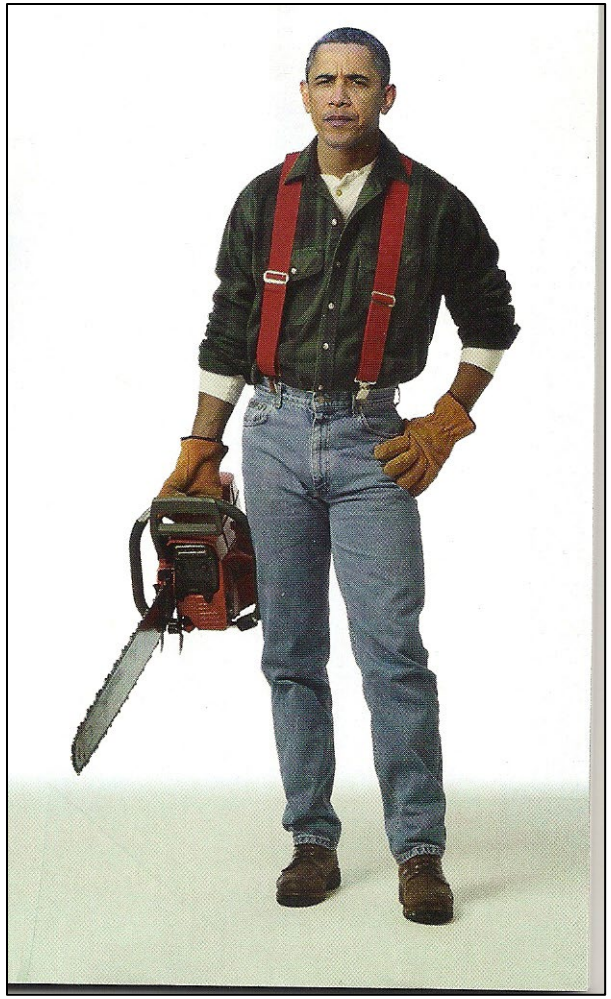
- Large logs and snags absent from models
- Climate-driven tree mortality
- Increasing atmospheric water demand



Type Conversion vs Restoring Fire

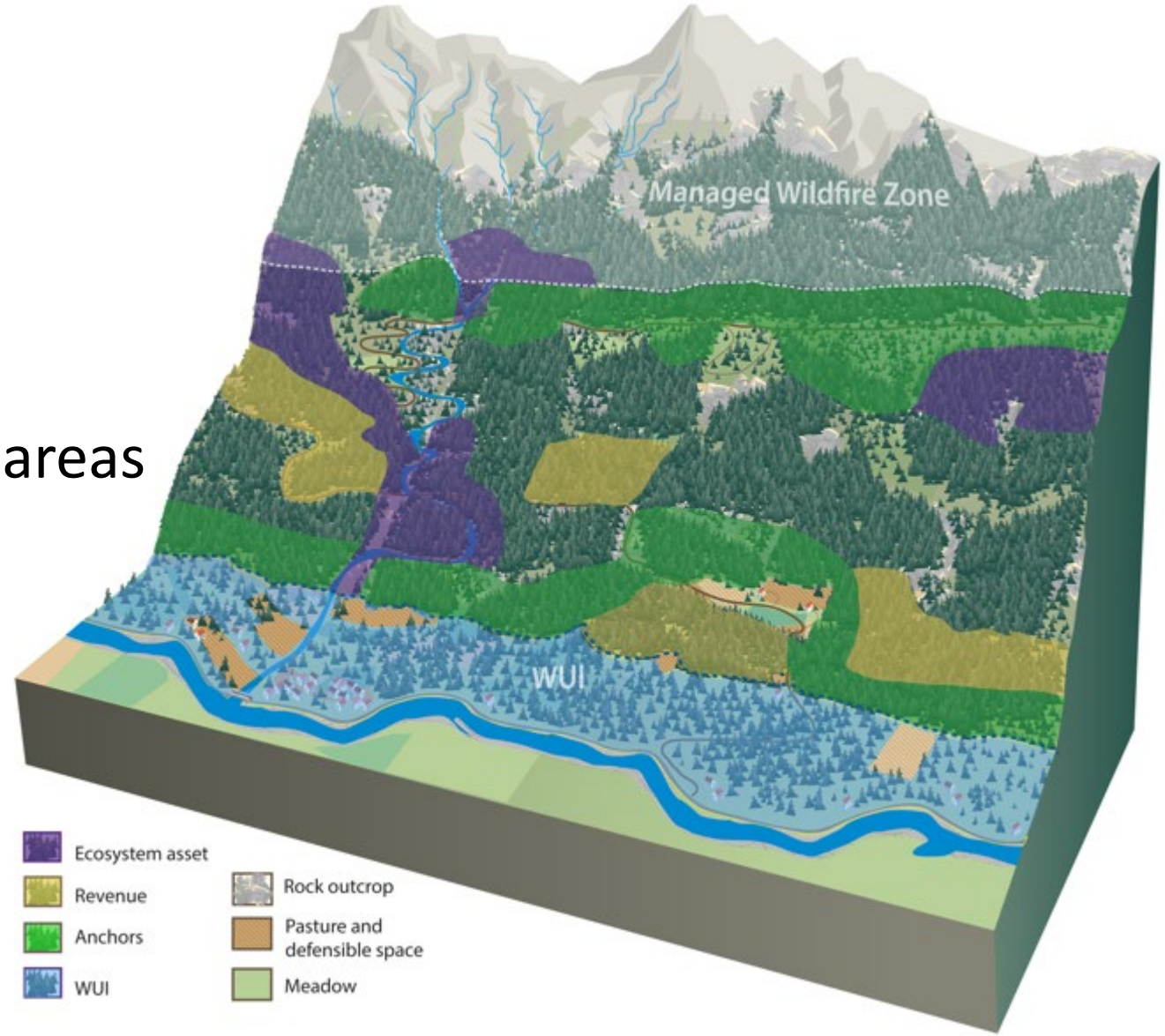
Restoring Fire as a Process

- Mechanical Thinning - $1500-2500/ac
- Prescribed Burning - $100-400/ac
- Managed Wildfire - $50-hundreds/ac



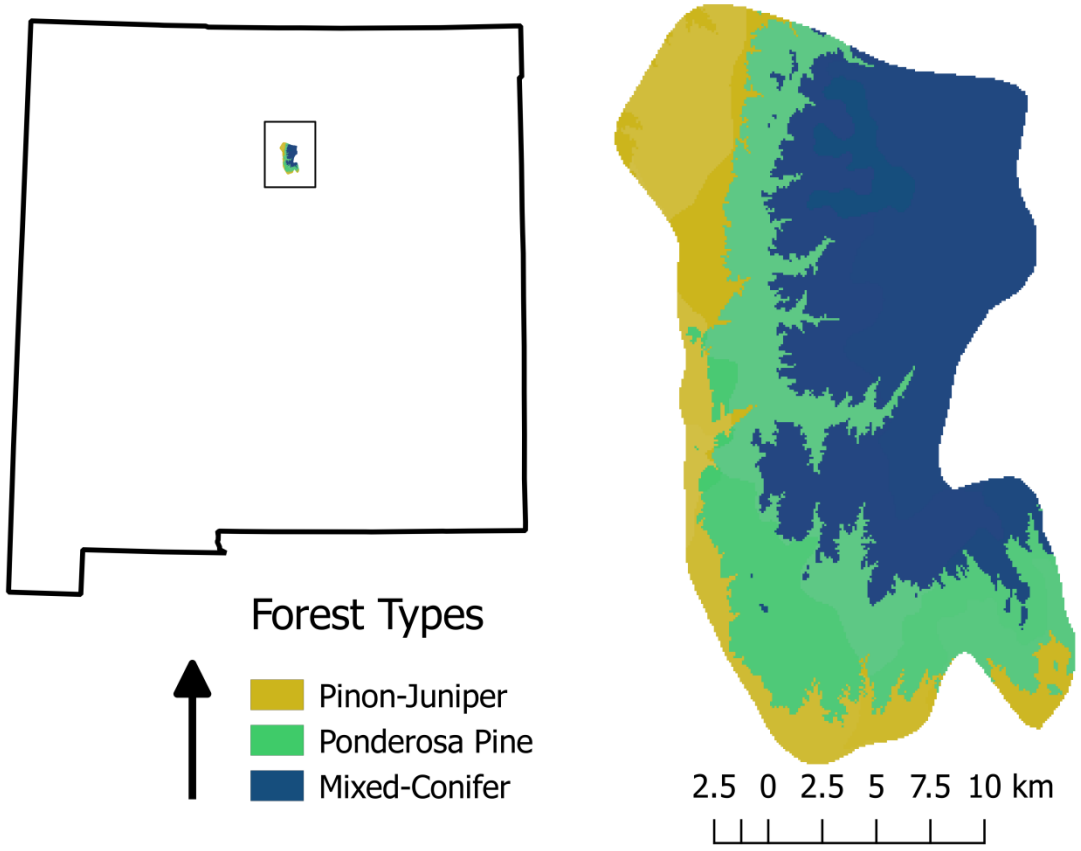
Place treatments to prepare the landscape for fire

- Thinning + Rx fire in WUI
- Thinning create anchors
- Prescribed fire for sensitive areas
- Managed fire for scale



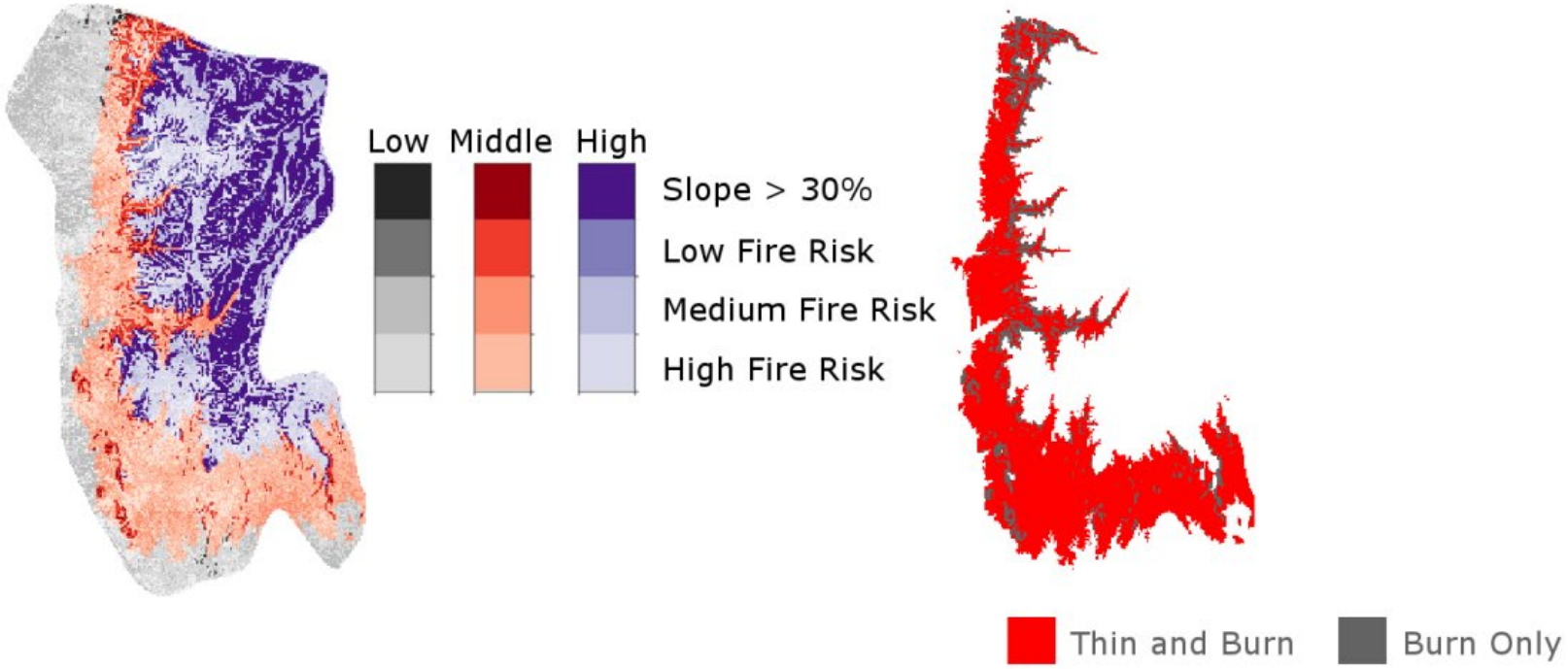
North et al. (2021)

Santa Fe Fireshed

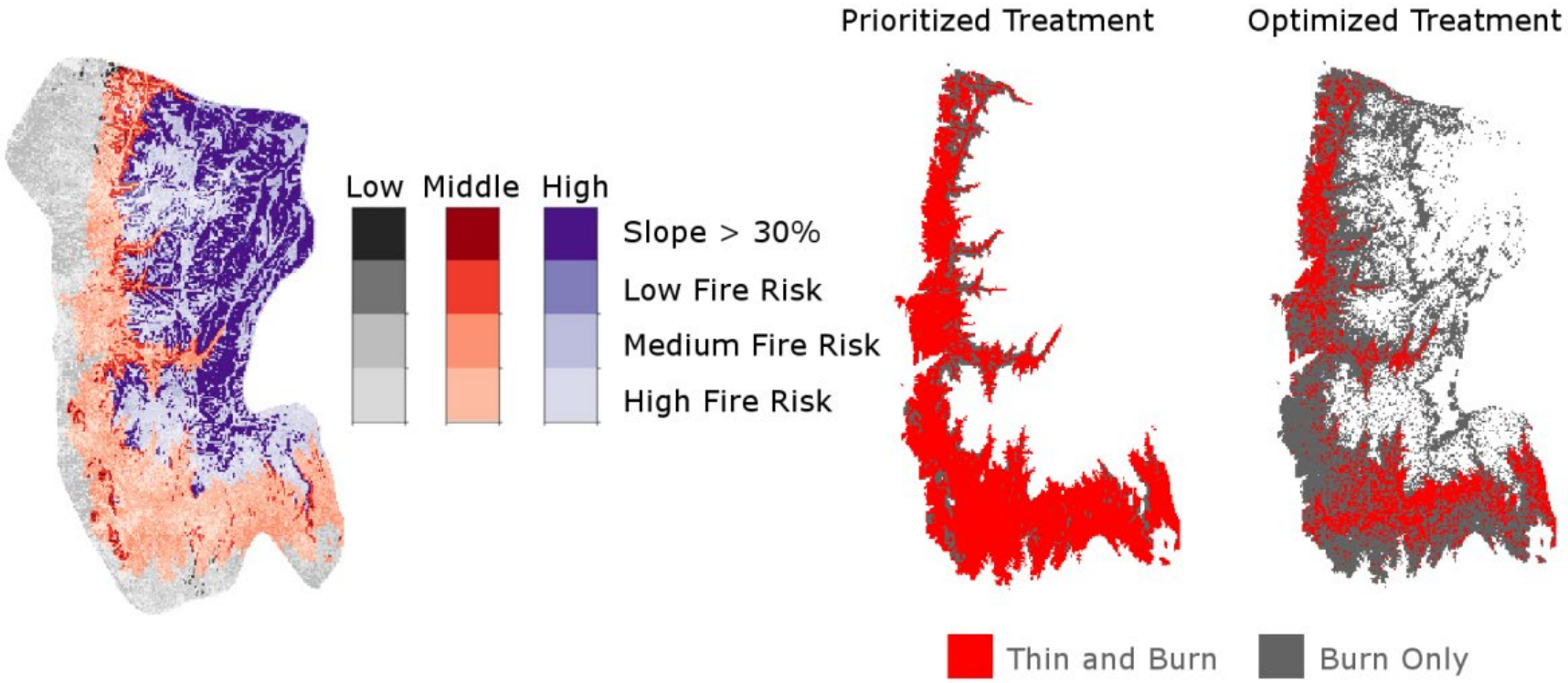


Krofcheck et al. (2019)

Management Scenarios



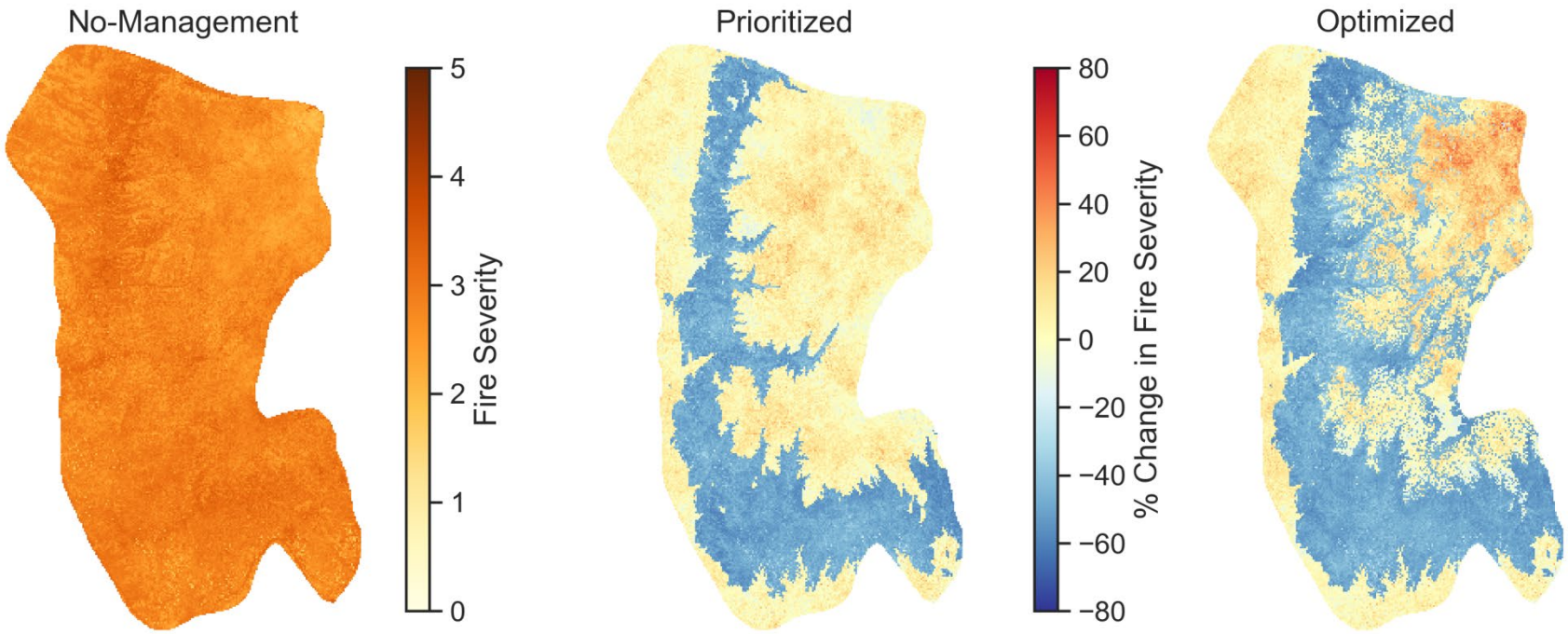
Management Scenarios



Thinning Reduced 54%, Prescribed Fire increased 24%

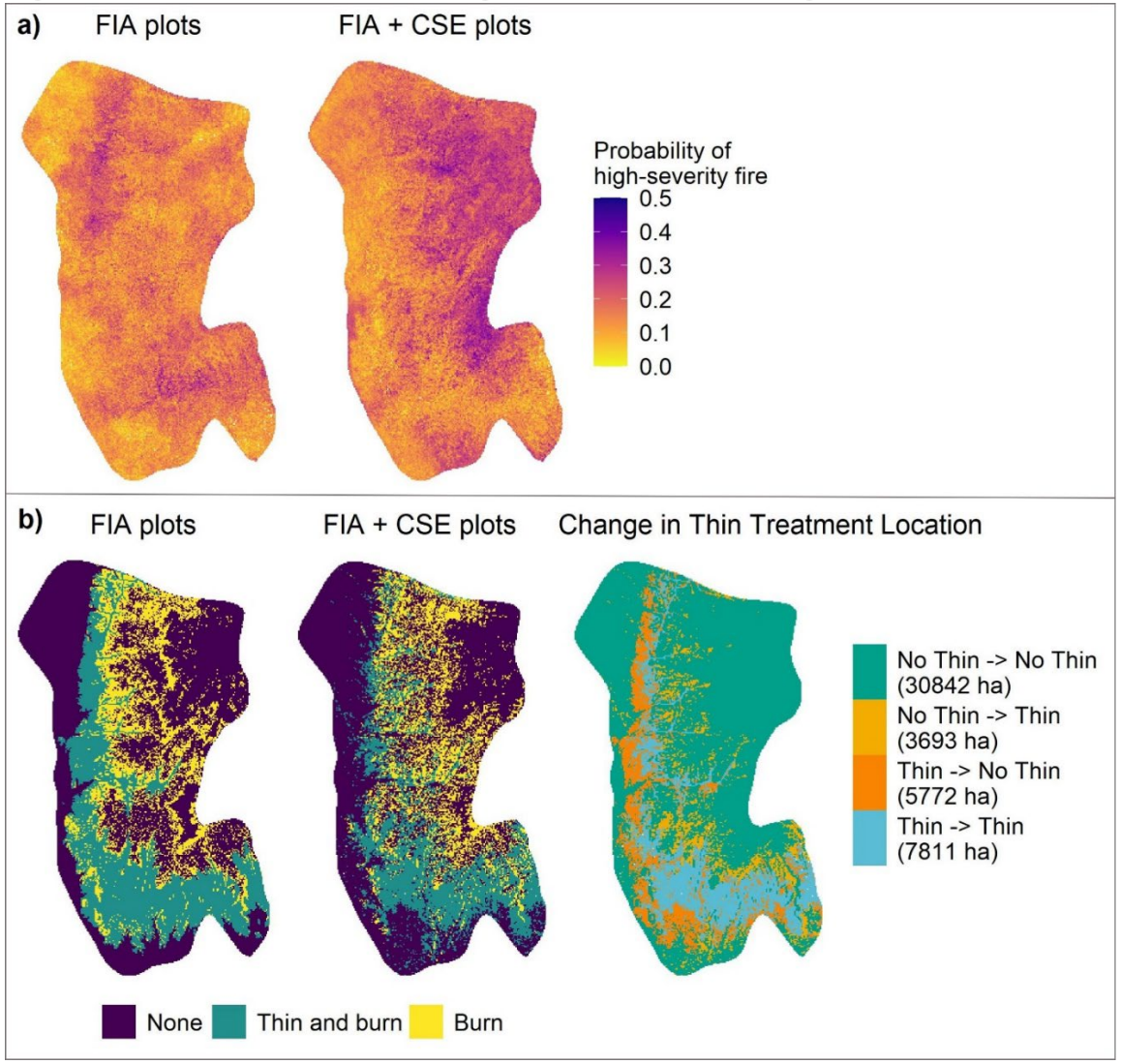
Krofcheck et al. 2019

Reduction in High-Severity Fire



Krofcheck et al. (2019)

Working together to get it right…



Hecht et al. (2024)

We need to change our relationship with fire

- We cannot afford a stand-scale mind-set
- Thinning outcomes cannot be the benchmark for fire outcomes
- Fire outcomes are more variable and we need to accept the variability

Large-scale fire should have silvicultural and ecological objectives

- Density reduction, which sometimes kills overstory trees
- Increased spatial heterogeneity: individuals, clumps, openings
- Fire-tolerant species and more drought tolerant species: fire will help prepare our forests for climate change


Thank you for your attention!
Prepare the landscape and plan for fire!
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