

# Unequal Treatments: Federal Wildfire Fuels Projects and Socioeconomic Status of Nearby Communities

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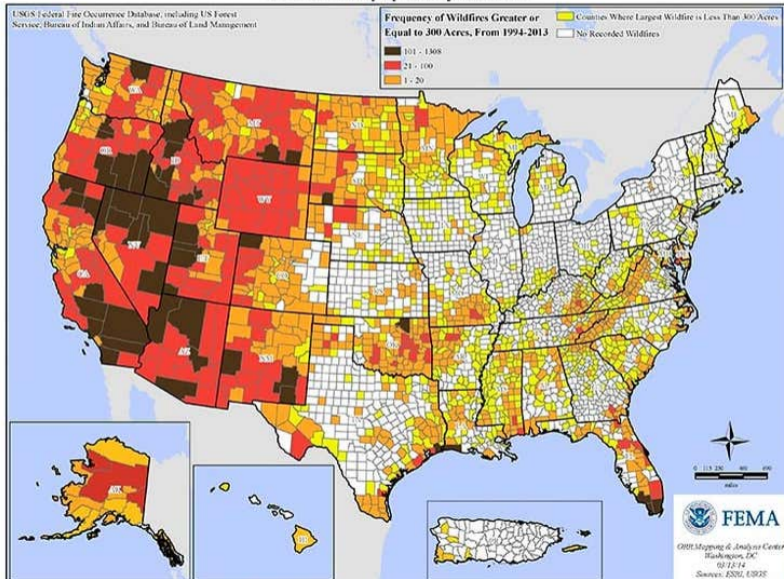
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# Wildfire



# East v. West

## Wildfire Activity by County 1994-2013

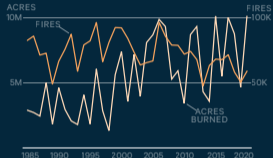


## US Wildfire Trends



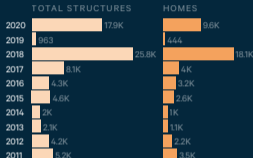
Wildfires pose an increasing threat throughout the United States due to climate change, forest management, and an expanding wildland-urban interface, among other factors. The rising impacts of wildfires are illustrated by trends in wildfire activity, costs, and damage since 1985.

### Number of Wildfires and Acres Burned



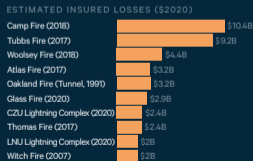
While the number of fires in the United States has not increased, the number of acres burned has trended upward. Each fire burns more land on average now than in 1985.

### Structures Destroyed by Wildfires



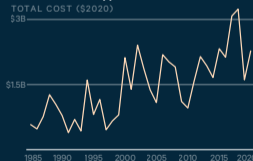
The majority of structures destroyed by fire in the past ten years were lost in just two recent years: 2018 and 2020.

### Most Destructive Fires by Financial Losses



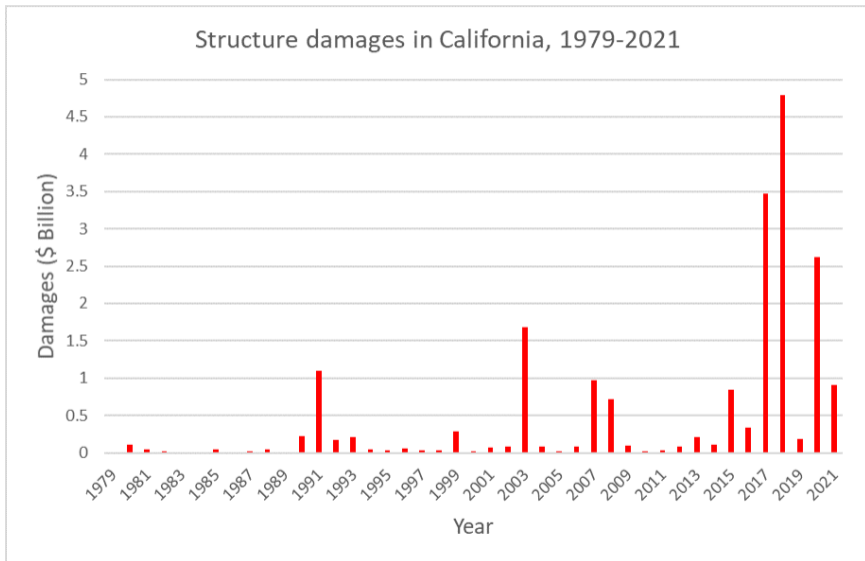
Of the ten most financially destructive fires ever to occur in the United States, eight occurred in the past five years. All ten occurred in California.

### Federal Wildfire Suppression Costs



Wildfire suppression costs have risen in recent years. Annual federal suppression spending far exceeds federal spending on fire prevention and hazard mitigation.

# Estimated structure damages from wildfire in California, Buechi et al. (2021)

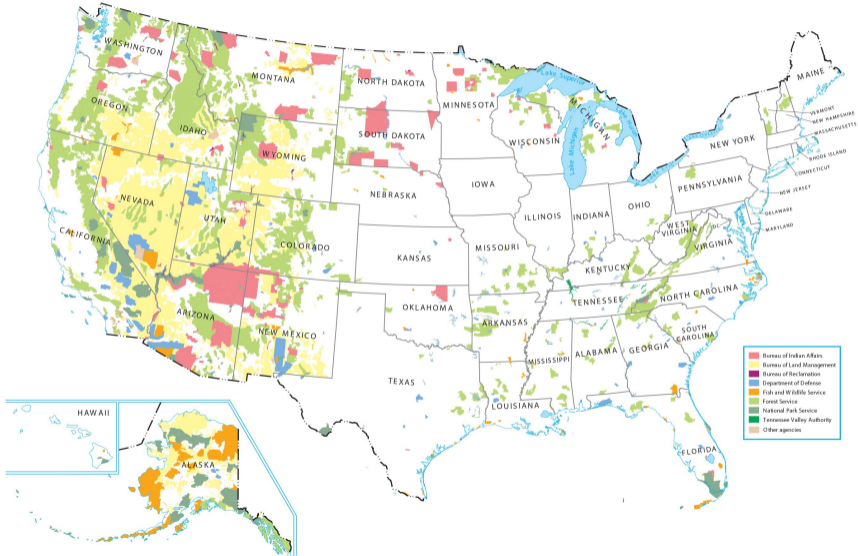


## Drivers of increasing wildfire activity and damages

- ▶ Climate change - higher temperatures, longer fire seasons, drier fuels, increase in extreme weather conditions
- ▶ Fire exclusion - fire suppression causes fuels to build up, resulting in more catastrophic wildfires
- ▶ Ignitions - more people on the landscape tends to increase ignitions
- ▶ Wildland Urban Interface (WUI) - more houses in high wildfire risk areas increases damages



# The majority of fires in the western U.S. are on federal lands



## Federal responses to wildfire: Suppression





# Federal responses to wildfire: Hazard mitigation



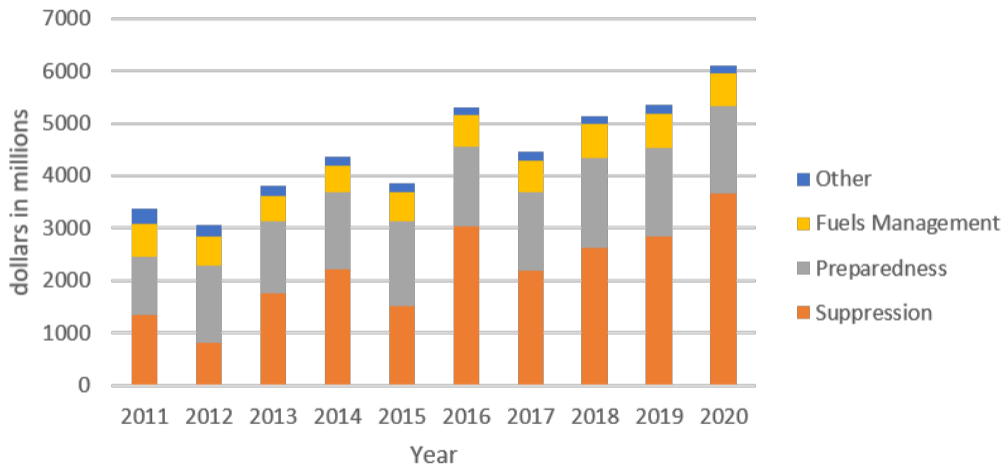
# Federal responses to wildfire: Fuels treatments



Figure 1: Prescribed fire

Figure 2: Mechanical thinning

## FS and DOI Wildfire Appropriations, FY2011-FY2020, constant 2020 dollars

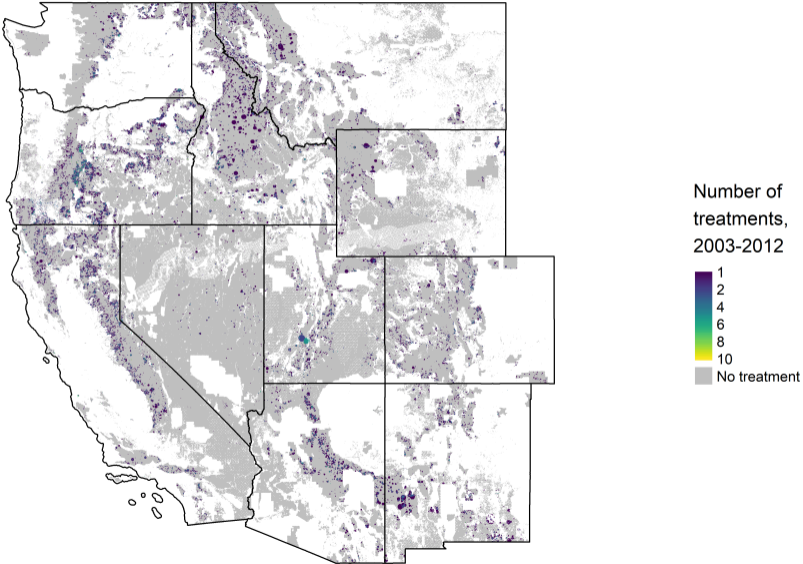


Source: Congressional Research Service (2020)

## Funding for fuels management

- ▶ The U.S. Forest Service estimates that there are 51 million acres of federal, state, tribal, and private lands with high wildfire hazard that are in need of fuels treatments
- ▶ The cost would be \$5 - 6 billion per year over 10 years, ten times the historical funding level
- ▶ The 2021 Infrastructure Investment and Jobs Act provides a total of \$3.3 billion over several years
- ▶ In California, the Governor's 2022-23 budget includes \$1.2 billion over two years for wildfire prevention and mitigation

# What determines the location and timing of federal fuels projects?



## Research on fuels management

- ▶ Wibbenmeyer, M., Anderson, S., and A.J. Plantinga. 2019. Salience and the Government Provision of Public Goods. *Economic Inquiry* 57(3):1547-67.
  - ▶ Federal agencies are more likely to put fuels treatments near WUI communities that have recently had nearby large fires
- ▶ Anderson, S., Plantinga, A.J., and M. Wibbenmeyer. 2022. Inequality and Government Responsiveness: Evidence from Salient Wildfire Events. *Journal of Politics*, forthcoming.
  - ▶ Following wildfires, the likelihood of fuels treatments on nearby federal lands increases more for higher income, more educated, and whiter communities

# Data

1. Public lands
  - Protected Area Database (PAD-US)
2. Fuels project data, 2003-2011
  - National Fire Plan Operations and Reporting System (NFPORS, 2003-2011)
  - Forest Service Activity Tracking System (FACTS, 2010-2020)
3. Census block data
  - Locations of wildland urban interface (WUI) blocks throughout western U.S. (Source: SILVIS)
  - Demographic variables observed at the Census block group level (Source U.S. Census, 2000)

## Distribution of fuel treatments

Table 1: Demographics of communities with and without fuels projects within 2 km

	Overall	No fuels projects	> 0 fuels projects
Per capita income (dollars)	20881.49	20643.09	22681.25
Proportion above poverty line	0.87	0.87	0.88
Proportion college grad.	0.23	0.22	0.26
Proportion white non-Hispanic	0.78	0.77	0.86
Proportion Hispanic	0.14	0.15	0.09
Population (thousands)	47.65	49.36	34.70
Proportion own place of residence	0.74	0.74	0.75
Wildfire hazard potential	496.37	429.49	1001.30
Number of observations	296571	261882	34689



## Distribution of wildfire hazard

Table 2: Differences in demographics across high and low wildfire hazard block groups.

	Low Hazard	High Hazard (90th perc.)	High Hazard (95th perc.)	High Hazard (99th perc.)
Per capita income	30,857	35,896	35,622	36,457
Percent below poverty line	15.4	12.0	11.8	11.6
Percent white (non-Hispanic)	63.7	78.2	80.4	84.8
Percent black	5.2	2.3	2.1	1.3
Percent Hispanic	30.1	18.6	17.1	13.9
Percent Native American	1.2	2.0	2.1	2.2
Percent over 65	11.2	14.0	14.7	16.3

*Note:* Columns 3-5 report mean values for blocks in which at least 20% of the properties are in areas where WHP is above the 90th, 95th, and 99th percentiles, respectively, among all homes in our data set. Low hazard block groups are those in which fewer than 20% of properties have WHP above the 90th percentile.

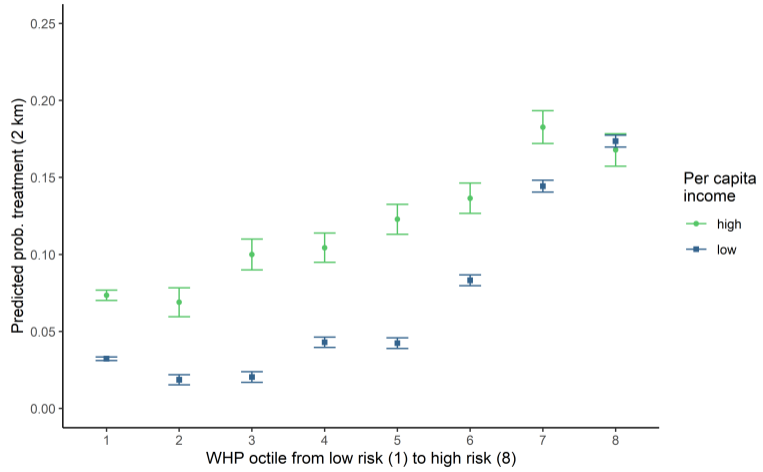
## Empirical strategy

1. Estimate:

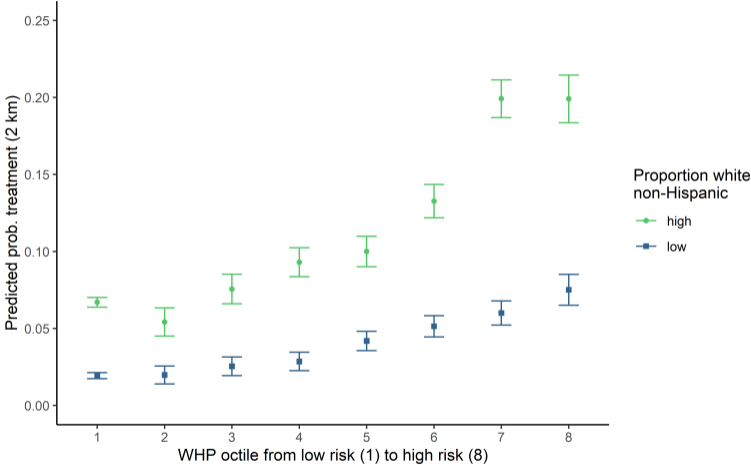
$$\begin{aligned} treat_{it} = & \alpha_0 + \alpha_1 SES_i + \alpha_2 hden_i + \sum_{j=2}^{j=8} \beta_j I[whp_i = j] \\ & + \sum_{j=2}^{j=8} \gamma_j I[whp_i = j] \times SES_i + \varepsilon_{it} \end{aligned}$$

2. Calculated  $\widehat{treat}_{it}$  for communities with SES measure  $SES_i$  two SDs above and two SDs below the mean.

# Predicted probability of treatment, by income and hazard



# Predicted probability of treatment, by race and hazard

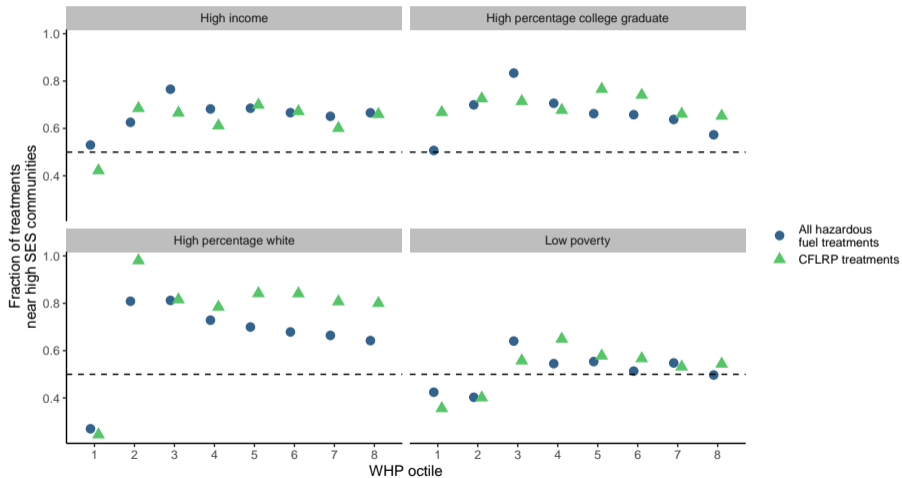


## Potential mechanisms: Federal cost-share programs?

- ▶ Federal fuels management projects are planned and executed with public input, as required by NEPA and the NFMA.
- ▶ The Collaborative Forest Landscape Restoration Program (CFLRP)
  - Established under Omnibus Public Land Management Act of 2009
  - Funding of up to \$80 million annually, 2019–2023
  - Proposals are submitted by collaborative ecosystem management groups (environmental groups, timber companies, tribes, fire districts, etc.)
  - Up to 50% of project cost provided by the CFLRP fund

# Fraction of fuel treatments near high SES communities.

All and CFLRP (cost-share)



## Summary

- ▶ Hazardous fuel removal is needed throughout a significant portion of the western US
- ▶ We find that hazardous fuel projects are more likely to be implemented:
  - Near high hazard communities
  - Near high SES (wealthier, whiter) communities
- ▶ Cost-share projects and projects overall are similarly likely to be implemented near high SES communities (for most measures of SES)

**Thanks!**



