



Wildfire & Planning

So much potential...



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Agriculture and Natural Resources

Cooperative Extension

What could better planning achieve?



Kilcrease Circle is a housing estate that sits in Paradise, California.

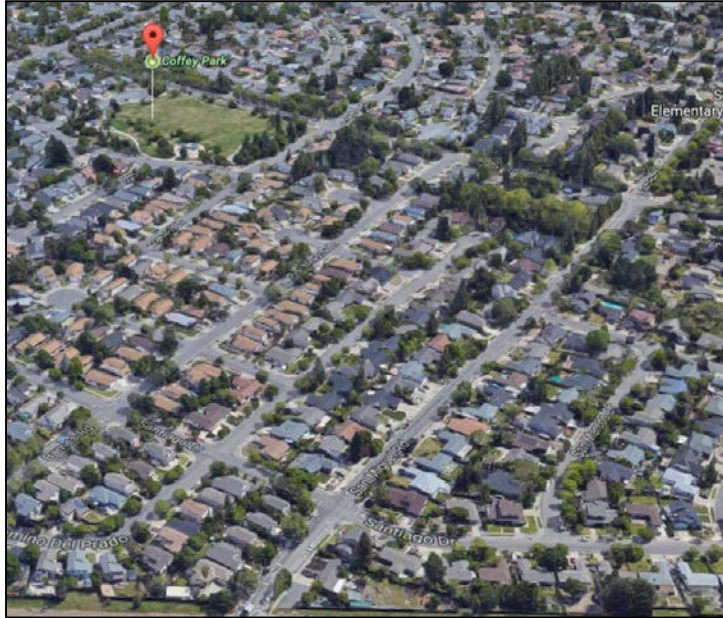
Google Earth



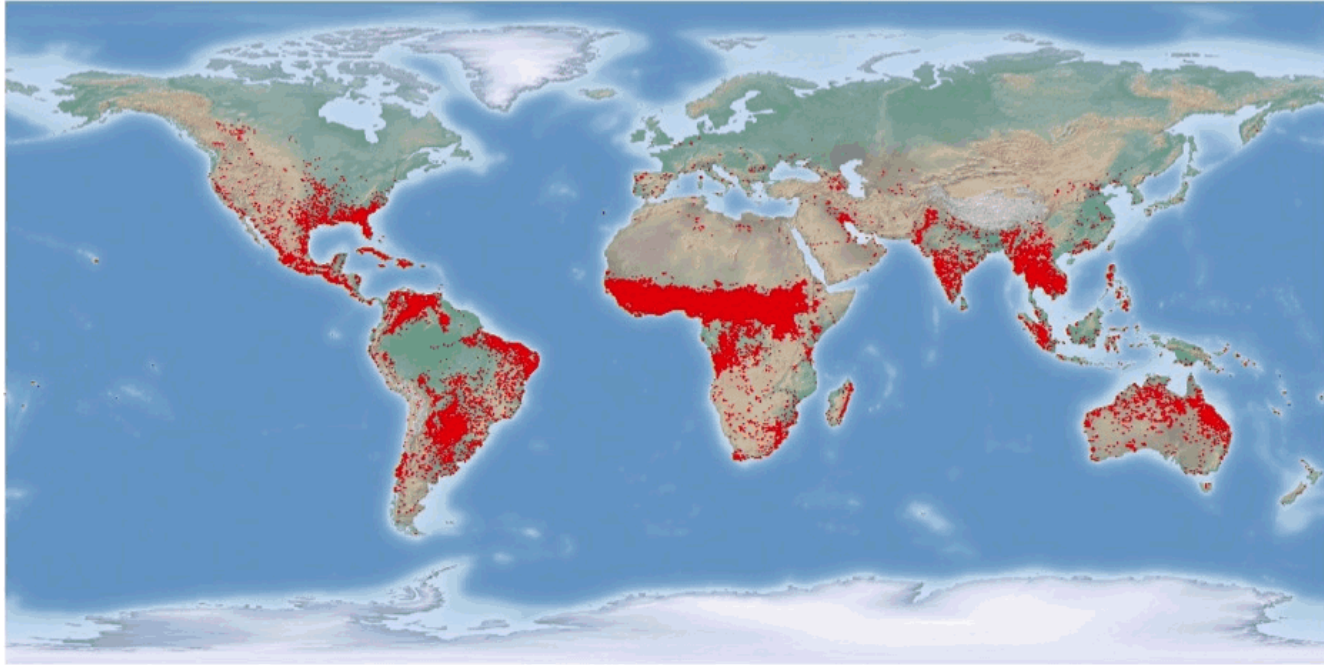
Nearly every home in Kilcrease Circle has been destroyed by the fire.

Digital Globe

What could better planning achieve?



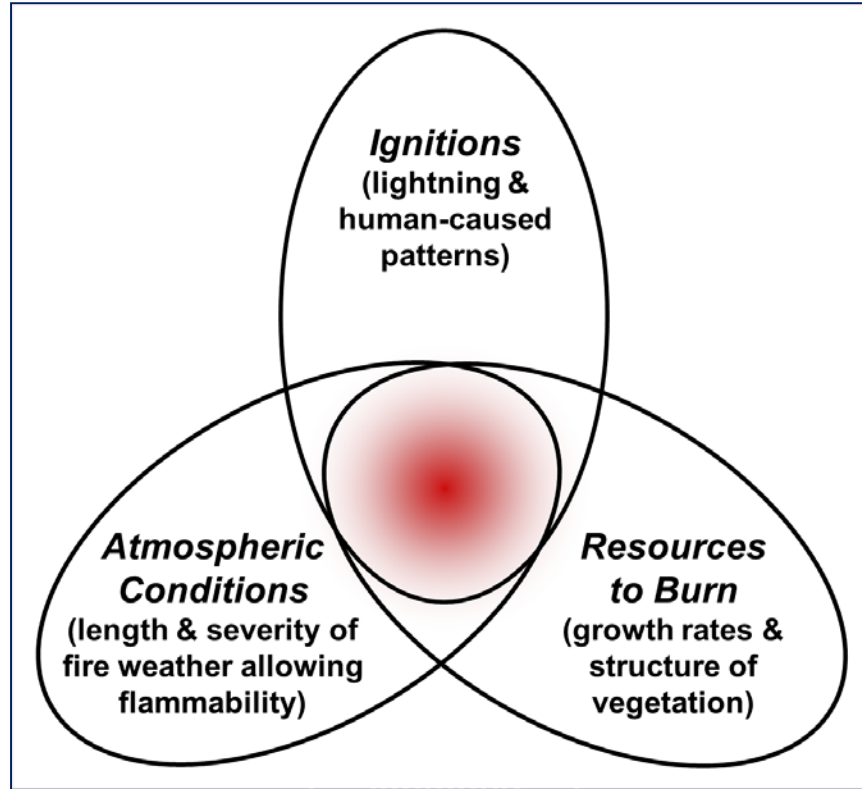
2012 MODIS Active Fire Detections from the Aqua and Terra Satellites



January February March April May June July August September October November December

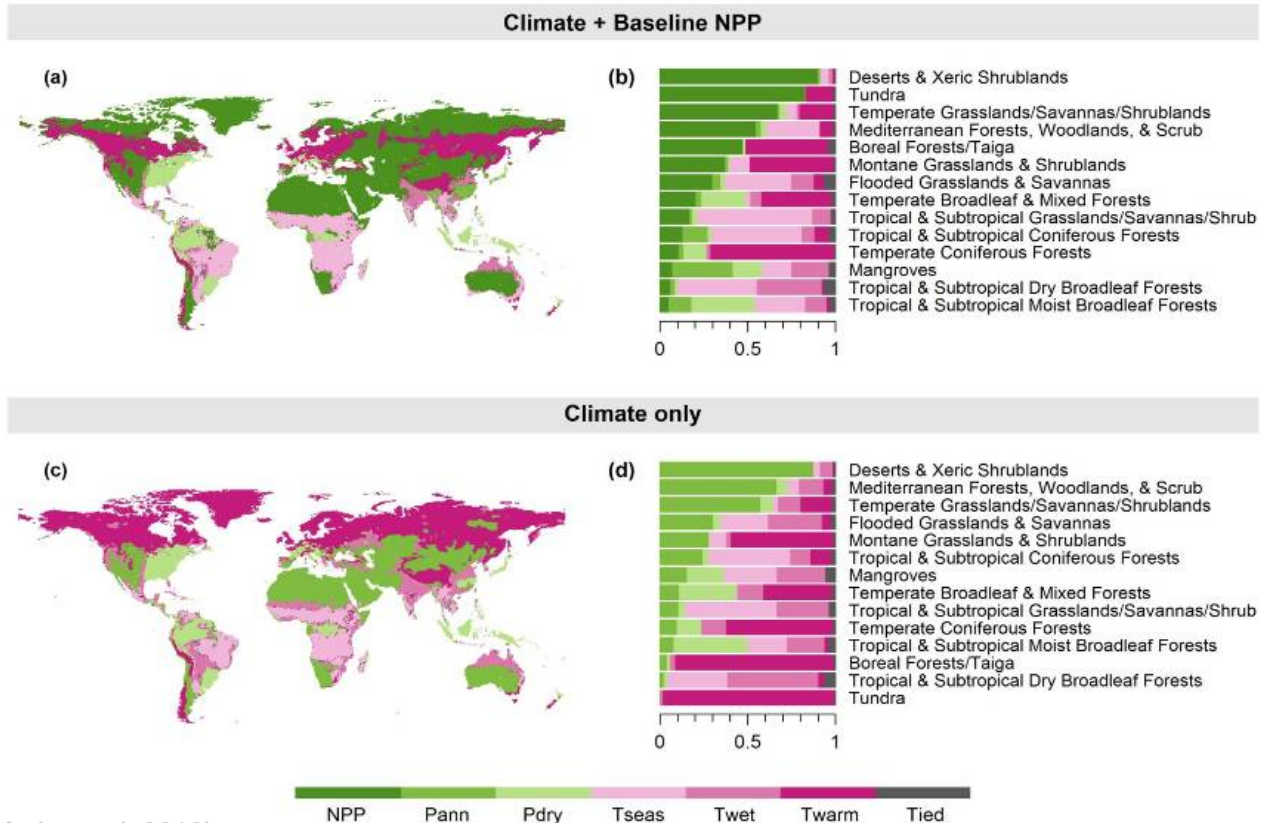
Fire Regime Controls

- ***Fuel amount***: environmental constraints on biomass productivity (i.e., resources to burn).
- ***Fire season***: environmental conditions promoting flammability.
- ***Ignitions***: spatial/temporal patterns.



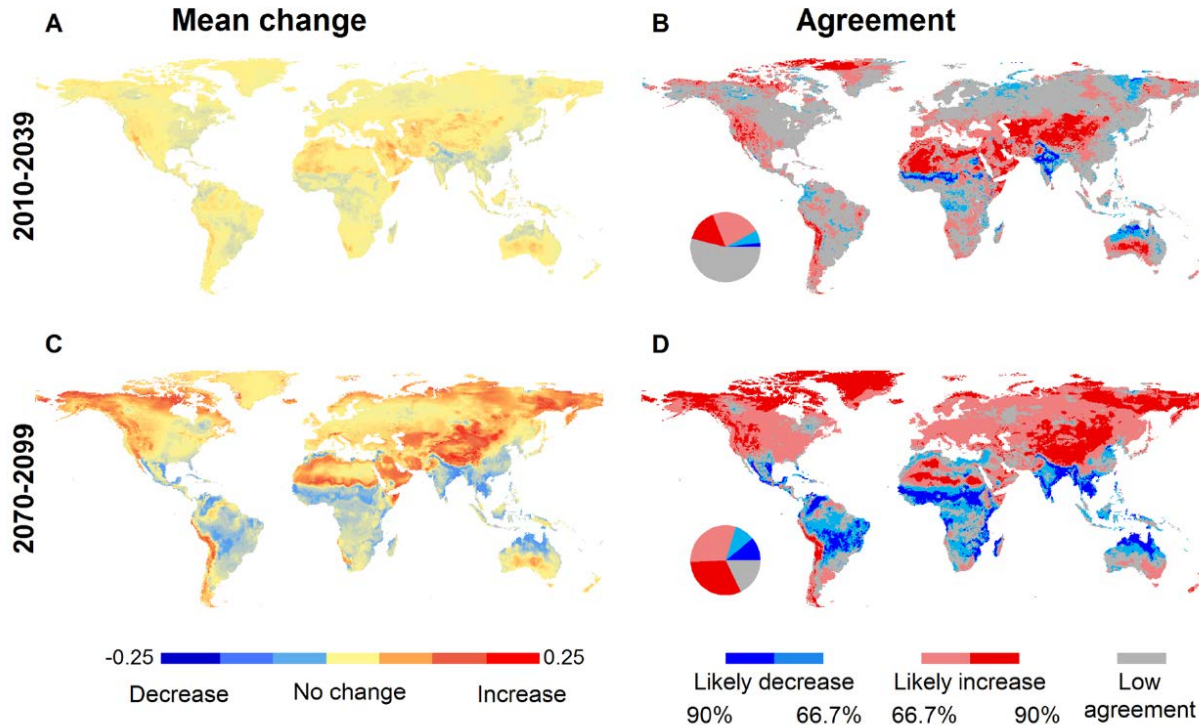
(Moritz et al. 2012)

Controls?



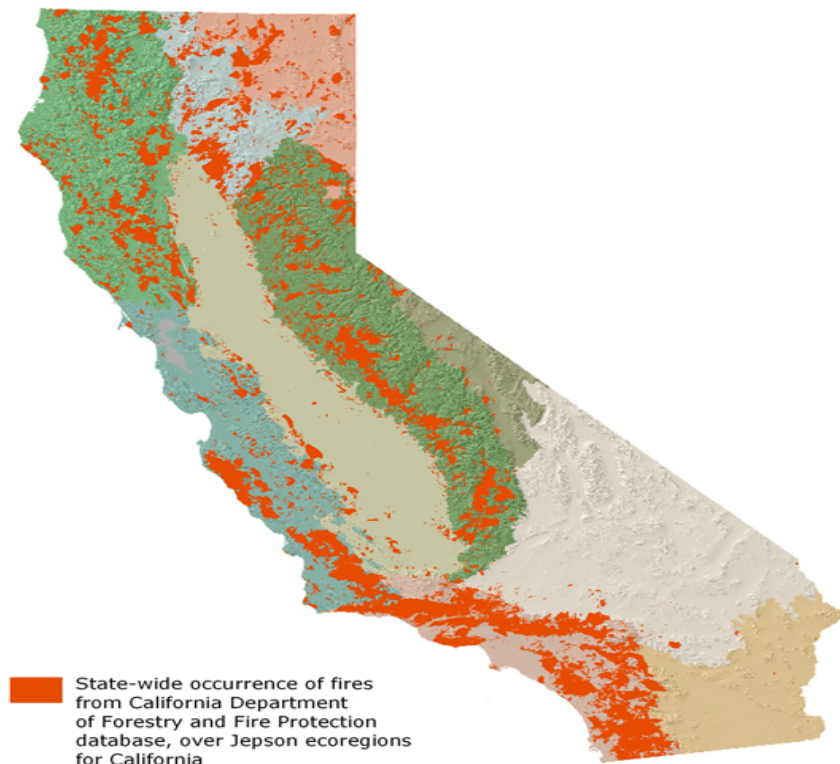
(Moritz et al. 2012)

Global Ensemble Model Projections

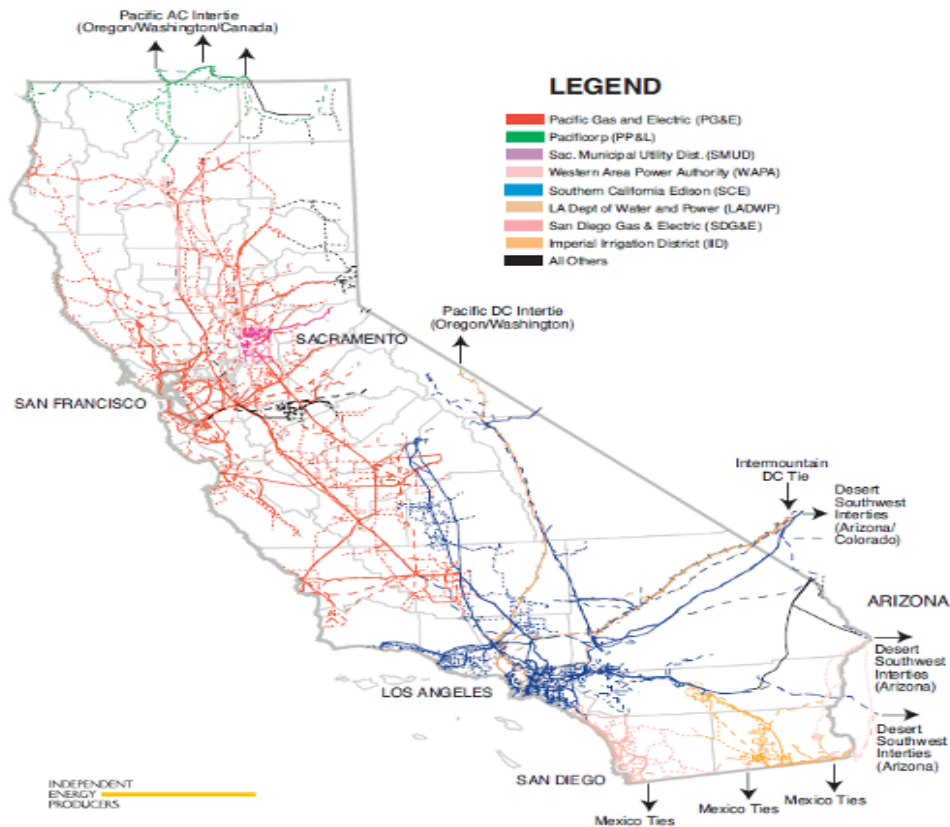


(Moritz et al. 2012)

Finer Scale: Humans?

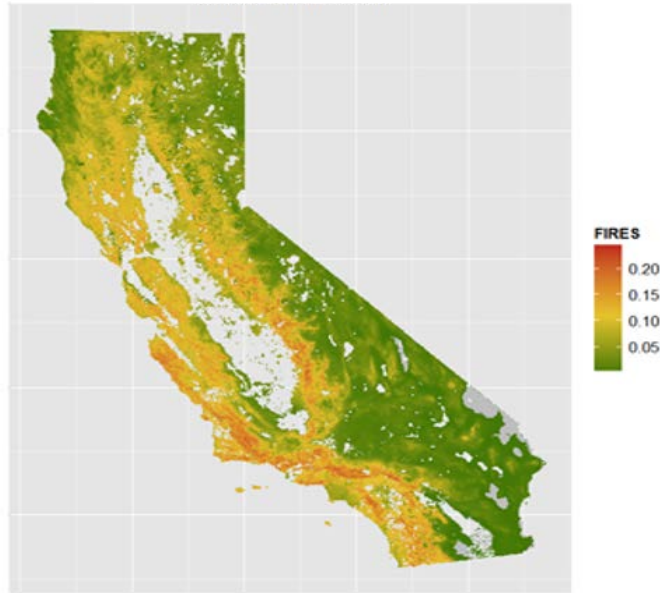


California's Major Electric Transmission Lines Map
The Power of California

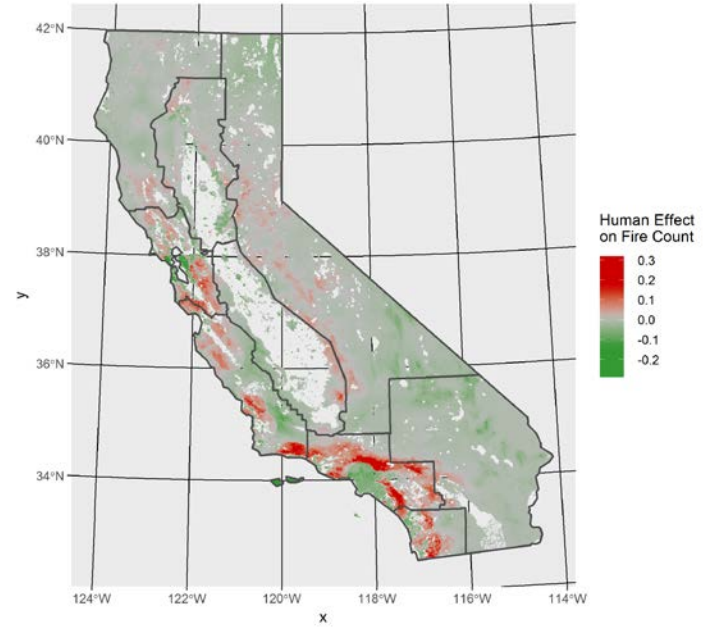


Including Human Dimensions

Natural Contribution



Anthropogenic Contribution



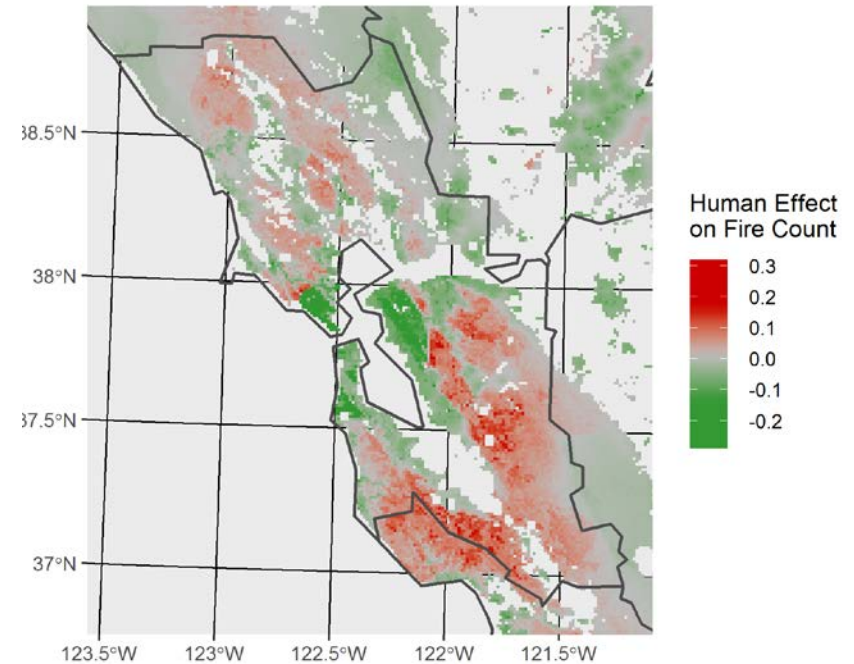
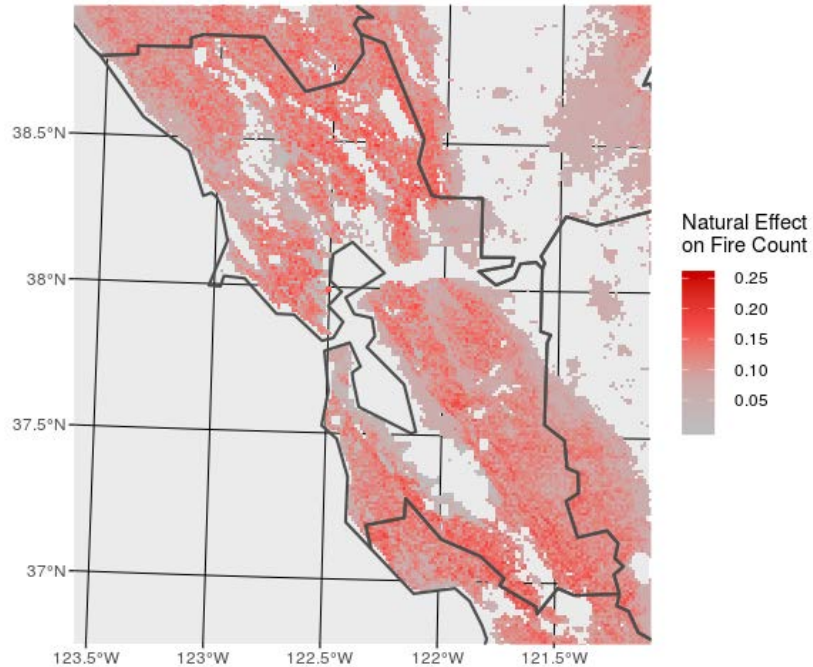
(Mann et al. 2016)

Including Human Dimensions



(Mann et al. 2016)

Humans Drive Exposure AND Hazard

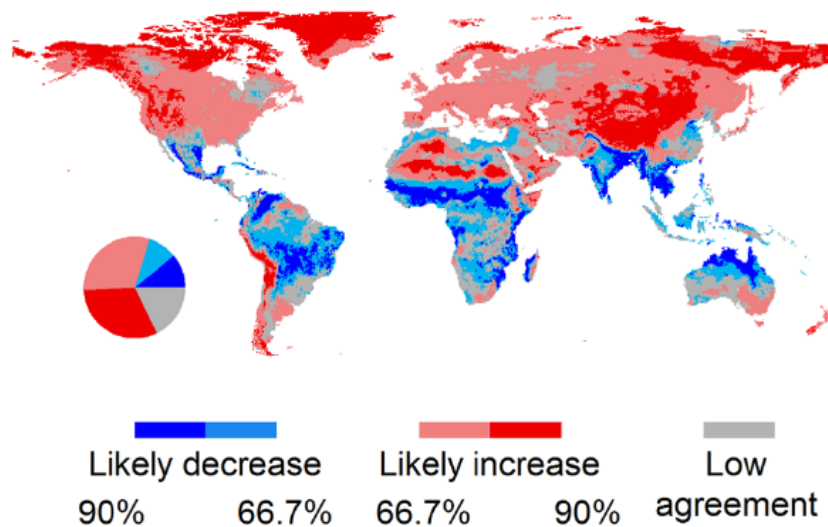


Why so little progress?

- ***Problem:*** The general perception of “the wildfire problem” is too simplistic.
- ***Solutions:*** We won’t find them, until we have a better understanding of what to fix.

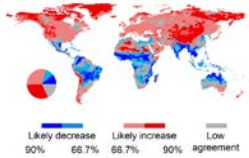
Increasing Fire Activity

Model Agreement: 2070-2099



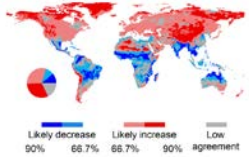
(Moritz et al. 2012)

More Severe Forest Fires



(Wikimedia Commons)

More Homes Lost



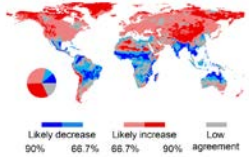
(USFS Lake Tahoe Basin
Management Unit)

More Disasters



(AP Photo/
Marcio Jose Sanchez)

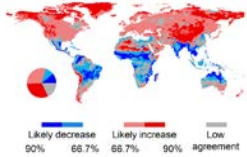
Is this really a causal chain of events and impacts?





What is common here, despite vast differences?

Is this really a causal chain of events and impacts?



**No: Most homes
burn due to embers**

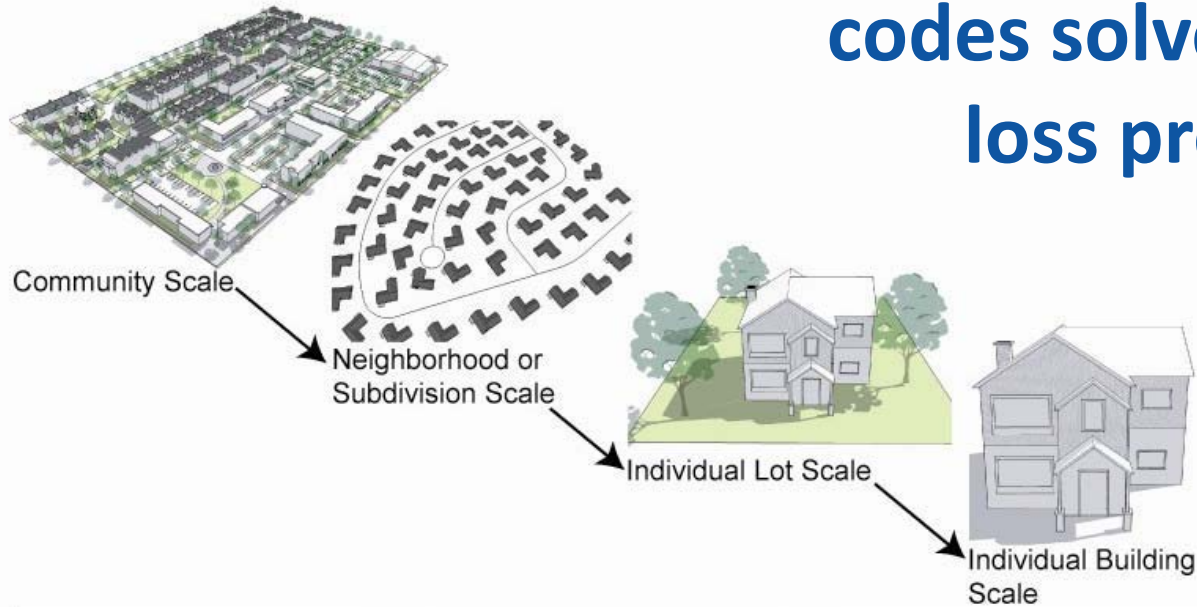
**No: Most home losses
are not in forests**

Which Problem?

- ***Forest losses***, in the face of more extreme droughts, pest outbreaks, and fires, is one set of problems.
- ***Home losses*** are not a “forest fire” problem, but one of ***where and how we build our communities***.

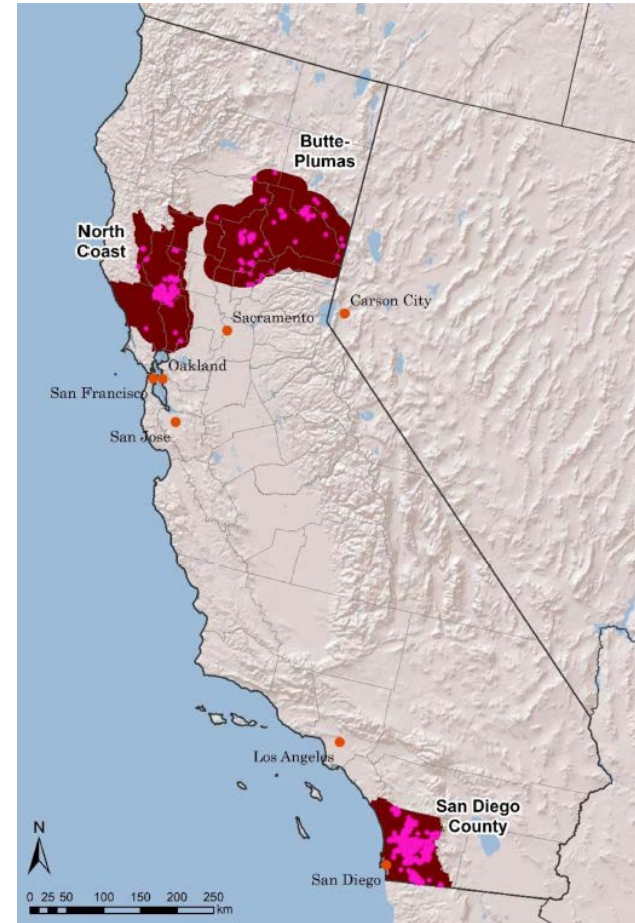
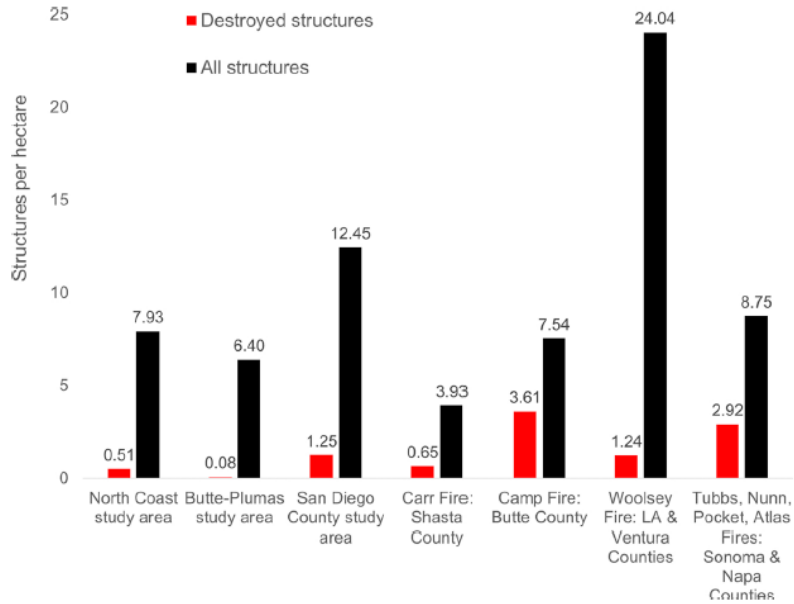
Role of Planning Decisions

Won't better building
codes solve the home
loss problem?



(Duerksen et al. 2011)

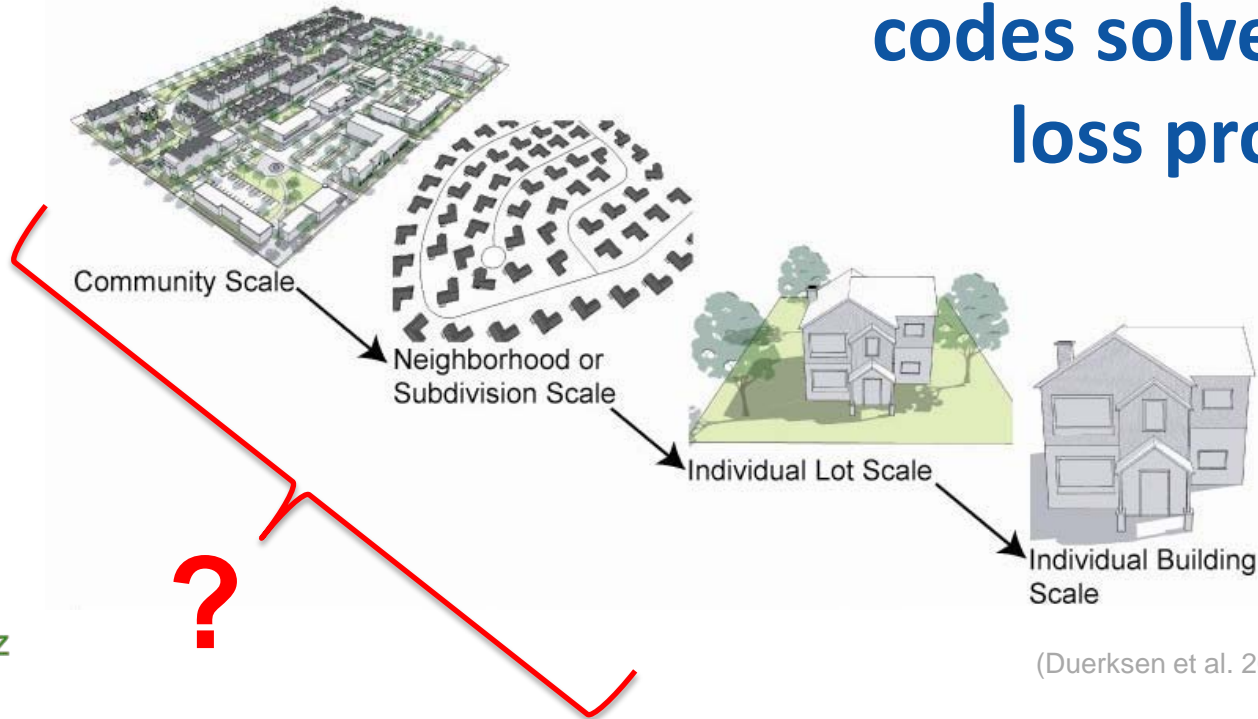
Density Matters!



(Syphard et al. 2019)

Role of Planning Decisions

Won't better building
codes solve the home
loss problem?



What else is Missing in Urban Planning?

Siting and layout Earlier integration

Design Element	Action	Scale	Goal
Landscape context of wildfire hazard	Engage in strategic planning much earlier	Community & subdivision	Include risk reduction measures before other considerations finalized
	Use hazard maps	Community location	Concentrate in least hazardous areas
	Use major landscape features	Community location	Buffer against oncoming wildfires
Separation from wildfire source	Use nonflammable amenities in design	Subdivision layout	Maximize defensible space
	Employ safe setbacks on slopes	Subdivision layout	Maximize defensible space
	Concentrate along inner side of roadway	Subdivision layout	Maximize defensible space
Density management	Cluster with other homes	Subdivision layout	Reduce collective exposure
Infrastructure concerns	Harden public facilities & refuges	Subdivision layout	Safeguard vulnerable populations; fallback for worst-case conditions
	Augment water requirements	Subdivision layout	Ensure redundant supplies; employ exterior sprinklers
	Locate power lines underground	Subdivision layout	Reduce ignition potential

Critical redundancies

Mitigation of extremes

(Moritz & Butsic, in review)

Design: New Communities

Risk Reduction Measure:
*Cluster structures and use
nonflammable community
amenities.*



Thank you

