Wildfires: Forestry & Community Impacts

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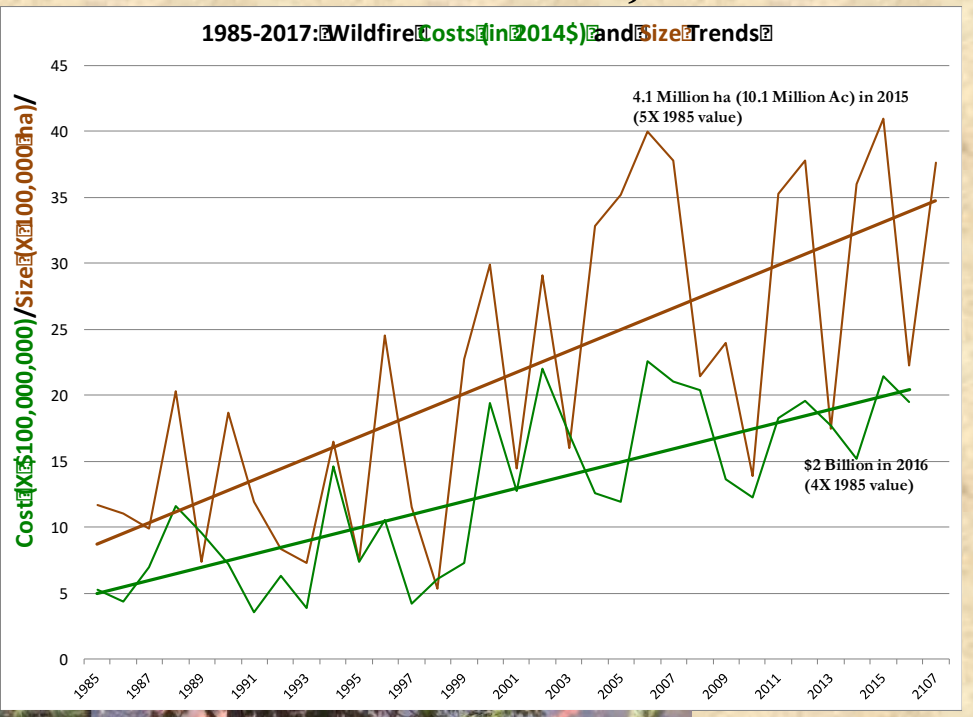
National Fire Trends: Even with the World's Best Fire Fighting Forces, Size, Cost and Severity of Wildfires is Increasing



2017 and 2018 each set new high record costs of $2.8 and ≈ $3.2 billion

Controlled burn and directional smoke plume

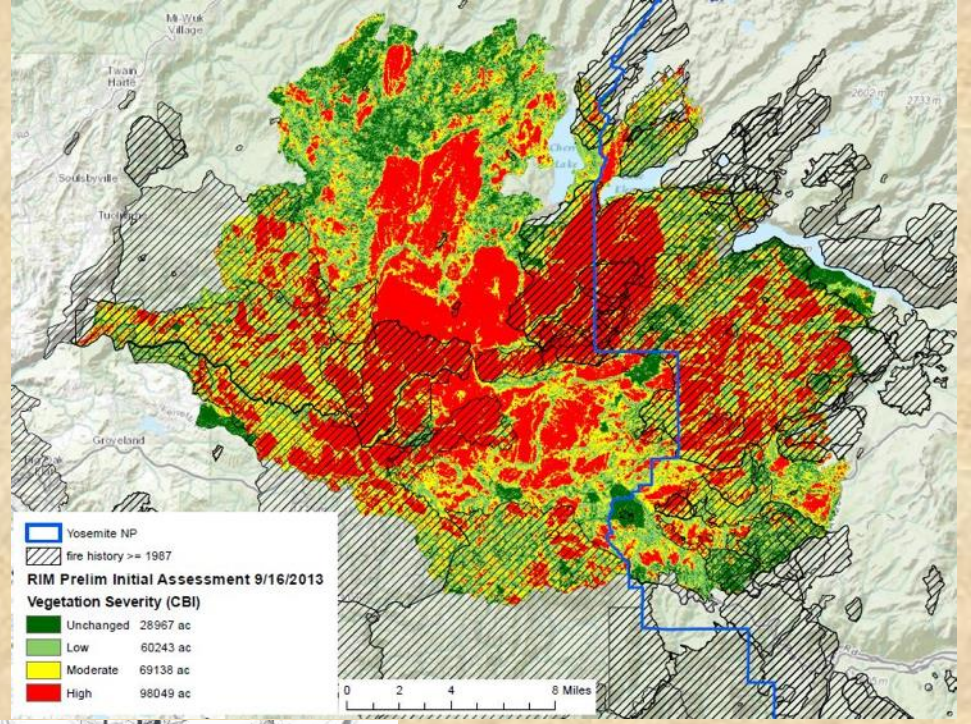
Crown fire and wall of smoke

Fire is inevitable in most dry western forests.
Ignore Smokey, the real debate is what kind of fire and smoke do you want?

If Forests Inevitably Burn: Suppression vs. Working with Fire

Example: 2013 Rim Fire: 250,000 ac
Fire started on FS land (left side) and with high fuel loading, burned at high severity into Yosemite NP (eastern third)

- FS land 33% high severity (red) vs. 5-10% desired (historic levels)
- Large size of red patches are > conifer seed can be wind dispersed
- >40 spotted owl use areas are 'black sticks'
- Right side burned in areas where fire had been allowed since the 1970s



Smoke: 'Catastrophic' High-Severity Fire (2013) Rim) vs. Planned Prescribed Burn (2009 Grouse and Harden)

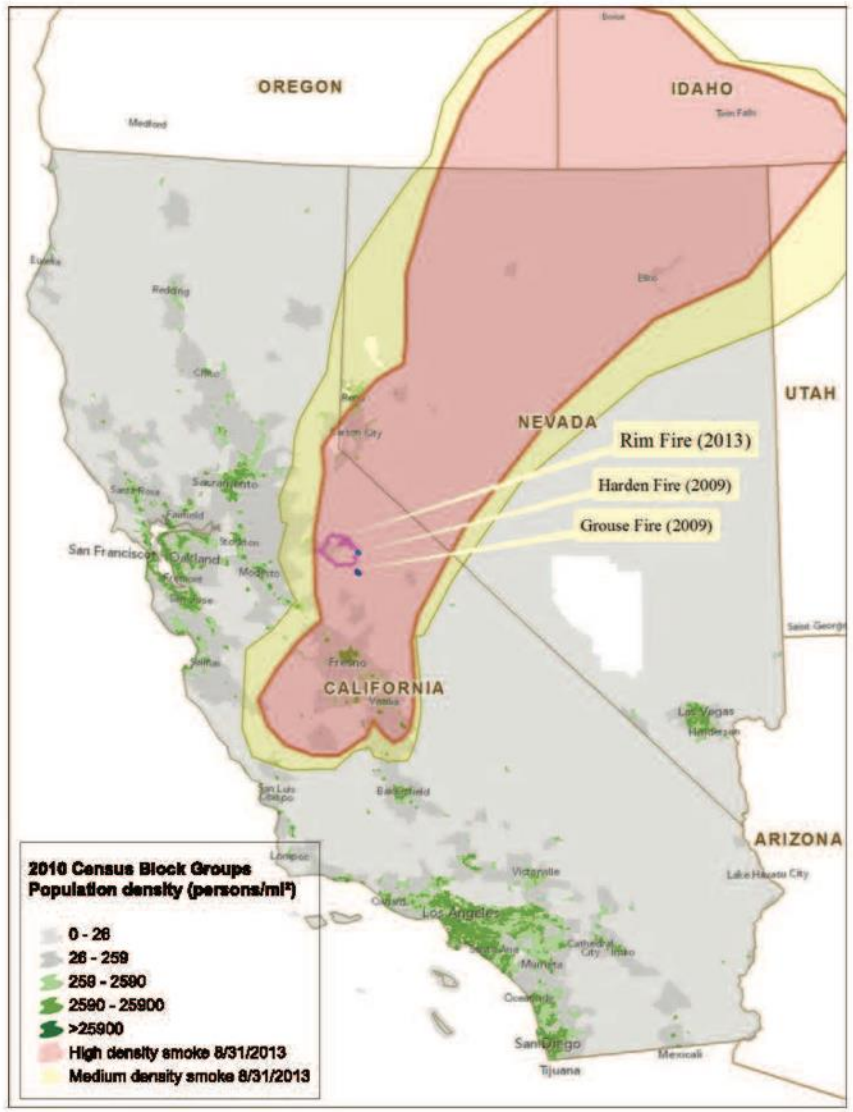


Figure 5. HMS smoke plumes from the Rim Fire on Aug. 31, 2013, a day of extensive heavy smoke impact, overlying population density of census tracts in California and Nevada.

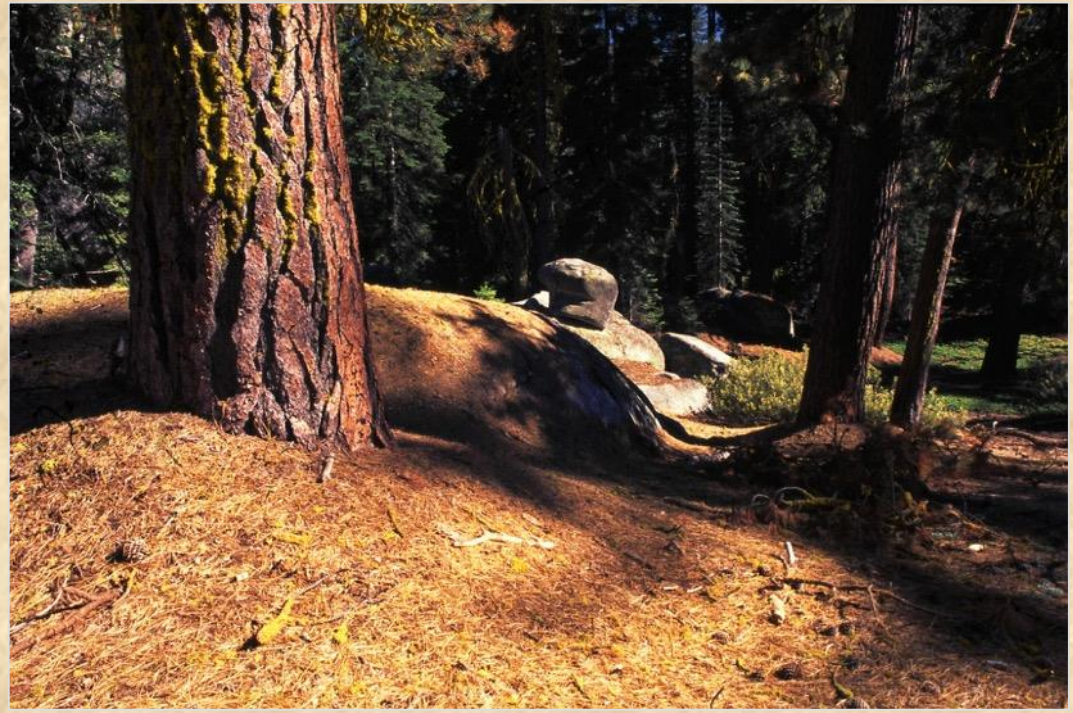
Figure 6. Fire managers pushed the Grouse Fire to spread during periods of favorable smoke dispersion, including times at night.

Yosemite fire managers push and pull fire depending on weather and where the smoke is headed: push fire into low fuel, contained areas during unfavorable dispersal but pull fire across landscape when weather and wind produce ecologically beneficial fire effects

In some forests it is difficult to simply re-introduce fire or let it burn

Fire suppression and human settlement have produced roadblocks

1) Small and intermediate size trees can ‘ladder’ surface or ground burns into catastrophic crown fires.



2) Surface fuel accumulations produce hot, long-duration temperatures that can kill large, old trees.

3) Smoke production

4) Liability

Carbon Tradeoffs in Fire Prone Forests:

- Fire suppression does temporarily increased forest C storage but it is very unstable.

- A better approach is to treat forests to reach their carbon carrying capacity: 'The potential carbon mass that a forest can store under prevailing environmental conditions and ***natural disturbance regimes***

- Prescribed fire and thinning can be used but should be measured against 3 key objectives:
- 1) reduce tree density (more water reducing drought stress);
- 2) reduce surface and ladder fuels (reduces fire severity);
- 3) keep big trees alive and packing on C

Carbon Dynamics of Fuels Reduction:

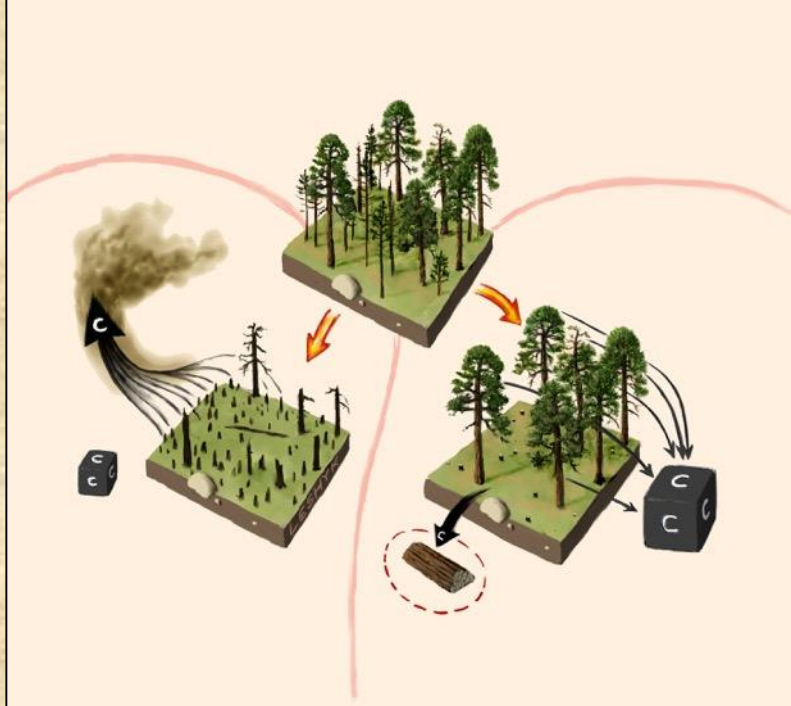
- Fuels treatments do reduce forest C, losses increase exponentially with tree size

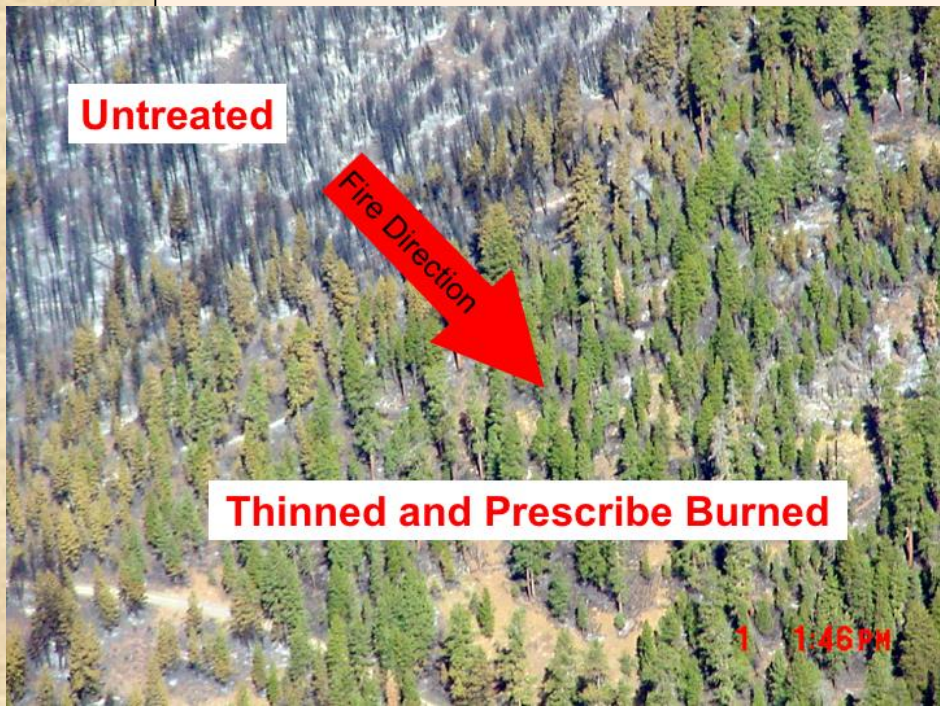
- Most reduction in fire intensity is from removing small trees (ladder fuels) and surface fuels—relatively small C reduction (15-25%)

- Fuels treatment reduces immediate wildfire C emissions (smoke) by 20-35%.

- The biggest benefit, however, is large tree survival, continued high C storage and reduced CO_2 emissions from decomposition.

- Through growth, many forests will regain the C lost in fuels treatment within 7-15 years and then increase C stores with released growth of large trees (more secure C storage)





- Landscapes that have succeed in re-introducing fire and avoiding…

  Western U.S. National Parks

Western Australia (around Perth)

Lessons:

- Need good communication/outreach
- Need crews trained in applying ‘beneficial’ fire
- With enough fuels reduced ‘anchors’, you reach a tipping point

Thanks!

Questions?