Sierra Forest Legacy

Protecting Sierra Nevada Forests and Communities

Tree Mortality, Forest Health and Prescribed Fire

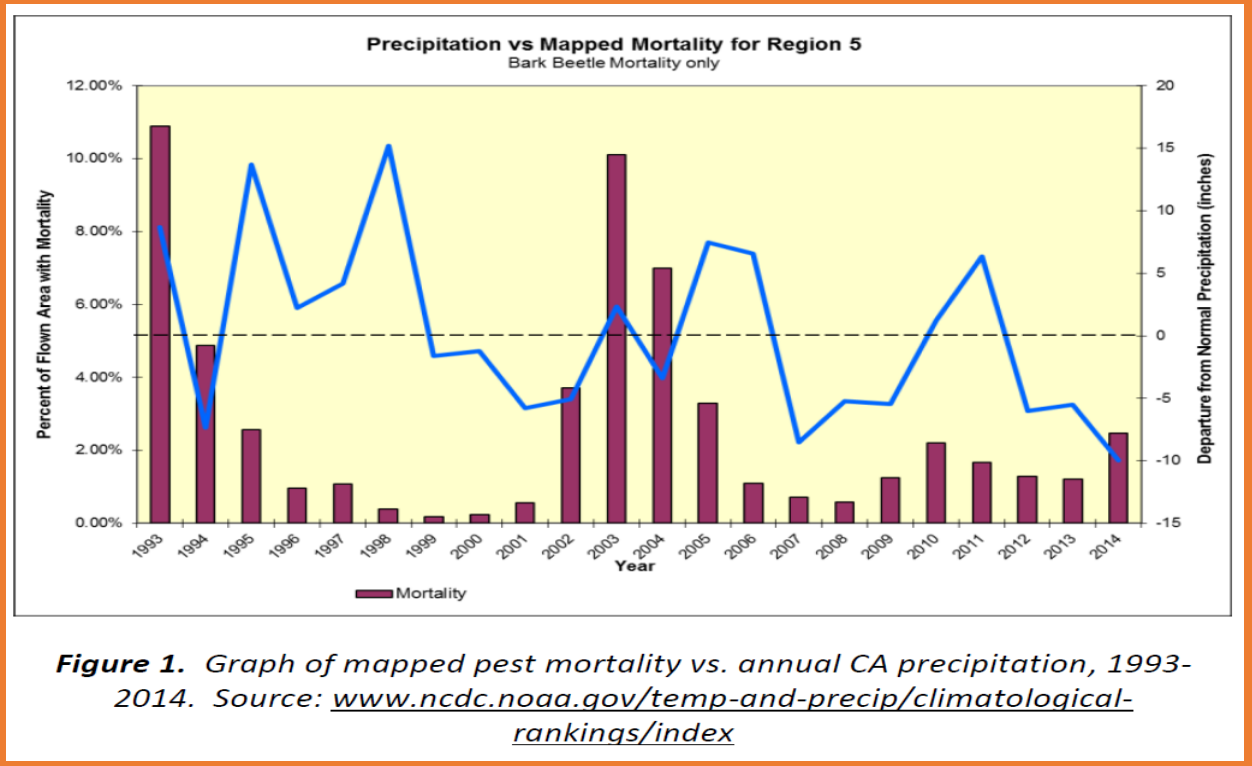
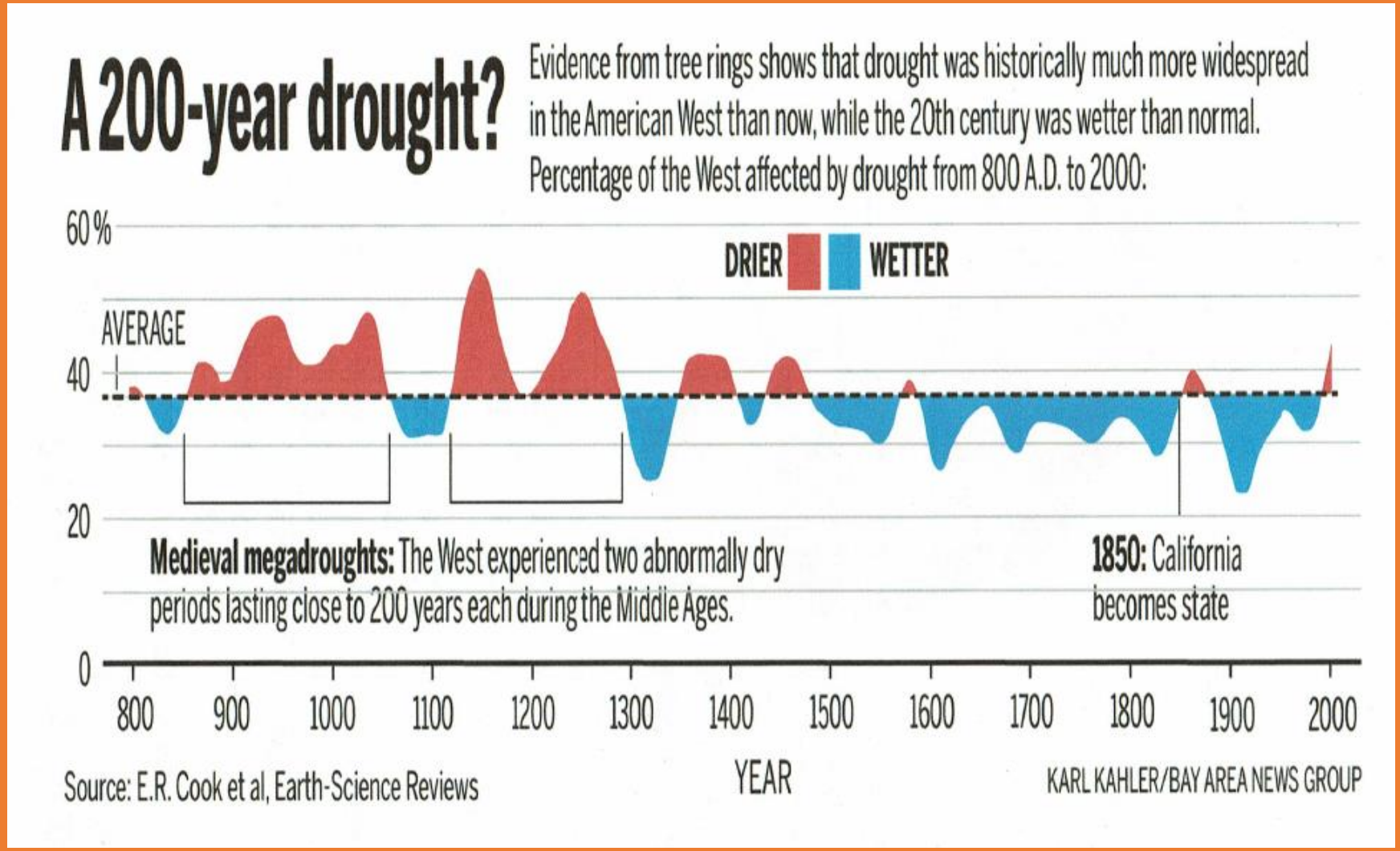


Figure 1. *Graph of mapped pest mortality vs. annual CA precipitation, 1993-2014. Source: www.ncdc.noaa.gov/temp-and-precip/climatological-rankings/index*

Vegetation changes during dry periods



2012-2014 The most severe drought in 1200 years

- **Geophysical Research Letters-Daniel Griffin and Kevin Anchukaitis 2014**
- **Using tree rings to measure drought severity**
- **Looking at soil moisture deficit and the combined influence of precipitation, evapotranspiration and soil water storage.**
- **Precipitation levels severe by not outside the range of variability in the paleoclimate record.**

Fire in the past . . .

Prehistoric fire and emissions in CA forests, woodlands, shrublands, grasslands (Stephens et al. 2007)

"The idea that US wildfire area of approximately two million ha annually is extreme is certainly a 20th or 21st century perspective."

"Approximately 1.8 million ha (4.45 million acres) burned annually in California prehistorically (pre 1800)". Actually that number may be much larger . . .

Much of California has changed since 1850 but our forestlands are still forestlands.

Burning Question: What are the implications of our efforts at fire exclusion in strongly fire-associated forests in the Sierra Nevada?

Based on vegetation need for fire, roughly 500,000 ac burned annually in the Sierra Nevada . . . (North et al. 2012)

How was fire, a key ecological process, removed from the ecosystem? Alan Taylor et al. 2016

Sociological transitions trigger fire regime shifts and modulate fire-climate interactions in the Sierra Nevada 1600-2015.

Native American depopulation and mission establishment reduced the self-limiting effect of Native American burns on fire spread.

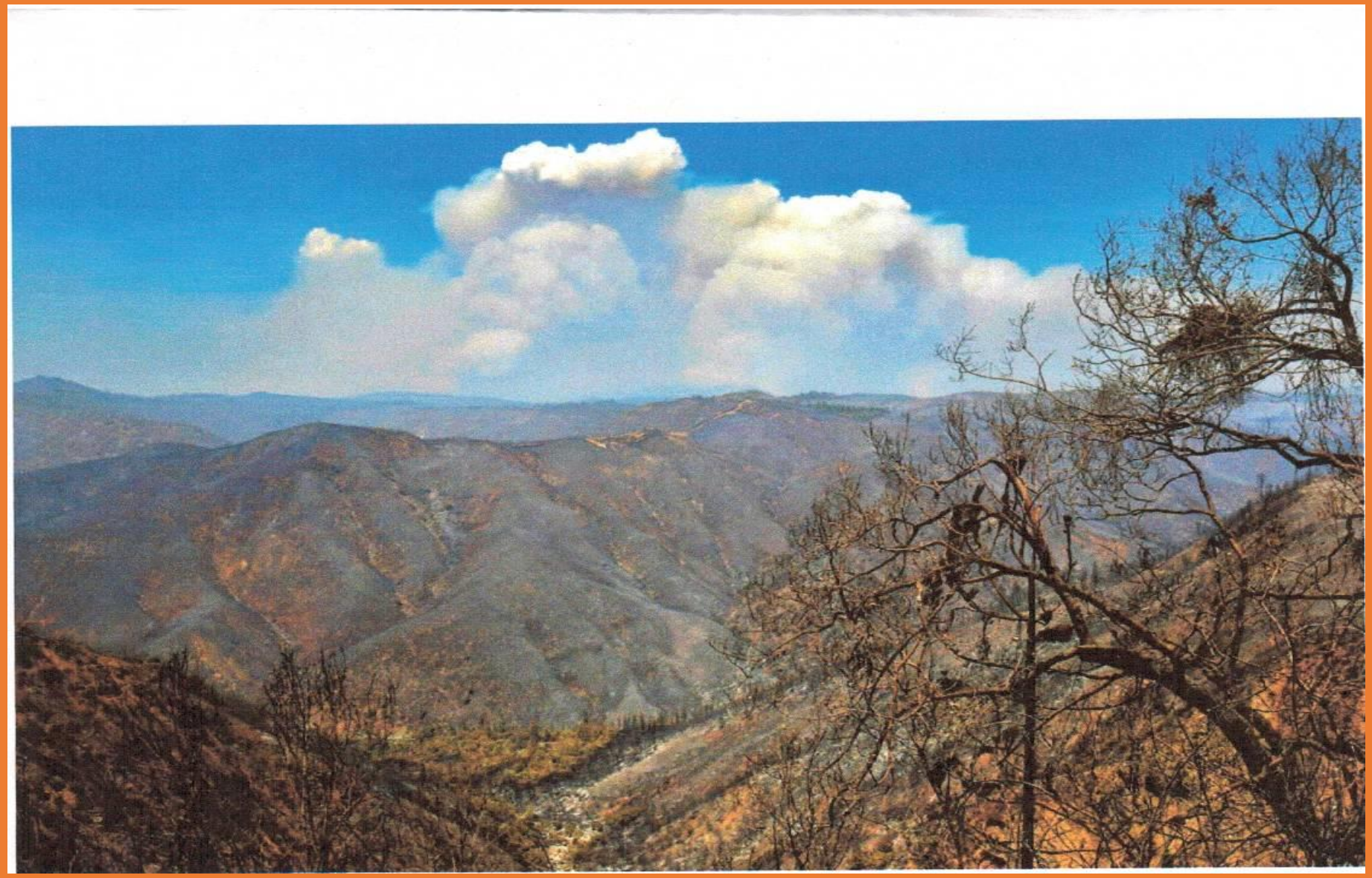
During the Gold Rush and Euro-American settlement the multidecadal relationship with temperature and fire decayed and disappeared after the implementation of fire suppression.

Fire Exclusion is the threat . . . What are the costs of removing fire from the forested ecosystems of California ?

- **Uncharacteristic fire effects**
- **Uncharacteristic mega-emissions**
- **Water supply and water quality impacts**
- **Public health and Public safety impacts**
- **Economic Impacts**

Welcome to Groveland, CA

The Rim Fire 24 hour run—50,000 acres



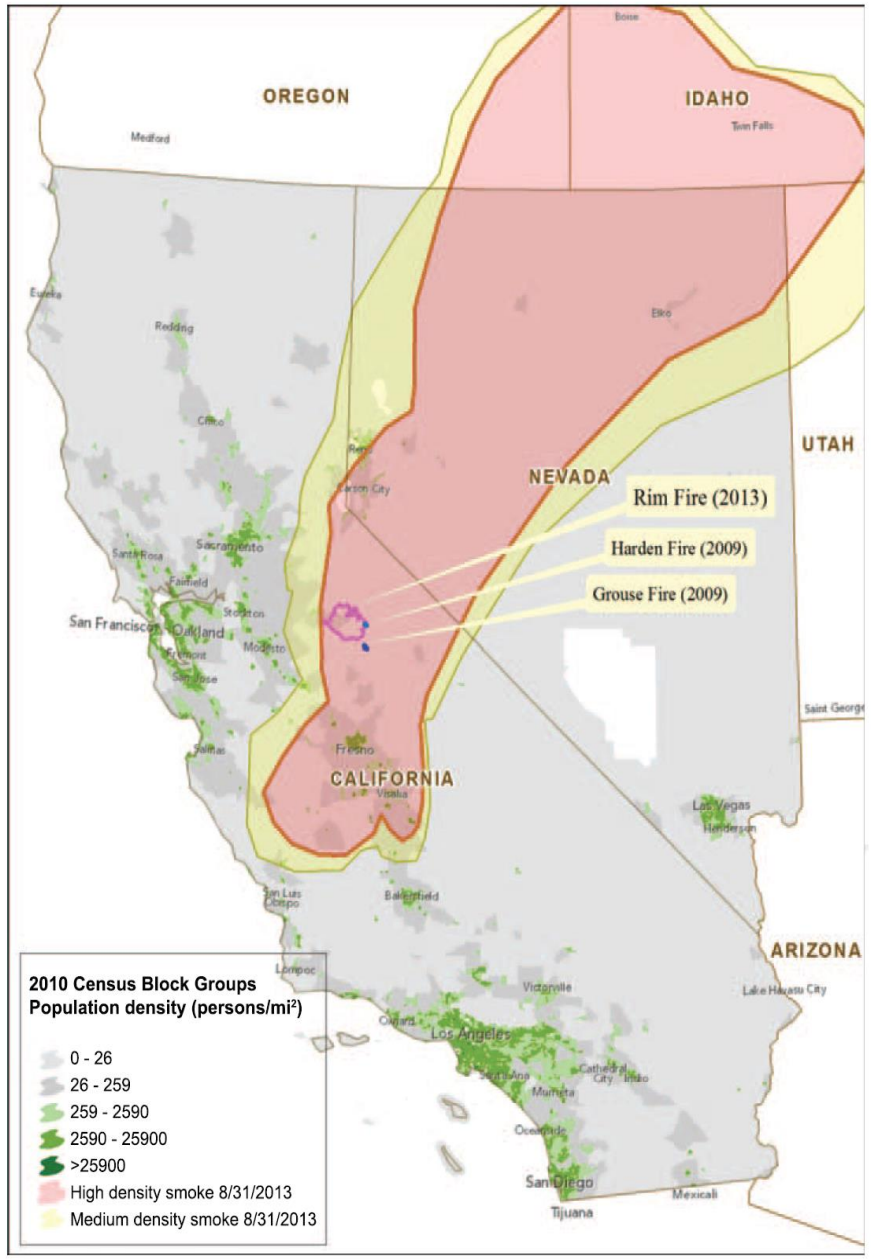


Figure 5. HMS smoke plumes from the Rim Fire on Aug. 31, 2013, a day of extensive heavy smoke impact, overlying population density of census tracts in California and Nevada.

7 Million total person-days of exposure to higher than normal levels of PM 2.5 from the Rim Fire between August 22nd and September 10th.

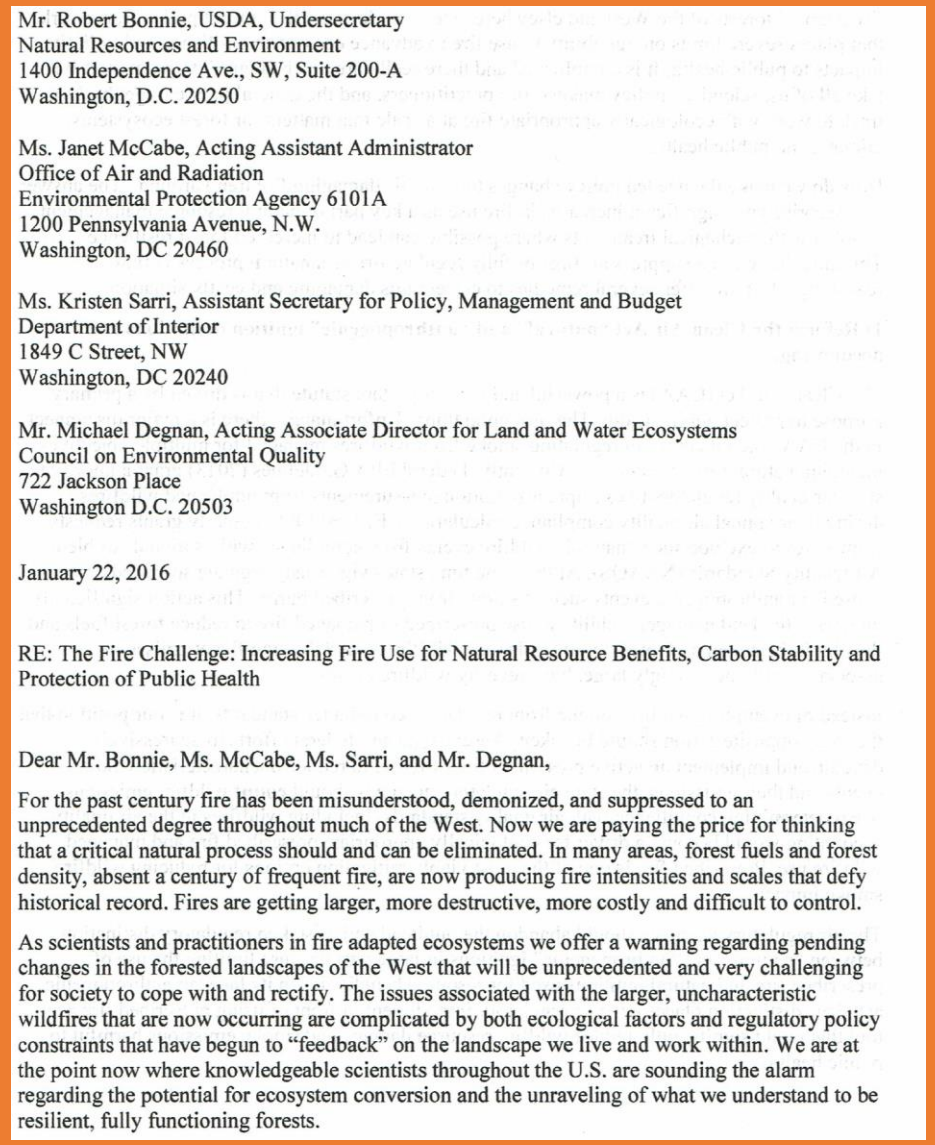
Values that exceed 35 $\mu g/m^3$ are considered unhealthy for sensitive groups.

Large smoke plumes occurring on August 23-25 and August 28-29 when PM values exceeded 55.5 $\mu g/m^3$ which is unhealthy for all populations.

Studies suggest the costs of the Rim smoke impacts approximate $600 million dollars.

Long et al. 2017. Aligning Smoke Management with Ecological and Public Health Goals.

The Fire Challenge Letter: Increasing Fire Use for Natural Resource Benefits, Carbon Stability and Protection of Public Health



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Ms. Kristen Sarri, Assistant Secretary for Policy, Management and Budget
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Mr. Michael Degnan, Acting Associate Director for Land and Water Ecosystems
Council on Environmental Quality
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January 22, 2016

RE: The Fire Challenge: Increasing Fire Use for Natural Resource Benefits, Carbon Stability and Protection of Public Health

Dear Mr. Bonnie, Ms. McCabe, Ms. Sarri, and Mr. Degnan,

For the past century fire has been misunderstood, demonized, and suppressed to an unprecedented degree throughout much of the West. Now we are paying the price for thinking that a critical natural process should and can be eliminated. In many areas, forest fuels and forest density, absent a century of frequent fire, are now producing fire intensities and scales that defy historical record. Fires are getting larger, more destructive, more costly and difficult to control.

As scientists and practitioners in fire adapted ecosystems we offer a warning regarding pending changes in the forested landscapes of the West that will be unprecedented and very challenging for society to cope with and rectify. The issues associated with the larger, uncharacteristic wildfires that are now occurring are complicated by both ecological factors and regulatory policy constraints that have begun to "feedback" on the landscape we live and work within. We are at the point now where knowledgeable scientists throughout the U.S. are sounding the alarm regarding the potential for ecosystem conversion and the unraveling of what we understand to be resilient, fully functioning forests.

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Dr. Penny Morgan
Dr. Jon W. van Wagtendonk
Dr. Stephen Pyne

Recommendations:

1. Quit thinking about California as a mix of jurisdictions and start thinking about the California landscape as eco-regions, nearly all of which need significant increases in fire use. The All Lands, All Hands Approach.

2. The relationship of fire to California's vegetation is not negotiable. Like rainfall, fire is critical and has been around a long time. We need to learn to live with fire, work with it and support the people who do that import fire work.

3. Publicly support changing the default rule in federal planning documents where federal officials have to "justify" using natural ignitions for ecological and other resource benefits (Stephens et al. 2016) and instead, support requirements for full disclosure of the long-term ecological, watershed, public health and safety impacts of continued wildland fire suppression.

4. Require full disclosure of the cumulative impacts of possible mega-emissions (slide 9) from uncontrolled wildfires in and surrounding areas where current burn permitting is being considered.

5. Support improved air quality monitoring tools for prescribed burns and managed fire use. Both advances in remote sensing tools and expansion of on-the-ground monitors need to be supported in California.

6. Burning in tree mortality areas—mid November 2016, KREW Project, Sierra NF “25% mortality, no control issues”

May be the only way to help these landscapes recover, if fire is integrated now, at needle drop, before the stands collapse.

7. Support continued dialogue and collaboration via the Fire MOU Partnership, prescribed fire councils and agency outreach and education efforts to help the public and policy makers understand there is no-no fire option in California. We have much better outcomes when we work with fire than when we fight it.

8. Change how we think about emissions from natural fire. "We contend the landscape use of ecological fire is essential for forest and human health. Radical change is needed where beneficial wildland fire smoke is treated as natural background and exempted from much of the regulation applied to anthropogenic sources."
(Schweizer and Cisneros 2016)

9. Increase support for Fire Safe Councils and Community Fire Protection efforts in the fire prone landscapes of California. The Butte Fire and Valley Fire should not have taken 1,800 homes. Homeowners need to do their part.

10. Don’t repeat the mistake of thinking that we can simply log our way out of this problem of tree mortality and increasing fire risk. While there is a role for well-designed mechanical treatments, only roughly 25% of the Sierra Nevada landscape is available for mechanical treatments, largely due to steep slopes and lack of roads (North et al. 2012). We need to use fire at ecologically relevant levels in California.

They don’t mess around in Florida!

The Ernest Coe Visitor Center at Everglades National Park -- Prescribed Burn 2017

Thank You . . .