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Protecting Sierra Nevada Forests and Communities

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Forest Issues Group

March 17, 2015

Sent via Internet to:
A-and-R-Docket@epa.gov
Docket ID No. EPA-HQ-OAR-2008-0699

Environmental Protection Agency, EPA Docket Center (EPA/DC)
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Re: Comments on Docket ID No. EPA-HQ-OAR-2008-0699

Ms. Susan Lyon Stone
Health and Environmental Impacts Division
Office of Air Quality Planning and Standards
U.S. Environmental Protection Agency

Dear Ms. Stone,

The following comments by Sierra Forest Legacy and coalition partners Defenders of Wildlife, the Central Sierra Environmental Resources Center, the Forest Issues Group, and Sierra Foothills Audubon Society pertain to the National Ambient Air Quality Standards for Ozone, Proposed Rule in the Federal Register Vol. 79: December 17, 2014. These comments are in addition to public comments, information and references submitted at the Federal EPA Ground-Level Ozone Hearing on February 2, 2015 in Sacramento, California. A list of reference papers is attached as an Appendix.

Sierra Forest Legacy (hereafter, SFL) is a coalition of over 80 conservation organizations, formed in 1996 and primarily focused on Forest Service land management in the Sierra Nevada Bioregion encompassing eleven national forests and over twelve million acres of public land.

SFL staff are active partners in the Northern California and Southern Sierra Prescribed Fire Councils, who have written separately to EPA regarding this proposed rulemaking. SFL is strongly supportive of the Prescribed Fire Councils' comment letter. SFL also works in active partnership with Forest Service land managers, Forest Service researchers, academics, public health officials and other key stakeholders regarding the use of prescribed and natural ignitions managed for multiple resource benefits.

Sierra Forest Legacy prefaces our comments by acknowledging the health risks associated with ozone pollution and ozone precursor impacts on human health. The proposed rule and background information on the EPA website http://www.epa.gov/glo/ presents ample information in support of the need for increased limits on ozone pollution, particularly on primary precursor pollutants including, volatile organic compounds (VOCs), nitrogen oxide (NOx), methane (CH4), and carbon monoxide (CO).

Sierra Forest Legacy's concern for clean air and public health is quite high as we will demonstrate below in our comments. While we do not dispute the regulation of ground-level ozone, we are concerned about the proposed rule's impact on the use of prescribed fire and natural ignitions in the management of forest ecosystems in the strongly fire-associated forests of the West, and California in particular.

We believe the proposed rule should better articulate fire's key role as a forest ecosystem regulator, specifically in terms of forest resilience, emission regulation, carbon stability, and public health and safety. It is important for EPA to gather all critical input from forest and fire ecologists to better articulate the natural role of fire in California's ecosystems, and to clarify how natural fire regimes, cultural burning, and active fuels management at a scale critical to ecosystem resilience will be addressed in the rule. Additionally, fire suppression, the assumed default action to address increasingly large, uncharacteristic fires in California, has played a key role in enabling large-patch high severity fire (Steel et al. 2015). Fire suppression has failed to halt the recent mega-fires in California (Rim Fire 2013, King Fire 2014), expending hundreds of millions of public dollars in suppression costs while simultaneously we witness an increasingly restrictive regulatory environment limiting the use of ecological fire as a restoration tool—a key tool that can help limit the extent of high severity mega-fires.

We need fundamental policy change in fire-associated ecosystems specific to fostering the positive role of fire in creating forest resilience and diversity. In California, efforts to suppress the key natural disturbance process during the past century are not only failing but the increasingly large fires are producing emissions, and will continue to produce increased emissions, well outside of the historic range for single events (FR 75383).

The Proposed Ozone Rule notice at (FR 75242) could not have said it more clearly, "Prescribed fire mimics a natural process necessary to manage and maintain fire-adapted ecosystems and climate change adaptation, while reducing risk of uncontrolled emissions from catastrophic wildfire."

While, “wildfire may make it more challenging to meet the NAAQS” (FR75242), setting standards that ignore a key ecosystem process (fire in fire adapted systems) and assuming fire’s role in natural systems can be halted, is a path to guaranteed failure . . . failure to make progress in achieving air quality goals and failure to maintain forest ecosystem function and the full range of ecosystem services forests provide.

There is an opportunity in this rulemaking to clarify the trade-offs and benefits to public health and to forest resilience where federal and state air regulators can support the science-based use of fire in fire-adapted ecosystems AND achieve the best possible outcome in managing uncontrolled emissions. We seek to work with federal and state air regulators to achieve the best possible outcome for public health and forest ecosystem resilience.

I. Fire and Ecosystem Resilience in California—the Natural Background Condition

Lightning fire and Native American burning conducted since the arrival of California’s first inhabitants, (est. 10-25,000 BP) has shaped species composition, vegetation structure and function of California ecosystems. Frequent fire is indisputably a major component of natural background conditions in the state, similar to wind, precipitation and other common disturbance elements.

In the pre-1800s California landscape, fire had a much larger, natural role in ecosystem regulation. In a recent fire paper regarding pre-historic fire area and emissions (Stephens et al. 2007) UC Berkeley fire scientist Dr. Scott Stephens noted that “estimates of prehistoric annual area burned in California is 88% of the total wildfire area in the entire US during a decade (1994-2004) characterized as ‘extreme’ regarding wildfires....The idea that US wildfire area of approximately 2 million ha annually is extreme is certainly a 20th or 21st century perspective.” The researchers estimated average annual burned area as “approximately 1.8 million ha [4.5 million acres] burned annually in California prehistorically (pre-1800).” The approximate historic fire estimate for the forests of the Sierra Nevada is 500,000 acres/year. The emission outputs modeled in the above research used the First Order Fire Effects Model (FOFEM) version 5.21 and represents a cautious approach to fuel model selection and fire return interval, attempting to best represent pre-historic conditions for a wide range of forest, shrubland and grassland vegetation types based on Barbour and Major (1988).

EPA has requested comments on 0_3 background levels and implementation (FR75383). The point of introducing the information (above) is to call into question the nature of two fundamental assumptions: first, related to natural background (NB) levels of ozone, and second, the cultural and ecological implications of separating human beings from the environment they are dependent upon. The “natural background level” estimates for air quality must address the fact that humans have been living in North America for tens of thousands of years and conducting various levels of burning since their arrival. We request that EPA adopt a baseline that accepts use of prescribed fire and natural ignitions as the fundamental ecological condition in fire-adopted ecosystems.

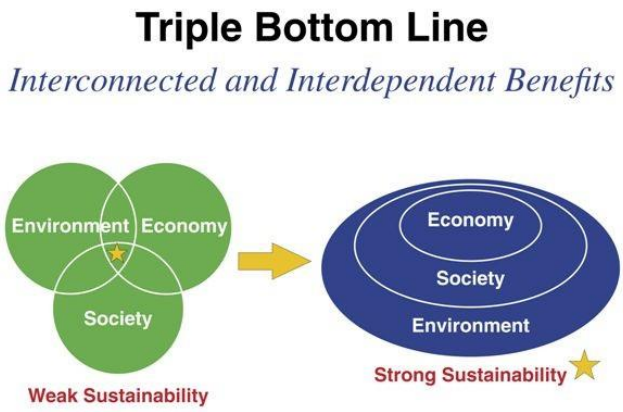
Historical eye witness accounts from the late 1800's suggest smoke and haze were the natural background conditions in the summer and fall in California. California skies, during the fire season, were likely smoky in the summer and fall before fire suppression. An eye-witness account of smoke in northern California forests (C.H. Merriam 1898, quoted in Morford, 1993) reported ''Of the hundreds of persons who visit the Pacific slope in California every summer to see the mountains, few see more than the immediate foreground and a haze of smoke which even the strongest glass is unable to penetrate.'' C.H. Merriam traveled extensively in California and was Chief, Division of Biological Survey for the US (Stephens et al. 2007). The concept of "pristine" air quality in California is an artifact of limited knowledge of the cultural history and ecological functioning of the California landscape.

We request the EPA adopt a baseline for emissions that is directly tied to the science-based fire regimes and vegetation types in the remaining wildlands of California. Understanding how wildland fire functioned prior to European settlement is critical. Today's environments (forests, shrublands, and grasses, rare and at-risk species) result from many thousands of years of association with fire as a key ecological and evolutionary process.

Fire and Sustainability

The USDA, Forest Service is the primary land manager in California. Recently, the agency has been revisiting the cultural and scientific foundations of its mission and in 2010 issued a **National Report on Sustainable Forests-2010 FS 979**. The Report highlights the agency's goal to implement a vision of ***strong sustainability***. The following quotes from p. 1-2 of the report define the Forest Service's new vision and includes the **Triple Bottom Line** diagram that frames the foundation of Strong Sustainability:

- Earlier thinking about sustainability (represented by the left side of the table) are intersecting but separate parts of the system.
- The updated thinking is the environmental realm is the foundation of strong sustainability because the environment provides natural goods and services that cannot be obtained through any other means.
- The core concept of strong sustainability is that the benefits of nature are irreplaceable, the entire economy is reliant on society, and society is reliant on the environment.
- Sustainability is not only about what happens on a landscape to natural resources but also what happens in the hearts and minds of citizens.



Source: Maureen Hart - Sustainable Measures

In line with the goal of ***Strong Sustainability***, the Forest Service is increasing efforts in Region 5 to implement ecological restoration, promote carbon stability, protect California's water quality, and integrate robust use of managed fire into all aspects of conservation planning and management. Fire suppression and the absence of fire in California's strongly fire-associated forests is regularly highlighted in the majority of fire science and forest ecology papers written in the past 20-years (SNEP Vol. II 1996-Section IV; Sugihara et al. 2006; Stephens et al. 2007; Miller et al. 2009; Webster and Halpren 2010; Silvas-Bellanca 2011; Collins et al. 2011; North et al. 2012; Steel et al. 2015).

The Forest Service Region 5, Ecological Restoration-Leadership Intent (R5-MR-048 March 2011, p.2) highlights risks associated with fire exclusion to the forests of California. The need to expand the use of prescribed fire and natural ignitions for resource benefit is one of the more common conversations among resource management professionals and scientists in California today.

This need was highlighted at the recent ***A Future with Fire Conference***, December 2, 2014, in Sacramento, CA, attended by approximately 200 participants including scientists, agency leaders, tribal representatives, conservation organizations and the Northern and Southern Prescribed Fire Councils.

Finally, the Forest Service has recently (10/9/14) signed an agreement with conservation organizations to create an M.O.U. to "support the increased application of managed fire for ecological benefit." Key objectives of the M.O.U. are to:

- Engage a variety of stakeholders, including, but not limited to, the National Park Service, CalEPA, State of California (Resources Agency, air boards), and non-governmental organizations;
- Reduce barriers to implementing managed fire by improving smoke management coordination and engaging in public education and outreach; and
- Increase capacity to implement managed fire through expanded training opportunities and resource sharing.

Sustainability has become the term de jour for validating a myriad of practices touted as benefiting the environment, non-detrimental resources management, or trends in an array of items in the marketplace from light bulbs and dish soap to housing developments on what was once pristine farmland to "clean" coal. In reality, sustainability is a meaningless buzzword absent science-based definition and solid, measurable metrics tied to real trends of change. The presence or lack of fire at appropriate scale, intensity, and consistent with the best available information regarding fire regime and vegetation type is a concrete, measurable suite of metrics to inform land managers, scientists and the public regarding the sustainable nature and ecological trends in our fire-associated ecosystems in the West.

Significant measurable reduction in O_3-forming pollutants since 1997 (FR 75370) is another example of a scientifically measurable trend towards strong sustainability. Captured in the **Triple Bottom Line** figure above are the symbols of "weak" and "strong" sustainability. More importantly is the arrow (trend direction) identified in the poster by Maureen Hart showing the Forest Service's abandonment of the weak and outdated "three-legged stool" model of resource management while adopting the more enlightened, science-based vision of strong sustainability grounded in a healthy, functioning, resilient environment. The sustainability challenge faced by regulatory agencies like EPA and the Forest Service is to create a regulatory balance that supports improved air quality AND fosters ecosystem resilience and ecological integrity in fire-adapted ecosystems in the West. Increasing restrictions on the use of managed fire (prescribed fire or natural ignitions) in strongly fire-associated ecosystems will defeat both goals.

This historic or background natural disturbance level is what many scientists and natural historians characterize as the natural or pristine condition of the past. It is a condition that "delivered" the resilience that is missing from these California landscapes today. A century of fire suppression has led to significant shifts in forest composition, structure, and function, resulting in some fires that are now uncharacteristically intense with larger patches of high severity effects.

There is a desperate need for regulatory relief for fire-adapted ecosystems to increase the use of managed fire in these fire-excluded landscapes. We strongly support EPA's public health goals, but we urge the EPA to expend increased regulatory effort on control of hydrocarbon emissions and other precursor pollutants, and resist the flawed thinking which suggests fire as a natural ecological process can be regulated. Much work can be done to improve a future with fire in California that benefits both public health and fire-adapted ecosystems (see below: Section VI).

II. Recent research suggests increased fire treatments are essential to maintain and increase forest resilience in the Sierra Nevada.

Recent research by forest ecologist Dr. Malcolm North and others (North et al. 2015) report that approximately 10.7 million acres of national forest ownership in the Sierra Nevada in California contain roughly 58 percent productive forest land, with 25 percent of those acres

available for mechanical treatment. In other words, if we can only restore 25 percent of the Sierra Nevada using mechanical treatments which then need fire as a follow-up treatment to maintain lower fuels benefits, the other 75 percent will either be "managed" by unplanned wildlife or the thoughtful, science-based use of natural ignitions and prescribed fire. Planned prescribed fire use or the appropriate management of natural ignitions significantly limits the precursor emissions from larger uncharacteristic events that contribute to ozone and particulate matter (PM) pollution (Schweizer and Cisneros 2014; Cisneros et al. 2014; Cisneros 2012).

The Proposed Ozone Rule (FR 75383) suggests that, "wildfire is a threat that can be mitigated through the management of woodland vegetation." EPA should explore this issue more deeply. In California's Sierra Nevada, with only 25 percent of the productive forest lands available for mechanical treatment, there are only two other choices for the "management of woodland vegetation." One choice is to let increasingly intense wildfire make the decisions for us or two, expand support for an active and robust program of prescribed fire and use of natural ignitions, of appropriate ecological scale, for specific fire regimes in the forests of California**. We are not suggesting a return to pre-1800's California burning since much of the total landscape is now converted to farmland or urban development**. We recommend managing the remaining wild and semi-wild landscapes in a manner that robustly integrates fire back into these fire-adapted systems for the benefit of these natural resources, the ecological services they provide and to benefit public health from lower wildfire emissions.

III. Fire Suppression effects are damaging the forest ecosystems in the Sierra Nevada.[1]

The current paradigm of fire suppression results in few fires with low to moderate fire effects and significant numbers of fires that escape initial attack, becoming large and severe. In another recent *Journal of Forestry* (2015) paper Dr. Marc Meyer, Forest Service Zone Ecologist for the southern Sierra Nevada, looked at fire severity indicators and the effects of natural ignitions (fires used for resource objectives) versus effects of fire suppression, compared to the science-based references for the natural range of variation (NRV) of fire effects in the Southern Sierra. Dr. Meyer found that "resource objective fires . . . were overwhelmingly within the natural range of variation." Meyer noted that most fires managed for suppression objectives fell outside the range of NRV for high severity fire effects (proportions and patch size). Despite increasing expenditures on fire suppression, these intense fires that escape initial attack represent a growing proportion of the annual area burned in California's forests, creating periods of severely degraded air quality, threatening human life and property, and altering the natural landscape, with implications for the conservation of threatened and endangered species.

1 This comment section does not pertain to firefighters who risk their lives protecting life and property. It is focused on an outdated strategy for "protecting" forests and other vegetation types from the primary disturbance process they have evolved with and desperately need returned.

Separate from protecting life and property around homes, the consequences of the fire suppression paradigm are driving increased resource destabilization and increased emissions. Federal EPA should deeply examine and disclose the impact of fire suppression in the wildland setting that is driving adverse ecological and public health outcomes. Protecting structures is one thing, causing major disruption to a fundamental, natural ecological process throughout the West is something very different and ecologically destabilizing.

Reversal of these trends requires the restoration and maintenance of forest conditions that once allowed for, and were maintained by, frequent low and mixed-severity fires. Turning around 100-plus years of fire suppression and the demonization of fire is no easy task. Carefully and regularly applied fire is the single most effective and efficient tool for restoring and maintaining forest health and resilience, while protecting against future, large uncharacteristic fires and the related threats to public health and welfare.

In a recent research paper by (Steel at al. 2015) titled, *The Fire Frequency-severity Relationship and the Legacy of Fire Suppression in California Forests*, the authors found that yellow pine and mixed conifer forests "tend to burn with greater proportions of high severity fire as either time since last fire or the mean modern fire return interval (FRI) increases." This is further evidence that frequent fire is a significant limiting factor on uncharacteristic fire effects (and thereby, emissions) in lower elevation Sierra Nevada forests.

IV. Recent Air Quality Science in California (2012-2014)

New science requires a "hard look" at assumptions guiding air quality regulations and the role of ecological fire in forest ecosystems. In recent atmospheric pollution research (Cisneros et al. 2014), academic and Forest Service scientists focused on source pollution generated in particulate matter less than 2.5 microns in the Sierra Nevada compared to the Central Valley, a major non-attainment area in California. The authors found for air quality regulatory purposes, air quality throughout the southern Sierra Nevada is assumed to be similar to the Central Valley. But locations used in their study (2002 to 2009) ranging from 91 meters in the Central Valley to 2598 meters in the Sierra Nevada, at elevations above 500 meters are actually in compliance with federal standards for $PM_{2.5}$. Fires during the time of the study were typical of the historical size and intensity of fires in this area of the Sierra Nevada**.** The authors determined that, while fires during the study period had an impact on air quality, "they did not appear to be a major driver in exceeding the United States Federal $PM_{2.5}$ standard" in the southern Sierra Nevada.

In the section of the above paper discussing the policy implications of the effects of fire on $PM_{2.5}$, the authors state that based on monitoring information at locations in rural and undeveloped monitoring sites, these sites did not exceed "mean annual or 98^{th} percentile federal standards." Another key finding of the study was that monitoring sites located near the largest burn areas, "did not have the largest concentrations of $PM_{2.5}$." This suggests that "natural ignition fires burning at historic intensities and areas do not significantly contribute to violation of the current federal standards in many instances."

Regarding background conditions for $PM_{2.5}$ the authors note, "Considering the total area burned in California in 2008, the increase in $PM_{2.5}$ could be assumed as the historic level of non-anthropogenic $PM_{2.5}$ from fire during a normal year." EPA should fully examine the results and implications of this key research paper on current air regulatory policy.

In another fire management and air quality case study from the southern Sierra Nevada, (Schweizer and Cisneros 2014), the authors monitored the 8,370 ha (20,422 ac) Lion Fire in 2011 on the Sequoia National Forest for $PM_{2.5}$ levels at monitoring sites used to access exposure, public health impacts, and to quantify annual air quality during a year with a fire that was within the normal fire size and intensity for this area of the Sierra Nevada. While the Lion Fire burned for 2 months, the Air Quality Index readings of moderate to good were recorded at the most impacted sites of Johnsondale, Kernville, and Camp Nelson. Smoke impacts to $PM_{2.5}$ concentrations did not reach the Central Valley. The authors concluded, ". . . this type of fire can be implemented with minimal public health impacts thus allowing an opportunity for air and fire managers to alter policy to allow additional burning in an area with severe anthropogenic air pollution and where frequent widespread fire is both beneficial and inevitable."

In contrast to large, high severity fire the authors conclude that, "the more extensive air quality impacts documented with large high intensity fire may be averted by embracing the use of fire to prevent unwanted high intensity burns. A widespread increase of the use of fire for ecological benefit may provide the resiliency needed in the Sierra Nevada forests as well as be the most beneficial to public health through the reduction of single dose exposure to smoke and limiting impacts spatially."

Also, it is interesting to note in Schweizer and Cisneros (2014) that the forest communities captured in a larger designation of federal non-attainment including Kernville, Springville and Pinehurst, show typical federal non-exceedance levels of $PM_{2.5}$ when site-specific monitors record year-round concentrations adjacent to forest communities which do not coincide with higher unhealthy readings in the Central Valley. EPA should address these complications related to limited air quality monitoring and their impact on the use of ecological fire in the Sierra Nevada and elsewhere.

In contrast, the same authors joined with other health science and air quality experts in 2012 to analyze the effects of the 61,000 ha (150,000 ac) 2002 McNally Fire on air quality in the San Joaquin Valley and southern Sierra Nevada (Cisneros et al. 2012). The federal PM_{10} standard was exceeded four times during the fire but violations of the California PM_{10} standard "increased drastically during the fire." The authors noted that the California PM_{10} standard was violated six times before the McNally Fire and 164 times during the fire. Highest O_3 concentrations increased downwind of the fire and increased by a factor of two, in two locations. Some of the O_3 increase was attributed to ozone precursors NOx, CO, and VOCs emitted from the fire.

In response to the potential increase in large, high intensity wildfires in combination with urban pollutants from the Central Valley impacting rural mountain communities the authors recommend "a network of densely distributed passive samplers aided by real-time portable **O_3** monitors and portable PM monitors is essential for evaluating effects of wildland fire on ambient air quality." They conclude with the recommendation that, "A return to historic fire size and intensity may be the best solution for reducing O_3 and PM exposure in the Sierra Nevada."

We ask that EPA explicitly address these issue with a clarity and depth consistent with the comments and the research cited.

V. Concerns over relying on the Exceptional Events Rule to support fire use.

The Exceptional Events Rule (EER) is cited in the proposed language as a potential pathway for exempting beneficial fire under the new standards (FR 75383-75384). We are concerned about the ability of the EER to allow for natural, beneficial fire to play a role to the extent that it is needed. Currently, the EER only treats wildfire and prescribed fire as exceptions under very particular circumstances that are not necessarily consistent with restoration and management goals on the landscape. For example, the EER can be used to exempt fires that are one-time events and not expected to occur again at the same location, but this contradicts management needs, where repeated application is necessary to restore more frequent fire and maintain resilience. While repeat burning may not be occurring under the same fuel conditions, it is essential that fire occur across the landscape consistent with the fire return intervals and natural range of variation in patch size and intensity. This reiterates the need for ecological and cultural burns to be classified as natural background emissions sources and treated differently than other industrial and anthropogenic sources. Also, the process to monitor and apply for the EER is cost prohibitive and cumbersome; this is especially true for prescribed fire, and as a result, the rule is rarely used for that purpose. While we appreciate EPAs commitment to "working with federal land managers, tribes and states to effectively manage prescribed fire use to reduce the impact of wildland fire related emissions on ozone" (FR 75384) to our knowledge, it has never been used to exempt prescribed fire in California.

We believe that beneficial fire use should be the primary component of any practical strategy to restore and maintain forest resilience on a landscape scale and protect the public from severe wildfire events and related pollutants. The current regulatory environment limits the duration of planned burns, limits burn windows, limits burn seasons, and makes the process more costly and politically risky for managers to attempt. EPA understands the benefits of using prescribed fire to limit emissions from larger, uncharacteristic fires (FR 75384). Whether in this proposed rule-making or in the upcoming revisions to the Exceptional Events Rule later this year it is time for EPA to offer a more streamlined, less costly and cumbersome process that fosters the use of beneficial fire. Promoting landscape fire plans, smoke management BMPs, collaborative coordination between stakeholders, fire managers, air regulators, scientists and public health officials is the best path forward. Finally, we must cease fostering the false dichotomy in recent rule language that suggests human beings somehow live outside the

environment that sustains use all. The use of such terminology as “natural” verses “anthropogenic” sources or causes is outdated and confusing framing that is stuck in the past. Fire is an inevitable and natural part of California’s future. We must accept that there are emissions trade-offs, learn how better to live with that fact and get on with the work of large scale restoration of fire-adapted ecosystems.

VI. Burning and Protecting Public Health–Increasing collaboration to reach those most impacted by ecological burning.

Sierra Forest Legacy and the Forest Service in Region 5 (Sequoia National Forest-Hume Lake District) have recently partnered with the Fresno-Madera Medical Society and others to establish an Air Quality Alert Notification System to utilize timely and best available weather information to make direct contact with the air-quality challenged communities of the southern Sierra Nevada through their physicians, school nurses and the public health community. The purpose is to alert these individuals to a pending prescribed fire, the ecological need for such fire as a restoration tool and to give them advanced notification of the event so they can better protect themselves and their families from the impacts of short-duration smoke in their communities. There has been a very positive response from San Joaquin Air Board staff and the Fresno Area Lung Association in developing this notification system.

An early alert system was designed for the Boulder Prescribed Burn and the two notices used for the project can be downloaded at:
http://www.sierraforestlegacy.org/CF_ManagingFire/AirQualityPolicy.php
The Boulder project is located in an area with no mechanical treatment options. Managed fire is the appropriate tool for this landscape. These notification alert examples are the first run of what should be a much broader, collaborative effort between land managers, air regulatory, public health officials, air quality scientists and modelers, conservation groups and the general public. One aspect of collaborative work is exemplified by the use of integrated, linked models to assess a variety of fuel, emissions and weather conditions to predict smoke intensity, dispersion and duration on impacted landscapes. BlueSky is one such modeling framework:

BlueSky modularly links a variety of independent models of fire information, fuel loading, fire consumption, fire emissions, and smoke dispersion (http://www.airfire.org/bluesky/)

While BlueSky and other predictive tools are currently in use, SFL, Forest Service, public health organizations, air regulators, scientists and conservation organizations seek a significantly expanded outreach, education and communication systems to better notify and protect public health—especially those most at-risk from short-duration smoke impacts. There is plenty of opportunity for good work on this front. What we seek and ask EPA to consider in this rule-making is to recommend collaborative, working groups in fire-adapted landscapes whose task it is to continually refine and expand public education and outreach using the best available science (ecological, public health, air quality and emissions prediction), best collaborative practices, and the best multi-media, multi-stakeholder effort that marries the need for fire in fire-adapted systems to the need and shared desire to protect and enhance public health.

These issues should no longer be viewed as antagonistic (fire versus health) but instead as challenging but workable mutual goals that are supported by our best actions and intentions.

Recommendations for EPA to Consider:

- Intensified outreach to local and regional public health communities with a goal of expanding the timely notification system targeting at-risk respiratory patients and families via their physicians, public health workers, hospitals, school nurses and other caregivers.
- Intensify education efforts on why fire is a key aspect of ecosystem management and resilience through a multi-media outreach effort.
- Intensify multi-media tools to reach the general public and to rapidly alert those willing to sign-up for notification of fire events and expanded options for health protection.
- Expand collaborative work between air regulators and air quality experts, fire scientists, land managers and public health officials before, during and after burns. This should include collaborative media presentations, webinars, in-service education among professionals in these different fields.
- Expand Air Quality monitoring in remote areas to better identify, source, and assess smoke impacts in rural areas (See policy recommendations in Schweizer and Cisneros 2014; Cisneros et al. 2014; and Cisneros et al. 2012).
- Expand the understanding of cultural burning and its relevance to many aspects of Native American culture from food gathering and site preparation, maintaining basket weaving materials, ceremonial and religious practices, as a right of First Nations people among the public, air regulators, and land managers.
- Clarify commitment to reduction of smoke impacts and smoke management planning by asserting EPA's desire to see increased collaborative engagement in the effort to "minimize exposure to sensitive populations" and ensure that burners are educated in smoke BMPs as per the 2007 Exceptional Events Rule March 22, 2007 (FR 13567).

VII. Conclusion

In conclusion we request the EPA undertake the following related to this rule making process:

1) The NAAQS Ozone Proposed Rule and the pending update in the Exceptional Events Rule should better address a broader definition of beneficial fire, including prescribed fire and managed wildfire. Fire's role in ecosystem resilience, in fostering carbon stability in fire-adapted systems, and overall biodiversity enhancement needs to be explained consistent with the best available science.

2) The NAAQS Ozone Proposed Rule needs to clearly define the emissions trade-offs and natural resources impacts associated with beneficial fire use when compared to uncharacteristic fires in California.

3) The NAAQS Ozone Proposed Rule should address the scientific information presented in this letter pertaining to the scale of historical fire and emissions in California; the limited options for mechanical fuels treatments (25% of the landscape) in the Sierra Nevada; the impacts of fire suppression on emissions and forest resources compared to managed fire and the natural range of fire effects; the recent air quality research and recommendations presented above; and the concerns expressed by the two Prescribed Fire Councils and by Sierra Forest Legacy in our comment letters regarding the lack of utility of the Exceptional Events Rule as an option to support appropriate fire use. Finally, please address the need to broaden collaboration between land managers, air regulators, public health officials, scientists and conservation organizations to improve the protection of public health and those most at-risk from smoke impacts.

4) As outlined by the Western Regional Air Partnership (2005), it is important to categorize cultural burning and ecological burning as natural background emissions sources, and treat them accordingly. The distinction between fire used to **maintain** an ecosystem that is currently in an ecologically functional and fire resilient condition is considered a "natural" fire while fire used to **restore** an ecosystem is considered "anthropogenic" fire and is placed in a more stringent regulatory environment (WRAP 2005, section 2.4). This makes little sense. While we understand there may be different fuel conditions, and therefore emissions, in a maintenance fire versus a first-entry burn, based upon North et al. (2015) roughly 75 percent of the forested landscape in the Sierra Nevada will see fire that we manage, or fire that we can't. The climate-impacted forests of California need fire reintroduced at significant scale, now. It is time to end the regulatory dissection of this critical ecological process.

We request further engagement with EPA administrators, USDA and Forest Service leadership, air quality regulators, and fire, forest and air quality scientists in California in order to have the deeper conversations necessary to resolve these complicated public health and forest restorations issues—a conversation that cannot be had in the context of a brief public hearing.

Thank you for this opportunity to comment on the Proposed Ozone Rule.

Sincerely,

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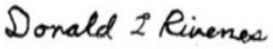

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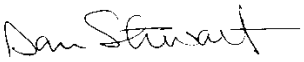

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