CALIFORNIA CHAPARRAL INSTITUTE
...the voice of the chaparral

January 12, 2018

California Board of Forestry and Fire Protection
Attn: Edith Hannigan, Board Analyst
Email: VegetationTreatment@bof.ca.gov

Dear Ms. Hannigan and Members of the Board,

We respectfully ask the Board to consider the following question: *Would the fuel treatments, as envisioned in the current Draft Programmatic Environmental Impact Report (DPEIR) for the state's proposed Vegetation Treatment Program (VTP), have prevented or significantly reduced the devastating loss of life and property during the 2017 Tubbs Fire, Nuns Fire, Atlas Fire, and the Thomas Fire?*

Based upon our preliminary research, we do not believe it would have.

Considering that such fires are predicted to increase due to climate change, the presence and continued building of communities in very high fire hazard zones, and the frequency of ignitions likely increasing with a growing population, the second question that we respectfully ask is:

How can we help the Board develop a comprehensive fire risk reduction plan that will save lives, property, and protect natural resources from the wildfires that are responsible for killing the most people and causing the most damage?

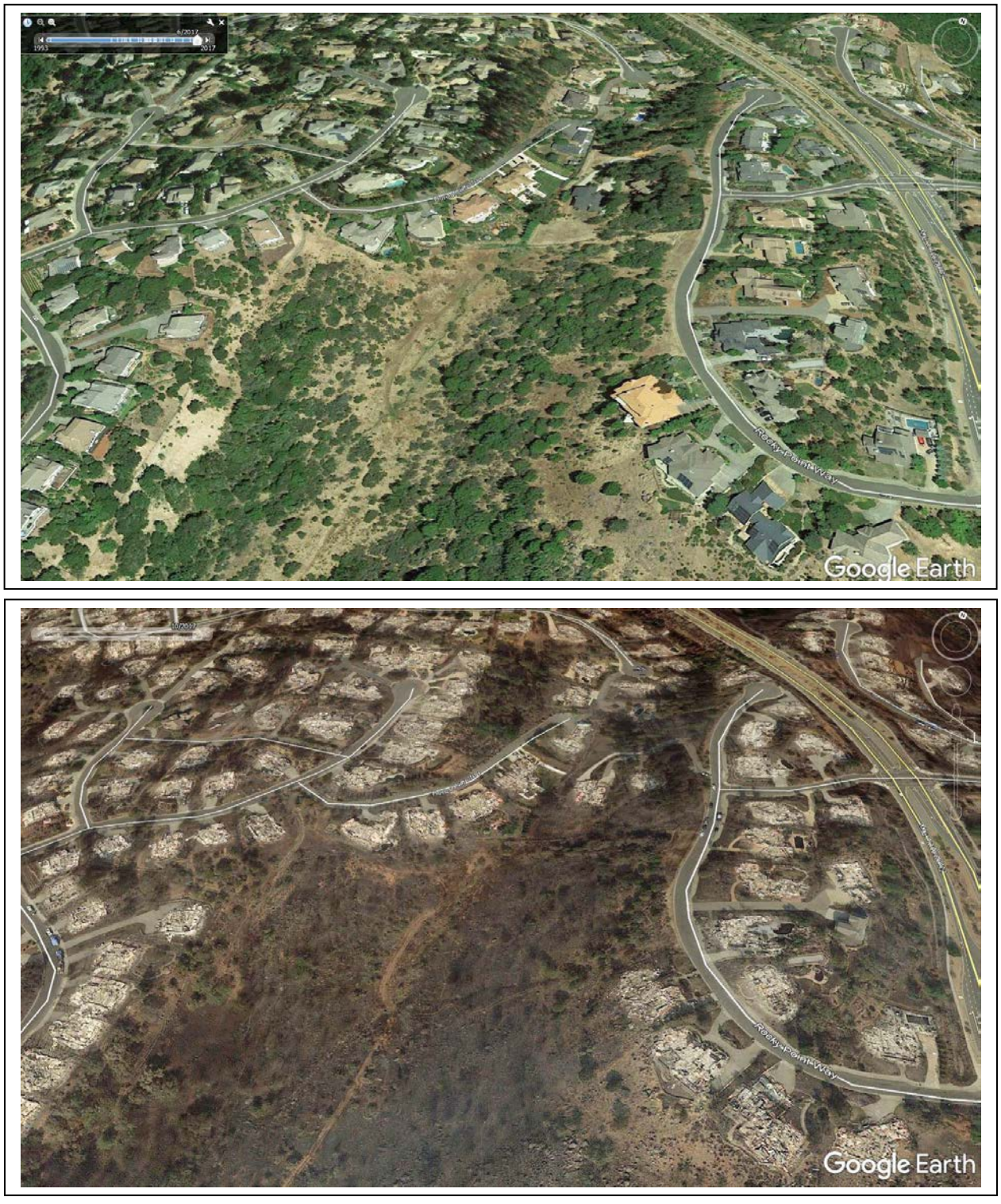
We understand that strategic fuel treatments beyond community boundaries can be effective fire suppression tools during non-wind-driven fire events. But those are not the fires that that cause the most devastating losses. In fact, we believe the DPEIR's current focus on vegetation treatments may facilitate the type of poor planning that allowed the kind of developments that were devastated by the 2017 wildfires.

We also understand the Board believes that vital fire risk reduction activities (e.g. regulating buildings in which people live, land planning, defensible space), "exist outside the scope of the proposed program." (1-15)

However, after witnessing multiple, wind-driven fires devastate so many lives and communities in which fuel treatments of the type the VTP envisions have had little impact, we believe it is time for the Board and Cal Fire to change their approach to a comprehensive one. Rather than focusing on **trying to control wildfires with fuel treatments,** a more effective approach would be to **focus on saving lives and property.**

If not the Board, the State Fire Marshal, and Cal Fire, who would be responsible for coordinating such a comprehensive program?

The number of lives lost and homes burned in the 2017 wildfires should inspire a new approach to fire protection, because what we have been doing (focusing on fuel) is not working.



Figures 1 and 2. Fountaingrove, Santa Rosa, California. Before and after the 2017 Tubbs Fire.

For example, nearly all of the homes in the Fountaingrove II community of Santa Rosa (Figs. 1 and 2) were built either right on or near ridgelines, geographical features well known for high fire danger (Fig. 3). Despite significant amounts of defensible space (note cluster of homes in the cul-de-sac at the lower right in Fig. 1), the homes were devastated by the Tubbs Fire. Also note the post-fire condition of forested areas in the upper portion of Figs. 1 and 2, and upper right in Fig. 3.



Figure 3. Ridgeline destruction at Fountaingrove II. This photo was taken looking north across the canyon from the former site of the orange-roofed home in the lower right corner of Figure 1.

As was the case in the 2007 Witch Creek Fire (IBHS 2009), it is likely nearly all these homes ignited from wind-blown embers and/or house to house radiant heat rather than flame contact from surrounding wildland vegetation.

The Fountaingrove II Open Space Maintenance Association had a rigorous fuel management program. The Association also understood well the danger of dry grasses and embers. In a 2013 bulletin to homeowners they warned,

> Over 90% of the homes destroyed by fires generated in the Wildlands are lost due to flying embers, not from fire lapping at their doorstep. A properly "Fire-scaped" home next to the Wildland Urban Interface can survive – if the owners have landscaped their property in a fire wise manner and keep all weeds and grasses clipped. (FOSMA 2013)

Yet the community was devastated in the Tubbs Fire.

We respectfully ask the Board, given that the Fountaingrove II community followed a vegetation management program with a focus similar to what is being proposed in the DPEIR, what policies would the Board help facilitate that would more successfully address the devastation caused to the community by the Tubbs Fire?



Figure 4. Coffey Park, Santa Rosa, California. Distance between community and wildland.

Figure 4 shows the community of Coffey Park in Santa Rosa (at the tip of the red arrow) devastated by the Tubbs Fire, and its distance from the nearest significant amount of wildland vegetation. – nearly a mile. Highway 101 was also between the community and the fire. Similar fire jumps over multi-lane highways and other large areas occurred during the 2003 Cedar Fire and the 2007 Witch Creek Fires in San Diego County.



Figure 5: Loss at Coffey Park. An older neighborhood far from the fire front, the entire community was ignited by a massive rain of embers driven by strong winds.

We respectfully ask the Board, what would have prevented these homes from igniting during the Tubbs Fire and what policies would the Board be willing to propose to prevent this kind of disaster in the future?

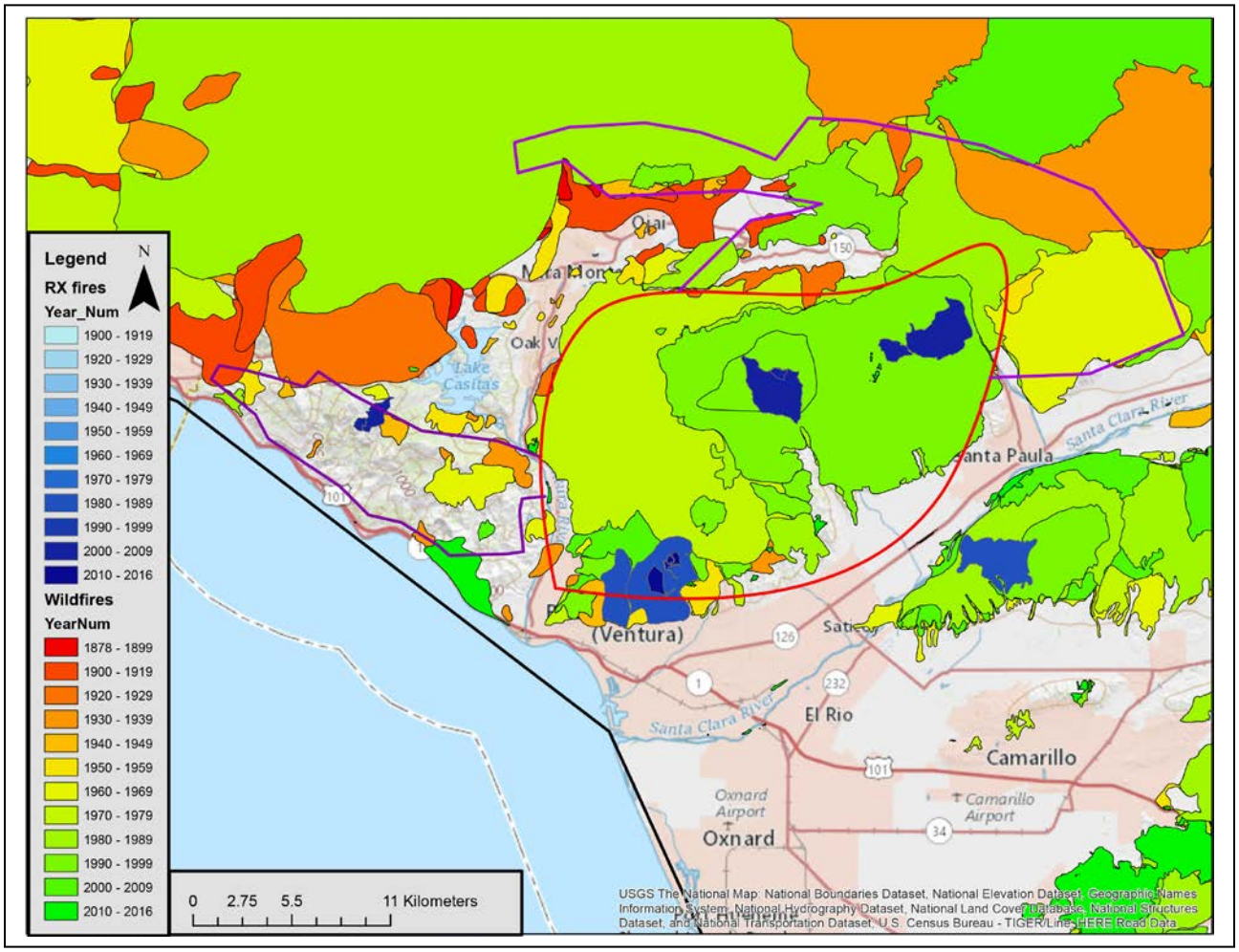


Figure 6. Prescribed burns within the Thomas Fire. The blue polygons show recent prescribed burns conducted by the Ventura County Fire Department. The red outline shows the rough perimeter of the Thomas Fire during its first hours. Source: USGS.

One of the key treatments described in the DPEIR is prescribed burning. As evidenced in Fig. 6 above, recent prescribed burn treatments (shown in blue) were not helpful in preventing the spread of the 2017 Thomas Fire.

The easternmost prescribed burn off Salt Marsh Road is approximately downwind of the probable origin of the Thomas Fire. The middle burn is in Aliso Canyon. Neither of these appear to have provided much in the way of anchor points for fire suppression activities.

Wind-driven fire generally spreads faster through grassy fuels than shrub fuels. Consequently, it is likely that the fire actually spread faster through these fuel treatments than it might have through the native shrubs that were present prior to treatment. Of course, with the high winds and low humidity that characterized the fire, nothing else really mattered than the extreme fire weather conditions.

The burns near the southern edge of the fire, in Hall, Barlow, and Sexton Canyons, have been worked on for years and were intended to create opportunities for controlling a fire.

In the initial run, the head fire spread 14 miles from the origin outside of Santa Paula to downtown Ventura in about five hours, spreading by ember ignited spot fires the entire way. This kind of fire behavior would likely defeat any fuel break - nothing on the ground can stop a fire that is basically flying through the air.

Further research is obviously needed to determine all the factors involved in the Thomas Fire's spread, but the consequences are clear from the damage assessment shown in Figure 7 below. The prescribed burns did little to protect the community. This is especially the case for the southernmost prescribed burn just above the northern edge of Ventura.

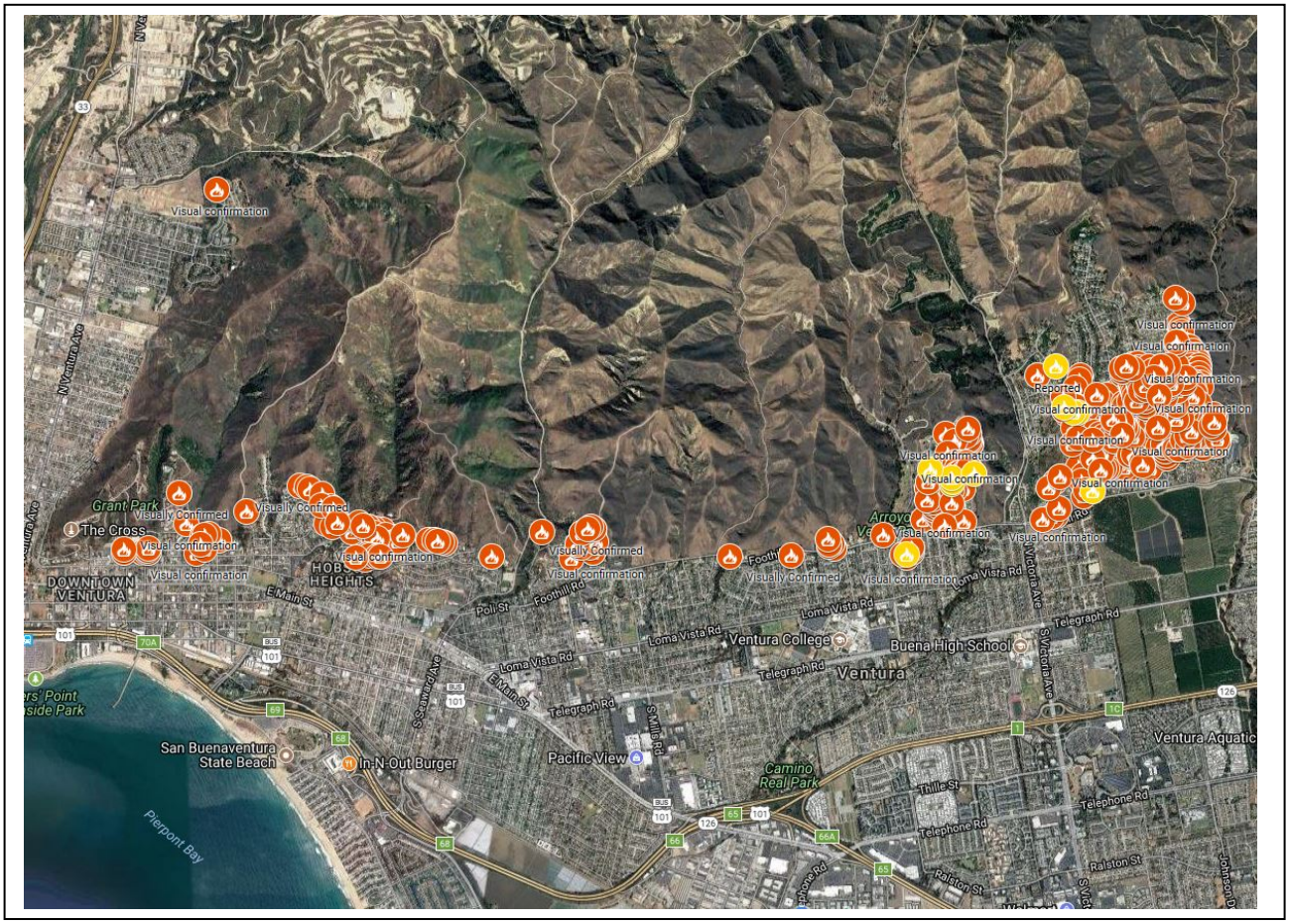
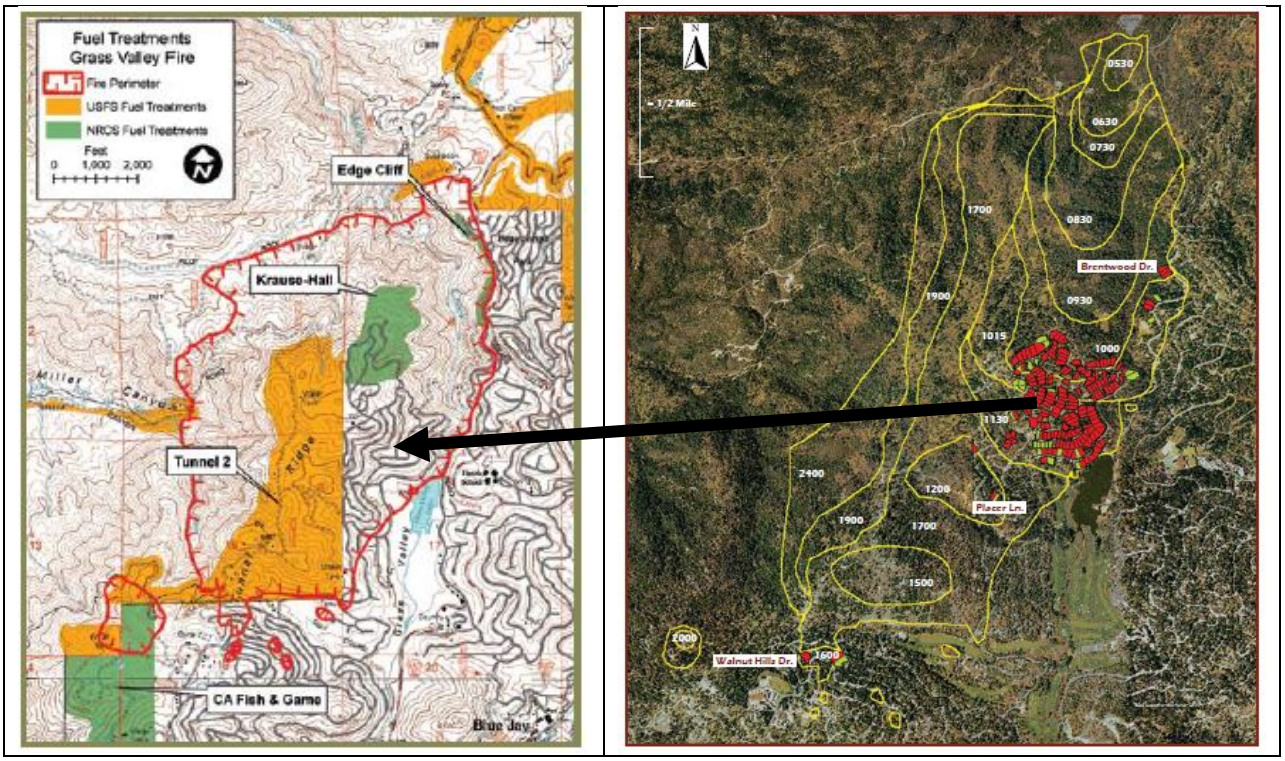


Figure 7. Home losses from the Thomas Fire on the edge of Ventura. Burned homes are indicated by orange dots. A prescribed burn was conducted just above the burned homes in the center middle of the image. Based on visual confirmation as of 12/8/2017: https://www.google.com/maps/d/viewer?mid=10S-m7mBzbjvG1rjiJ8wFAIbeG-F5VoKS&ll=34.2989948363656%2C-119.20525410881879&z=16



Figures 8 and 9. The 2007 Grass Valley Fire, Lake Arrowhead, California. Map on the left show fuel treatments as orange and green polygons (Rogers et al. 2008). Map on the right shows location of 174 homes burned in the fire (Cohen and Stratton 2008).

In the 2007 Grass Valley Fire, the US Forest Service and the Natural Resource Conservation Service conducted several fuel treatments around the community of Lake Arrowhead (Fig. 8). Reportedly, the fuel treatments performed as expected by allowing firefighters to engage the fire directly and reducing the rate of spread and intensity (Rogers et al. 2008). However, the end result for the community was much less positive. One hundred and seventy-four homes were lost (Fig. 9).

The comprehensive analysis of the Grass Valley Fire by US Forest Service scientists (Cohen and Stratton 2008) concluded that,

> Our post-burn examination revealed that most of the destroyed homes had green or unconsumed vegetation bordering the area of destruction. Often the area of home destruction involved more than one house. This indicates that home ignitions did not result from high intensity fire spread through vegetation that engulfed homes. The home ignitions primarily occurred within the HIZ due to surface fire contacting the home, firebrands accumulating on the home, or an adjacent burning structure.
>
> Home ignitions due to the wildfire were primarily from firebrands igniting homes directly and producing spot fires across roads in vegetation that could subsequently spread to homes.

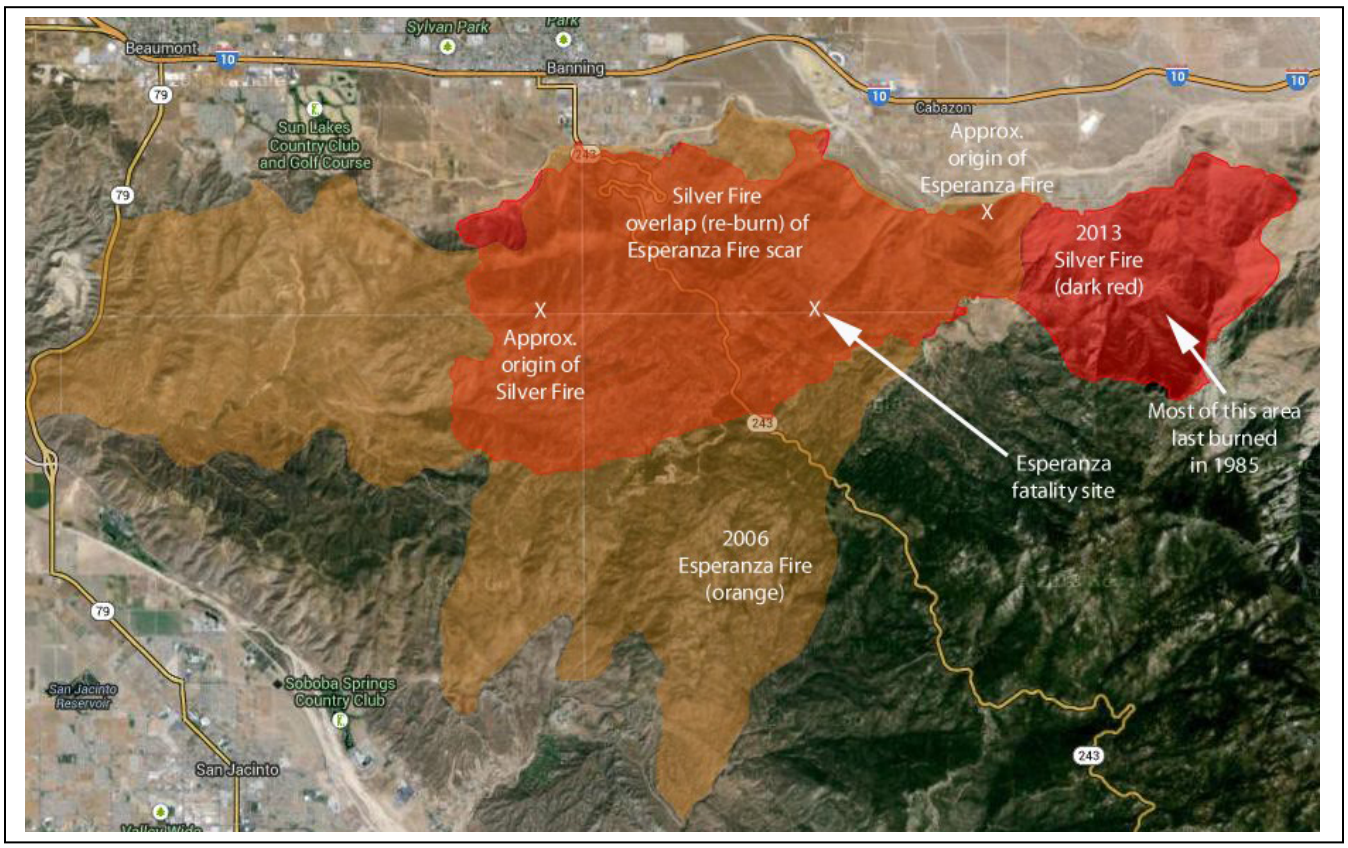


Figure 10. Reburned after seven years. The 2013 Silver Fire reburned almost entirely within the deadly 2006 Esperanza Fire scar near Banning, California.

The 2013 Silver Fire near Banning, California (Fig. 10) challenged the fundamental assumption of the DPEIR that treating older vegetation is an effective way to prevent devastating wildfires. Most of the fire burned through invasive weeds and young, desert chaparral that was recovering from the deadly 2006 Esperanza Fire. **Twenty-six homes were lost in a fire that was fueled by seven-year-old vegetation.**

There are numerous other examples and a number of solid research papers explaining why and how homes burn. What nearly all of them demonstrate can be best summarized by Cohen and Stratton (2008). They wrote,

> These incidents remind us to focus attention on the principal factors that contribute to a wildland-urban fire disaster—the home ignition zone.

We know that the DPEIR cites numerous case studies as well, claiming to show how effective fuel treatments can be. We also know there are numerous examples of when fire suppression has been facilitated when the flames meet previous fire perimeters. Suppression of the 2017 Thomas Fire was reportedly aided when its western edge interacted with the 2008 Tea and 2009 Jesusita Fire perimeters in the mountains above Santa Barbara. However, the weather changed as well.

We are not arguing with the fact that fuel modification is a tool that can be used to help control non-wind driven wildfires. However, the nearly exclusive focus, both financially and through time spent in planning, on fuel modification as presented in the DPEIR has failed us. How else

can we account for the loss of 46 lives and more than 9,500 structures in wildfires from October to December this past year?

We believe nearly everyone can agree that that level of loss is unacceptable.

We also believe the current approach in dealing with fire risk as proposed in the DPEIR is also unacceptable. It is unacceptable not only because the DPEIR's justifications for its approach are flawed, but because **it does not deal with the wind-driven fires that cause nearly all the damage nor the actual causes that place people in harm's way in the first place.**

In its only attempt to address the effectiveness of fuel treatments involved in devastating wind-driven fires, the DPEIR cites Jin et al. (2015), listing the percentage of final fire perimeters found along fuel breaks (8%) and roads (56%) (4-38). Although fire perimeter data can be helpful, it does not necessarily indicate why a fire stopped where it did. Was it a change in the weather? Was it a back fire? Was it fuel moisture?

However, consistent with previous research, Jin et al. (2015) concluded **when examining the full data set that**,

> SA (Santa Ana wind-driven) fire probability did not depend on stand age, and we did not find evidence that age-dependent flammability limits SA fire spread…

In other words, whether it be young or old-growth, sparse or dense chaparral and associated plant communities (including highly flammable non-native grasses), wind-driven fires defy control and basically stop when the weather permits.

The omission of this conclusion by Jin et al. (2015) is symptomatic of a problem that plagues the entire DPEIR document – substandard research and a failure to provide substantial evidence that the program's goals, and the goals of the revised 2010 California Fire Plan, will be achieved.

Even though the latest draft makes efforts to incorporate relevant science, it often cherry picks statements out of papers that have nothing to do with the research cited, ignores the main conclusions of cited papers, or attempts to use anecdotal stories to diminish scientific findings contrary to the DPEIR's assumptions about fuel treatments.

As a consequence, among other reasons as described below, **the DPEIR lacks substantial evidence to support its conclusion that the environmental impacts of the program would be mitigated below the level of significance**, much less that the program would protect life, property, and the environment from exceptional, damaging wildfires.

As per CEQA Statute and Guidelines (AEP 2012),

> **CCR S. 15384.** [Substantial Evidence]
>
> (a) "**Substantial evidence**" as used in these guidelines means enough relevant information and reasonable inferences from this information that a fair argument can be made to support a conclusion, even though other conclusions might also be reached. Whether a fair argument can be made that the project may have a significant effect on

> the environment is to be determined by examining the whole record before the lead agency. Argument, speculation, unsubstantiated opinion or narrative, evidence which is clearly erroneous or inaccurate, or evidence of social or economic impacts which do not contribute to or are not caused by physical impacts on the environment does not constitute substantial evidence.
>
> (b) Substantial evidence shall include facts, reasonable assumptions predicated upon facts, and expert opinion supported by facts.
>
> (Note: Authority cited: Section 21083, Public Resources Code; References: Sections 21080, 21082.2, 21168, and 21168.5, Public Resources Code; No Oil, Inc. v. City of Los Angeles (1974) 13 Cal.3d 68; Running Fence Corp. v. Superior Court (1975) 51 Cal.App.3d 400; Friends of B Street v. City of Hayward (1980) 106 Cal.App.3d 988.)

We provide detailed examples of this problem plus other failings of the DPEIR in the analysis below.

As we have in the past, we urge the Board of Forestry and Cal Fire to produce a document that starts by responding to the following question, **"How do we protect lives and property from wildfire?"** instead of "How do we manage fuel?" These are two different questions resulting in two different answers. And focusing on lives and property suggests questions that are precluded by the fuel approach taken by the DPEIR - questions that allow us to address the actual problem (poor land planning) rather than just symptoms of the problem (lives lost, communities destroyed).

Such a powerful approach will challenge everyone to leverage their own experiences, be willing to consider new paradigms, and honestly collaborate with others, especially with those who have different perspectives. Otherwise, we will continue practices that have brought us to this point – increased loss of homes, increased loss of habitat, and increasing levels of carbon in our atmosphere.

After our testimony to the Board on August 26, 2015, the Board's Chair said that, "Scientists used to believe a lot of things that we've learned were wrong. So, we can't just wait around for science to find the correct answer. We need to move forward."

We do need to move forward, but we need to do so by utilizing *all the information available to us today*, not depend on outdated models, poor research, and incorrect assumptions.

Therefore, we urge the Board to prepare a revised DPEIR by correcting the errors and incorporating the suggested improvements below.

We owe it to ourselves and future generations to get it right this time, especially because the changing climate will not be forgiving if we continue to squander the opportunity.

1. Transparency Eliminated

We respectfully ask the Board, what was your rationale for removing recommendations from the California Fire Science Consortium regarding greater transparency from the DPEIR? How do you feel the removal of these recommendations will increase the achievement of the goals of the DPEIR?

The need for greater transparency and communication was a key recommendation in the California Fire Science Consortium's Panel Review Report of the 2012 DPEIR (CFSC 2014) whereby,

> Projects should include a general description of what is expected to be done. This should be announced at least six weeks before the project takes place. A more detailed description of the project, including project goals and scientifically-grounded rationale as to why and how these goals will be met, should be released prior to the project implementation. The monitoring plan and its results should be made publically available when completed.
>
> At minimum, the above information should be posted on a website database. Additional outreach via newsletters, TV, radio, or events may be included.

Following the Panel's recommendation, the Board included several opportunities for the public and local stakeholders to participate in the project process. For example, in the previous DPEIR, treatments in southern California old-growth chaparral would not take place, "without consultation regarding the potential for significant impacts with the CDFW and the CNPS."

In addition, the 2014 DPEIR (2-57) stated that,

> During the project planning phase provide a public workshop or public notice in a newspaper that is circulated locally describing the proposed project during the project planning phase for projects outside of the WUI. The notification will be used to inform stakeholders and to solicit information on the potential for significant impacts during the project planning phase.

Unfortunately, the Board eliminated these opportunities for community involvement and transparency in the current DPEIR.

2. Ecological Restoration

We respectfully ask the Board, why does the DPEIR claim "ecological restoration" (i.e. more fire) is needed in southern California chaparral (as per Condition Class maps) despite the fact that the document itself acknowledges that such areas are threatened by increasing fire frequencies? Why does the DPEIR claim fuel treatments can be used for "ecological

restoration" in northern California because of undocumented "observed recovery of these ecosystems post-fire" rather than cited research?

The DPEIR repeatedly recognizes that chaparral,

> ... in its present state, and in consideration of the substantial pressure from human-caused or human-related fire, chaparral does not need more fire, it needs less. (4-179)

Then, in one of the most perplexing contradictions, the DPEIR identifies large stands of chaparral in need of "treatment" due to Condition Class 2 and 3 without specifying how such determinations have been made (Condition Class 2 and 3 according to the DPEIR are "areas where fire behavior is uncharacteristic and vegetation composition is altered due to the loss of the key components of an ecosystem"). Complicating such determinations is the fact that the DPEIR does not indicate if such stands are either positively or negatively deviating from their natural fire return intervals.

Complicating the situation further are maps showing where the DPEIR considers "ecological restoration" is needed. The maps are basically useless in determining where the sites are located. There is a database link that provides more detail in Appendix (A-7), but it requires the user to have expertise in GIS software. Such a critical component of the DPEIR needs to be made available in a form the general public can be able to use.

It appears the root of the problem is that the DPEIR is using a Condition Class data product that dates from 2003 (that is the only Condition Class GIS data product we can find from CDF-FRAP online today).

It appears that the cutoff date for fire history in that analysis for Condition Class is no more recent than 2002 and may be several years older than that. Fifteen of the 20 biggest fires in California history have occurred since 2002. None of them would be reflected in this 2003 analysis that Cal Fire proposes to base statewide public policy on in 2018 and beyond.

This is the same outdated, flawed data product we discussed in our previous comments. Cal Fire could easily recalculate Condition Class with modern methodology and newer, more robust data by using Safford et al. (2011).

The Board needs to update Cal Fire's Fire Return Interval Departure (FRID) and Condition Class (CC) data products if they intend to use them for any kind of actual decision-making. Using best available modern fire history data to calculate Condition Class can be easy. With Safford et al. (2011) methodology that calculates positive **and negative** departures from presumed historic fire frequency, the conceptual model for FRID (and Condition Class) was given some validity for the first time.

Data issues aside, as mentioned above, Cal Fire's 2003 model for Condition Class can only produce nonsensical maps because it does not distinguish between over- and under-burned departures from presumed prehistoric fire frequencies.

3. Substandard Research

We respectfully ask the Board what process was followed to ensure cited references applied to statements being made in the DPEIR and why that process continued to allow scientific work (e.g. Lombardo et al. 2009, Safford and Van de Water 2014) to be misrepresented after the problem was revealed in our comment letter of May 24, 2016 and after one of the affected scientists provided corrections?

We also respectfully ask the Board to acknowledge these and additional misrepresentations made in the latest DPEIR as described below (e.g. Syphard et al. 2011, Keeley and Syphard 2016) and make the necessary corrections.

A key recommendation of California Fire Science Consortium's Panel Review Report (CFSC 2014) was to, "Include additional scientific findings throughout," and that,

> … a sound scientific foundation should be reflected with each vegetation management plan providing a clear rationale for the selected action. This should be done by providing additional references to support claims in the VTDPEIR and including additional scientific concepts that are relevant to the planned actions.

The DPEIR has improved its review of the chaparral's fire regime. However, as to developing a sound scientific foundation for the plan, the DPEIR fails to do so.

A. Infrequent, Large Fires are the Pattern for Chaparral (Lombardo et al. 2009)

Inexplicably, after detailing the most recent research that has shown short fire return intervals in chaparral are unnatural, the DPEIR then misrepresents Lombardo et al. to suggest that science may yet find that such a conclusion incorrect.

> DPEIR (4-179)"... chaparral does not need more fire, it needs less (Safford and Van de Water, 2014). However, new scientific information could modify that conclusion in the future as it becomes available. For example tree-ring data collected by Lombardo et al. (2009) in bigcone Douglas-fir stands surrounded by chaparral indicate that both extensive and smaller fires were present in historical time."

Lombardo et al. make it very clear that smaller fires were generally centered in or around Douglas-fir stands and that, "the historical and modern records both imply that large, landscape-scale fires are inevitable in chaparral landscapes."

The DPEIR is cherry picking statements out of context from a scientific research paper to support its stated goals, statements that are contrary to the research paper's fundamental conclusions.

The paragraph quoted above is the exact wording used in the last two versions of the DPEIR.

The Board is ignoring information in the record in violation of CEQA and ignoring testimony and a letter from the lead author of the cited paper that it is misrepresenting the cited research (Appendix A).

B. Plan for the Future, Not the Past - Fires in Northern California (Safford and Van de Water 2014)

The DPEIR claims northern chaparral is not threatened by increased fire frequencies like southern chaparral and therefore can be treated (4-180). It cites Safford and Van de Water (2014) as support. This is a fallacy of incomplete evidence ("cherry picking"). While Safford and Van de Water do indeed note that northern California does not suffer the higher fire frequencies that southern California does, they also warn that,

> ...recent trends in fire activity, burned area, and fire severity suggest that the situation is rapidly changing as climate warms and fuels continue to accumulate.

The Safford and Van de Water paper also notes that increasing fire frequencies appear to be spreading into the northern Santa Lucia Range. It is likely this trend will continue to spread northward as climate change and population growth increase the potential for ignitions in the northern part of the state. The recent Thomas Fire in Ventura and Santa Barbara Counties and the 2017 firestorm in Napa and Sonoma Counties lend support to this hypothesis.

While dismissing increasing fire threats to northern chaparral in Chapter 4, the document's Introduction presents a contradiction by emphasizing the fact that fires in northern California are indeed increasing.

> DPEIR (1-3) These types of anthropogenic alterations are some of the reasons why wildfire frequency in Northern California has increased 18 percent in the period from 1970 to 2003...

If the Board desires the DPEIR to be a plan for the future, as the DPEIR explicitly states it is doing, it should plan for that future rather than depend on conditions of the past. It would also be helpful for the DPEIR to be internally consistent. In descriptions of the fire hazard severity zone analysis Cal Fire repeatedly states that the goal is to model fire hazard based on potential future (NOT current) conditions.

C. Justifying Ecological Restoration for Chaparral with a Logical Fallacy

The DPEIR follows its misrepresentation of the Safford and Van de Water paper with a non sequitur regarding ecological restoration of chaparral in northern California. Chaparral in southern California is currently being threatened by high fire frequencies. Chaparral in the north is presumably not being threatened by such high frequencies. Therefore, Cal Fire believes it can burn/masticate chaparral in the north for "ecological restoration" purposes. Not only does such a conclusion not follow the observations, there is no scientific evidence to support it.

Presumably the DPEIR's reason to suggest burning chaparral in northern California for "ecological restoration" is that it is too old. Yet the DPEIR recognizes that such an idea is based on outdated notions.

> Contrary to ideas that chaparral was subject to significant senescence, it was observed that the accumulation of dead and dying plants was part of a normal cycle of post fire stand development. (4-178)

The failure to correct this section for the second time (it appeared in the previous DPEIR as well) is perplexing since CNPS and we offered testimony specifically discussing these errors. We wrote in our letter of October 27, 2015 (Appendix B),

> "There is NO research that supports this claim (treating northern chaparral for ecological purposes). In fact, a study just released by the Joint Fire Science Program indicates that there are indeed ecological trade-offs in reducing chaparral fire hazard in northern California (Wilkin, et al. 2015). Clearance of chaparral has also been recently suspected of increasing the spread of Lyme disease in vertebrates (Newman et al. 2015).
>
> The Draft EIR also appears to be assuming that climate change will not modify northern California in a way that will replicate increased fire patterns found in southern California chaparral. This is in opposition to USFS research. Safford and Van de Water (2014) suggest chaparral type conversion is spreading northward into the northern Santa Lucia Range and may likely continue to spread as climate change and population growth increase the potential for ignitions."

The artificial truncation of northern and southern California chaparral is not based on research or ecological realities. The DPEIR needs to correct this error and recognize that chaparral, California's most extensive plant community, can be threatened by increasing fire frequencies throughout the state. In addition, the DPEIR needs to recognize that any treatment of chaparral should be viewed as a **resource sacrifice** unless proven otherwise.

Ironically, the issue of "cumulative impacts to chaparral communities from program treatments and wildfires" is cited as an Area of Controversy in the DPEIR (2-54). As such, the topic should have been addressed in a thorough, scientific manner.

Claiming that chaparral in northern California can be treated for ecological benefit continues to be one of the most significant errors in the DPEIR.

D. Prescribed Fire and Seeds (Keeley and Fotheringham, 1998)

> DPEIR (3-18) Prescribed burning elicits a host of ecological interactions potentially important to restoration in an environment, including release from plant competition, greater access to light and water, nutrient enrichment, destruction of germination retardants, and the beneficial effects of smoke on plant germination (Keeley and Fotheringham, 1998).

The DPEIR also incorrectly uses this paper to support the positive benefits of prescribed fire for restoration. This paper actually deals with seed germination of chaparral plant species in southern California, the very same region that the DPEIR acknowledges as being threatened by too much fire.

In fact, prescribed burning in chaparral has been shown to cause ecological damage when burns are usually conducted, during winter or spring. In a comprehensive review of the literature regarding the ecological impacts of prescribed burning, Knapp et al. (2009) wrote,

> Observations suggest that vegetation response to such prescribed burns often differs from response to natural wildfires, with reduced germination of certain herbs and potentially altered species composition.

E. Political Testimonies/Reports are Not Scientific Citations

A significant number of references used to support statements in the DPEIR are from testimony or reports to Congress. While such references can provide overviews, many are too broad or political in nature to be of any use in developing a scientific foundation. And because such references are not peer-reviewed, there is no mechanism for determining how factual, evidence-based, or scientifically accurate they are.

McKelvey et al. (1996), a report to Congress on the forest of the Sierra Nevada, is cited out of context to support the notion that, "prescribed fire is believed to benefit the overall health of fire adapted ecosystems" (4-186). While true for some Sierra Nevada forests, this is not true for chaparral. This represents a chronic problem in the DPEIR.

The reference to Bonnickson (2003) (2-10) was his testimony provided during a politically charged Congressional hearing after the 2003 fires. Much of the content is opinion, not scientific fact.

Finally, we were surprised to see that the Board chose to use a quote from Secretary of the Interior Ryan Zinke from a political press release to lead the DPEIR's introduction (E-2).

> It is well settled that the steady accumulation of vegetation in areas that have historically burned at frequent intervals exacerbates fuel conditions and often leads to larger and higher-intensity fires…

Excepting the fact that it is far from settled that accumulating vegetation leads to larger fires, this statement only applies to some forested systems below 7,000 feet. In addition, most of the wildfire risk in California is within areas that have little to do with the kind of ecosystem the secretary appears to be describing.

We respectfully ask the Board what the rationale was in choosing to use a quote from a politically polarizing individual who has no background in wildfire, is on the record making

misleading claims to promote logging in the Katahdin Woods National Monument, and appears to advocate logging in national parks (Zinke 2017, McKean 2018).

Does such a quote belong in a collaborative, non-partisan planning document?

F. Raising Doubt Over Established Science

> DPEIR (4-176): Studies are indicating a difference in data regarding type conversion or invasive spread of exotic/non-native species. Although these studies have differing methodologies and analysis characteristics, they offer an insight to the challenges in evaluating encroachment of non-native species. One study looked at the disturbance of plant communities after fuel break construction used for firefighting activity. This study identified potential impacts to the ratio of native and non-native species in the study area, which consisted of chaparral/grassland mosaic on an ecological reserve (Moroney and Rundel, 2013). However, another study found overall type conversion of existing species composition in chaparral may be difficult and rare across a landscape (Meng et al., 2014).

The risk of type conversion and the spread of invasive species due to fuel break construction, soil disturbance, or high fire frequency in chaparral is an established fact (Zedler et al. 1983, Haidinger and Keeley 1993, Jacobson et al 2004, Brooks et al. 2004, Merrriam et al. 2006).

Characterizing the evaluation of non-native species as challenging and citing one inconclusive paper (Meng et al. 2014) to raise doubts about type conversion occurring in chaparral reflects the DPEIR's inconsistent attitude toward the degradation of native shrubland ecosystems. On pages following the above quote, the DPEIR states,

> Burning in southern chaparral systems, to enhance ecological function, at intervals shorter than natural fire return frequencies, may lead to adverse ecological results. (4-180)

then

> For these reasons, an ecological rationale for fuel treatments in shrub dominated and co-dominated ecosystems in northern California can be used. (4-180)

The problem with Meng et al. is that it makes conclusions not justified by the collected data. The paper begins by raising some skepticism about the ability of repeat fire to affect type conversion by pointing out the difficulty early 20th-century range managers experienced in using fire to "improve" ranges that were supposedly plagued by chaparral. These managers typically relied on herbicides and mechanical destruction for thorough replacement of shrubs to more useful grazing lands. However, as pointed out by Keeley and Brennan (2012), managers only utilize fire under narrow prescription conditions, which are generally not capable of carrying repeat fires at short fire return intervals; hence, their difficulty in meeting their objective. In contrast, wildfires

typically burn outside prescription with 100 kilometer/hr (about 62 mile/hr) wind gusts and relative humidity less than five percent.

Then by using remote sensing, Meng et al. attempted to answer the question of how extensive type conversion is due to repeat fires occurring in the last decade. While the technique cannot address the changes in diversity and species composition that are known to occur with short interval fires, it has some potential for viewing grosser changes in functional types such as shrubs and annual plants. Although these authors concluded that widespread type conversion is not an immediate threat in southern California, this conclusion deserves closer scrutiny since documenting fire-related vegetation change across large landscapes over just a 25-year period using remote sensing is fraught with potential errors.

One reason for error is that numerous spatially and temporally different human and biophysical factors can influence the process of post-fire recovery; these factors should be controlled for before attribution can be determined. In the Meng et al. paper, the control and overlap areas were located on somewhat adjacent, but very different parts of the landscape that varied by factors such as aspect, terrain, or soil type. The areas could have also experienced different landscape disturbance legacies. This is especially possible given the topographic complexity of the region and researchers' use of the California's Fire Resource and Assessment Program's Fire History Database (FRAP) for discerning precise stand ages. This database is broadly useful for management planning but must be used carefully in a research context.

For example, Keeley et al. (2008) found across 250 sites that the FRAP database did not accurately portray stand age (as determined by ring counts) for 47% of the sites, presumably due to the scale at which fires are mapped and by generally ignoring fires less than 40 hectares (100 acres) in size. This is a fundamental problem the DPEIR does not recognize.

Another concern is that the Meng et al. method of documenting vegetation change may not be sensitive enough to resolve gradual shifts in composition that would likely occur after only one repeat fire event. They used a vegetation index derived from remotely sensed imagery from a satellite as a way of assessing vegetation "cover," or "greenness" of each 30-meter pixel of the image. Because different pigments are stimulated by different parts of the light spectrum, this index essentially assesses chlorophyll content, which is correlated with biomass and assumed to represent the relative cover of evergreen shrubs. However, it does not account for differences among chaparral species, whose composition in the plots was unknown. Additionally, different species of chaparral have varying sensitivities to repeat fires and thus it might require multiple repeat fires of differing intervals to discern enough vegetation change that it would be detected by this index.

Given that vegetation change is likely a gradual, cumulative process, the results reported by Meng et al., contrary to their conclusions, are actually consistent with a potential for widespread chaparral conversion. Slightly more than half of the area that burned twice in their study did have lower cover, as defined by the index, than the control. Given enough fire on the landscape over a long enough period of time, gradual shifts may result in significant change and impact.

Before the DPEIR cites a paper that raises doubts about long confirmed research, it should closely examine the data and the conclusions. Just because a paper appears to confirm a particular position, does not mean it actually does.

G. Overgeneralized “Park-like” Forests

Contrary to the assertions made in Chapter 2 of the DPEIR, historical forests of California were highly variable in density. The notion that many were “generally open and park-like” is an over-generalized statement that has been challenged by a significant number of researchers. This fact has been ignored by the DPEIR.

While many forested areas below 7,000 feet have missed fire cycles and it is likely that a small portion of California’s forests were "open", many more were probably closer to being moderately to very dense. Recent investigations have proposed that historical forests may have been 2-3 times denser than has been suggested in recent USFS studies (Baker 2014, Hanson and Odion 2016 a, Baker and Hanson 2017).

Mixed-intensity fire in mixed-conifer and yellow pine forests is essential to maintain and enhance native biodiversity in California's forests. Many species depend on the unique habitat created by mixed-intensity fires, including large fires and large high-intensity fire patches (Tingley et al. 2016).

The DPEIR also ignores recent research which finds that increased logging may not reduce fire intensity (Bradley et al. 2016). Nor is the DPEIR's assumption about fire and water flows consistent with current science (Boisrame et al. 2016). Post-fire sedimentation is natural after fires and occurs in pulses that wane within a relatively short period of time post-fire, whereas post-fire logging creates chronic sedimentation that lasts for many years (Wagenbrenner et al. 2015).

H. Incorrect citations

The Sugihara et al. 2006 citation, an introductory chapter in a book about fire in California is used nine times within Chapter 4. We searched for the specific DPEIR points the citation was supposed to be supporting within the Sugihara et al. work, but were unable do so in most instances. In other words, the statement the DPEIR is using the citation to support does not exist within the Sugihara et al. reference.

Regardless, using an introductory book chapter multiple times to establish a scientific foundation for the DPEIR is inappropriate. Original peer-reviewed research needs to be used and the research needs to be double checked to verify that cited references are in fact relevant to the point in question.

4. Mischaracterizing Fuel Treatment Research

We respectfully ask the Board if it has conducted a cost/benefit analysis of fuel treatment/fuel break construction and use in order to support its support of such activities?

Searching for Support Where There is None (Keeley and Syphard 2016)

> DPEIR (4-55): The impacts of fire suppression have changed the historical fire activity in the 20th century, and prescribed fire is a tool that can help maintain appropriate fire regimes (Keeley and Syphard, 2016).

Keeley and Syphard (2016) never concluded this. The paper is an analysis of projecting future fire regimes based on climate models. There is one sentence in the entire paper that mentions prescribed burning (pg. 10), but it is merely a reference to another paper. Citing Keeley and Syphard to support a claim about prescribed burning is inconsistent with the standards of academic research.

Anecdotal Information is Not a Substitute for Science (Syphard et al. 2011)

One of the primary advantages of scientific research is that it can filter out biases and opinions formed from anecdotal evidence by examining large sets of data. However, the DPEIR depends heavily on anecdotal evidence, sometimes to discount scientific research.

> DPEIR (2-23): There is also a level of uncertainty in the scientific literature on the effectiveness of fuel breaks that are staffed by fire suppression personnel (Syphard et al., 2011). Effectiveness can be impacted by the type of treatment used (prescribed fire, herbivory, mechanical tools, etc), position on the landscape, condition of surrounding vegetation, time since treatment, and the seasonality and weather conditions during the wildfire(s) intersecting the treatment. Due to these variables, the scientific evidence on the effectiveness of treatment suffers from some limitations of the ability to extrapolate beyond the study area. While not controlled experiments, there are case studies that CAL FIRE and other local fire agencies have developed that can point to site specific treatments that helped suppression efforts. The Toro Creek Fire Case Study within this section is a good example, as well as several others in Chapter 4.1.5.2.

There are two Syphard et al. (2011) papers in the DPEIR reference list, but they are improperly identified so it is unclear which one the document is referencing. But the one titled, "Comparing the role of fuel breaks across southern California national forests," assembled a very large data set - a spatial database of fuel breaks and fires from the last 30 years in all four national forests in southern California. The researchers also interviewed firefighters.

The study indicated that on average, 23% of the fires studied intersected fuel breaks. During those intersections, fuel breaks helped about half the time, but "only when they facilitated fire management, primarily by providing access for firefighting activities."

But more relevant to the goals of the DPEIR is the following conclusion from Syphard et al.:

> …this study strongly supports the notion of constructing fuel breaks along the wildland–

> urban interface where firefighters will have better access to the fuel breaks, and where the fuel breaks will provide an immediate line of defense adjacent to homes that are at risk. The case studies from all four national forests demonstrate that fuel breaks will not stop fires without firefighter presence. Therefore, constructing fuel breaks in remote, backcountry locations will do little to save homes during a wildfire because most firefighters will be needed to protect the wildland–urban interface, and fires will not be stopped by those fuel breaks that are located farther away.

Misrepresenting Research (Reinhardt et al. 2008)

The scientific research shows that the most effective way to protect lives and property is to focus directly in and around where people live. Perhaps unknowingly, the DPEIR references research that supports this approach (Reinhardt et al. 2008), but incorrectly cites it as supporting the vegetation management program.

> DPEIR (2-7): There is strong scientific agreement that the use of fuel treatments helps to reduce the impact and damage from wildfires (Reinhardt et al., 2008; Safford et al., 2009; Schoennagel and Nelson, 2011). This objective seeks to reduce the size of fires through the use of appropriate vegetation treatments. The assumption is that decreasing fire size will have a resulting decrease on overall fire suppression costs.

Here is what the cited Reinhardt et al. paper actually says:

Treating fuels to reduce fire occurrence, fire size, or amount of burned area is ultimately both futile and counter-productive. In the long run, fuel treatments are a sustainable management option only if they increase the acceptability of wildfire.

In such situations, destruction in the WUI is primarily a result of the flammability of the residential areas themselves, rather than the flammability of the adjacent wildlands. It may not be necessary or effective to treat fuels in adjacent areas in order to suppress fires before they reach homes; rather, it is the treatment of the fuels immediately proximate to the residences, and the degree to which the residential structures themselves can ignite that determine if the residences are vulnerable.

By reducing the flammability of structures, WUI fuel treatments can be designed such that an extreme wildfire can occur in the WUI without having a residential fire disaster. Although general wildfire control efforts may not benefit from fuel treatments during extreme fire behavior, fuel modifications can significantly change outcome of a wildfire within a treatment area. Research has shown that a home's characteristics and its immediate surroundings principally determine the WUI ignition potential during extreme wildfire behavior.

It is a natural mistake to assume that a successful fuel treatment program will result in reduced suppression expenditures. Suppression expenditures rarely depend directly on fuel conditions, but rather on fire location and on what resources are allocated to suppression. The

only certain way to reduce suppression expenditures is to make a decision to spend less money suppressing fires.

Fuel Breaks – does the cost justify the benefit?

> DPEIR (4-38): An article by Syphard et al. (2011) conducted a spatial analysis of the Los Padres National Forest in southern California and concluded that fires stopped at fuel breaks 46 percent of the time. Preexisting fuel breaks allowed fire suppression activity to take advantage of the lighter fuels along the ridge lines to cut control lines. This was useful in both the wilderness areas (utilizing hand line and hose lays) and areas outside the wilderness where heavy equipment could aid in suppression efforts (Syphard et al.,2011).

The DPEIR mischaracterizes Syphard et al. (2011) and places the research in the wrong context. What the paper shows is that only 20 out of 95 fires intersected fuel breaks, fuel breaks stopped only one fire without firefighters present, and that fuel breaks were ineffective under severe fire-weather conditions.

> A key conclusion by Syphard et al. that the DPEIR ignored was the following:
>
> Although fuel breaks surrounding communities clearly serve an important role in creating a safe space for firefighting activities, fuel breaks in remote areas and in areas that rarely or never intersect fires have a lower probability to serve a beneficial function. It is important to consider strategic placement in terms of values at risk, near communities and the WUI, in shrubland ecosystems or other areas where the resource benefits of fuel treatments have not been demonstrated as they have been in forests. Despite strong arguments for locating fuel breaks near communities where protection is most needed (Winter *et al*. 2002; Halsey 2005; Keeley *et al*. 2009*b*), most fuel break proposals continue to be located in more remote wildland areas (Ingalsbee 2005; Schoennagel *et al*. 2009). Other finer-scale factors may also be important for strategic placement (e.g. placing them on ridgelines or other landscape features that offer tactical advantages; Ingalsbee 2005). It is also important to consider that many homes are not ignited owing to direct fire spread, but from firebrands (embers), and more research is needed on the location of fuel breaks relative to firebrand production and structure exposure (Mell *et al*. 2010).

The question of examining the actual cost/benefit of fuel break construction/use is also an important issue. In a recent paper from the University of Montana (Naughton and Barnett 2017), researchers found that,

> There exists an assumption within the wildland fire science and management community that investments in fuel treatments will result in decreased future fire management costs. In order for this to manifest, wildland fires must interact with fuel treatments during the lifespan that treatments remain effective. Our finding that 6.7%

> of treatments on federal lands between 1999 and 2012 were encountered by a subsequent fire by 2013, and that only 7.7% of the total treated area was burned by a subsequent fire through 2013, raises questions over the validity of such an assumption.

The observation that back country fuel modifications are generally not effective in stopping fires and, as a consequence, haven't generated any significant reductions in total annual area burned in southern California, has been confirmed by other research as well (Keeley et al. 2009, Syphard et al. 2011).

Global surveys concerning fuel modifications have also demonstrated that even very large amounts of strategic fuel modification are not very effective in reducing total areas burned. This research makes a compelling case that constructing and maintaining large fuel treatments is not the most effective use of fire risk reduction resources (Price et al. 2015, Price et al. 2015b).

Additional research also questions the entire concept of pouring millions of dollars into trying to suppress wildfires. As Bridge et al. (2005), in examining fires in the boreal forests of Canada, writes,

> … it seems that in large-area burned years, the conditions are such that the sheer number of fire starts and their quick rate of spread can overwhelm fire management agencies (KPMG 1999), and it is unlikely that suppression can significantly influence the total area burned.
>
> Thus, to date there is insufficient empirical evidence that fire suppression has significantly changed the fire cycle in the boreal forest of Ontario.

If the Board intends to establish an effective fire risk reduction program, it should investigate research that not only supports its assumptions, but also questions them. The DPEIR does not do this.

A WUI Without Scientific Merit

The DPEIR claims a 1.5-mile wide Wildland Urban Interface (WUI) is necessary because this is assumed to be the approximate distance embers can be carried from the fire front (4-33). The DPEIR dismisses concerns that its definition of the WUI is too large an area because Cal Fire staff overheard USFS representatives from the Cleveland National Forest talk about a 6-mile wide WUI buffer (4-33). Casual conversations are not legitimate scientific references.

The only citation the DPEIR uses for support is the Sierra Nevada Forest Plan Amendment. (3-38) This is a serious misrepresentation. The Amendment does not provide any evidence for a 1.5-mile WUI, but rather is a management document that established an arbitrary distance to determine the number of homes/communities affected by the Plan.

Ironically, the DPEIR discounts a smaller WUI, such as the 1,000-foot version in one of the alternatives (3-38), because, "A review of the literature found no scientific basis to limiting WUI treatments to 1,000 feet."

This perspective is more appropriate for the DPEIR's 1.5-mile WUI as there is significant evidence indicating fuel treatments even beyond 300 feet (the length of a football field) are excessive for the purpose of reducing fire risk to communities (see Cohen's extensive research, e.g. Cohen 2004).

In DPEIR Appendix A, "Characterizing the Fire Threat to Wildland-Urban Interface Areas in California" is equally unscientific and does not provide the necessary information to properly assess the characteristics of the WUI.

For example, Figure 1 does not distinguish fuel types, slope conditions, how heat per unit area and rate of spread is estimated/modeled/calculated. The axes are not mentioned in the descriptions. Another important point omitted from this section is that flame length as an indicator of fire risk varies by vegetation type – 12-foot flame lengths in conifer forests are routine, but not in grasslands.

As a tool, Figure 1 is not useful.

Considering the expense and extensive environmental damage that can occur with fuel treatments, the Board should base the size of the WUI on available science, not arbitrary numbers (see Appendix C: Ember Behavior: Why the 1.5-mile WUI is Excessive).

Finally, the Board needs to reconsider how the WUI is defined in order to help us address the actual issues that are causing so many losses due to wildfires – poor land planning. Gregory Simon (2017) makes this clear in his book, "Flame and Fortune in the American West." He writes,

> … the inadequacy of the WUI as a concept lies in its inability by itself to reveal the forces behind its own creation.

5. Inadequate Data

The maps provided in the DPEIR cannot provide enough information to properly assess the Program. They do not reflect data-rich research nor Cal Fire's expertise.

As in previous drafts, the DPEIR presents fuzzy, indistinct graphics reduced far beyond the point of legibility. At 72dpi screen resolution each fuzzy indistinct pixel represents about 3.5 miles (approximately 8,000 acres) on the ground.

This is not just about illegible maps, but one more example of a much larger, systemic problem mentioned several times above. The Program must be based on a solid, statistically valid technical analysis, undertaken in good faith, based on appropriately solid, modern data, and peer-reviewed fire science. CEQA requires it. The current DPEIR does not follow this standard.

6. Circumventing CEQA

Throughout the document, the DPEIR completely ignores the necessary detail needed to determine if the Program will have significant impacts. Instead, it defers to managers at the individual project level because the Program is either too "large and complex" to consider the true environmental impacts within the DPEIR (4-198 among others), or too small because the projects average 260 acres (5-35 among others). By using the "Fallacy of Authority," the DPEIR claims without providing supporting evidence,

> Because of the amount of acreage eligible but not receiving treatment under the VTP, the proposed Program would likely result in a less than significant cumulative effect on biological resources at the bioregional scale. (5-33)

The DPEIR frequently follows up these claims, again without supporting evidence, with the suggestion that the Program may actually provide a net environmental gain because it may "decrease the frequency, extent, or severity of wildfire." (5-37)

Such rationales have no merit. There is a rich source of literature describing the potential impacts, both local and cumulative, of "fuel treatments" as well as the ecological benefits of high-severity fires in crown fire ecosystems. The DPEIR should adhere to the requirements of CEQA and determine the overall environmental impact of the Program, not pass the responsibility on to individual project managers via a checklist based on subjective opinions.

This failure to account for environmental impacts is troubling because it gives the impression that the DPEIR was not produced to comply with CEQA, but rather to accomplish its stated goal of streamlining the regulatory process (1-7). In fact, this is in line with the Board of Forestry's 2010 Strategic Fire Plan which endorses efforts to "remove regulatory barriers that limit hazardous fuel reduction activities" (Fire Plan Goal #5, objective "b").

Inadequate Standard Project Requirements (SPRs) and Mitigation Measures (MMs)

Even if the law allowed the lead agency to pass along all the environmental impact determinations/responsibilities to local project managers, the DPEIR's project checklist, Standard Project Requirements (SPRs), and Mitigation Measures (MM) make such a task impossible.

Mitigation Measures as per CEQA must be legally adequate. The DPEIR must demonstrate with solid evidence that Mitigation Measures are feasible, effective, and enforceable.

- Many of the Program's SPRs and MMs fail to provide enforceable procedures (via legally binding agreements) that will produce measurable effectiveness.
- Important terms are not defined such as "critical infrastructure," allowing for inconsistent implementation and unknown impacts of projects.
- Some SPRs and MMs are vague and allow for so much subjectivity that they are meaningless.

For example, despite the fact that MM BIO-2 appears to provide a mechanism to reduce the impact of "fuel treatments" in chaparral (4-211), it essentially requires little of the project manager for the following reasons:

Only southern chaparral. Without justification, the DPEIR excludes chaparral from BIO-2 except that which occurs in nine southern and central counties. As indicated above, the exclusion of chaparral in northern California by the DPEIR is not supported by scientific evidence.

Considering ecosystem values of chaparral removed. Inexplicitly, an important mitigation measure that was part of BIO-2 in the 2014 DPEIR (BIO-5, 2-57) was removed from the latest DPEIR:

> Take into account the local aesthetics, wildlife, and recreation of the shrub dominated subtype during the planning and implementation of the project.

This presumably means such concerns will not be taken into consideration.

Median fire return interval undefined. Although the DPEIR discusses fire return intervals, there is no guidance in the SPRs and MMs to assist the local manager in determining what this value happens to be. Given the fact that there is tremendous misunderstanding and resistance to accepting the latest science about this topic (Halsey and Syphard 2015), it is critical that the DPEIR addresses this issue within the SPRs and MMs.

Critical infrastructure/forest health undefined. The project manager may dismiss BIO-2 if a proposed project is not deemed necessary to protect "critical infrastructure" or "forest health." Neither term is defined, therefore a project can be approved that destroys valuable, old-growth chaparral because again, the DPEIR does not provide the necessary guidelines.

Projects causing significant environmental harm are not speculative. One such project occurred July 4, 2013 when Cal Fire conducted a prescribed burn in the San Felipe Valley Wildlife Area, San Diego County. The approximately 100-acre fire escaped and burned 2,781 acres, causing significant damage to an old-growth stand of rare desert chaparral in addition to other plant communities.

Cal Fire's partial justification for the project was that it would provide "indirect community protection to Julian and Shelter Valley." This justification was erroneous. Julian is 4.5 miles distant to the project location and 2,000 feet higher in elevation. Shelter Valley is 6 miles distant with extremely light, arid vegetation between it and the project. The project also violated the land management plan for the site and was out of prescription when ignited (CCI 2013).

Clear, unambiguous definitions are required to prevent this type of incident from occurring again. In addition, it would be helpful if the San Felipe escaped burn could be highlighted in a case study to help managers avoid similar situations rather than using case studies that merely confirm the Board's preferred program.

Preventing type-conversion unspecified. There are no guidelines on how to prevent the type conversion of native shrublands within the MMs. Since it is not the instant conversion of shrublands to non-native grasslands, but typically a gradual process, guidelines should be established to assist project managers to recognize the native shrubland's condition. Type-conversion in shrublands begins with the loss of biodiversity by the elimination of obligate seeding shrubs leading to a combination of resprouting shrubs and native sage scrub species or resprouters and alien grasses (Halsey and Syphard 2015). While still appearing to be "chaparral" to the casual observer, it is in fact a seriously compromised habitat.

BIO-2 is a prime example of how the DPEIR allows the project manager to make subjective decisions that may cause significant impacts without a reasonable opportunity for mitigation or independent oversight to assist in preventing such environmental harm.

Suggested Improvements to the Program to Reduce Fire Risk

- Reduce fire risk from the house out -

We are aware that the Board prefers to only deal with vegetation management, but if such a strategy does not protect lives and property during wind-driven fires, what is the point?

The Board and Cal Fire should stop focusing on modifying fuels in order to try to control wildfires and focus instead on saving lives and property by focusing directly on communities. The science is overwhelming in support of this approach. Schoennagel et al. (2017) offers some compelling options that will help us move in this direction:

> The majority of home building on fire-prone lands occurs in large part because incentives are misaligned, where risks are taken by homeowners and communities but others bear much of the cost if things go wrong. Therefore, getting incentives right is essential, with negative financial consequences for land-management decisions that increase risk and positive financial rewards for decisions that reduce risk. For example, shifting more of the wildfire protection cost and responsibility from federal to state, local, and private jurisdictions would better align wildfire risk with responsibility and provide meaningful incentives to reduce fire hazards and vulnerability before wildfires occur. Currently, much of the responsibility and financial burden for community protection from wildfire falls on public land-management agencies. This arrangement developed at a time when few residential communities were embedded in fire-prone areas. Land-management agencies cannot continue to protect vulnerable residential communities in a densifying and expanding WUI that faces more wildfire (Moritz et al. 2014).
>
> Providing incentives for counties, communities, and homeowners to plan fire-safe residential development for both existing and new homes and discouraging new development on fire-prone lands will make communities safer (Calkin et al. 2014; Abrams et al. 2015; Syphard et al. 2013; Alexandre et al. 2016).

Changing incentives require policy changes, but such changes are achievable if properly organized. An example is requiring approving, local entities in charge of development (cities, counties) to assume responsibility for future losses due to wildfire and issue Fire Development Bonds for any development approved in a Very High Fire Hazard zone. These Bonds would be funded by a significant portion of the tax revenue that is generated by said development and the developer of the property. Residents could be responsible for a small portion of the Fire Development Bond as well. The bonds would be used to help pay for any damage caused by a future wildfire.

Such an approach would internalize the costs of fire hazards instead of forcing society to shoulder the burden. The ultimate goal would be to make development in Very High Fire Hazard zones prohibitively expensive.

All homes already within VHFH zones should be required to retrofit to improve fire safety within 20 years, similar to the code passed by the City of Los Angeles in 2016 to retrofit older buildings for earthquake safety.

A retrofit that is not typically used in California, but used effectively in Australia and Canada is external sprinklers (Mitchell 2005). Such an approach is uncommon because traditionally home fires started inside, hence the use of internal fire sprinklers. However, internal sprinklers are designed to save lives, not homes (Fig. 11 below).

External sprinklers, coupled with an independent water supply (swimming pool or water tank), should be required for all homes within very high fire hazard zones. Clusters of homes could be served by a community water tank that should be a requirement for every planned development.

Many residents have taken it upon themselves to retrofit their own homes with external sprinkler systems. Under-eave misters on the Conniry/Beasley home played a critical role in allowing the structure to survive the 2003 Cedar Fire in San Diego County. The home was located in a canyon where many homes and lives were lost to the flames (Conniry 2008).



Figure 11. External sprinklers. As a wildfire approaches, external sprinklers wet the structure at risk, the surrounding environment, and increase the local humidity to prevent ignition. Photo: A conference center in New South Wales, Australia.

The Current DPEIR

If the intent is to maximize the impact of the VTP in terms of saving lives, property, and natural resources it needs to focus directly on the WUI. **Alternative A comes closest to this approach, however the 1.5-mile distance for the WUI needs to be drastically reduced and based on scientific research.**

This alternative also needs to be rewritten to emphasize the reduction of fire risk by using "from the house out" approach (as discussed above) – proper land planning, reducing home flammability, properly maintained defensible space, community fire safe retrofits (e.g. external sprinklers, ember-resistant vents, ignition resistant internal framing), then strategic fuel treatments within 1,000 feet of a community if needed.

Many county fire programs support "from the house out" concept. Cal Fire promotes this strategy too, and has since at least 2007.
http://www.fire.ca.gov/fire_prevention/fire_prevention_wildland_faqs#gen01

We urge the Board to reconfigure the DPEIR so that it incorporates the entire fire risk reduction equation, not just vegetation management. Additional suggestions on how to do so, and examples of programs that have worked, can be found in Appendix D: An Appeal to California's Fire Agencies.

Other recommended improvements to the DPEIR include:

- Detail impacts. Examine possible direct and cumulative impacts and develop legally adequate mitigations for those impacts as required by CEQA.

- Recognize all chaparral as potentially threatened. Chaparral in the central and northern part of the state will likely be threatened by higher fire frequencies as the climate continues to change. There is no ecological rationale for fuel treatments in shrub dominated ecosystems in northern or southern California.

- Define terms. Define all terms utilized in the text needed to ensure consistency in use such as critical infrastructure, forest health, etc.

- WUI distance. Establish a reasonable distance for the WUI by using science rather than anecdotal information.

- **Redefine the WUI.** Redefine the WUI to include the social environment as well as the physical. "From a management perspective this approach suggests that decision-makers pay greater attention to the systemic causes of change, risk, and vulnerability – factors that are quite often implicated in policies promoting increased wealth and profit opportunities for stakeholder in urban and exurban settings" (Simon 2017).

- Redefine defensible space. The present definition includes the term clearing, implying that defensible space should be clear of all vegetation. Creating large areas of clearance with little or no vegetation creates a **"bowling alley" for embers**. Without the interference of thinned, lightly irrigated vegetation, the house becomes the perfect ember catcher. In addition, when a fire front hits a bare fuel break or clearance area, a shower of embers is often released (Koo et al. 2012).

- Research support for conclusions. Conclusions in a DPEIR need to be supported by research, not by employing the Fallacy of Authority.

- Maintain consistency and research quality. Eliminate contradictions, errors in citations, and inconsistencies throughout the document.

- Consultation on chaparral treatments. All projects involving old-growth chaparral (in excess of 60 years from the last fire) should be developed in consultation and in agreement with the California Native Plant Society as was previously indicated in the prior DPEIR.

- Account for biodiversity in chaparral. Incorporate into the cumulative impact analysis how biodiversity may be impacted by the Program. See Halsey and Keeley (2016).

- Increase transparency. Develop a web-based public notification process for projects similar to the US Forest Service SOPA website. For example: http://www.fs.fed.us/sopa/forest-level.php?110502

- Plan for the future. Base project need, selection, and treatment approach, on projected climate change scenarios, not past, anecdotal experiences.

- Reassess the efficacy of back country fuel modifications.

- Proper account of carbon sequestration. Recalculate the potential increase in atmospheric carbon from the proposed program to account for the loss of below ground carbon sequestration in healthy chaparral communities due fuel treatments. The assumption in the DPEIR that the proposed program will have no significant impact on atmospheric carbon is based on incomplete calculations.

With the impacts of human-caused climate change accumulating much faster than even the most severe predictions, it is imperative that every policy we implement from here on out must honestly and exhaustively examine how such policy can facilitate the reduction of carbon in the atmosphere and the protection of what natural environment remains.

The current DPEIR fails to do so.

The DPEIR assumes all the projects will work out properly and treated plant communities will not type convert to low carbon sequestering grasslands because of the Program's project requirements. These requirements are legally inadequate and unenforceable.

The DPEIR fails to account for the loss of underground carbon storage with the concomitant loss of above ground shrub cover in shrublands, an important carbon sink (Jenerette and Chatterjee 2012, Luo 2007). The DPEIR also fails to address the research that has shown vegetation treatments often release more carbon than wildfires (Mitchell 2015, Law et al. 2013, Meigs et al. 2009).

By using assumptions based on anecdotal evidence and focusing on the short term (such as how to reduce flame lengths, remove dead trees, or increase the number of clearance projects), the DPEIR will likely exacerbate climate impacts, increase the loss of habitat, and fail to adequately accomplish its primary goal – protecting life and property from wildfires.

A final note.

At the May 25, 2016 California Fire Service Task Force on Climate Impacts, members of the task force were discussing changes that still needed to be accomplished to improve California's response to wildfires.

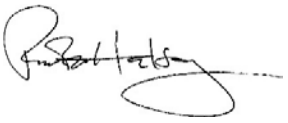
Orange County Fire Chief Jeff Bowman spoke up and distributed an After Action Report concerning the Southern California Wildfire Siege. He pointed out that its 95 recommendations for improving future responses to major fire incidents were nearly identical to those recommended by the Governor's Blue Ribbon Fire Commission after the 2003 wildfires.

Chief Bowman then asked everyone in the meeting to look at the date of the After Action Report. It was 1993, ten years prior to the Blue Ribbon Commission recommendations.

In 2018, we are still discussing.

We are hopeful the Board and Cal Fire will help change the conversation about how we address wildfire risk, improve the DPEIR so that it addresses how to save lives, property, and habitat, and turns to fire science for help in doing so.

Sincerely,



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Rob DiPerna
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Jim Wells

Attachments:

Appendix A. Understanding the Relationship between Fire/Chaparral - K.J. Lombardo
Appendix B. CCI letter of October 27, 2015
Appendix C. Ember Behavior: Why the 1.5-mile WUI is Excessive
Appendix D. An Appeal to California's Fire Agencies
Appendix E. CCI letter of May 24, 2016

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