CALIFORNIA CHAPARRAL INSTITUTE

...the voice of the chaparral

San Bernardino National Forest
Mountain Top Ranger District

April 27, 2018

RE: Grass Valley Fire Restoration Project Environmental Assessment

Dear District Ranger Marc Stamer,

We appreciate the opportunity to comment on the Grass Valley Project's Environmental Assessment (EA). The California Chaparral Institute is a non-profit research and educational organization specializing in helping the public better understand and appreciate the chaparral ecosystem. In addition, we have done extensive work analyzing wildland fire behavior as it relates to the chaparral and chaparral/forest intermix and how communities can become more fire safe.

After reviewing the Draft EA, we were immediately struck by the absence of any discussion of Cohen and Stratton (2008) and their in-depth analysis of the 2007 Grass Valley Fire.

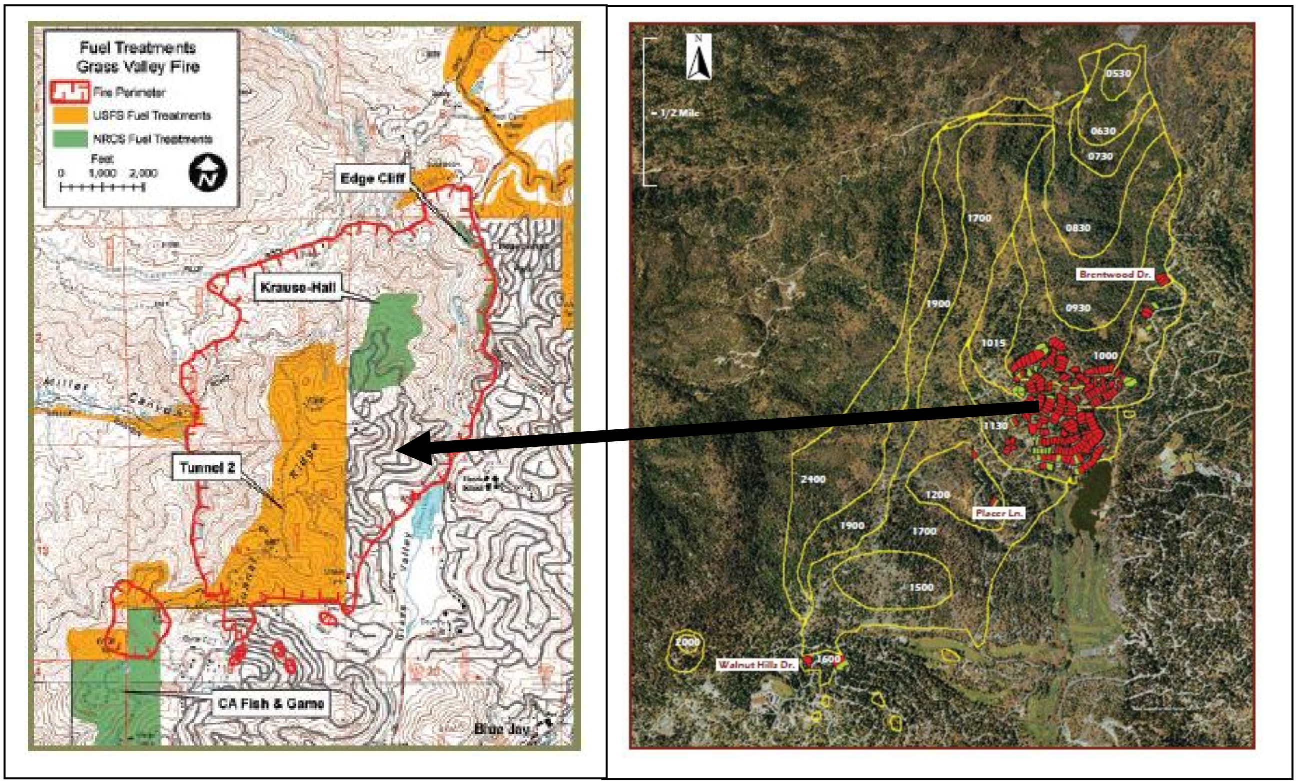
Prior to the 2007 Grass Valley Fire, the US Forest Service and the Natural Resource Conservation Service had created several fuel treatments around the community of Lake Arrowhead (Fig. 1). Reportedly, the fuel treatments performed as expected by allowing firefighters to engage the fire directly and 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. 2).**

The comprehensive analysis of the Grass Valley Fire by 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.

www.californiachaparral.org PO Box 545, Escondido, CA 92033 760-746-0025

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.



Figures 1 and 2. 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 2007 Grass Valley Fire (Cohen and Stratton 2008).

As shown in Figures 1 and 2 and as described in Cohen and Stratton (2008), **the fuel treatment approach was not effective in protecting 174 homes.**

We support the Draft EA's proposal to remove hazard trees and invasive species, and to repair damaged infrastructure from the 2007 fire. We also agree that limited vegetation treatments are warranted immediately adjacent to the community. But the Draft EA's nearly exclusive focus on the clearance of native vegetation to reduce fire risk **ignores the lesson's learned from the 2007 Grass Valley Fire.**

Although the Draft EA holds that "descriptions [of the Forest Plan] are pertinent for this project," the prioritization of fuel treatments over directly protecting homes and communities does not align with the "Program Emphasis" for Arrowhead Place. The first sentence states: "Community protection from wildland fire is of the highest priority, and will be emphasized through public education, fire prevention, and fuels management," (p. 6). In order to protect the community—and thus fulfill the "highest priority" of the Forest Plan—the EA must focus more time and funding into helping citizens fire harden their homes, public education, and efforts to prevent ignitions.

We strongly recommend that the Draft EA be revised in a way that addresses the entire wildfire problem. This must include a parallel effort with vegetation treatments that involves the community in order to encourage the correction the flammable conditions of the homes themselves. Without such an effort, most benefits of vegetation treatments become moot. We believe that there should be a reasonable expectation that if public lands are to be impacted by vegetation treatments at taxpayer expense, there should also be a concomitant effort by private property owners to conduct their own projects – retrofitting structures to reduce flammability, maintaining a fire safe environment, and maintaining appropriate defensible space. Please see Appendices 1-3 for additional details and suggestions.

We understand that considering the flammability of the community and the suggestions we are offering to reduce that flammability can be seen as “beyond” the scope of this project. We respectfully challenge that assessment, especially in light of the Program’s Emphasis and the lessons learned from the 2007 Grass Valley Fire. The Draft EA basically describes a project that replicates much of what was done in the past. The science and experience are showing that we need to think and act differently so as not to repeat was has failed to work in the past.

We are hopeful that our suggestions will help the U.S. Forest Service in finding and implementing a viable solution that is based on scientific analysis, public participation, and collective action.

Sincerely,

Austin Gent
Research Associate
California Chaparral Institute
austin_gent@californiachaparral.org

Appendix 1

Focusing on what matters: flammable homes

Calkin et al. (2014) illustrates the importance of prioritizing risk management practices within and surrounding the Home Ignition Zone (HIZ), rather than focusing on vegetation management practices that exceed past the boundaries of the WUI.

> Wildfires are inevitable, but the destruction of homes, ecosystems, and lives is not. We propose the principles of risk management to provide land management agencies, first responders, and affected communities who face the inevitability of wildfires the ability to reduce the potential for loss. Overcoming perceptions of wildland-urban interface fire disasters as a wildfire control problem rather than a home ignition problem, determined by home ignition conditions, will reduce home loss.

Syphard et al. (2017) also highlights the importance of approaching the fire problem with a comprehensive, community-based solution, in order for the given project to be the most cost-effective. This solution illustrates that, if we are trying to protect homes and communities from the threat of wildfire, we must prioritize our focus in the vulnerabilities of the structures that we are trying to protect. With a handful of cross-references to other scientific literature, Syphard et al. 2017 states that:

> Historically, fuels-based hazard assessments and the use of fuels management for protecting communities have been the central focus of study [Finney and Cohen, 2003; Stratton, 2004], but recent research has contributed to a growing recognition that community safety is a function of a large suite of variables, which when considered together, may lead to the most effective management [Gill and Stephens, 2009; Moritz et al., 2014; Calkin et al., 2014]. For example, studies now show how land use decision-making [Syphard et al., 2012; Syphard et al., 2013; Bustic et al., 2017], defensible space and homeowner preparation [Cohen, 2000; Syphard et al., 2014; Cao et al., 2016], and ignition prevention strategies [Cary et al., 2009; Prestemon et al., 2010; Syphard and Keeley, 2015], can complement traditional management actions of fire suppression and fuels management.

The research makes clear that one of the most significant factors in determining fire risk to communities is the ignitability of structures. This factor directly connects wildfire and the destruction of homes to (I) wind-driven embers and (II) the flammable construction materials and improper design features of homes. Syphard et al. (2017) explain,

> Another factor that is broadly recognized as critical for preventing structure loss to fire is the design and materials used in the building's construction. That is, the physical attributes of a structure confer ignitability either through flames and heat [Cohen, 2004] or via embers produced during wind events, which can blow 1–2 km ahead of a fire front [Quarles et al., 2010]. In fact, it is these embers that are most responsible for homes igniting during wildfires [Koo et al., 2010; Maranghides and Well, 2009; Quarles et al., 2010; Ramsay et al., 1987].

Syphard et al. (2017) concludes that "embers…are the most responsible for homes igniting during wildfires." If wind-driven embers are the "most responsible" for destroying homes, it is imperative that the EA shifts its primary focus from the removal of native vegetation to improving structural resiliency against wind-driven embers.

Mitchell (2006) furthers the point regarding the active role that embers, wherein he concludes:

> The vast majority of structures destroyed by wildland fire in California have been lost during massive, wind-driven events. Showers of airborne brands are characteristic of such events and have proven to be a leading cause of structure ignition. Strategies for increasing the survivability of structures in the wildland–urban interface (WUI) must take this factor into account.

Following Mitchell (2006)'s suggestion, the analysis of Penman et al. (2015) echoes the need for a focus on wind-driven embers in wildfire prevention strategies. Penman et al. (2015) parallels Syphard et al. (2017) regarding how much a building's materials and design contribute to structural ignitability:

> Given that wildfires under severe fire weather conditions are generally responsible for the majority of area burned and greatest loss of houses (Blanchi et al., 2010; Bradstock et al., 2009; Mees and Strauss, 1992; Podur and Martell, 2007), wildfires will continue to reach houses regardless of the extent of management intervention in the landscape (Bradstock et al., 2012; Cary et al., 2009; Penman et al., 2014; Syphard et al., 2011). The frequency with which fire impacts upon the interface is predicted to increase due to the expansion of populations into native vegetation and the severity of fire weather increases (Clarke et al., 2013; Penman et al., 2013a; Syphard et al., 2007). Therefore house-based strategies are required to complement the landscape strategies in order to minimize house loss.

The scientific literature stresses that "wildfires under severe weather conditions [i.e. extreme wind] are generally responsible for the majority of area burned and greatest loss of houses." It is thus the case that "wildfires will continue to reach houses regardless of the extent of management intervention in the landscape." In other words, as reinstated by Penman et al. (2015), no matter how much vegetation is cleared (especially beyond the WUI), wildfires will continue to threaten peoples' lives and communities.

In order to sufficiently protect lives and communities of Arrowhead Place, the EA must analyze in greater detail the impact of wind and embers on community fire safety and help the community develop a program that that focuses on structural retrofitting and public education in order to maintain a truly fire-resilient property.

Defensible Space

Syphard, Brennen and Keeley (2014) emphasize the importance of defensible space and the degrees to which defensible space is effective or not:

> Structures were more likely to survive a fire with defensible space immediately adjacent to them. The most effective treatment distance varied between 5 and 20 m (16–58 ft) from the structure, but distances larger than 30 m (100 ft) did not provide additional protection, even for structures located on steep slopes. The most effective actions were

> reducing woody cover up to 40% immediately adjacent to structures and ensuring that vegetation does not overhang or touch the structure. Multiple-regression models showed landscape-scale factors, including low housing density and distances to major roads, were more important in explaining structure destruction. The best long-term solution will involve a suite of prevention measures that include defensible space as well as building design approach, community education and proactive land use planning that limits exposure to fire.

As the “most effective treatment distance varied between 5 and 20 m (16-58 ft) from the structure,” we recognize the importance of creating defensible space around structures. However, it also must be recognized that defensible spaces with “distances larger than 30 m (100 ft) did not provide additional protection” from fire.

In another study, Syphard et al. (2012) concluded, "We're finding that geography is most important - where is the house located and where are houses placed on the landscape."

Syphard and her coauthors gathered data on 700,000 addresses in the Santa Monica Mountains and part of San Diego County. They then mapped the structures that had burned in those areas between 2001 and 2010, a time of devastating wildfires in the region.

Buildings on steep slopes, in Santa Ana/sundowner wind corridors and in low-density developments intermingled with wild lands had the highest probability of burning. **Nearby vegetation was not an important factor in home destruction.**

The authors also concluded that **the exotic grasses that often sprout in areas cleared of native habitat like chaparral could be more of a fire hazard than the shrubs.** "We ironically found that homes that were surrounded mostly by grass actually ended up burning more than homes with higher fuel volumes like shrubs," Syphard said.

The Limits of Vegetation Treatments

Vegetation modification beyond 100 feet of defensible space can be useful in the attempt to control wildfire, especially non-wind driven wildfires. But the almost exclusive focus on reducing vegetation has not been a viable solution to the wildfire problem.

Penman et al. 2015 illustrates that no matter how effective a strategically-placed fuel treatment may be in preventing destruction, no wildfire can be contained under extreme weather conditions—especially extreme wind:

> Optimized placement of fuel treatments and resources can reduce the risk to the interface, i.e. those houses which form the boundary between native vegetation and urban areas (Bradstock et al., 2012; Finney et al., 2007; Penman et al., 2014; Plucinski, 2012; Wilson and Wiitala, 2005). However, these actions are not expected to contain all wildfires, particularly under more severe fire weather conditions (Cary et al., 2009; LaCroix et al., 2006; Penman et al., 2011a; Price and Bradstock, 2010).

Because fuel treatments "are not expected to contain all wildfires, particularly under more severe fire weather conditions," the current emphasis that the Draft EA has on vegetation clearance needs to be reconsidered.

Through explicit language, the EA invokes a causal relationship between the 2007 Grass Valley Fire and the need to conduct vegetation removal practices in the name of "increased fuel loading," (p. 3). This causality, however, ignores the findings of the comprehensive post-fire Home Destruction Examination of the Grass Valley Fire by Cohen and Stratton (2008).

Rather than placing the blame on native vegetation for destroying 174 homes, Cohen and Stratton "remind us to focus attention on the principle actors that contribute to a wildland-urban fire disaster—the home ignition zone [HIZ]."

As "most of the destroyed homes had green or unconsumed vegetation bordering the area of destruction," it becomes clear that the vegetation itself—even when situated directly adjacent or around the destroyed sites—was not the reason why 174 homes were destroyed. Cohen and Stratton stress that "home ignitions did not result from high intensity fire spread through vegetation that engulfed homes."

Cohen and Stratton's post-fire examination goes on to illustrate how it was the makeup and layout of the homes themselves—not the vegetation surrounding them—that attributed most to the overall destruction of structures:

> With minor exception (6 homes), the wildfire primarily initiated residential burning from firebrands igniting homes directly and/or producing spot fires that spread through surface fuels to homes. Once initiated, home destruction largely resulted from local residential fire conditions. The ignition vulnerable homes (e.g., flammable wood roofing, surface fuels in contact with wood siding, heavy pine litter in roof gutters), burning in close proximity to one another continued the fire spread through the residential area without the wildfire as a factor.

Individually, Cohen and Stratton list examples of the conditions of "ignition vulnerable homes," including "flammable wood roofing, surface fuels in contact with wood siding, [and] heavy pine litter in roof gutters." Collectively, the conditions that propagate home destruction are noted in relation to their geographical layout, wherein "burning in close proximity to one another," the layout of the homes "continued the fire spread through the residential area without the wildfire as a factor."

Despite the findings of Cohen and Stratton (2008), the Draft EA uses the same wildfire event to justify practices that are inconsistent with the lessons learned from the 2007 Grass Valley Fire.

Appendix 2
External Sprinklers

A retrofit that is not typically used in California, but has been used effectively in Australia and Canada, is external sprinklers (Mitchell 2005). Although internal fire sprinklers certainly help save lives within homes, additional external sprinklers can save both lives and homes (Fig. 6 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 and should be required for every planned development.

Many residents have retrofitted their homes with external sprinkler systems to protective effect. For example, 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 (Conniry 2008).

Figure 6. 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.

Appendix 3

FEMA Pre-disaster Grants

Mountain communities can use federal grants to install ember-resistant vents and eliminate wood roofs, vital to reducing home loss during wildfires

In 2013, David Yegge, a fire official with the Big Bear Fire Department, submitted his fourth grant proposal to the FEMA pre-disaster mitigation grant program to pay up to 70% of the cost of re-roofing homes with fire-safe materials in the Big Bear area of San Bernardino County. Yegge also has assisted Idyllwild and Lake Tahoe in applying for grants, including the costs of installing non-ember intrusion attic vents.

Yegge's first $1.3 million grant in 2008 retrofitted all but 67 of 525 wooden-roofed homes needing retrofits in Big Bear Lake. A forward-thinking, "no-shake-roof" ordinance passed by the Big Bear City Council in 2008 required roofing retrofits for all homes by this year. San Bernardino County passed a similar ordinance in 2009 for all mountain communities, with compliance required by next year. Such "future effect clause" ordinances can be models for other local governments that have jurisdiction over high fire hazard areas.

To qualify for a FEMA grant, a cost/benefit analysis must be completed. "Our analysis indicated that $9.68 million would be saved in property loss for every $1 million awarded in grant funds," Yegge said. "FEMA couldn't believe the numbers until they saw the research conducted by then Cal Fire Assistant Chief Ethan Foote in the 1990s. There's a 51% reduction in risk by removing wooden roofs."

"The FEMA application process is challenging, but well worth it," said Edwina Scott, Executive Director of the Idyllwild Mountain Communities Fire Safe Council. "More than 120 Idyllwild homes are now safer because of the re-roofing program."

Additional Information

In California, the state agency that manages the grants is the Governor's Office of Emergency Services (Cal OES), Hazard Mitigation Grants Division. Cal OES is the administrative agency and decides what grant proposals are funded based on priorities established by the State Hazard Mitigation Plan.

The Mountain Area Safety Taskforce re-roofing program:
http://www.thinisin.org/shake/

The San Bernardino County re-roofing ordinance:
http://www.thinisin.org/shake/images/DOWNLOADS/ORDINANCES/ord_4059.pdf

FEMA grant program:
http://www.fema.gov/pre-disaster-mitigation-grant-program

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