From: Dias, Matt@BOF
To: Russ Henly; Wolf, Kristina@BOF
Subject: FW: research plan comment
Date: Wednesday, May 5, 2021 3:40:28 PM

See below from Susan Husari.

Matt Dias
Executive Officer
Board of Forestry and Fire Protection
Sent from my Samsung Mobile Device

-------- Original message --------
From: shusari@comcast.net
Date: 5/5/21 3:11 PM (GMT-08:00)
To: "Dias, Matt@BOF" <Matt.Dias@bof.ca.gov>
Subject: research plan comment

The page where Russ summarized the recommendations should be in the report, either as part of the executive summary or as another section.
S

From: gwlamb11@gmail.com
To: Wolf, Kristina@BOF
Subject: Comments on Draft Report
Date: Friday, May 7, 2021 4:50:47 PM

Hi Kristina

The report looks good and I have no comments on the report.

Since I spend most of my time in the desert landscapes area, I would like to see more research and studies being done in arid ecosystems. As you may know, UNLV is doing some research and studies on post fire rehab but they have a long way to go to find something that can be used to rehab burned areas. Wildfire has a major impact on desert landscapes that may affect the areas for decades. Their studies and research effort is something that is needed and I applaud them for their effort. However, I would like to see more effort spent on pre and post fire resilience in these arid lands.

Thanks for all you do to reduce the wildfire impacts to people and the ecosystem. Fire will never go away but we can find better ways to live with it.

Bill Lamb

--

Bill Lamb

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Centerville, Utah 84014

Email: gwlamb11@gmail.com

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Marc J. Jameson
12376 Scotts Valley Road
Nevada City, CA 95959

May 20, 2021

Re Draft Report on Forest Management Research

Dear Members of the Board:

It is my privilege to provide comment upon your Draft Research Report. My initial reaction to the report is that it is comprehensive, in fact, overly so, as most reports of this type tend to develop. Most readers will be lost, bored, or both, before getting anywhere near the recommendations. In California, there are such a large number of overlapping and competing interests with something to add, that over-complexity seems to be unavoidable. None-the-less, I appreciate the effort, knowing many of the participants personally.

Historically, research in the forestry realm has been spotty and disjointed in my view. Very good work has been done, but it is difficult to assimilate it into the larger forest management picture. I had the great privilege of being the manager of Jackson Demonstration State Forest over a very difficult period between 1997 and 2009. During that period, our annual harvest varied between zero and approximately 40 million board feet per year, due primarily to civil suits.

Funding fluctuated wildly, as did staff numbers and expertise. In addition, I reported to fire protection personnel with only moderate interest in the well-being and appropriate function of a research and demonstration forest. Unfortunately, State agencies continuously face these issues, making it extremely difficult to remain on any given track for long.

Though JDSF has been in existence since 1947, there are very few on-going, long-term study results to show for it. There are a few of note, as well as abundant valuable short-term projects. This is not for a lack of trying on the part of staff; but due primarily to obstacles beyond the control of the management. Budgetary and staffing stability are essential for any long-term research to occur; an important issue for the Board to address if the state forests are to be an integral part of your research agenda, as they should be.

With regard to Table 11 of the report, I have the following comments:

The first research topic listed is as follows:

> **<u>Biophysical, ecological, social, and economic effects</u> and trade-offs associated with different forest management strategies on private, federal, and state lands, and urban areas <u>under climate change</u>, including impacts associated with increased pace, intensity, and location of forest treatments. Includes identifying areas that should not be treated for ecological, social, or economic reasons.**

With the underlined additions, this important topic is rendered overly complex. As mentioned above, there are very few long-term and on-going studies of various silvicultural practices at the landscape level. This is very basic stuff that should be implemented and implemented well. While many individual silvicultural studies were initiated at JDSF over the years, many had to be either abandoned or modified because there were significant flaws in their initial set-up. Many had been established by college professors, who unfortunately, let their students set up the field applications. While some valuable information was gleaned from these studies, the point I make here is that the studies had to be largely abandoned after a period of time.

JDSF offers a unique opportunity for long-term study at the landscape level. Me and my staff attempted to introduce such a plan while employed there, but failed due to the competing interests and broad make-up of committees appointed to oversee our efforts at management. This is understandable, but reflects the reality of forestry in California today, and the limitations the Board will face in attempting to make valuable research a reality.

Climate change is real, but slow-moving and indeterminant. By adding this element to any study of forest development, you are adding too much uncertainty. As changes associated with climate become more distinct relative to forest growth and development, research can be adjusted if need be. I realize that everyone wants to be on the front lines associated with this phenomenon; my point is that basic forest science is well behind the curve as it is.

Methods and barriers (including workforce limitations) to obtain greater production and utilization of timber and wood products, while not exceeding sustainable harvest levels.

There are two primary barriers to obtaining greater production and utilization of timber and wood products. The first and primary one is the desires of landowners, most of whom have no interest in substantially greater production if achieving that production level significantly alters their desired management planning and income flow. The second limitation relates to the rules of the Board, and/or enforcement thereof. It is well known in the industry and forestry community that the word maximum within MSP means nothing of the kind. If I had to guess, I would place California's forest production level at no more than half of maximum. This is not a criticism; but reflects the long, tortured history of rule-making, attempting to balance the desires of NIPFs, industry, environmental groups, voters, and legislators. This said, finding some solution to the biomass utilization, or under-utilization problem would be highly beneficial to both production levels and fire-related impacts.

Re-establishment of forests and their ecosystem functions after wildfire and other severe disturbances in the context of a changing climate.

This has become increasingly significant in light of the apparent increase in fire severity that has occurred over the past decade. On one level, the issue is one of simply knowing what species to replant, and providing the funding and opportunity to do so. It appears that a significant obstacle is the failure of either large landowners or federal agencies to replant conifers, favoring a "natural" vegetative development pattern; or lack of funding. This may mean a 350-year recovery process versus a 50 year one. Aside from the replanting of conifers, there is study to be done on the appropriate intermediate and understory species to establish after fires. Non-native invasive species are running rampant in California with none more daunting than European annual grasses, which are ubiquitous. Again, I see

little value in the inclusion of “changing climate”. Any long-term research project, by its very nature, will take this into account as time passes. The monitoring data will provide evidence in this regard.

Improved wildfire modeling and prediction, including in the WUI.

Suggested additions/improvements to this element would be research into suppression access, response times, and small fire identification. It is essential that access to fires be made rapidly and early, which means spotting them and getting to them quickly. It is well known that most lookouts have been abandoned, and miles of forest road have been idled or abandoned. There are thousands of cell phones out there, but location and reporting issues should be thoroughly evaluated. Another major factor is wind speed, direction, and duration. If, as many have reported, fire intensity has increased, the primary reason is most likely associated with the winds. With regard to the WUI, prevention practices appear to be mixed, uncoordinated, and partial at best. With a better understanding of local wind patterns, communities would be better prepared to devise appropriate prevention measures, assuming that funding and cooperation exist.

Forest Practice Rule effectiveness and management impacts on watershed, plant, and wildlife resources and other ecosystem services.

The Board and Department have spent decades of effort on this topic, but due to the influences of the public, landowners, and resource agencies, there has been little agreement upon results of those efforts. I personally participated in many of them. That said, this general topic is ripe for long-term research; not focused upon any specific rule, but upon long-term management in general. The rules have been too unstable to study on a long-term basis. There appears to be an opportunity for outreach to gain access to landscape level areas, whether public or private, to initiate research along these lines.

Determining the optimal mix of wildfire prevention and suppression mechanisms, including use of managed fire, where feasible, to reduce losses to life, property, and natural resources, while minimizing costs.

It is my opinion that there is no optimal mix of prevention and suppression. Prevention gets very little attention relative to suppression, which is a sad state of affairs. It may well be that no amount of prevention will ultimately reduce suppression costs and efforts, but this is unknown at this time. When examining the various prevention practices employed in the forested areas of California, they appear to be quite mixed and mostly ineffective. Most landscape-level treatments look good for a few years, but are not maintained, resulting in a continuous cover of ladder fuels, which essentially negates the effort.

Closer examination of mechanical methods is recommended. These types of treatment would initially utilize mechanized equipment and chainsaws, piling, and burning, rather than broadcast fire applications. Study in needed to expand treatment to steeper slopes. Treatment of these slopes, whether by under-burning or mechanical, is extremely difficult, and capable of causing more damage that prevention benefit.

My final comment is that, while a list of priority research subjects is important, what may be more important is the means by which long-term, landscape level research can be conducted. Relatively unbiased partners must be identified, and funding secured. Perhaps most important is staying power; keeping the research alive in a world where priorities continue to shift as the world changes.

Thank you for the opportunity to comment upon this important topic.

Sincerely,

Marc J. Jameson

May 26, 2021

California State Board of Forestry & Fire Protection
Attn: Kristina Wolf
P.O. Box 944246
Sacramento, CA 94244-2460

Comments on the California Board of Forestry (Forest Management Research Report) done in conjunction with the Science Advisory Team of the Forest Management Task Force and CAL FIRE -- the Draft Report on Forest Management Research ('Report') was presented to Board and to the public in a virtual meeting on May 5, 2021.

Our comments are in conjunction with February 28, 2021 comments on the California Air Resources Board public draft on Greenhouse Gas Emissions of Contemporary Wildfire, Prescribed Fire, and Forest Management Activities **(which is attached for the record**).

Also important for the relevant state agencies is the nexus between these topics listed and rated in the BOF Report and the State's Biodiversity Action Plan and the Wildfire and Forest Resilience Action Plan.

We appreciate the challenges of trying to "stitch" these various issue areas and plans together into coherent actions and monitoring activities. We suggest that the "Reports" rating review team consider the other State Agency mandates, responsibilities, and plans in a transparent process to see how many similar boxes can be checked via a more holistic approach to rating issues and their importance.

Four of the most important mandates for natural resource management in forests in California are:

- Reaching Climate Stability (Forest Carbon Action Plan-2018)
- Creating wildfire resilience landscapes (2021 Wildfire and Forest Resilience Action Plan)
- Achieving the State's Biodiversity Goals (The Biodiversity Initiative EO-N-82-20)
- California Air Resources Board public draft on Greenhouse Gas Emissions of Contemporary Wildfire, Prescribed Fire, and Forest Management Activities

We offer two examples from our above-mentioned letter to CARB.

1. Forest Soil Carbon Monitoring

While tree growth and carbon modeling is a fairly well understood thing (even if imperfect) art for tracking storage and emissions, roughly half the forest carbon is below ground and is impacted by forest practices yet little to nothing is said about it.

Absent a rigorous effort to expand overall forest carbon monitoring to include the full forest carbon profile state agencies, policy makers, forest managers, conservation partners and climate activists are left with half the story. That is unacceptable. Especially when forestry site-prep can be very aggressive and include deep-ripping and other tools as seen in the attached letter.

Farm soil carbon sequestration is clearly called out in the States Biodiversity Initiative
if we can monitor that can figure out a reasonable approach to monitoring soil carbon emissions from forestry activities that impact below ground carbon stocks.

2. Fire risk in plantation forestry—we urge you to look back at historic information on plantation resilience and track recent trends in plantation survival (across ownerships). Reforestation for Resilience and planting like fire matters is critical to successful planting on post-fire landscapes.

There should be a specific goal of monitoring reforestation success over time, especially with increasing wildfire trends and larger landscape, uncharacteristic fires becoming more common. We request as part of this monitoring research effort to examine as far back as the mid-1980's to present and characterize plantation survival to the greatest degree possible.

Our concerns include crediting reforestation in carbon calculations at one point in time and them watching those some acres burn and possibly acerbate fire effects more broadly due to the uncharacteristic stand structure and fire promotion. The Rim Fire, The King Fire, the recent North Complex Fire, and back to the Cleveland Fire of 1992 there are many examples where densely planted-burned landscapes have been densely planted again . . . only to burn again.

We are happy to discuss this more with all parties.

Sincerely,

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February 28, 2021

RE: Comments on the Public Comment Draft: Greenhouse Gas Emissions of Contemporary Wildfire, Prescribed Fire, and Forest Management Activities (December 2020)

Ms. Anny Huang
Manager of the Emission Inventory Analysis Section
California Air Resources Board
1001 I Street, Sacramento, CA 95814
Sacramento, CA

Dear Ms. Huang and Air Quality Planning and Science staff,

We appreciate the effort to capture and explain the important information in the draft Greenhouse Gas Emissions of Contemporary Wildfire, Prescribed Fire, and Forest Management Activities Report (draft Report) as we grapple to understand the natural ecological processes and anthropogenic effects to the human environment that define our past and present California landscape. By better defining the processes and effects that shape our landscape, we can improve and stabilize California's fire and forest environment.

1. Meeting the legislative requirements of SB 901 (Dodd) 2018

The charge directed by Senate Bill SB 901 (Dodd) 2018 is a comprehensive one that should take into full account the potential emissions from wildfire, prescribed fire, and forest management activities. In terms of examining the carbon implications of forest management, it is critical that the Emissions Inventory Analysis be comprehensive and investigate all aspects of carbon emissions and capture (short-and-long term carbon stability; above ground and below ground emissions potential; reforestation and plantation survival; life cycle functions of wood products, etc.).

Based on the language in the State Senate Bill (SB 901)[1] it is important that a rigorous analysis of soil carbon loss be conducted as part of the emissions inventory. On two occasions in the

[1] **SEC. 4.**
Section 38535 is added to the Health and Safety Code, to read:

38535. The state board, in consultation with the California Department of Forestry and Fire Protection, shall develop all of the following:

recent history of development of the State's Forest Carbon Action Plan (May 2018) and this 2020 draft emissions monitoring report, it was made clear that despite research on monitoring carbon loss in forest soils (Lacroix 2016: Gershenson et. al. 2010; Smith et al. 2019, Chenyang et al. 2020; Post et al. 2001; Achat et al. 2015; Buckholz et al. 2016; James and Harrison 2016; Palmer et al. 2012; Vanguelova et al. 2016) and the clear statement of importance for retention of soil carbon in Governor Newsom's recent Biodiversity Executive Order N-82-20, that soil carbon loss related forest management is not being considered:

("These estimates do not include soil carbon" p.ii),

It is arbitrary and highly inconsistent for the Governor to praise the need for soil carbon retention in agriculture (in the Biodiversity Executive Order N-82-20), which will require monitoring and evidence to be valid, and then for CARB to ignore various forest management practices effecting below ground root material and soil organic matter that contribute to forest carbon stability and emissions. These practices occur on significant acreage throughout the Sierra Nevada and elsewhere where logging is followed by extensive site preparation (see below).

Failure to address soil organic material and below ground carbon stability (where roughly 50% or more of the overall carbon profile is located) will present an incomplete picture of forest carbon stability and will fail to identify factors related to timber harvest and site preparation that can contribute significant carbon sourcing. Recent soil carbon research states:

> "Forest harvest has been shown to cause major changes in soil C pools. Soil is the world's largest terrestrial C pool (Davidson and Janssens, 2006; Jobbagy and Jackson, 2000; Schlesinger and Bernhardt, 2013). There is approximately three times as much C in soils than in aboveground biomass and twice as much as in the atmosphere (Eswaran et al., 1993)." (in Lacroix et al. 2016).

2. Site Preparation must be considered and analyzed (See: Gershenson et. al. 2010 pg. 30)

Site preparation activities to clear land for new seedlings and improve soil fertility in the footprint of clear-cut harvests can have negative effects on overall carbon storage, as removal of debris and fertility enhancements create conditions favorable to microbial decomposition in soil

(a) A standardized system for quantifying the direct carbon emissions and decay from fuel reduction activities for purposes of meeting the accounting requirements for Greenhouse Gas Reduction Fund expenditures. This system may include standardized lookup tables by forest stand type, including for oak woodland forests, and harvest or other management prescriptions. The system shall acknowledge that certain expenditures, such as for planning, analysis, modeling, or outreach, will not have a direct greenhouse gas reduction benefit, but will facilitate necessary climate preparedness activities that will have direct greenhouse gas benefits.

(b) In consultation with academic experts, a historic baseline of greenhouse gas emissions from California's natural fire regime reflecting conditions before modern fire suppression. This shall be completed on or before December 31, 2020. The baseline may be included within the state board's natural working lands inventory.

(c) On or before December 31, 2020, and every five years thereafter, a report that assesses greenhouse gas emissions associated with wildfire and forest management activities.

carbon and increases in microbial decomposition of soil organic matter. (see Palmer et al. 2002; Gershenson, A., and Barsimantov, J., 2010).

Certain techniques, including the retention of soil cover on the forest floor, or converted to carbon in charcoal is more resistant to decomposition and is likely the primary reason for carbon accumulation following fire events (Kuzyakov et al. 2009). However, the intensity of site preparation, and therefore disturbance to soils, is generally correlated with increases in carbon losses (Jandl et. al. 2007), so the beneficial effects of converting biomass carbon into charcoal may be offset by disturbance to the site.

As with the case of harvest intensity, overall effects of site preparation on soil carbon are more negative with higher manipulation of the site. Ensuring that soil cover is left in place (or at a minimum converted to charcoal), reducing the amount of soil disturbance and mechanical mixing of forest floor-mineral soil, and making efforts to ensure that overall soil microclimate conditions do not change significantly, could minimize increases in microbial activity and soil carbon decomposition, dissolved organic carbon leaching, and soil erosion. Projects that involve plowing, deep ripping, or furrowing will result in soil carbon losses that may be mitigated by long-term (over 50 year) rotation schedules but should be avoided as some soil carbon loss may take much longer to be recovered. Figures 1-4 below illustrate examples of soil disturbance referenced here. Although some mechanical disturbance to the soil is inevitable as a result of harvest or site preparation activities, such disturbance should be minimized to ensure minimal soil carbon losses. In the recent Clean Development Mechanism of the Kyoto Protocol (CDM) Afforestation/Reforestation **guidelines for soil carbon management specify that such disturbance shall not exceed 10% of the project area**, which is an example of a conservation allowance for such disturbance and will likely result in significantly small soil carbon losses. See Appendix A below for images illustrating the extent and intensity of these practices in the Sierra Nevada.

Figures 1-4.

Figures 5-8 below illustrate several types of equipment used in site preparation in industrial forestry practice (to provide a general picture of ripping equipment). Many different equipment designs exist for site preparation, ripping, and sub-soiling throughout the world of forestry practice.

Figures 5-8.

The 2010 Climate Action Reserve's (CAR) paper titled ***Accounting for Carbon in Soils*** states, "Soil carbon accounts for 50-75% of all the forest carbon in temperate and boreal regions, so small changes in soil carbon can have significant influence on total ecosystem carbon storage."

The paper further states, "High disturbance site preparation activities, such as plowing, deep ripping, etc., will have significant negative effects on soil carbon, with losses as high as 30%, **and should be avoided**" (emphasis added). The type and residence time of soil carbon elements vary and range from short-lived (microbial biomass and labile root exudates), and medium-term materials, to decades to hundreds of years old materials (roots, trunks below ground), and ancient carbon (hundreds to thousands of years old) represented by (humins and humic acids), (CAR Report p.7).

Finally, the CAR Report p.11 states even though soil carbon stability and exchange is highly complicated and highly variable depending on a variety of factors, "current research suggests that one of the most critical components to successful soil carbon retention in forests is proper management, which reduces some types of disturbance, while actively encouraging processes that protect soil organic carbon from decomposition through both chemical and physical means."

The most extreme type of disturbance in industrial forest practice is deep ripping, plowing, furrowing, and sub-soiling disturbance in the top and mid-soil horizons. The physical disturbance to soils threatens remaining soil carbon stocks by accelerating rapid decomposition, allowing temperature increases, and breaking up soil aggregates all of which aid microbial decomposition (CAR Report p. 20).

While the 2010 CAR ***Accounting for Carbon in Soils*** report is not tailored specifically to California and some recommendations such as leaving significant logging slash post-harvest is not an appropriate soil carbon building strategy in the frequent-fire landscapes of California, the strong admonition to avoid and severely limit (to 10%) the amount of soil disturbance in the project area (subjected to ripping, plowing, sub-soiling, etc.) is emphatically repeated throughout the 47-page report.

The draft CARB Emissions Monitoring Report (December 2020) must consider the potential long-term soil carbon impacts to certain forest practices such as deep ripping, sub-soiling, plowing, and other practices utilized in industrial forestry as a part of routine site-preparation. It would be arbitrary to move forward validating or attempting to account for carbon loss or storage associated with forest management, including standard industrial forest practices, without examining the level of acres annually subjected to such site-preparation activities. California must not ignore soil carbon loss from post-harvest site disturbance associated with short rotation clear-cut forestry on one hand, while crediting such activities with any benefits, economic or otherwise, on the other. The lack of a comprehensive consideration of carbon stability in forest management activities is a current failure of the draft Emissions Monitoring Report to account for significant issues related to carbon storage and emissions - the very focus of major global, national, and state climate initiatives. This current failure must be addressed for California in particular, where we have been first to act to recognize, account for, and limit carbon emissions from all sectors to halt global warming.

Timber harvest records exist, inspections have occurred, and photos taken. Soil organic matter testing could have happened for some subset of the harvested landscape to at least demonstrate concern for the issue of loss of a critical C pool; conducting these tests and analyzing their findings must become a priority. Restating that soil carbon monitoring cannot be accomplished

in the December 2020 GHG Emissions Monitoring Report, echoing claims from the 2018 Forest Carbon Action Plan, is unacceptable. Especially, in light of the information presented then and now, that it is possible to make estimates from study plots in similar soil types, elevations, climates, and practices.

3. Addressing the vulnerability of forest carbon stability associated with non-analog forest structural homogeneity.

The Forest Carbon Action Plan (May 2018) focuses on restoration of fire-excluded landscapes to limit carbon sourcing from wildfires and increase sequestration via increased carbon stability in frequent fire forests**. Looking at stand structure and associated fire risk that foster or limit ecosystem service is recognized in greenhouse gas protocols and cap-and-trade mechanisms, yet forest carbon is valued equally regardless of forest type (stand structure within or outside NRV for the specific landscape), an approach that fails to account for risk of carbon loss from disturbance in non-analog stand conditions" (Hurteau et al. 2009).**

To this point, the re-establishment of ecologically **non-analog stand structures** during reforestation strategies is to invite weakened resilience (the fire prone nature of non-analog, homogenous stand structures) in forest systems by planting trees like fire does not matter. It is critical for CARB and other state and federal partners to examine the history of plantation forestry in California, especially in areas that have been harvested or burned in (at least) the past 45-50 years, to understand the resilience (or lack of resilience) of these ecologically uncharacteristic practices. Looking back on the 2013 Rim Fire landscape is a good place to start. Figure 9 below illustrates the recent burn history of the Rim Fire area, illustrating an example of a landscape that has been harvested or burned, replanted in narrow-spaced, fire prone plantations, and then burned again, repeatedly. How CARB accounts for the carbon value in fire prone plantations must rest on the reforested areas surviving into a reasonable timeframe, andthat is a highly uncertain speculation at this point. The reforestation and fire history needs to be accumulated and disclosed to help the state better understand what to support (with restoration funds, human capital, and policy) and what to limit.

It is critical that the State fully embrace a "Reforestation for Resilience—North et al. 2019" strategy when planting trees in recently burned landscapes. This paper with its 26 authors explores deeply the failures of planting like fire does not matter. The paper offers several approaches that are based on ecosystem resilience and uses best available science on the matter of reforestation in California. Non-analog (uniform) plantation tree farms are much more susceptible to fires, drought, and beetle infestations then approaches that emphasize heterogeneity (Koontz et al. 2020; Kane et al. 2019).

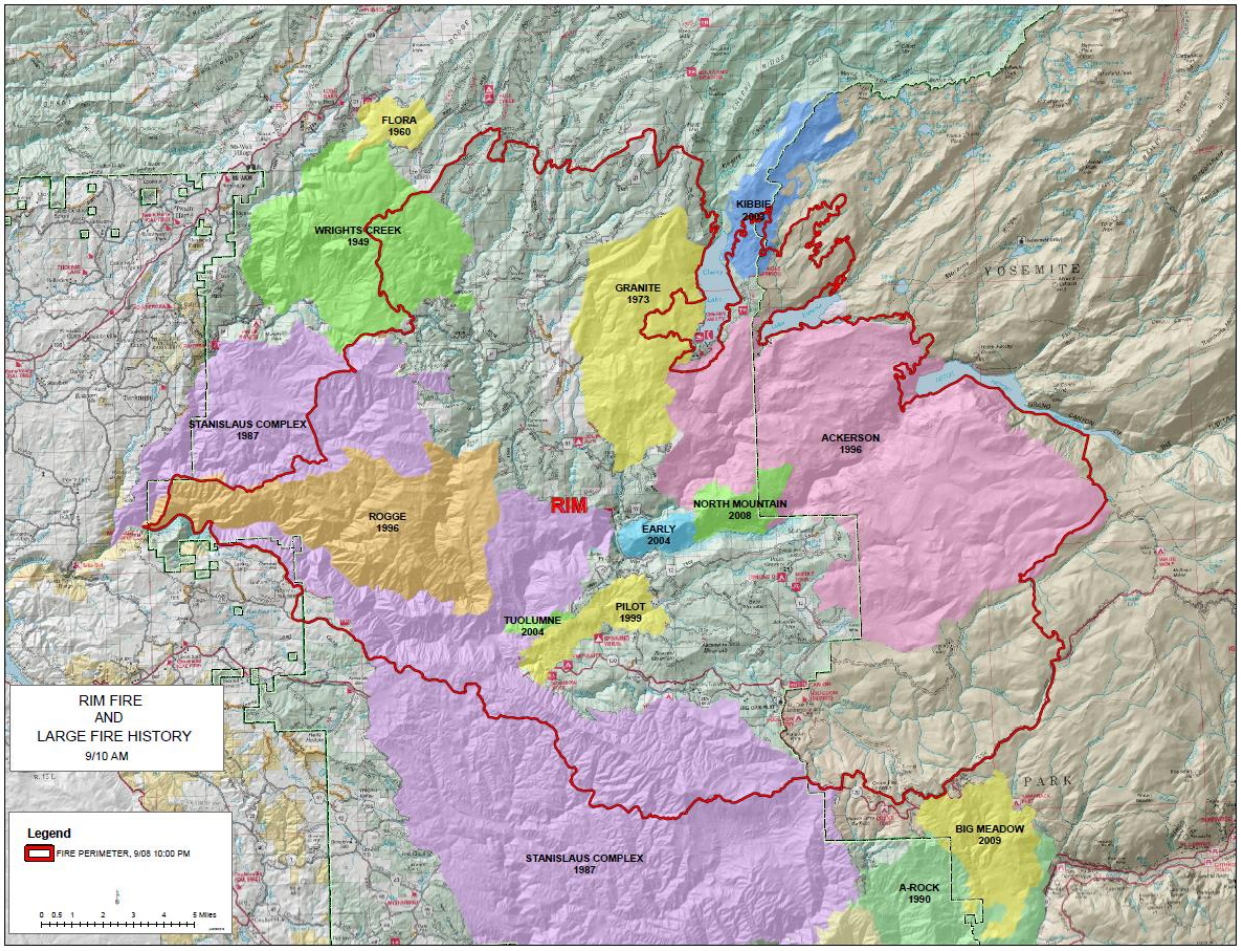
Locally, plantation reburns on the El Dorado National Forest (in one fire perimeter) include the Cleveland Fire (1992), the St. Pauli Fire (2002), the Fred's Fire (2004) while just to the west, the 97,000-acre King Fire burned thousands of acres of plantations on industrial and Forest Service ground.

The 2013 Rim Fire is another example for the vulnerability and lack of resilience of uncharacteristic stand structures being burned, planted, and reburned which calls into serious

question any carbon monitoring and mitigation approach that fails to account for risk of carbon loss from disturbance in non-analog stand conditions. **If wildfires are being fueled by ecologically uncharacteristic conditions that the State of California is permitting, and offering accolades for economic performance of these practices, while spending millions on fire suppression each year, then we argue it is past time to conduct a full scientific investigation of both soil carbon loss in industrial forestry practices and of uncharacteristic stand structure as an important and contributing variable influencing wildfire and forest carbon.** This investigation should include similar practices on federal lands such as reforestation from past logging and post-fire reforestation.

To be clear, we are not calling for the end of reforestation. We are calling for a new model of reforestation, one designed like fire matters and that is essential to forest resilience.

Figure 9. 2013 Rim Fire and Large Fire History (data from USDA Forest Service)



4. Non-Fire Forest Management Activities

The draft Report does not address non-fire forest management activities. Absent machinery and transport emissions, and wood processing and retail transport emissions there would be little wood processing going on in California. It is arbitrary to ignore these activities which are inextricably linked to forest management and need to be addressed. The wood life cycle function of wood products is also critical because assumptions regarding longevity and carbon "storage" benefits are part of the crediting of forest management practices in California which need independent examination.

On (pg. 5) the Report claims there is insufficient information to quantify the impact that forest management has on ecosystem processes under current climate conditions and extreme fire behavior. This statement is incorrect and unfounded when uncharacteristic stand structure is likely a significant contributor to extreme wildfire behavior and has been analyzed elsewhere (see Zald and Dunn 2018; Hurteau et al. 2009). We argue that stand structure along with other variables can be sorted out for this report.

Fred's Fire 2004 burning 1992 Cleveland Fire Plantations

St Pauli Fire (2002) burning more of 1992 Cleveland fire plantations.

5. Current Ecological Baseline

When assessing carbon emissions from fire and forest management, CARB should identify a current ecological baseline. The past level of emissions from fire in 1800 (Stephens et al. 2007) is very interesting but not relevant to the 2021 California landscape. We suggest working with UC fire scientists and Forest Service PSW researchers to get accurate estimates of today's vegetation-fire regime landscape to acquire a benchmark understanding of ecological fire need (Schweizer and Cisneros 2016). A good place to start is explained in (North et al. 2012). It is important to define what the natural relationship to ecological fire (including lightning and anthropogenic fire restoration) in California is before accounting for harmful emissions.

It is also important when characterizing carbon stack transformation to characterize a carbon stability goal and a science-based "picture" of resilient forests that fosters stability. We will have to transform forest carbon stocks by eliminating non-resilient and uncharacteristic stand structures and uncharacteristic tree densities with much more heterogeneity to achieve resilient large tree dominated, frequent fire forests in much of California. Starting with the SNEP Report in 1996, we have a good idea what a resilient forest system looks like. While the past may not be a perfect model for the 2100 future, it is certainly a good place to start.

6. Conclusion

Including stand structure in a wildfire behavior analysis, (i.e., assessing what variables were the primary drivers of the fire), is essential to gain clarity on the relative value or harm from certain forest manage practices. In terms of below ground soil carbon stability, we would like to see a strong annotated literature review of the current monitoring efforts (we offer several references) and a strong commitment to acquire a clear understanding of what is happening to roughly half of all the forest carbon -that which is below ground- due to forest management. This information needs to be part of the benchmark carbon and ecosystem functioning statement for ecosystems in California.

Thank you for this opportunity to comment on the draft Greenhouse Gas Emissions of Contemporary Wildfire, Prescribed Fire and Forest Management Activities.

Sincerely,

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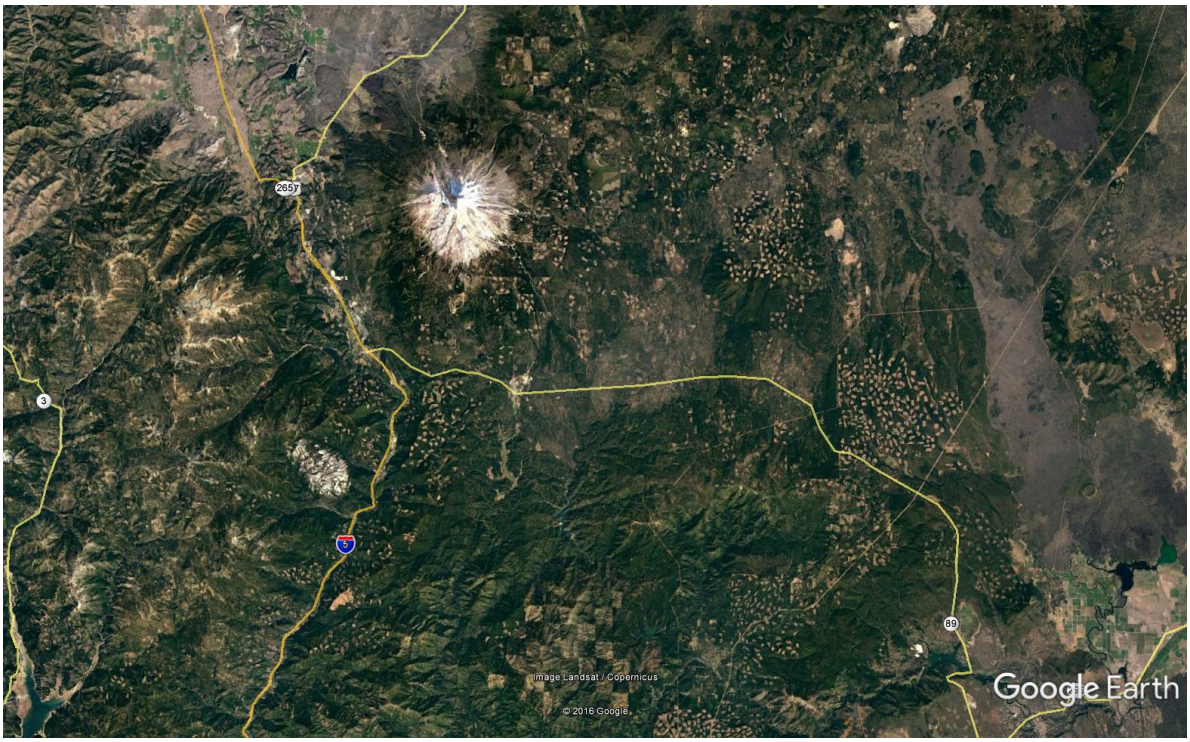
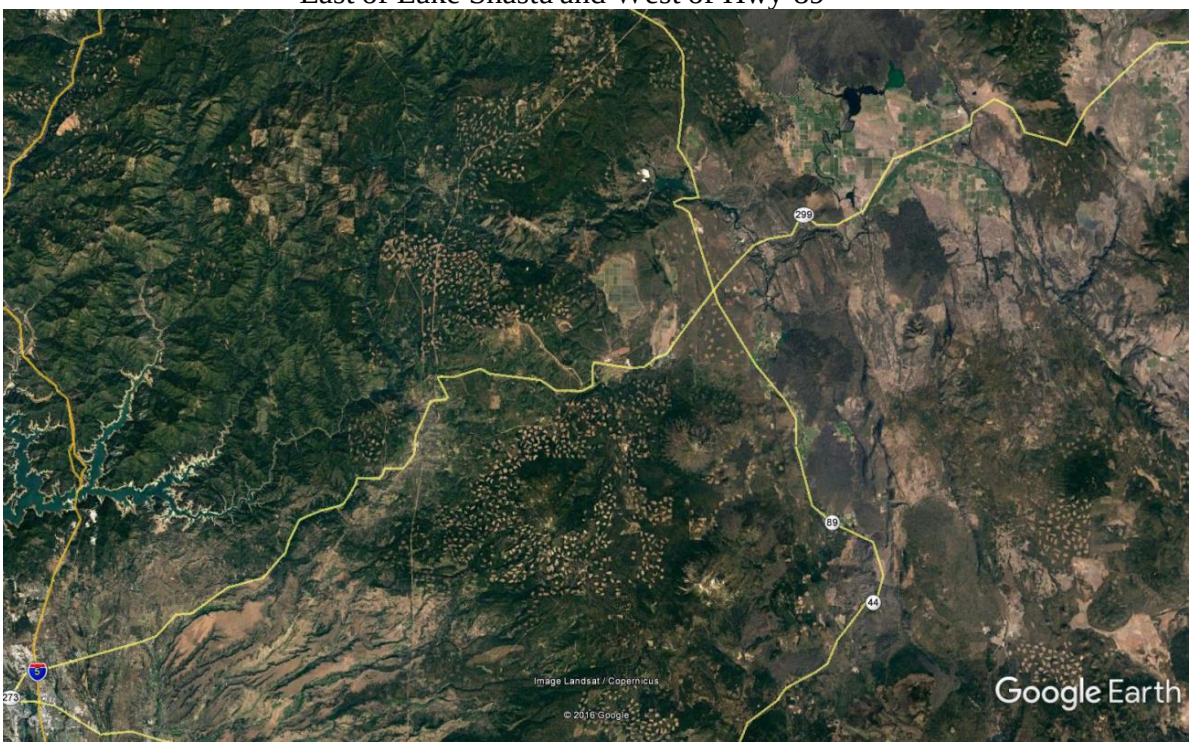
Appendix A: photos are 2016 Gogle Earth snapshots of 20-30 acre clear-cut patches

Industrial logging and fragmentation in the Sierra Nevada and Southern Cascades

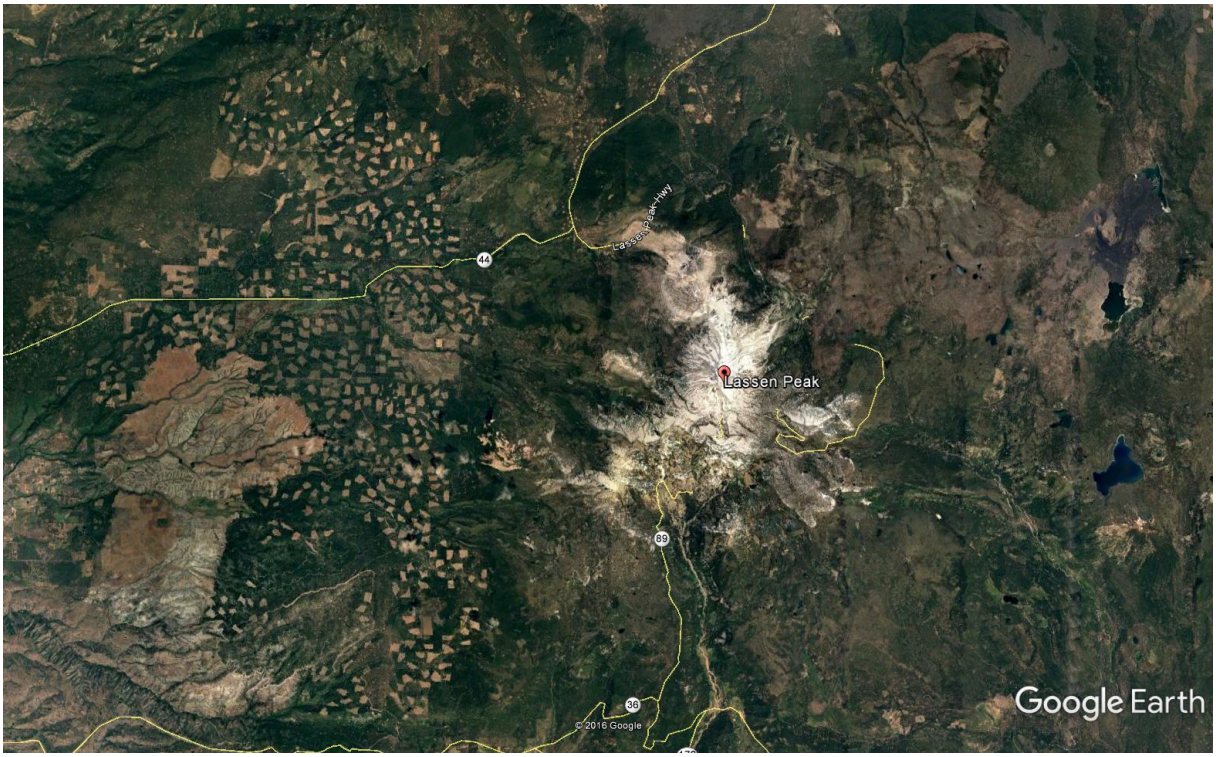
Mount Shasta Area



East of Lake Shasta and West of Hwy 89

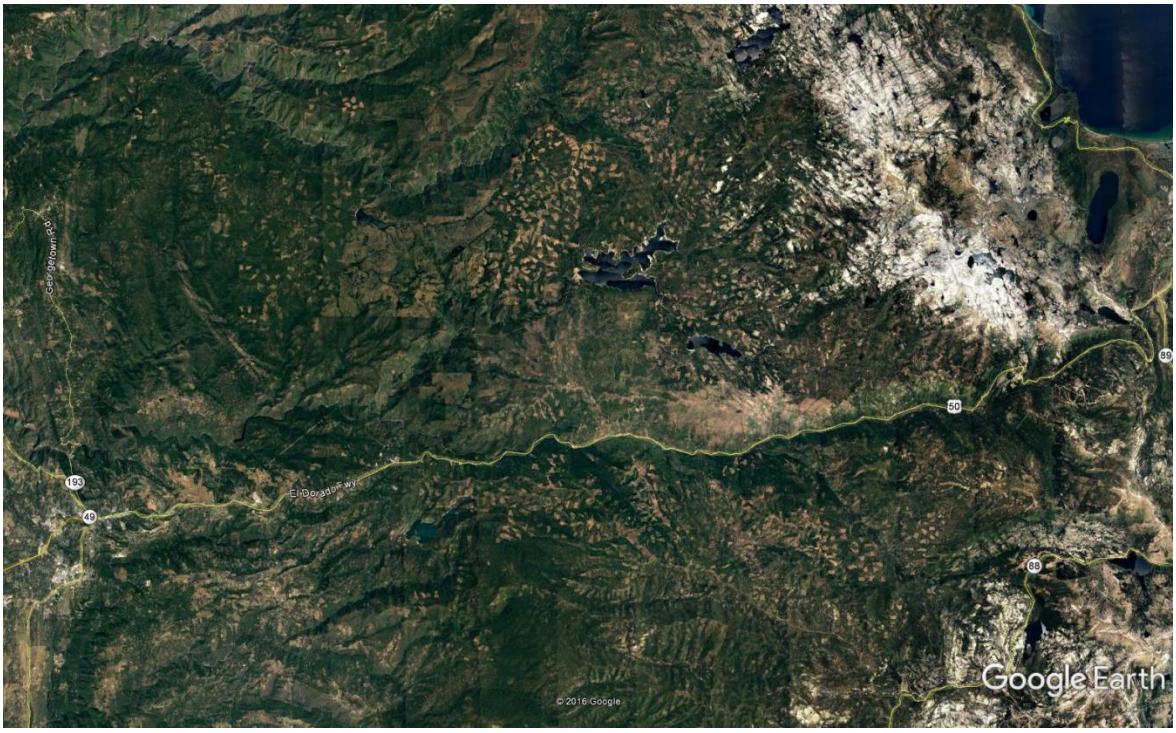


West of Mt. Lassen National Park



North of Hwy 70 and West of Lake Almanor

Hwy 50 Corridor East of Placerville and West of Lake Tahoe



Highway 108 north to Highway 88 (Tuolumne Co, Calaveras Co., Amador Co.)

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Sacramento, CA 95825
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Email: info@woolgrowers.org

May 26, 2021

Submitted via email to kristina.wolf@bof.ca.gov

California State Board of Forestry & Fire Protection
Attn: Kristina Wolf
P.O. Box 944246
Sacramento, CA 94244-2460

Re: Notice and request for public comment on DRAFT Report on Forest Management Research

Dear Members of the Board:

The California Wool Growers Association (CWGA) appreciates the opportunity to provide comments for the DRAFT Report on Forest Management Research (Report). Our members strive to be responsible stewards of California's diverse natural resources as integrating sheep and goat grazing in forestry management allows for greater utilization of resources, while improving the function and appearance of a wide variety of landscapes. As California's forests are comprised of both public and private ownership, our association has been engaged in addressing the State's needs for improving landscapes and reducing the risk of catastrophic wildfire.

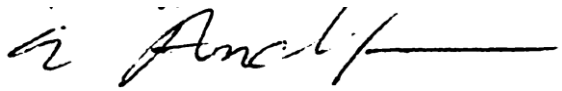
Conditions in California's treatable landscapes are changing at a rapid pace and experiencing a wildfire crisis. While the factors contributing to the State's current treatable landscape conditions can be debated, it can be stated the State's current practices and policies regarding vegetation management are inadequate to accommodate the environmental changes that are said to be occurring. Nonetheless, there is an evident buildup of fire fuel and priorities for research on forest management need to include a variety of means, including targeted grazing (or prescribed herbivory) to successfully lower the risk of potential wildfire, mitigate the effects of destructive wildfires, and re-establish the ecosystem following a wildfire event.

We appreciate the Board recognizing targeted grazing as a viable vegetation and forest management solution as noted by it being recognized to an extent in the 14 research topics developed the Board and CAL FIRE staff for stakeholder ranking. Targeted grazing can play a role in each of the recommended priority research topics identified in the Report. This long-time practice has proven to reduce the severity of fires, promote healthy forests by grazing the vegetation that crowds out and competes with trees, improve wildlife habitat, and can be utilized in areas that are too steep for machinery, or too close in proximity to residential areas that may have concerns with chemical treatments of the landscape. Grazing of livestock improves forest ecosystems by recycling nutrients back into the soil, minimizing erosion and encouraging native plant growth.

We ask the Board to consider directly recognizing grazing of livestock in the final research topic recommendations in the Report. The Report alluded to many methods for managing the forest ecosystem such as prescribed fire except targeted grazing of livestock. The forest management and research community are recognizing the benefits that prescribed herbivory can provide for managing treatable landscapes and as a natural means of addressing the wildfire crisis. Grazing can be especially effective when combined with other forest management methods such as prescribed fire. The minimized losses in property and ecosystems in recent wildfires due to grazed landscapes has provided evidence for prescribed herbivory to be included in all management and research efforts regarding forest management and wildfire prevention.

CWGA appreciates the Board recognizing targeted grazing as a viable treatment activity included within the priority research topics. This long-time practice has proven to prevent wildfires by reducing fuel loads on all forms of treatable landscapes. However, we request the Board to specifically list the application of targeted grazing or prescribed herbivory in the Report's final recommended priority research topics to ensure this proven practice is included in research and the administration of programs concerning the management of California's forests. We are committed to working with the Board and other stakeholders on forest management research efforts that include prescribed herbivory to improve the State's landscapes.

Respectfully,



Ed Anchordoguy, President
California Wool Growers Association