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Re: Mendocino County Climate Action Advisory Committee Discussions Regarding JacksonDemonstration State Forest

Dear Private Sector Forest Mangers,

Thank you for submitting your letter to the Mendocino Climate Action Committee regarding our recent vote to support a new management plan for JDSF. While your letter was addressed to me, it was obviously intended for the important legislative and state officials listed on the cc line. Here are some summary thoughts with regards to your letter:

- I understand why you want the management of Jackson to stay the way it is, as you benefit directly, indirectly, and financially from continued industrial logging on the publicly owned 50,000-acre Jackson Demonstration State Forest.
- Our coalition is composed of numerous organizations and countless individuals who are galvanized by the need to respond to climate change and change the mission of Jackson from commercial logging to forest restoration, carbon sequestration, and recreation.
- Our document "Time to Change the Mission: Jackson Demonstration State Forest" includes a thorough analysis of the role that Jackson could play in climate resiliency, recreation opportunities, our economy, the preservation of biological diversity and to reduce fire risk. The document also includes 30 references to scientific articles and reports. However, you take issue with only three supposed "misconceptions" in the reduce fire risk section. I want to state clearly for the record that every one of the supposed "misconceptions" is a factual statement supported by the scientific literature, while your "corrections" are problematic. I have carefully documented the misleading nature of your letter below. I have also excerpted the sections of each scientific paper that supports our findings rather than the odd cherry-picked statement which you used in your rebuttal.
- An honest dialogue requires an honest critique.

To begin, unfortunately you commented on a draft document that was outdated two months ago. You have put me in an awkward position of responding to comments on a draft document that has not been circulated to any of the people in this CC list. Perhaps a fool's errand as many may not read this reply. However, we feel that a public response is necessary because you have directly attacked my credibility, the science, and by extension, our effort to re-envision the mission of Jackson in response to the accelerating climate crisis. I have therefore responded to each of your major assertions in the following pages.

Your Statement: One of the statements in *Save Jackson State Forest* mentions the wood products industry has dwindled to only 350 jobs in Mendocino County. Mendocino Redwood Company and Mendocino Forest Products employ about these many employees alone. Two other sawmills exist in the county and when coupled with numerous logging companies, log truck drivers, road contractors, reforestation companies, foresters, biologists, and overhead, woods product jobs in the county account for thousands of jobs in the county.

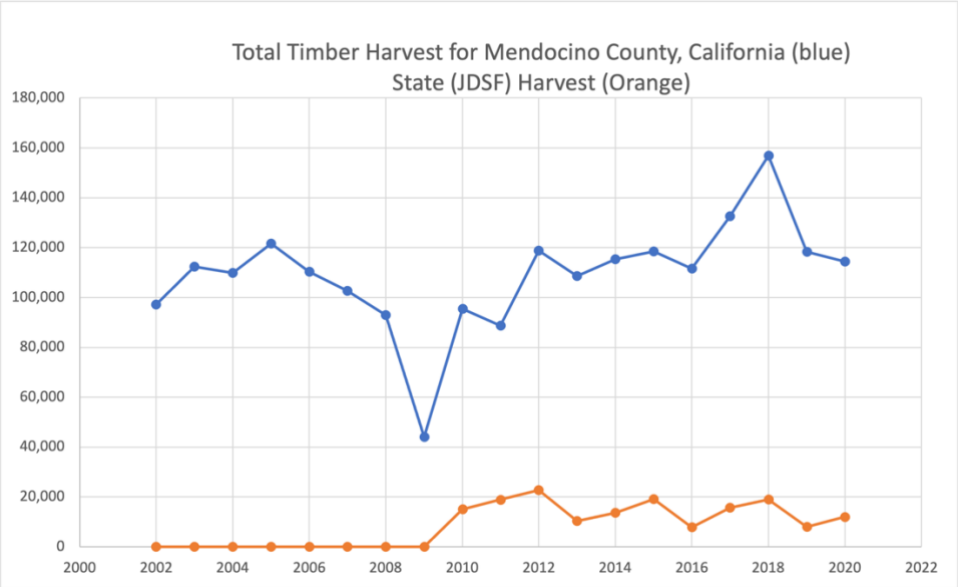
Response: The 394 jobs identified are Forestry and Logging jobs not "wood products" jobs. The reality is that JDSF actually supports a rather small number of jobs in Mendocino County relative to the much larger and rapidly growing tourism economy, despite the unrealized eco-recreational economic potential possible at JDSF. The table below backs this (see "Economic Contribution of Timber Harvesting and Manufacturing to North Coast Redwood Region" James E. Henderson, Richard B. Standiford, and Samuel G. Evans [Link]). The total direct jobs from wood products is 973 jobs, compared with 6,900 tourism jobs in our economy.

Table 6—Mendocino forest products industry's economic contribution indicating direct effect values for forestry-related sectors and resulting indirect and induced effects on all other sectors (the total effect is indicated along with the total county economy size, the total effect expressed as a percentage of the total county economy, and the multiplier value of the forest products industry)

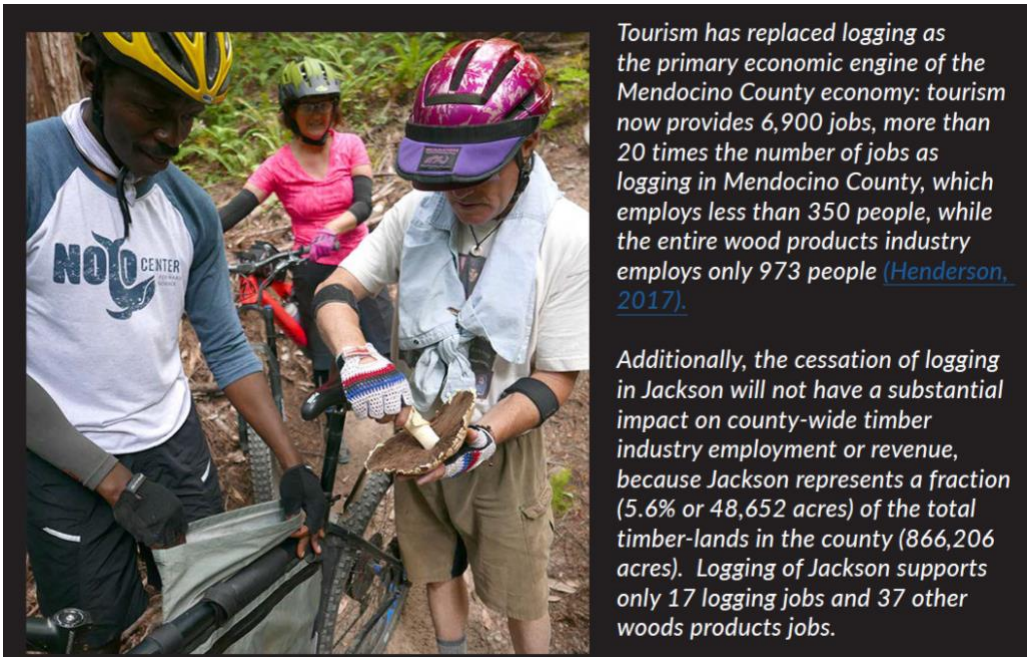
	Employment	Labor income ($M)	Output ($M)	Value added ($M)
Forestry and logging	394.6	38,409	57,597	40,696
Wood biomass	0.0	0	0	0
Solid wood	566.9	27,080	136,184	30,099
Wood furniture	12.0	474	1,476	492
Subtotal of direct effects	973.4	65,962	195,257	71,287
Subtotal (indirect & induced effects)	1,203.1	44,961	134,427	80,285
Total (total effect)	2,176.5	110,923	329,684	151,572
Total county economy	49,115.6	2,975,548	5,968,931	3,329,705
Total effect as % of county	4.4%	3.7%	5.5%	4.6%
Multiplier effect	2.24	1.68	1.69	2.13

Monetary values in 2013 dollars and expressed in thousands ($M).

Moreover, JDSF at approximately 50,000 acres, only represents a mere 5.5% of the ~866,206 acres of total area zoned TPZ in Mendocino County. On top of that, on any given year, timber harvest in JDSF only accounts for on average about 10% of the total timber production in Mendocino County (see the following Figure). Accordingly, re-envisioning Jackson's mandate from "managed as commercial timberlands" to a restoration- and recreation-focused forest will only minimally impact the County's timber industry. On the other hand, according to the 2018-2019 Mendocino Economic Report [Link], Mendocino's tourism economy has been steadily growing, and a recreation-focused Jackson stands to bring in far more revenue, that would be distributed across Mendocino's economic sectors, rather than being concentrated in only one. The report estimates that timber production generates ~$80 Million annually compared to the nearly $500 Million multisector economic impact, and growing, tourism currently brings to the County.



To be clear, here is the exact language of our document.



Your Statement: There is a misconception in this document that forest management activities will increase the risk of wildfires when the opposite has proven true in real world examples, including the recent Caldor Fire that threatened South Lake Tahoe. Kyle Jacobson, a USDA Forest Service Fire Management Officer in the Lake Tahoe Basin, helped plan and conduct many of the prescribed burns and mechanical thinning projects in the area that would later interact with

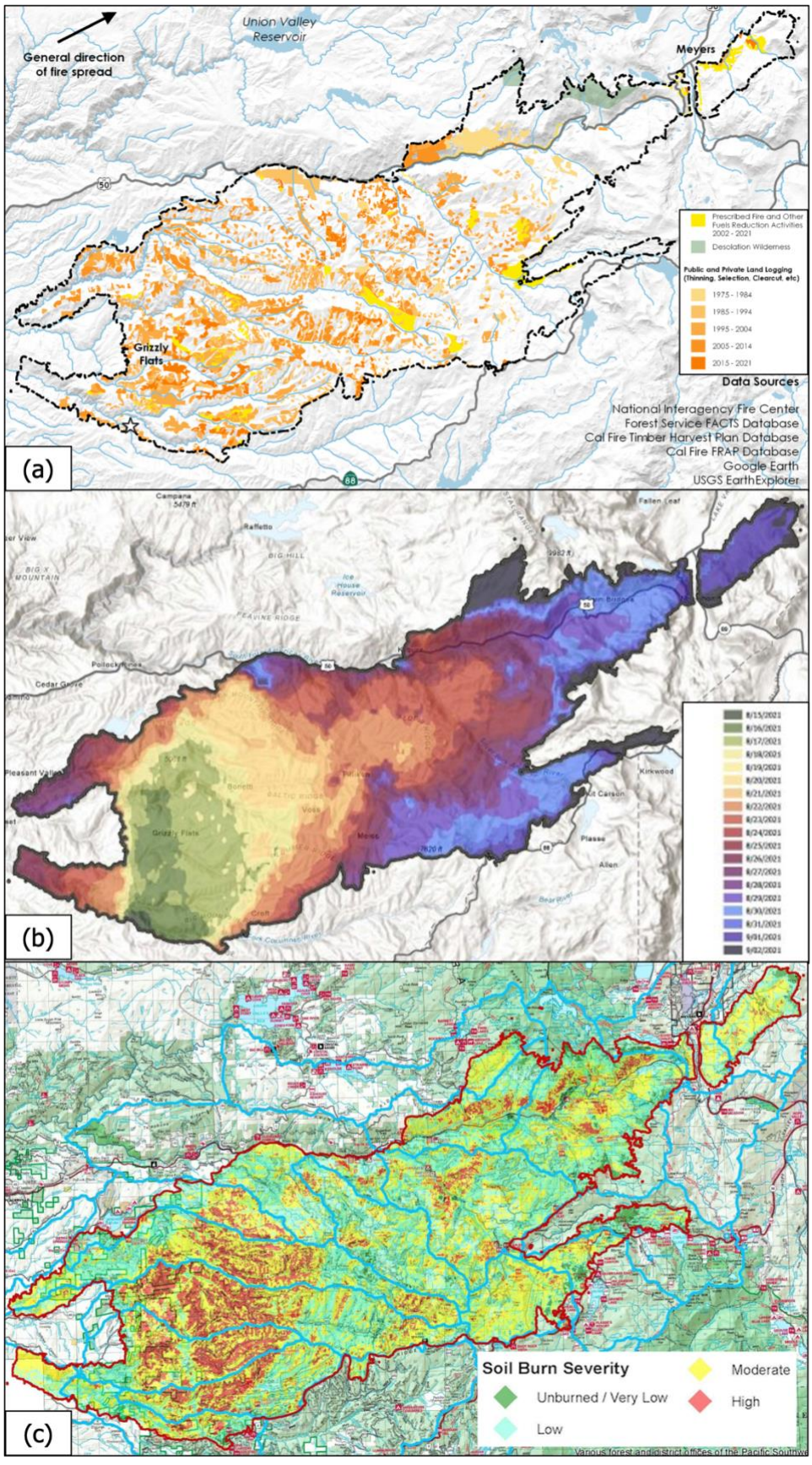
the Caldor Fire. “We noticed that when the fire moved into those areas that were treated around neighborhoods in Christmas Valley, the fire intensity greatly diminished,” said Jacobson. “That gave firefighters the room they needed to safely suppress the flames potentially saving around 600 homes in that community.

Response: It is interesting that you cite the Caldor fire as an example of forest management that works. The area you are specifically referring to is the Caples Project, conducted by the Sierra Nevada Conservancy and the USFS, which "treated" approximately 3500 acres of forest land consisting of understory (small tree diameter) thinning and about 1000 acres as controlled prescribed fire and about 2500 acres as uncontrolled (mostly low intensity) fire (note that the Caldor Fire totaled 214,000 acres). That you reference this is notable because this is NOT the type of management that occurs in JDSF. In the 75 years JDSF has been under State management there has been only ONE prescribed fire, which incidentally consisted mostly of burning slash piles, a far cry from a true landscape-scale prescribed fire or a cultural burn practiced by the indigenous Pomo and Coast Yuki before they were brutally and forcibly displaced from their homelands by a State-sponsored genocide campaign.

What is more striking about the Caldor Fire is the intensity of commercial timber harvest (extractive forest management) that has occurred throughout and within the fire perimeter. The Figure on the following page shows the larger picture of forest management within the Caldor Fire. Panel (a) shows both State (CalFire) and Federal (USFS) timber harvest activity, Panel (b) shows the rate of fire spread, and Panel (c) shows the burn severity. It is little coincidence that the Caldor Fire spread the fastest and burned the most intensely in the regions that were the most heavily managed for commercial timber production, **just as JDSF is**. This is the same scenario that played out in the Camp Fire that destroyed Paradise killing 88 people, and again this year in Dixie Fire resulting in the loss of Greenville.

The factors that contribute to rapid and intense fire spread within commercially logged areas are well documented:

1. Commercial timber harvest increases surface fuel loads and fine woody fuels that rapidly dry and easily combust when exposed to fire (Weatherspoon 1996; Dicus 2003; Stone et al 2004).
    a. To be *crystal* clear, Weatherspoon writes, “*Thinnings, insect sanitation and salvage cuts, and other partial cuttings add slash, or activity-generated fuels, to the stand unless all parts of the tree above the stump are removed from the forest. Small trees damaged by harvest activities but not removed from the forest often add to the fuel load. To the extent that it is not treated adequately, this component of the total fuel complex tends to increase the probability of a more intense, more damaging, and perhaps more extensive wildfire.”*


General direction of fire spread
Union Valley Reservoir
Meyers
Grizzly Flats
Prescribed Fire and Other Fuels Reduction Activities 2002 - 2021
Desolation Wilderness
Public and Private Land Logging (Thinning, Selection, Clearcut, etc)
1975 - 1984
1985 - 1994
1995 - 2004
2005 - 2014
2015 - 2021
Data Sources
National Interagency Fire Center
Forest Service FACTS Database
Cal Fire Timber Harvest Plan Database
Cal Fire FRAP Database
Google Earth
USGS EarthExplorer
(a)
Campana 5479 ft
Raffetto
BIG HILL
Ice House Reservoir
FAWNE RIDGE
Cedar Grove
Pleasant Valley
Fallen Leaf
Kirkwood
Meeks
Plasse
Allen
(b)
Soil Burn Severity
Unburned / Very Low
Low
Moderate
High
(c)

b. Dicus writes, "*Fuel loading of the 1-hour, 10-hour, and 100-hour timelag fuel classes, as well as litter loading and fuel depth were all significantly higher after the selective harvest (Table 1). […] As expected, higher fuel loadings and fuel depths after harvest led to a greater fire behavior in the post-harvest stand.*"

c. Stone writes, "*Logging geared only towards large tree removal, since it does not manage surface fuels, will increase fire hazard and subsequent fire severity."*

2. Canopy openings created by either partial or complete timber harvest increase the amount of downwelling solar radiation that reaches the forest floor accelerating surface fuel drying, lowering near surface humidity levels, and fostering the growth of xeric pyrogenic invasive and native grasses and brushes all which facilitate and exacerbate wildfire behavior (Weatherspoon 1996; Bradley et al 2016).

   a. Weatherspoon writes, "*Thinning or otherwise opening a stand allows more solar radiation and wind to reach the forest floor. The net effect, at least during periods of significant fire danger, is usually reduced fuel moisture and increased flammability (Countryman 1955). The greater the stand opening, the more pronounced the change in microclimate is likely to be. […] For example, removing most of the large trees from a stand, leaving most of the understory in place, and doing little or no slash treatment—a situation all too familiar in the past—will certainly increase the overall hazard and expected damage to the stand in the event of a wildfire. Everything points in the same direction: removing most of the fire-tolerant large trees; retaining most of the easily damaged small trees; increasing the loading (quantity) and depth of the surface fuel bed; and creating a warmer, drier, windier environment near the forest floor during times of significant fire danger*."

   b. Bradley et al writes, "*In these ecoregions, the most long-unburned forests experienced mostly low/moderate-severity fire (Odion et al. 2004, Odion and Hanson 2006, Miller et al. 2012, van Wagtendonk et al. 2012). Some of these researchers have hypothesized that as forests mature, the overstory canopy results in cooling shade that allows surface fuels to stay moister longer into fire season (Odion and Hanson 2006, 2008). This effect may also lead to a reduction in pyrogenic native shrubs and other understory vegetation that can carry fire, due to insufficient sunlight reaching the understory (Odion et al. 2004, 2010)."*

3. Finally, it is well-known that trees make highly effective windbreaks (farmers have leveraged this property for centuries), thus removing trees, in particular the largest, highest market value trees with the largest canopies, either in a partial or complete

harvest scenario, will increase in-stand and near-surface windspeeds which exacerbates fire behavior (Green et al 1995; Russell et al 2018)

a. Green et al states, "Tree spacing played a major role in modifying canopy turbulence. As tree spacing was increased, ventilation rates and turbulent exchange were enhanced and momentum penetrated deeper into the canopy"

b. Russell et al states, "*As the forest was thinned, turbulence and wind speed near the surface (0.13 h) increased and became more connected with above the canopy (1.13 h). […] Thinning the whole canopy reduced the overstory, leading to increased mixing and a better coupling between the canopy layers and the atmosphere as larger eddies could penetrate through the canopy*."

Taken together, the combined effects of commercial timber harvest on forest structure by (1) selectively removing the largest most fire resilient trees as these are also the trees with the highest market value, (2) substantially increasing surface fuel loads, (3) creating hotter, drier understory microclimates exposed to more solar radiation, and (4) thinning the forest structure (either partially or completely) allowing for greater in-stand and near-surface wind speeds, all combine to exacerbate wildfire risk and severity in previously commercially logged areas.

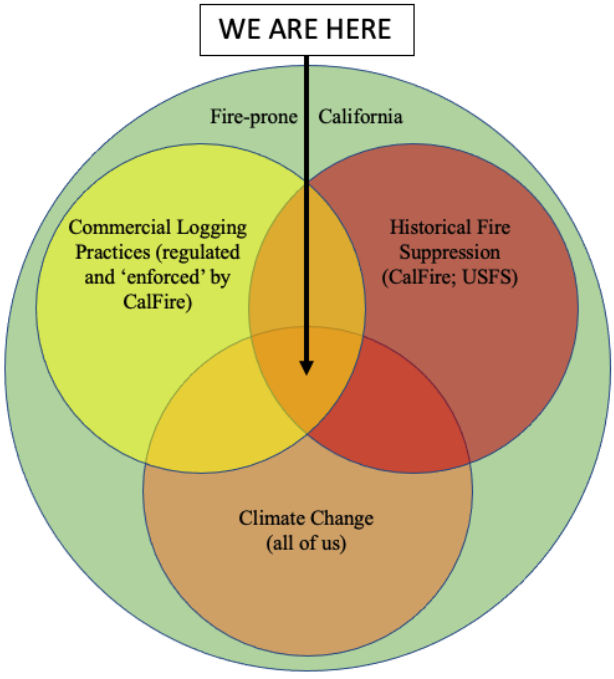
Incidentally, a CalFire official just recently explicitly stated that fires on previously logged lands burn hotter and more intensely.

Lastly, you cite the management in the Goat Fire to backup your case. What you conveniently fail to mention is that in the thinning unit you point to, surface fuels and small ladder fuels were treated. In fact, every single example in that report treated under story surface and ladder fuels by removing small diameter trees from the thinning units (Nakamura 2004). The report further notes, "*Forest surface fuels comprised of needles, leaves, branches, logging slash are the most important fuel to treat, as they drive overall fire behavior. Ladder fuels comprised of small trees, large brush, and lower branches of overstory trees will carry surface fires into the crowns of trees under some conditions. In California, crown fires are usually supported by the surface and ladder fuel complex, not crown fuel levels.*" Once again reinforcing that commercial timber harvest does not reduce wildfire behavior or intensity in the absence of subsequent surface and ladder fuel treatment. And further, as Weatherspoon 1996 points out, "*It is assumed that, to the extent practicable, fuels are removed from the site to promote utilization as well as to reduce wildfire hazard. In the case of partial cuttings (cuttings other than clear-cuts), this includes the removal of small understory trees that form hazardous fuel ladders. Historically, effective fuel management has not always been a strong emphasis, due largely to short-term economic considerations. However, it is becoming an increasingly important concern in treatments prescribed today*." Clearly BOTH studies point to the critical importance of treating slash and ladder fuels that promote vertical continuity between the forest floor and the canopy as fires are buoyancy driven and burn from the surface up, thus they critically rely on these fuels to sustain them. However, due to the profit-driven mindset of commercial timber companies, it is

widely recognized that slash is routinely left on the forest floor and that in partial cut stands, ladder fuels are not removed. Regrettably the case is no different in JDSF where THPs across the forest are characterized by an abundance of slash strewn across the forest floor and small diameter trees, which choke the forest understory.

It is also notable that timber industry spokespersons come back to this Goat Fire figure time and time again despite it showing the effects of management of that is NOT employed by the vast majority of the commercial timber industry due to the prioritizing of profits over human and environmental well-being. Furthermore, the fact that "success" stories are so few on commercial timberlands should be telling as to the efficacy of commercial timber harvest on reducing wildfire behavior… It doesn't. This can easily be seen by the literal hundreds of commercial THPs the Caldor, Dixie, and Camp Fires raged though just to name a few. One can cherry-pick an example of where fire intensity reduced on commercial timberlands and recycle that over and over again with the same talking points while omitting the critical information as WHY that happened, but the facts remain that by and large commercial timber harvest increases fire risk.

All this said, we would agree that understory (small diameter (2-15in DBH) trees) thinning, woody brush removal, and surface fuel removal/treatment (by prescribed fire) does indeed positively affect fire behavior and offer forest and community protection- this is widely supported by the scientific literature (e.g. Prichard et al 2021; Stephens et al 2009; and refs therein). However again, and we reiterate, **this is NOT the type of management practiced in Jackson**, and contrary to the outcomes of understory thinning combined with prescribed fire, the preponderance of scientific evidence indicates that commercial logging practices increase wildfire risk. On top of our fire-prone California climate, the facts are abundant and *crystal* clear,



Your Statement: Page 22 of the document states "Logging intensity is the second most important predictor of wildfire intensity, surpassed only by weather and drought conditions (Zald and Dunn, 2018)." This research focused on plantation forests created by clearcuts in Oregon and concluded "Our findings suggest intensive plantation forestry characterized by young forests and spatially homogenized fuels, rather than pre-fire biomass, were significant drivers of wildfire severity." As *Save Jackson State Forests* states in many locations, selectionthinning is by far the dominant silvicultural method used in JDSF with only 50 acres using even-aged clearcutting from 1997-2018.

Response: First, the actual paragraph from our report follows:

> *Logging intensity is the second most important predictor of wildfire intensity, surpassed only by weather and drought conditions (Zald and Dunn, 2018). Across the entire western U.S., fires burn with less intensity on lands that have the highest protections from logging (Bradley et al., 2016).*

Second, prior to 1997 even-aged management by the State was a common practice. In CalFire's 2015 report on JDSF management, the report states that, "*After acquiring the forest, the state continued partial cutting on the east end during the 1950s and 1960s. This first round of partial harvest was an individual marked tree cut that removed about 70% of the coniferous volume. As a result, most of the large old-growth trees were removed. This initial cut was followed by a diameter-limit harvest that removed most remaining coniferous trees greater than 22 inches (in) (56 centimeters (cm)) in diameter*." Management prior to 1997 and subsequent continued timber harvest has ensured that the forest in JDSF has remained exceedingly young and a fraction of its potential age and biomass. Indeed, the average stand age in Jackson is only 30-60 years old, just a fraction of this forests potential age. Additionally, as stated in Zald and Dunn, 2018, harvest rotation in the commercial units studied were 30-50 years. Contrast that with the 20-25 year rotations JDSF employs in their THPs and its clear to see that Jackson is managed largely as a plantation.

You are correct that the JDSF harvest data indicate that there have only been 50 acres of clearcuts since 1997, however this statement is also disingenuous as you of all people should know this is only one form of even-aged management, as it conveniently says on your website. Even-aged management in Jackson totals closer to 855 acres since 1997 with 3177 acres of group selection, which on paper is labeled uneven-aged, however is clearly even-aged within the group being selected.

Your Statement: On Page 23 Weatherspoon, 1996 is referenced with this statement: "Logging large trees opens the forest canopy allowing more sunlight to reach the forest floor and dry out the underbrush and soils, and create a hotter, drier, and more flammable under-story

microclimate." We could not find any discussion in this research paper which makes this claim. Instead, we found this statement: "Aggressive, strategically logical fuel-management programs, compatible with overall desired conditions for sustainable ecosystems, are necessary to address the basic problem of excessive fuel accumulation."

Response: It is clear you did not read the article carefully or the conclusions. Please re-read the report, linked above, with greater care. We will place the exact quotes here for your convenience, which you will see clearly support the conclusions in our report. In addition, your statement, "*Aggressive, strategically logical fuel-management programs, compatible with overall desired conditions for sustainable ecosystems, are necessary to address the basic problem of excessive fuel accumulation*" appears nowhere in Weatherspoon 1996.

Effects of Partial Cuttings on Microclimate

A related but separate kind of concern has to do with changes in microclimate brought about by stand opening. Thinning or otherwise opening a stand allows more solar radiation and wind to reach the forest floor. The net effect, at least during periods of significant fire danger, is usually reduced fuel moisture and increased flammability (Countryman 1955). The greater the stand opening, the more pronounced the change in microclimate is likely to be.

Interactions of Changed Fuels and Microclimate

The ways in which changes in these two sets of factors—fuels and microclimate—as a result of a management activity interact to affect wildfire hazard can be quite complex. The net effect, in terms of the direction of change in hazard, may be obvious in many cases, however. For example, removing most of the large trees from a stand, leaving most of the understory in place, and doing little or no slash treatment—a situation all too familiar in the past—will certainly increase the overall hazard and expected damage to the stand in the event of a wildfire. Everything points in the same direction: removing most of the fire-tolerant large trees; retaining most of the easily damaged small trees; increasing the loading (quantity) and depth of the surface fuel bed; and creating a warmer, drier, windier environment near the forest floor during times of significant fire danger. In contrast, heavily thinning an over-

An example of a more complex relationship was reported by Weatherspoon and Skinner (1995) as part of a large retrospective study of factors—including prior management activities—that affected the degree of tree damage resulting from the extensive 1987 wildfires in northern California. Among three categories of uncut or partial-cut stands, they found that uncut stands (with no treatment of natural fuels) suffered the least fire damage, followed by partial-cut stands with some fuel treatment; partial-cut stands with no treatment had the most damage. The fact that partial-cut stands with no fuel treatment experienced more damage than partial-cut stands with some fuel treatment is no surprise. One might wonder, however, why the uncut stands experienced less damage than the partial-cut and treated stands. The explanation probably lies in a combination of the following factors:

- The partial cuttings created a warmer, drier microclimate compared with that of the uncut stands—an inevitable effect of cuttings, as was explained earlier.
- The partial cuttings were typical of many past cuttings that removed big trees and left small ones. The more readily scorched small trees thus constituted a higher percentage of the residual stand. Furthermore, the live fuel ladder component of fire hazard in the uncut stand was not reduced in the partial-cut stand.

Your Statement: On page 24 Banerjee, 2020 is referenced with this statement: “Logging the largest trees thins the canopyallowing for greater in-canopy and in-stand wind speeds that fuel higher intensity fires”. While Banerjeestates there are several factors to consider, he also states “A high degree of thinning was effective in reducing fire intensity.”

Response: To be clear, here are Banerjee’s [Link] exact words:

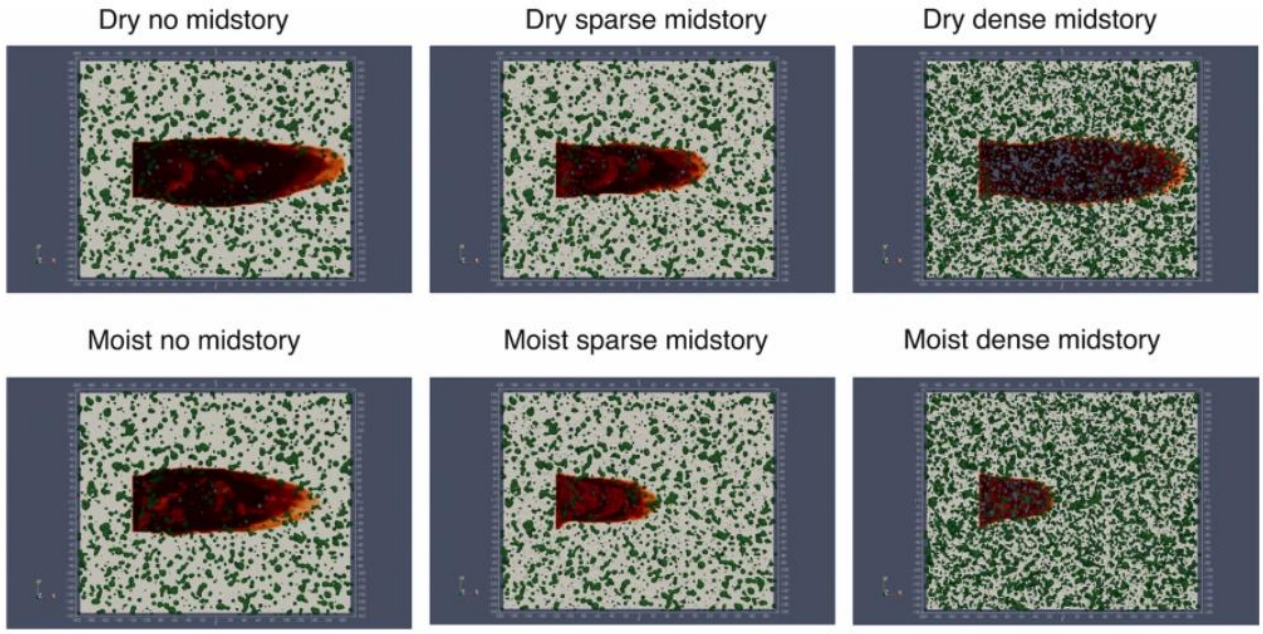
> The objective of thinning operations is primarily to reduce the potential of high intensity crown fires, by reducing fuel amount and connectivity. However, there are several short and long term consequences to forest thinning. As a discernible first order effect, thinning changes the stand structure and connectivity pattern of the fuel bed immediately after the operation. This alters the micrometeorology of the forest canopy. The opening of the canopy can entrain more wind [8] and solar radiation which might result in the reduction of fine fuel and canopy fuel moisture. Moreover, if the resultant additional surface fuel accumulation is not removed, it might increase surface loading of fuel. All of these effects could result in enhanced surface fire behavior and increase in crowning potential [1,9]. There could also be long term consequences such as altered regimes of carbon storage [10] which changes the future fuel loading and altered hydrologic regimes [11] which changes future water stress and fuel moisture. Moreover, the effectiveness of thinning treatments start to reduce with time [12] and therefore the timing of such operations is also crucial. The age and composition of the forest stand are important as well because older fine canopy fuels usually contain less moisture than newer fuel elements. Consequently, whether a thinning operation will lead to a reduction of high intensity crown fire is not a trivial questions and depending on the fuel and micrometeorological conditions, it is possible to have a range of outcomes.

Once again, this is consistent with everything above so we are unclear what your point is. Additionally, for context Banerjee is specifically considering crown fire propagation, and does not account for vertical ladder or surface fuels. Additionally, thinning (in this computer simulation) is done by randomized drawing, thus there is no discrimination for the selective removal of large or small trees on fire behavior. The fire in this framework is a priori in the canopy and stays there.

Further, your quote above that, "*A high degree of thinning was effective in reducing fire intensity*." was clearly "cherry-picked" and does not represent the conclusions of the scientific article. Please see the entirety of the quote below for clarity.

> thinning. Both of these scenarios are reported in the literature. **Results**: We found out that a low degree of thinning can indeed increase fire intensity, especially if the canopy fuel moisture is low. A high degree of thinning was effective in reducing fire intensity. However, thinning also increased rate of spread under some conditions. Interestingly, both intensity and rate of spread were dependent on the competing effects of increased wind speed, fuel loading and canopy fuel moisture. **Conclusion**: We were able to find the limits of fire behavior post thinning and actual fire behavior is likely to be somewhere in the middle of the theoretical extremes explored in this work. The actual fire behavior post thinning should depend on the site specific conditions which would determine the outcome of the interplay among the aforementioned conditions. The work also highlights that policymakers should be careful about fine scale canopy architectural attributes and micrometeorological aspects when planning fuel treatment operations.

In the follow up work to this study, Banerjee et al 2020 considered mid canopy thinning intensity and fuel moisture on fire spread. In this framework dense, moist forests showed the slowest rate of fire spread, consistent with the results of Bradley et al 2020, while fire spread the fastest in the heavily thinned, dry forest.



Your Statement: "We did not look at all the research quoted in *Save Jackson State Forests* for accuracy, but it stands to reason additional research they mention is misquoted and misrepresented to back their false claim that timber harvesting increases wildfire impacts. Most recent research finds the opposite is true and the following research paper by twenty prominent forestry and wildfire experts actually directly contradicts the conclusions of *Save Jackson State Forest* (Prichard et al, 2021. Adapting western North American forests to climate change and wildfires: 10 common questions). See attached."

Response: In a recent SacBee article discussing forest management and wildfire, lead fire researcher Crystal Kolden made the most poignant statement of the entire story, "*the term 'thinning' has been co-opted by the logging industry*", and that is exactly what we see happening here. Private timber industry executive John Anderson is attempting to co-opt the term 'thinning' to justify and advance continued extractive commercial logging across both private and public lands to the detriment ecosystems, biodiversity, and Public Trust resources. By and large, wildfire researchers and ecologists alike are calling for an increase of small diameter understory tree removal combined with prescribed fire for surface fuel treatment. This is NOT what MRC/HRC does on their lands and it is NOT what CalFire does in Jackson. The contrast between the effects of understory thinning combined with prescribed fire and commercial timber harvest could not be more stark. The former is capable of offering both forest and community protection while the latter offers forest loss and increased wildfire severity.

Indeed, nowhere in Prichard et al 2021 do they advocate for the increase in the scale of commercial timber harvest. The study correctly points out that,

1. While “thin the forest to reduce wildfire threat” is commonly cited in the popular media, the capacity for thinning alone to mitigate wildfire hazard and severity is not well supported in the scientific literature. Thinning treatments require strategic selection of trees to target fuel ladders and fire-susceptible trees, along with a subsequent fuel reduction treatment. When thinning is conducted without accompanied surface fuel reduction, short and long-term goals may not be realized.

2. Thinning from below reduces ladder fuels and canopy bulk density concurrently, which can reduce the potential for both passive and active crown fire behavior.

3. Large-diameter trees and snags that provide essential wildlife habitat and other ecosystem values can be retained and fuels can be deliberately removed around these structures using this approach.

4. On most sites, thinning alone achieves a reduction of canopy fuels but contributes to higher surface fuel loads. If burned in a wildfire, these fuels can contribute to high-intensity surface fires and elevated levels of associated tree mortality.

5. When trees are felled and limbed, fine fuels from tree tops and branches (termed activity fuels) are re-distributed over the treatment area, thereby increasing surface fuel loads.

6. Other unintended consequences of thinning without concomitant reduction in surface fuels can occur. For instance, decreasing canopy bulk density can change site climatic conditions. Wildfire ignition potential is largely driven by fuel moisture, which can decrease on drier sites when canopy bulk density is reduced through commercial thinning.

7. Reduced canopy bulk density can lead to increased surface wind speed and fuel heating, which allows for increased rates of fire spread in thinned forests.

8. In summary, although the efficacy of thinning alone as a fuel reduction treatment is questionable and site dependent, there exists widespread agreement that *combined* effects of thinning plus prescribed burning consistently reduces the potential for severe wildfire across a broad range of forest types and conditions

All of the statements above from Prichard et al 2021 are consistent with everything we’ve said and are inconsistent with the management practices of both MRC and JDSF. Moreover, Anderson fails to be forthcoming that Prichard et al 2021 primarily focuses on the management of the dry Sierra Nevada forests, which have unique fire dynamics compared to our moist coast

mesic forests. That said, Prichard et al 2021 note that, "*In some mesic forests, for instance, mechanical treatments may increase the risk of fire by increasing sunlight exposure to the forest floor, drying surface fuels, promoting understory growth, and increasing wind speeds that leave residual trees vulnerable to wind throw*." Active management (in terms of mechanical understory thinning) should be proportional to how safe the carbon is in any given forest. The carbon in our coast redwood forests is relatively safe (compared to the Sierra Nevada forests) thus management should be relatively light in order to maximize carbon storage and facilitate forest and watershed recovery following from over 150 years of continued commercial logging. Both CalFire and the CNRA have tried to use the Big Basin (SCZ Complex) Fire as an example that our coast forests need to be logged to protect them. Following the 2020 fire season, former Resources Director at CalFire Helge Eng stated at a Board of Forestry meeting, "we have a social license to log because of the fires." However, this is factually unfounded. In the first postfire study of redwood survival in Big Basin, the authors found that 95% of the coast redwoods survived and are rapidly recovering (Mahdizadeh and Russell 2021). The carbon stored within them (upwards of ~2000 Mg/ha) is largely still sequestered and continuing to accumulate with forest regrowth.

Finally, it must be kept in mind that fire is as natural to our forests as a mushroom or a fern. Fire is not some external agent descending on our forests to kill them. The increase in the fires we are seeing IS our forest's response to a rapidly changing climate. Fire acts as either an agent of maintenance or change, and we are seeing our forests convert to shorter, sparser vegetation characterized by a species composition of more xeric, drought-tolerant species such as oaks and short woody brushes. We should not be aiding in that conversion by cutting down the largest trees, thereby facilitating the climate change induced conversion to shorter, sparser, oak-dominated woodlands. A study published just last week from UCLA found that upwards of 70% of the increase in Western US wildfires can be directly attributed to anthropogenic climate change (Zhuang et al 2021). As such, the only way we can truly preserve the forests we have come to know and love is to stop climate change and bring atmospheric CO2 concentrations back down to preindustrial levels. Short of that, all other management strategies are just damage control and should be aimed wholly at slowing their conversion. Cutting down the largest healthiest specimens for short term profit unequivocally does not do that.

Unfortunately, your cursory (perhaps biased) reading of the supporting research opens you to the exact criticisms that you have inaccurately leveled at us. We have not misquoted or misrepresented the research, nor have we made false claims. We have prepared a thoroughly researched and valid critique of the common myth that cutting down large redwood trees in a mature redwood forest is somehow good for the forest or for fire reduction. It is not. The scientific research and common-sense support this understanding. Instead of providing an innuendo that we have misquoted or misrepresented the research, please provide evidence of

this. The “evidence” that you did provide in your letter was incorrect and misleading. I don’t use the word lie unless someone intentionally misspeaks; in this case it is appropriate.

One more important clarification is required. We are looking for a new Management Strategy for Jackson Demonstration State Forest, as we clearly state in our document, not an end to management as you incorrectly stated. We are seeking a focus on carbon sequestration and recreation benefits for this publicly owned forest. We understand why you want the management plan to stay the way it is, as you benefit directly and financially from continued industrial logging in Jackson.

John, we take our credibility very seriously and it would behoove you to do the same before sending out unfounded and baseless attacks citing studies which you clearly haven’t even read, or unskillfully cherry-pick quotes from them that superficially bolster your bottom line: for-profit commercial timber harvest of Public Trust resources.

Lastly, I have attached the final version of the draft document which you critiqued, so you and all the other people who have read to the end of this letter, can have the pleasure of reading the report in its entirety.

Sincerely,

Marie Jones
Chair, Mendocino County Climate Action Advisory Committee
Executive Director, Jug Handle Creek Farm
Mendocino County Planning Commissioner

John P. O’Brien, Ph.D.
Climate Scientist
National Center for Atmospheric Research

Cc: Senator Mike McGuire
Assemblymember Jim Wood
CNRA Secretary Wade Crowfoot
CNRA Deputy Secretary Jessica Morse
Cal Fire Director Thom Porter
Cal Fire Deputy Director, Resource Management, Matthew Reischman
Supervisor Maureen Mulheren
Supervisor Glenn McGourty
Supervisor Dan Gjerde
Supervisor John Haschak
Supervisor Ted Williams