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FRIENDS OF THE SOUTH
FORK GUALALA

IN THE SUPERIOR COURT OF THE STATE OF CALIFORNIA

IN AND FOR THE COUNTY OF SONOMA

FRIENDS OF THE SOUTH FORK GUALALA, an unincorporated association, Petitioner and Plaintiff, vs. CALIFORNIA DEPARTMENT OF FORESTRY AND FIRE PROTECTION, a state public agency, and DOES I through X, inclusive, Respondents and Defendants, and RICHARDSON RANCH LLC, a Nevada corporation, and DOES XI through XX, inclusive, Real Parties in Interest.	No. SCV-268396 **DECLARATION OF CHAD HANSON, Ph.D., IN SUPPORT OF PETITIONER'S EX PARTE APPLICATION FOR TEMPORARY RESTRAINING ORDER; EXHIBIT 1** Hearing Date: October 25, 2022 Hearing Time: 10:30 a.m. Department: 17 Judge: Hon. Bradford DeMeo Complaint Filed: October 25, 2022

I, Chad Hanson, declare as follows.

1. I submit this declaration in support of petitioner Friends of the South Fork Gualala's motion for stay or preliminary injunction halting logging under the Bootleg Two timber harvest plan (Bootleg 2 THP or "Project").

2. The facts set forth in this declaration are based upon my personal knowledge – except as

to those matters which reflect an opinion, which reflect my professional opinion and judgment on the matter. If called as a witness, I would and could competently testify.

3. I am a research ecologist with a Ph.D. in Ecology from the University of California at Davis. My research focuses on forest/fire ecology. I have published over three dozen scientific studies, regarding forest/fire behavior and ecology. I am the co-editor and co-author of the 2015 forest/fire ecology textbook, "The Ecological Importance of Mixed-Severity Fires: Nature's Phoenix," and my second book, "Smokescreen: Debunking Wildfire Myths to Save Our Forests and Our Climate," was released in May 2021. My Curriculum Vitae (CV) is attached as Exhibit A. I support petitioner's requested relief in this case. As I explain below, the proposed logging would likely have the effect of causing increased wildfire behavior and intensity.

4. First, dense, mature forests do not burn more intensely. CalFIRE assumes that dense, mature and old forests will burn more intensely due to "fuel" accumulation and higher forest density due to decades of fire suppression. However, the science tells us a very different story. Denser, mature and old forests have higher canopy cover, which creates a cooler, shadier microclimate, and such forests have more trees, which act as a natural windbreak against the gusts that drive the flames in wildfires. For these reasons, the densest forests do not tend to burn more intensely in wildland fires, and typically burn less intensely. This includes long-unburned forests (Odion et al. 2004, Odion and Hanson 2006, Odion and Hanson 2008, Odion et al. 2010, Miller et al. 2012, van Wagtendonk et al. 2012), forests with the highest biomass levels or highest tree densities (Campbell et al. 2007, Meigs et al. 2009, Dunn et al. 2020, Meigs et al. 2020) and strongest environmental protections from logging (Bradley et al. 2016). Even the Forest Service's own scientists are now finding this to be true (Lesmeister et al. 2019, Lesmeister et al. 2021). Nor do forests with high numbers of dead trees, from drought and native bark beetles, burn more intensely than other forests, according to the largest and most comprehensive scientific analyses (Hart et al. 2015, Hart and Preston 2020). In fact, such forests often burn less intensely, and this is true even years after trees die and later fall to the ground (Meigs et al. 2016). Shortly after trees die, the needles and small twigs fall and decay into soil, after which there is not much material to carry flames and, when dead trees fall, they soak up and retain large amounts of soil moisture on the forest floor, like giant sponges.

5. Logging, including mechanical/commercial "thinning" and post-fire logging, does not curb wildfires-it does the opposite. When logging occurs, such as commercial "thinning," it reduces the cooling shade of the forest canopy, creating a hotter, drier, and windier microclimate, and leaving behind logging "slash debris" made up of the easily combustible tops, branches and needles of the previously standing trees. In addition, logging machinery spreads easily ignitable, highly combustible invasive grasses like cheatgrass. For these reasons, such logging more often tends to increase, not decrease, fire intensity, as both independent scientists and Forest Service scientists are increasingly reporting (Cruz et al. 2008, Cruz and Alexander 2010, Cruz et al. 2014, Bradley et al. 2016, Lesmeister et al. 2021). This is also true where logging includes the removal of dead trees, as in post-fire logging (Donato et al. 2006, Thompson et al. 2007). The fact is that forest fires are driven mainly by weather and climate but logging can be a significant additive factor, which can make fires more intense, as my colleagues and I found in a massive and unprecedented scientific analysis spanning three decades, covering the entire western U.S., including California, and analyzing 23 million acres of forest fires (Bradley et al. 2016). We saw the tragic consequences of these effects of so-called "fuel reduction" logging in the fall of 2018 in northern California, as the Camp fire raced through thousands of acres that had been post-fire logged and commercially thinned in previous years (see map @ https://johnmuirproject.org/2019/01/logging-didnt-stop-the-camp-fire/) before devastating the town of Paradise.

6. With regard to thinning and fire severity, CalFIRE ignores and excludes large bodies of peer-reviewed scientific evidence which conclude that thinning and other so-called "fuel reduction" logging projects tend to increase fire severity, and instead rely on assumptions which do not represent the best available science. Wildland fire behavior is highly variable, even from moment to moment, as different combinations of factors change and shift-relative humidity, wind speed, temperature, slope steepness, vegetation type, among many others. A given stand of forest that has been thinned can, of course, sometimes burn at low intensity, during a particular fleeting combination of factors, but the opposite result is more commonly true (Cruz et al. 2014). The weight of scientific evidence increasingly indicates that removal of mature trees (e.g., those over 12 inches in diameter), which comprise the cooling shade of the forest canopy, changes the microclimate of the forest, creating hotter, drier, and

windier conditions, and tends to increase wildfire severity and rate of spread. Below is an annotated reference list on this subject (where sources are authored or co-authored by a government agency, particularly the U.S. Forest Service, I have noted that):

Morris, W.G. (U.S. Forest Service). 1940. Fire weather on clearcut, partly cut, and virgin timber areas at Westfir, Oregon. Timberman 42: 20 28.

> "This study is concerned with one of these factors - the fire-weather conditions near ground level - on a single operation during the first summer following logging. These conditions were found to be more severe in the clear-cut area than in either the heavy or light partial cutting areas and more severe in the latter areas than in virgin timber."

Countryman, C.M. (U.S. Forest Service). 1956. Old-growth conversion also converts fire climate. Fire Control Notes 17: 15 19.

> "Although the general relations between weather factors, fuel moisture, and fire behavior are fairly well known, the importance of these changes following conversion and their combined effect on fire behavior and control is not generally recognized. The term 'fireclimate,' as used here, designates the environmental conditions of weather and fuel moisture that affect fire behavior. It does not consider fuel created by slash because regardless of what forest managers do with slash, they still have to deal with the new fireclimate. In fact, the changes in wind, temperature, humidity, air structure, and fuel moisture may result in greater changes in fire behavior and size of control job than does the addition of more fuel in the form of slash."

> "Conversion which opens up the canopy by removal of trees permits freer air movement and more sunlight to reach the ground. The increased solar radiation in turn results in higher temperatures, lower humidity, and lower fuel moisture. The magnitude of these changes can be illustrated by comparing the fireclimate in the open with that in a dense stand."

> "A mature, closed stand has a fireclimate strikingly different from that in the open. Here nearly all of the solar radiation is intercepted by the crowns. Some is reflected back to space and the rest is converted to heat and distributed in depth through the crowns. Air within the stand is warmed by contact with the crowns, and the ground fuels are in turn warmed only by contact with the air. The temperature of fuels on the ground thus usually approximates air temperature within the stand."

> "Temperature profiles in a dense, mixed conifer stand illustrate this process (fig. 2). By 8 o'clock in the morning, air within the crowns had warmed to 68° F. Air temperature near the ground was only 50°. By 10 o'clock temperatures within the crowns had reached 82° and, although the heat had penetrated to lower levels, air near the surface at 77° was still cooler than at any other level. At 2:00 p.m., air temperature within the stand had become virtually uniform at 87°. In the open less than one-half mile away, however, the temperature at the surface of pine litter reached 153° at 2:00 p.m."

> "Because of the lower temperature and higher humidity, fuels within the closed stand are more moist than those in the open under ordinary weather conditions. Typically, when moisture content is 3 percent in the open, 8 percent can be expected in the stand."

> "Moisture and temperature differences between open and closed stands have a great effect on both the inception and the behavior of fire. For example, fine fuel at 8-percent moisture content will require nearly one-third more heat for ignition than will the same fuel at

3-percent moisture content. Thus, firebrands that do not contain enough heat to start a fire in a closed stand may readily start one in the open."

"When a standard fire weather station in the open indicates a temperature of 85° F., fuel moisture of 4 percent, and a wind velocity of 15 m.p.h.--not unusual burning conditions in the West--a fire starting on a moderate slope will spread 4.5 times as fast in the open as in a closed stand. The size of the suppression job, however, increases even more drastically."

"Greater rate of spread and intensity of burning require control lines farther from the actual fire, increasing the length of fireline. Line width also must be increased to contain the hotter fire. Less production per man and delays in getting additional crews complicate the control problem on a fast-moving fire. It has been estimated that the size of the suppression job increases nearly as the square of the rate of forward spread. Thus, fire in the open will require 20 times more suppression effort. In other words, for each man required to control a surface fire in a mature stand burning under these conditions, 20 men will be required if the area is clear cut."

"Methods other than clear cutting, of course, may bring a less drastic change in fireclimate. Nevertheless, the change resulting from partial cutting can have important effects on fire. The moderating effect that a dense stand has on the fireclimate usually results in slow-burning fires. Ordinarily, in dense timber only a few days a year have the extreme burning conditions under which surface fires produce heat rapidly enough to carry the fire into the crowns. Partial cutting can increase the severity of the fireclimate enough to materially increase the number of days when disastrous crown fires can occur."

SNEP (co-authored by U.S. Forest Service). 1996. Sierra Nevada Ecosystem Project, Final Report to Congress: Status of the Sierra Nevada. Vol. I: Assessment summaries and management strategies. Davis, CA: University of California, Davis, Center for Water and Wildland Resources.

"Timber harvest, through its effects on forest structure, local microclimate, and fuel accumulation, has increased fire severity more than any other recent human activity."

"[I]n areas where the larger trees (greater than 12 inches in diameter breast height) have been removed, stand-replacing fires are more likely to occur."

Chen, J., et al. (co-authored by U.S. Forest Service). 1999. Microclimate in forest ecosystem and landscape ecology: Variations in local climate can be used to monitor and compare the effects of different management regimes. BioScience 49: 288-297.

When moving from open forest areas, resulting from logging, and into dense forests with high canopy cover, 'there is generally a decrease in daytime summer temperatures but an increase in humidity…'

The authors reported a 5 C difference in ambient air temperature between a closed-canopy mature forest and a forest with partial cutting, like a commercial thinning unit (Fig. 4b), and noted that such differences are even greater than the increases in temperature predicted due to anthropogenic climate change.

Dombeck, M. (U.S. Forest Service Chief). 2001. How Can We Reduce the Fire Danger in the Interior West. Fire Management Today 61: 5 13.

"Some argue that more commercial timber harvest is needed to remove small-diameter trees and brush that are fueling our worst wildlands fires in the interior West. However, small-diameter trees and brush typically have little or no commercial value. To offset losses from their removal, a commercial operator would have to remove large, merchantable trees in the overstory. Overstory removal lets more light reach the forest floor, promoting vigorous forest regeneration. Where the overstory has been entirely removed, regeneration produces thickets of 2,000 to 10,000 small trees per acre, precisely the small-diameter materials that are causing our worst fire problems. In fact, many large fires in 2000 burned in previously logged areas laced with roads. It seems unlikely that commercial timber harvest can solve our forest health problems."

Morrison, P.H. and K.J. Harma. 2002. Analysis of Land Ownership and Prior Land Management Activities Within the Rodeo & Chediski Fires, Arizona. Pacific Biodiversity Institute, Winthrop, WA. 13 pp.

Previous logging was associated with higher fire severity.

Hanson, C.T., Odion, D.C. 2006. Fire Severity in mechanically thinned versus unthinned forests of the Sierra Nevada, California. In: Proceedings of the 3rd International Fire Ecology and Management Congress, November 13 17, 2006, San Diego, CA.

"In all seven sites, combined mortality [thinning and fire] was higher in thinned than in unthinned units. In six of seven sites, fire-induced mortality was higher in thinned than in unthinned units…Mechanical thinning increased fire severity on the sites currently available for study on national forests of the Sierra Nevada."

Platt, R.V., et al. 2006. Are wildfire mitigation and restoration of historic forest structure compatible? A spatial modeling assessment. Annals of the Assoc. Amer. Geographers 96: 455 470.

"Compared with the original conditions, a closed canopy would result in a 10 percent reduction in the area of high or extreme fireline intensity. In contrast, an open canopy [from thinning] has the opposite effect, increasing the area exposed to high or extreme fireline intensity by 36 percent. Though it may appear counterintuitive, when all else is equal open canopies lead to reduced fuel moisture and increased midflame windspeed, which increase potential fireline intensity."

Cruz, M.G, and M.E. Alexander. 2010. Assessing crown fire potential in coniferous forests of western North America: A critique of current approaches and recent simulation studies. Int. J. Wildl. Fire. 19: 377-398.

The fire models used by the U.S. Forest Service falsely predict effective reduction in crown fire potential from thinning:

"Simulation studies that use certain fire modelling systems (i.e. NEXUS, FlamMap, FARSITE, FFE-FVS (Fire and Fuels Extension to the Forest Vegetation Simulator), Fuel Management Analyst (FMAPlus), BehavePlus) based on separate implementations or direct integration of Rothermel's surface and crown rate of fire spread models with Van Wagner's crown fire transition and propagation models are shown to have a significant underprediction bias when used in assessing potential crown fire behaviour in conifer forests of western North America. The principal sources of this underprediction bias are shown to include: (i) incompatible model linkages; (ii) use of surface and crown fire rate of spread models that have an inherent underprediction bias; and (iii) reduction in crown fire rate of spread based on the use of unsubstantiated crown fraction burned functions. The use of uncalibrated custom fuel models to represent surface fuelbeds is a fourth potential source of bias."

Graham, R., et al. (U.S. Forest Service). 2012. Fourmile Canyon Fire Findings. Gen. Tech. Rep. RMRS-GTR-289. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 110 p.

Thinned forests 'were burned more severely than neighboring areas where the fuels were not treated,' and 162 homes were destroyed by the Fourmile Canyon Fire (see Figs. 45 and 46).

Bradley, C.M. C.T. Hanson, and D.A. DellaSala. 2016. Does increased forest protection correspond to higher fire severity in frequent-fire forests of the western USA? Ecosphere 7: article e01492.

In the largest study on this subject ever conducted in western North American, the authors found that the more trees that are removed from forests through logging, the higher the fire severity overall:

"We investigated the relationship between protected status and fire severity using the Random Forests algorithm applied to 1500 fires affecting 9.5 million hectares between 1984 and 2014 in pine (Pinus ponderosa, Pinus jeffreyi) and mixed-conifer forests of western United States, accounting for key topographic and climate variables. We found forests with higher levels of protection [from logging] had lower severity values even though they are generally identified as having the highest overall levels of biomass and fuel loading."

Lesmeister, D.B., et al. (co-authored by U.S. Forest Service). 2019. Mixed-severity wildfire and habitat of an old-forest obligate. Ecosphere10: Article e02696.

Denser, older forests with high canopy cover had lower fire severity.

Dunn, C.J., et al. 2020. How does tree regeneration respond to mixed-severity fire in the western Oregon Cascades, USA? Ecosphere 11: Article e03003.

Forests that burned at high-severity had lower overall pre-fire tree densities, and forests that burned at lower severity had higher pre-fire tree densities.

Meigs, G.W., et al. (co-authored by U.S. Forest Service). 2020. Influence of topography and fuels on fire refugia probability under varying fire weather in forests of the US Pacific Northwest. Canadian Journal of Forest Research 50: 636 647.

Forests with higher pre-fire biomass (higher forest density) are more likely to experience low-severity fire.

Moomaw et al. (2020) (letter from over 200 scientists):

"Troublingly, to make thinning operations economically attractive to logging companies, commercial logging of larger, more fire-resistant trees often occurs across large areas. Importantly, mechanical thinning results in a substantial net loss of forest carbon storage, and a net increase in carbon emissions that can substantially exceed those of wildfire emissions (Hudiburg et al. 2013, Campbell et al. 2012). Reduced forest protections and increased logging tend to make wildland fires burn more intensely (Bradley et al. 2016). This can also occur with commercial thinning, where mature trees are removed (Cruz et al. 2008, Cruz et al. 2014). As an example, logging in U.S. forests emits 10 times more carbon than fire and native insects combined (Harris et al. 2016). And, unlike logging, fire cycles nutrients and helps increase new forest growth."

Moomaw et al. (2021) (letter from over 200 scientists):

"[C]ommercial logging conducted under the guise of 'thinning' and 'fuel reduction' typically removes mature, fire-resistant trees that are needed for forest resilience. We have watched as one large wildfire after another has swept through tens of thousands of acres where commercial thinning had previously occurred due to extreme fire weather driven by climate change. Removing trees can alter a forest's microclimate, and can often increase fire intensity. In contrast, forests protected from logging, and those with high carbon biomass and carbon storage, more often burn at equal or lower intensities when fires do occur."

Lesmeister, D.B., et al. (co-authored by U.S. Forest Service). 2021. Northern spotted owl nesting forests as fire refugia: a 30-year synthesis of large wildfires. Fire Ecology 17: Article 32.

> More open forests with lower biomass had higher fire severity, because the type of open, lower-biomass forests resulting from thinning and other logging activities have "hotter, drier, and windier microclimates, and those conditions decrease dramatically over relatively short distances into the interior of older forests with multi-layer canopies and high tree density…"

Stephens, S.L., et al. (co-authored by U.S. Forest Service). 2021. Forest Restoration and Fuels Reduction: Convergent or Divergent? BioScience 71: 85 101.

> While the authors continued to promote commercial thinning, they acknowledged that commercial thinning causes wildfires to move faster and become larger more quickly:
>
> "Interestingly, surface fire rate of spread increased after restoration and fuel treatments [commercial thinning] relative to the untreated stand. This increased fire rate of spread following both treatment types is due to a combination of higher mid-flame wind speeds and a greater proportion of grass fuels, which result from reductions to canopy cover."

Hanson, C.T. 2021. Is "Fuel Reduction" Justified as Fire Management in Spotted Owl Habitat? Birds 2: 395 403.

> "Within the forest types inhabited by California Spotted Owls, high-severity fire occurrence was not higher overall in unmanaged forests and was not associated with the density of pre-fire snags from recent drought in the Creek Fire, contrary to expectations under the fuel reduction hypothesis. Moreover, fuel-reduction logging in California Spotted Owl habitats was associated with higher fire severity in most cases. The highest levels of high-severity fire were in the categories with commercial logging (post-fire logging, private commercial timberlands, and commercial thinning), while the three categories with lower levels of high-severity fire were in forests with no recent forest management or wildfire, less intensive noncommercial management, and unmanaged forests with re-burning of mixed-severity wildfire, respectively."

Hanson, C.T. 2022. Cumulative severity of thinned and unthinned forests in a large California wildfire. Land 11: Article 373.

> "Using published data regarding the percent basal area mortality for each commercial thinning unit that burned in the Antelope fire, combined with percent basal area mortality due to the fire itself from post-fire satellite imagery, it was found that commercial thinning was associated with significantly higher overall tree mortality levels (cumulative severity)."

Baker, B.C., and C.T. Hanson. 2022. Cumulative tree mortality from commercial thinning and a large wildfire in the Sierra Nevada, California. Land 11: Article 995.

> "Similar to the findings of Hanson (2022) in the Antelope Fire of 2021 in northern California, in our investigation of the Caldor Fire of 2021 we found significantly higher cumulative severity in forests with commercial thinning than in unthinned forests, indicating that commercial thinning killed significantly more trees than it prevented from being killed in the Caldor Fire…Despite controversy regarding thinning, there is a body of scientific literature that suggests commercial thinning should be scaled up across western US forest landscapes as a wildfire management strategy. This raises an important question: what accounts for the discrepancy on this issue in the scientific literature? We believe several factors are likely to largely explain this discrepancy. First and foremost, because most previous research has not accounted for tree mortality from thinning itself, prior to the wildfire-related mortality, such research has underreported tree mortality in commercial thinning areas relative to unthinned forests. Second, some prior studies have not controlled for vegetation type, which can lead

to a mismatch when comparing severity in thinned areas to the rest of the fire area given that thinning necessarily occurs in conifer forests but unthinned areas can include large expanses of non-conifer vegetation types that burn almost exclusively at high severity, such as grasslands and chaparral. Third, some research reporting effectiveness of commercial thinning in terms of reducing fire severity has been based on the subjective location of comparison sample points between thinned and adjacent unthinned forests. Fourth, reported results have often been based on theoretical models, which subsequent research has found to overestimate the effectiveness of thinning. Last, several case studies draw conclusions about the effectiveness of thinning as a wildfire management strategy when the results of those studies do not support such a conclusion, as reviewed in DellaSala et al. (2022)." (internal citations omitted)

Prichard, S.J., et al. (co-authored by U.S. Forest Service). 2021. Adapting western US forests to wild-fires and climate change: 10 key questions. Ecological Applications 31: Article e02433.

In a study primarily authored by U.S. Forest Service scientists, and scientists funded by the Forest Service, the authors state that "There is little doubt that fuel reduction treatments can be effective at reducing fire severity. . ." yet these authors repeatedly contradict their own proposition, acknowledging that thinning can cause "higher surface fuel loads," which "can contribute to high-intensity surface fires and elevated levels of associated tree mortality," and mastication of such surface fuels "can cause deep soil heating" and "elevated fire intensities." The authors also acknowledge that thinning "can lead to increased surface wind speed and fuel heating, which allows for increased rates of fire spread in thinned forests," and even the combination of thinning and prescribed fire "may increase the risk of fire by increasing sunlight exposure to the forest floor, drying vegetation, promoting understory growth, and increasing wind speeds."

Despite these admissions, contradicting their promotion of thinning, the authors cite to several U.S. Forest Service-funded studies for the proposition that thinning can effectively reduce fire severity, but a subsequent analysis of those same studies found that the results of these articles do not support that conclusion, and often contradict it, as detailed in Section 5.2 of DellaSala et al. (2022) (see below).

DellaSala, D.A., B.C. Baker, C.T. Hanson, L. Ruediger, and W.L. Baker. 2022. Have western USA fire suppression and megafire active management approaches become a contemporary Sisyphus? Biological Conservation 268: Article 109499.

With regard to a previous U.S. Forest Service study claiming that commercial thinning effectively reduced fire severity in the large Wallow fire of 2011 in Arizona, DellaSala et al. (2022, Section 5.1) conducted a detailed accuracy check and found that the previous analysis had dramatically underreported high-severity fire in commercial thinning units, and forests with commercial thinning in fact had higher fire severity, overall.

DellaSala et al. (2022, Section 5.2) also reviewed several U.S. Forest Service studies relied upon by Prichard et al. (2021) for the claim that commercial thinning is an effective fire management approach and found that the actual results of these cited studies did not support that conclusion.

Bartowitz, K.J., et al. 2022. Forest Carbon Emission Sources Are Not Equal: Putting Fire, Harvest, and Fossil Fuel Emissions in Context. Front. For. Glob. Change 5: Article 867112.

The authors found that logging conducted as commercial thinning, which involves removal of some mature trees, substantially increases carbon emissions relative to wildfire alone, and commercial thinning 'causes a higher rate of tree mortality than wildfire.'

Evers, C., et al. 2022. Extreme Winds Alter Influence of Fuels and Topography on Megafire Burn Severity in Seasonal Temperate Rainforests under Record Fuel Aridity. Fire 5: Article 41.

> The authors found that dense, mature/old forests with high biomass and canopy cover tended to have lower fire severity, while more open forests with lower canopy cover and less biomass burned more severely.

USFS (U.S. Forest Service) (2022). Gallinas-Las Dispensas Prescribed Fire Declared Wildfire Review. U.S. Forest Service, Office of the Chief, Washington, D.C.

> "A thinning project in the burn area opened the canopy in some areas, allowing more sunlight which led to lower fuel moistures. Heavy ground fuels resulting from the construction of fireline for the burn project added to the fuel loading. This contributed to higher fire intensities, torching, spotting, and higher resistance-to-control."

I declare, under penalty of perjury, that the foregoing is true and correct to the best of my knowledge and recollection. Executed on October 24, 2022 in Big Bear City, California.

Chad Hanson

CHAD HANSON

<u>References</u>

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Thompson, J.R., Spies, T.A., Ganio, L.M., 2007. *Reburn severity in managed and unmanaged vegetation in a large wildfire.* Proceedings of the National Academy of Sciences of the United States of America 104, 10743–10748.

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EXHIBIT 1

Curriculum Vitae of Chad T. Hanson, Ph.D.

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EDUCATION

University of California at Davis, Ph.D., Ecology, 2007

University of Oregon, Juris Doctorate, 1995

University of California at Los Angeles, Bachelor of Science, 1991

BOOKS

Hanson, C.T. 2021. Smokescreen. University Press Kentucky, Lexington, KY (in press).

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PROOF OF SERVICE BY E-MAIL

I am a citizen of the United States of America; I am over the age of 18 years and not a party to the within entitled action; my business address is 584 Castro Street # 904, San Francisco, California, 94114. On October 25, 2022, I served a true copy of the following document entitled:

DECLARATION OF CHAD HANSON, Ph.D., IN SUPPORT OF PETITIONER'S EX PARTE APPLICATION FOR TEMPORARY RESTRAINING ORDER; EXHIBIT 1

in the above-captioned matter on each of the persons listed below by sending a true copy of said document by electronic mail, addressed as follows:

Janelle Smith
Deputy Attorney General, California Department of Justice
Attorney for California Department of Forestry and Fire Protection
janelle.smith@doj.ca.gov
micaela.harms@doj.ca.gov

John Pernick
Daniel Bergeson
Bergeson LLP
Attorneys for Richardson Ranch LLP
jpernick@be-law.com
dbergeson@be-law.com
mflores@be-law.com

I declare under penalty of perjury that the foregoing is true and correct. Executed on October 25, 2022, at San Francisco, California.

____
Daniel P. Garrett-Steinman