Testimony of Bryant C. Baker, M.S., Director of Conservation & Research, Los Padres ForestWatch, to the House Committee on Natural Resources
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I am a conservation scientist and geographic information system (GIS) specialist with over a decade of experience in environmental science, research, and conservation. I spend hundreds of hours each year documenting natural regrowth in post-fire areas and have published peer-reviewed studies about wildfire in California. Aside from peer-reviewed research, my GIS analyses and maps have been featured in news outlets such as the *Los Angeles Times*, *Oregon Public Broadcasting*, and *Mother Jones*.

There has long been concern that the lack of fire in giant sequoia groves due to fire suppression poses an existential threat to the species, due to the dependency of sequoias on fire for reproduction. In a 1994 study,[1] Stephenson wrote that "[a] large body of research points directly at fire suppression as the cause of this century's massive failure in sequoia reproduction" and "that sequoia seed dispersal, seedling establishment, growth, and survival are highest **where fires have burned most intensely**" (emphasis added). However, the language surrounding the Save Our Sequoias Act, as well as statements from some organizations and agency officials, has not only failed to acknowledge the important and outsized role of high-severity fire (i.e. where >75% of trees are killed) in giant sequoia establishment but has also simultaneously painted a distorted picture of the last few decades of fire patterns in giant sequoia groves.

I analyzed publicly available GIS fire occurrence and severity data—produced by the federally managed Monitoring Trends in Burn Severity (MTBS) program, the Fire and Resource Assessment Program (FRAP) managed by Cal Fire, and the extensive wildfire and prescribed databases maintained by the National Interagency Fire Center (NIFC)—going back to 1984 within all giant sequoia grove boundaries in existence. As shown in Table 1 below, most of the total giant sequoia grove area (grove boundaries were provided by USDA Forest Service researchers) in existence has burned either in a wildfire or prescribed fire since 1984 (over 92%), and nearly 84% of the total grove area has burned just in the last 10 years. While the memo from the Natural Resources Committee Republican Staff ("Memo") acknowledges the fact that most of the total grove area has recently burned (page 6), it fails to provide any meaningful data about the severity of recent fires. Table 1 below shows that, of the total grove area burned since 1984, about 87% burned at low-moderate severity in a wildfire or as part of a prescribed fire. Even when just the last 10 years are considered, approximately 86% of the grove area experienced low-moderate severity wildfire or low-severity prescribed fire.

In other words, most of the total giant sequoia grove area has burned relatively recently, and despite decades of fire suppression, the vast majority of what burned *did not experience high-severity fire*. The areas that burned at low-moderate severity within the last decade have therefore experienced a recent fuel reduction so to speak and thus should be buffered against high-severity fire according to the Memo (*see* page 9). And as demonstrated by decades of research, the areas that did experience high-severity fire are where we can expect the greatest recruitment of new giant sequoias into the once-declining population.

[1] Stephenson, N.L. 1994. Long-term Dynamics of Giant Sequoia Populations: Implications for managing a Pioneer Species. USDA Forest Service Gen. Tech. Rep. PSW-151.

Thus, it is reasonable to expect that the vast majority of recently burned grove area will support natural regeneration, especially in the higher-severity fire areas, and this is something that can already be easily seen in a high-severity patch within the Freeman Creek Grove less than two years after it was burned during the 2020 Castle Fire (Figure 1), and in the Nelder Grove at four years post-fire even within the few areas that are over 300 meters from the nearest surviving mature sequoias (Figure 2).

It should also be noted that there are highly inaccurate statements peppered throughout the Memo. For example, the Memo states on page 3 that "prior to 2015, the last recorded evidence of Giant Sequoia mortality due to wildfires occurred in the year 1297 A.D." The memo cited a *Los Angeles Times* story here, but the 1994 USDA Forest Service report by Stephenson mentioned above states:

*"…we found that most sequoias occur in even-aged clumps corresponding to known fire dates in the tree-ring record (fig. 4; see also Stephenson and others 1991). In two of these sequoia clumps (**dating to the 1860s** at central Giant Forest **and the 1870s** at Atwell)….Collectively, the data presented in this section imply **that most sequoia recruitment was limited to areas where fire killed all or most of the forest canopy.**"* (emphasis added)

In other words, giant sequoia recruitment is largely limited to areas where most or all trees are killed by fire, and if such recruitment occurs in areas where giant sequoias were established before the fire, then by requirement mature giant sequoias must have been killed in the fire. Moreover, there is ample evidence that mature sequoias were killed by high-severity fire across a number of groves in 1875, 1910, 1928, 1955, 1977, 1987, and 2008 as described by Stephenson et al. 1991,[2] Meyer and Safford 2011,[3] and even the Sequoia National Forest's own website.[4] Caprio (2016)[5] also documented numerous large wildfires from 1700 to 1900 that spanned the entire Kaweah watershed, which includes many giant sequoia groves. In short, high-severity fire has been an important, though not well-understood, aspect of giant sequoia ecology for centuries (and likely since the species first developed).

Lastly, the Memo points to the 2022 Washburn Fire, which burned approximately 6 acres of the 270-acre Mariposa Grove in Yosemite National Park, as a success and gives the impression that the Save Our Sequoias Act would result in similar successes across the region. However, it's critical to understand that the Mariposa Grove has been managed exclusively by prescribed fire without pre-fire mechanical work (e.g. thinning) according to the National Park Service's (NPS) own fuel treatment dataset. This is typical of prescribed fire conducted by the NPS in the Sierra Nevada. Yet the Save Our Sequoias Act would allow increased mechanical removal of trees, including large trees. This is unnecessary when considering the success of the NPS' prescribed fire program in the region, including the use of prescribed fire without preceding mechanical tree removal even in areas that had not experienced fire in several decades.

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[2] Stephenson, N.L., D.L. Parsons, and T.W. Swetnam. 1991. Restoring Natural Fire to the Sequoia-mixed Conifer Forest: Should Intense Fire Play a Role? Proc. 17th Tall Timbers Fire Ecology Conference, May 18-21, 1989.

[3] Meyer, M.D. and H.D. Safford. 2011. Giant Sequoia Regeneration in Groves Exposed to Wildfire and Retention Harvest. Fire Ecology, 7, 2-16.

[4] https://www.fs.usda.gov/detail/sequoia/home?cid=fsbdev3_059512

[5] Caprio, A.C. 2016. A historical perspective on large fires in the southern Sierra Nevada: Rare or everyday events? In: Association for Fire Ecology Annual Meeting, November 2016.

To summarize:

1. The vast majority of giant sequoia grove area has burned relatively recently, with most of this occurring as low-moderate severity.
2. The large portion of the total grove area that has recently burned at low-moderate severity should be buffered against high-severity fire in the coming years.
3. A relatively small portion of the total grove area did burn at high-severity in recent years, but giant sequoia recruitment is expected to be highest in areas that burn most intensely.
4. Prescribed fire can be used successfully in giant sequoia groves without the need for mechanical tree removal beforehand, rendering the Save Our Sequoias Act misguided and unnecessary.

Limited resources should be directed toward preparing communities for inevitable wildfire effects while utilizing managed wildfire and prescribed fire—without the need for pre-fire mechanical tree removal—in the backcountry when possible.

Figures and Tables

Figure 1. Giant sequoia seedlings in a high-severity fire patch less than two years after the Castle Fire (Freeman Creek Grove).

Figure 2. Hundreds of naturally-regenerating sequoia seedlings and saplings per acre—many of them several feet tall already—at four years post-fire in a high-severity fire patch within the Nelder Grove, more than 300 meters from the nearest mature sequoia that survived the fire.

Table 1. Summary of analysis of GIS data for modern fire activity in giant sequoia groves.

Category	Acres	% of Total Grove Area*	% of Burned Grove Area
1984 - Present			
Wildfire + Prescribed Fire**	23121	92.3	100
Wildfire (All Severities)	20459	81.7	88.5
Wildfire (Low-Moderate Severity)	17462	69.7	75.5
Wildfire (Unmeasured Severity)	17.8	0.07	0.08
Prescribed Fire Only (No Overlap with Wildfire)	2662	10.6	11.5
Wildfire (Low-Moderate Severity Only) + Prescribed Fire	20124	80.4	87.0
Unburned (No Wildfire or Prescribed Fire)	1918	7.7	—
2013 - Present			
Wildfire + Prescribed Fire	20949	83.7	100
Wildfire (All Severities)	20014	79.9	95.5
Wildfire (Low-Moderate Severity)	17038	68.0	81.3
Wildfire (Unmeasured Severity)	7.6	0.03	0.03
Prescribed Fire Only (No Overlap with Wildfire)**	935	3.7	4.5
Wildfire (Low-Moderate Severity Only) + Prescribed Fire	17973	71.8	85.8
Unburned (No Wildfire or Prescribed Fire)	4090	16.3	—

* Total grove area = 25039 acres

** Prescribed fire includes intentionally set fires and prescribed natural fires.

Note: Where wildfires with severity data overlapped, I chose the highest severity in that given location to include in the analysis.