House Natural Resources Committee Hearing, Save Our Sequoias Act

Date: *Wednesday, May 10, 2023 at 10:15 a.m. EDT*

Prepared Remarks: *5-minute, oral testimony, comprised of selections from the written statement below – Joanna Nelson, Ph.D.*

This is our written statement from Save the Redwoods League, savetheredwoods.org. Submitted May 8, 2023.

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I'm Dr. Joanna Nelson, director of science and conservation planning for Save the Redwoods League. Our non-profit is dedicated to protecting redwoods, including the globally unique giant sequoias – the world's largest and among the oldest trees, which can:

- Grow to be more than 100 feet in circumference at the base;
- Reach heights taller than 300 feet; and
- Survive more than 3,000 years, as well as providing places of awe, beauty, and delight.

The League supports efforts to protect giant sequoias from the threats of wildfire and climate change, and the Save Our Sequoias Act is such an effort – we look forward to working with the Committee and the bill's cosponsors to enact the best possible legislation to ensure the future of giant sequoias. This is the basis of my testimony today.

Save the Redwoods League was founded in 1918 with a mission to protect, restore, and connect people with California's iconic "big trees," the coast redwoods (*Sequoia sempervirens*) and giant sequoias (*Sequoiadendron giganteum* (Lindl.) J. Buchholz). We protect each of these related species throughout their entire range. At the time of our organization's founding, the major threat to these ancient giants was logging. Today, wildfires – exacerbated by drought, climate change, and practices of fire exclusion – are occurring at a frequency and severity that, if allowed to continue at the current rate, could wipe out our irreplaceable and magnificent giant sequoia groves.

Although giant sequoias evolved with low- to moderate-intensity fire, and in fact need fire to reproduce, today's wildfires are killing large, mature trees, which is largely unprecedented. In the past six years, since the 2015 Rough Fire, we have lost about 20% of the large, mature giant sequoia on the planet (1). We see the 2015 Rough Fire as a marker of an exponential uptick in wildfire area, intensity, and severity. And I'll emphasize that nearly all of that loss (20%) of the largest, oldest trees occurred <u>in only 14 months</u> across the 2020 and 2021 fire events.

We are short on time in this emergency.

We know what to do to meet this emergency.

There is substantial evidence that forest management – silvicultural and ecological prescriptions to implement restoration thinning, pile burning – especially that which culminates in prescribed burning, reduces the risk of conifer mortality in wildfire in the seasonally dry forests of California and the Sierra Nevada region (2,3). The seasonally dry forests of the Sierra Nevada include the mixed-conifer forests in which we find giant sequoias.

Low-severity fire, moving through the understory and clearing out duff and fallen branches – without moving up into the forest canopy and killing sequoias – tends to lead to the next low-severity fire, where that wildfire has less fuel to burn. In contrast, high-severity fire tends to lead to the next high-severity fire based on forest condition (dead standing or dead-and-fallen trees and heavy shrub growth). High-severity fire can exacerbate the impacts of climate change on California conifer forests (4). In other words, these unprecedented fires will come again and again … and our immediate forest-management actions matter for irreplaceable, giant sequoia survival.

Dr. Scott Stephens and collaborators, in a 2020 study of forests of the western US, state:

"We argue that fire-use treatments (including prescribed fires and managed wildfires) as well as restoration thinning strategies, rather than conflicting with existing environmental objectives, will provide numerous co-benefits, including enhanced biodiversity, increased water availability, greater long-term and more sustainable carbon storage, improved forest resilience and adaptation to climate change, and reduced air pollution." (5)

In addition to reporting on the scientific literature, we, at the League, can report on what we've seen on the ground that works – through some difficult, recent years of wildfire. We offer four examples:

1. 2021 KNP fire in Giant Forest, Sequoia and Kings Canyon National Park (SEKI) - wildfire burned into the grove with high energy, but once it reached areas that had previous, repeated, prescribed burns, flame lengths decreased and fire fighters were able to put it out (personal communication with the National Park Service).
2. 2021 KNP fire in Redwood Mountain grove (SEKI) - previously treated areas had low- to moderate-severity fire effects (pers comm). Unburned areas burned at high severity (see Figure 1).
3. 2021 Windy Fire - Trail of a hundred giants (Long Meadow grove, Sequoia National Forest, USFS) – this highly visited trail loop, in the Long Meadow grove, had been previously treated. Although fire fighters were needed in the grove to protect individual trees, the area came through the fire with low mortality (personal observation, J. Nelson).
4. In the Mariposa grove of Yosemite National Park, the Washburn fire met the perimeter of a 2017 prescribed burn and did not carry. Yosemite scientists wrote, "Fuels reduction and prescribed fire have been at the core of Yosemite's fire management program since the 1970s and much of this activity has been concentrated in the two areas where firefighting operations were most successful [in the Washburn]" (https://www.researchsquare.com/article/rs-2520979/v1 ; and also see https://www.nationalgeographic.com/environment/article/the-key-to-protecting-yosemites-sequoias-from-wildfires-more-fire)

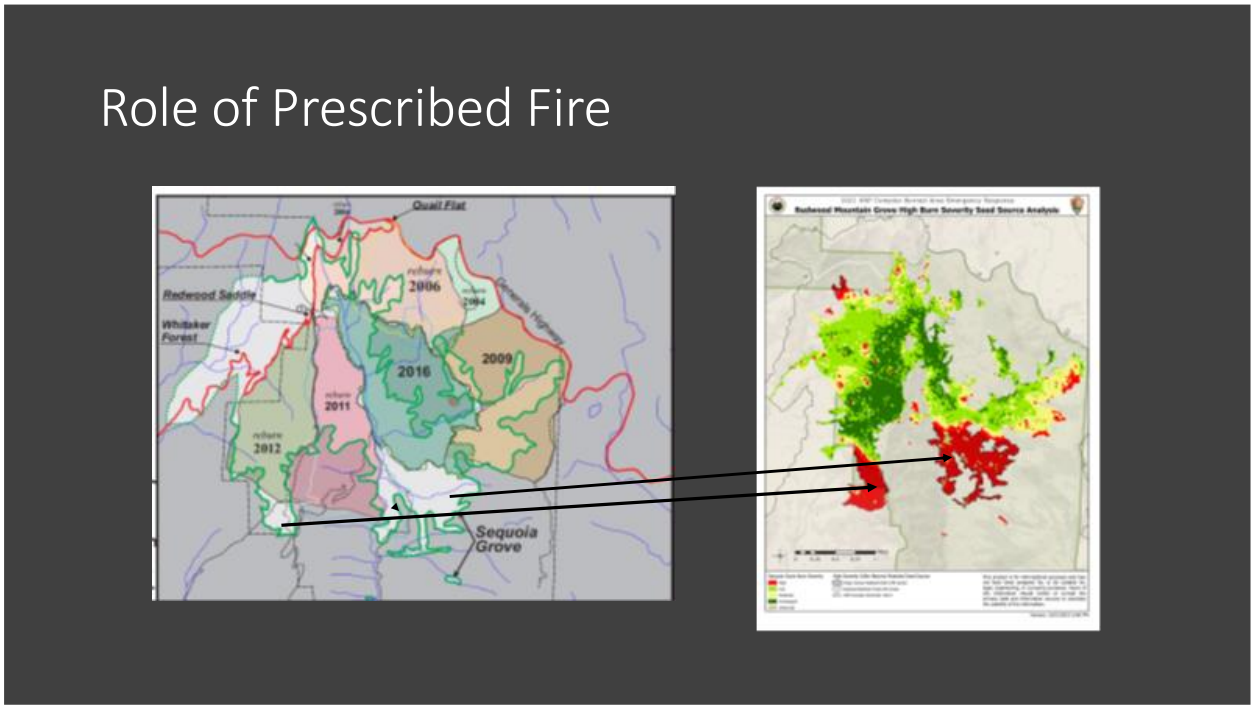

Figure 1: Redwood Mountain Grove in Sequoia Kings Canyon National Park, California. Results of the 2021 KNP fire. The right panel shows fire severity, where high-severity is red. The left panel shows the location of prescribed burns in the grove, including some that are reburns (repeated prescribed fire). Where there were prescribed-fire footprints, the wildfire burned with moderate and low severity. Where there were none are the two notable patches of high-severity fire.

We know what to do to meet this emergency. However, I'll start with a vision of no-action before I move to solutions.

What can we expect in the future if we don't take action?

a) We can expect more mass-mortality events for ancient trees, until we have very small, isolated, populations of giant sequoia or arboretum specimens – at that point we are looking at risk of extinction in the wild, in the native range of giant sequoias. That is, of course, the ultimate threat: extinction.

b) We can expect to keep living in this "hot, new world" of climate change that we have created, which holds increasing wildfire area and severity. We could expect pulses of big-fire years in clusters, or simply repeated and consistent big-fire years – either of which are devastating. According to the Intergovernmental Panel on Climate Change (IPCC), for every one degree Celsius of global average warming, we can expect a two-to-four-fold increase in wildfires in the US West (6). Because the world has already initiated 1°C of warming, and rising,

we are living in that at-least doubled fire-world in the US West. Given the difference between climate and weather – where weather consists of short-term events and climate is a regional or global average – our snowy, rainy, and severe weather of this past winter does not counteract the trends of hotter and dryer lands, air, and ocean, all of which detrimentally impact giant sequoias.

c) In fire events that now kill mature trees, including their cones and seeds, we will continue to lose seed sources, severely curtailing natural regeneration and therefore growth and existence of the sequoia ecosystem. Genetic diversity, which has helped the sequoia population adapt and thrive for millions of years, will also be reduced, threatening sequoia adaptation and therefore existence.

d) As an additional fire effect, we could expect "type conversion," for example from sequoia forest to shrubs. Type conversion means ecosystem conversion – not through an ecological dynamic such as successional stages, where, for example, post-fire we see regrowth of herbaceous plants, grasses, then shrubs, then seedling trees become saplings and take over the canopy – but full conversion to other plant communities and corresponding loss of sequoia groves. There is a "vicious cycle," called a positive feedback loop, in which carbon losses (large, mature trees burning up in fire) continue to accelerate global, average temperature increase and beget more carbon losses in increasing wildfire. Anything we can do to interrupt these harsh breaks in conditions, and tipping points, we must do, to protect gradual change and the ability of ecosystems and ecosystem-function to adapt (7).

Save the Redwoods League works with our membership and partners to motivate and enact solutions.

The League serves as a collaborator and affiliate partner within the Giant Sequoia Lands Coalition, a formal coalition of federal, state, Tribal, county and other members who all steward giant-sequoia lands. Every government member is dedicated and active, and still by law constrained to their own jurisdiction – one function of the Coalition is to see what we can do more effectively together. The League plays a unique role in the Coalition, able focus on the species across the whole range regardless of ownership. In that key role, we provide rangewide evaluation (8) and advocacy for giant sequoia. As the League, and a Coalition collaborator, we have conducted extensive media outreach and science-based storytelling, resulting in hundreds of front-page news stories from local outlets to the *New York Times* and the *Washington Post*.

The League currently owns and stewards two properties in giant-sequoia ecosystems where we conduct post-fire assessment, active land stewardship, post-fire restoration, and demonstrations of forest treatment. We participate in operational, ecological thinning and prescribed fire; we are continuing training to be resource advisors in sequoia groves during wildfire. The League has a history of acquiring properties in the Sierra Nevada for conservation

and transferring them to public ownership, having contributed significantly to the current state of 98-99% of giant sequoia that are protected in Tribal or public lands.

The League funds modest grants for academic research directly applicable to conservation action in giant sequoias: for example, on post-wildfire impacts, best restoration and re-planting practices, the impacts of Western Cedar Bark Beetles (*Phloeosinus* spp.), and interacting impacts, such as wildfire, beetle attack, and drought in combination.

As a non-profit organization, we have the ability to act in nimble ways, and to participate in opportunities not always open to our federal and state partners, such as supporting conservation legislation.

What are the solutions?

As with other crises, we need to go directly to the root causes, particularly two in tandem: global warming due to the burning of fossil fuels, and policies of fire exclusion for over a century that have led to overly dense forests. As a society in the United States, and here in California, we need to redouble our climate action on all fronts and address the overly high densities of forests with active management.

Studies suggest we have a current window of time to take concerted action in forest management (9). Climate disruption and lack of forest management cause sequoia mortality. While climate change is a global problem requiring meta-solutions, specific local actions can reduce its impact on the giant sequoias and preserve a future for these great trees while we work for progress on the larger crisis.

The League has multiple solutions in our written statement, and I'd like to share the top three here:

1. We must allocate the funding and resources needed to conduct fuel reduction treatments based on silvicultural and ecological goals, prescribed burns, and cultural burns led by Indigenous practitioners, in our most at-risk groves. We need to continue until treatments are completed in every grove – and then sustain consistent cycles of fire management to ensure resilience into the future. Although fuel reduction plans will be site specific and ecologically based, we have generalizable needs for taking action to promote fire-resilient states in groves.

    a. These low-intensity, controlled burns mimic the natural cycle of fire in the American West. On average, the sequoia ecosystem experienced fire approximately every 3-15 years (depending on the scale, e.g., a small area or a whole grove) (10). The practice of prescribed burning is unequivocally supported by both current Western science and the traditional cultural knowledge and science that Indigenous peoples have practiced for millennia, and continue to practice today.

2. We need more time in the calendar year where forest treatments, pile burning, and broadcast burning is acceptable. From high moisture resulting from winter snow melt, to important species' nesting and habitat protection in the spring, to summer fire season, there is precious little time in the year to do the work – narrow windows in spring and fall "shoulder seasons." Currently established windows with acceptable weather, humidity, and air-quality are narrow, and are missing times that are also appropriate. As one example, approvals for active management could be based on spot-weather reports, rather than CAL FIRE declaring, "All of California is under a red-flag warning." We respect CAL FIRE's authority and expertise; we hear CAL FIRE leadership wanting to do more prescribed burning from here on out; we also see opportunities for differing regions or micro-climates at specific times. We must begin now and work collaboratively on an ongoing basis before this year's wildfires and next claim more of the giant-sequoia ecosystem.

3. Federal agencies need an increased ability to quickly share resources in the form of skilled people, equipment, and materials – not only in response to wildfire emergency, but in preventative actions of forest management. As one example, extending the "Good Neighbor" authority to the National Park Service – an option now held by the USFS but not the Park – could be useful. Our federal partners will know more about what is most useful to them.

4. We need a streamlined permitting process for the Endangered Species Act (ESA) and the National Historic Preservation Act (NHPA), while upholding species protection and cultural-resource protection. Some examples might include the ability to bundle biological assessments across broader regions and streamlined response to Section 106 of the NHPA. The White House administration has approved the US Forest Service and National Park Service's "Emergency Declaration" for 12 groves and 11 groves respectively. All groves need treatment as soon as possible, with a method for prioritizing which come first (these 23 groves come first, and the rest of the approximately 78 groves also need stewardship and treatment).

5. We need a paid, on-call, skilled workforce for active management and prescribed fire. The League recommends engaging with Jeremy Bailey, North American director of the Prescribed Fire Training Program (TREX), Calaveras Healthy Impact Product Solutions (CHIPS) which collaborates with local Native Nations, the Sierra-Sequoia Burn Cooperative, the Indigenous People's Burning Network, and the Tule River Tribe. All of these individuals and entities have much to contribute to a workforce discussion, centered on equity, based on their significant on-the-ground experience.

6. Our society needs to recognize and support the wisdom and skill of Indigenous communities and nations in forest stewardship and cultural burning. We need their stewardship, active on the land, with fewer barriers to access. We need more clarity, advised by Indigenous people, on what equitable "co-management" of lands, air, and water means, with clear roles and responsibilities.

In conclusion, we need the full weight of our conservation communities and our lawmakers to coalesce and prioritize the protection and management of the sequoia groves. We are demonstrating our connections and consensus in the Giant Sequoia Lands Coalition, and we see you here to take action with your authority and expertise as law-makers. Thank you very much.

Footnotes

(1) a) Mature, sequoia mortality estimates drawn from field sampling from the Rough Fire (2015), Pier Fire (2017), and Railroad Fire (2017) = approximately one percent. Reference: Shive, K. et al. 2022. Ancient trees and modern wildfires: declining resilience to wildfire in the highly fire-adapted giant sequoia. *Forest Ecology and Management* 511: 120110.

https://doi.org/10.1016/j.foreco.2022.120110

b) Mortality estimates from Castle Fire (2020): 10-14% of all large, mature giant sequoia. Reference: Stephenson, N. and Brigham, C. 2020. "Preliminary estimates of sequoia mortality in the 2020 Castle Fire." National Park Service.

c) Mortality estimates from KNP Complex and Windy Fire (both 2021): 3-5% of all giant sequoia. Reference: Shive, K., Brigham, C., Caprio, T., Hardwick, P. 2021. 2021 Fire season impacts to giant sequoias. Executive Summary. National Park Service.

A sum of those estimates means a range of 14-20% of mature, giant sequoias on the planet were killed in wildfire, 2015 to the present.

(2) Davis, K.T., Robles, M.D., Kemp, K.B., Higuera, P.E., Chapman, T., Metlen, K.L., Peeler, J.L., Rodman, K.C., Woolley, T., Addington, R.N. and Buma, B.J., 2023. Reduced fire severity offers near-term buffer to climate-driven declines in conifer resilience across the western United States. *Proceedings of the National Academy of Sciences*, *120*(11), p.e2208120120.

(3) Stephens, S.L., Westerling, A.L., Hurteau, M.D., Peery, M.Z., Schultz, C.A. and Thompson, S., 2020. Fire and climate change: conserving seasonally dry forests is still possible. *Frontiers in Ecology and the Environment*, *18*(6), pp.354-360.

(4) Davis et al. 2023 *PNAS*, *ibid*.

(5) Stephens et al. 2020 *FREE*, *ibid*., p. 354

(6) Among multiple IPCC reports, one pertinent reference is: IPCC, 2018: Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [V. Masson-Delmotte, P. Zhai, H. O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J. B. R. Matthews, Y. Chen, X. Zhou, M. I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, T. Waterfield (eds.)].

(7) Millar, C., Stephenson N., and Stephens. 2007. Climate change and forests of the future: managing in the face of uncertainty. *Ecological Applications* (17) 8: 2141-2151. **https://doi.org/10.1890/06-1715.1**

(8) Burns, E., Campbell, R., Cowan, P. 2018. “State of Redwoods Conservation Report: a tale of two forests.” Save the Redwoods League, San Francisco, California. In addition, the League produced a snapshot update of the current state of the giant sequoia with recommendations for 2022-2023 actions (https://www.savetheredwoods.org/wp-content/uploads/files/SAVE-THE-GIANT-SEQUOIAS-Emergency-Actions-for-2022%E2%80%9323.pdf).

(9) Davis et al. 2023 *PNAS*, *ibid*.

(10) Multiple studies by Tom Swetnam, including: Swetnam, T.W., Baisan, C.H., Caprio, A.C. *et al.* Multi-Millennial Fire History of the Giant Forest, Sequoia National Park, California, USA. *fire ecol* **5**, 120–150 (2009). https://doi.org/10.4996/fireecology.0503120