July 6, 2021

Liane M. Randolph
Chair California Air Resources Board
1001 I Street, Sacramento
CA 95814

RE: 2022 Scoping Plan Update: Focus Area Natural and Working Lands

Dear Chair Randolph,

On behalf of the Environmental Protection Information Center (EPIC), please accept these comments on the Air Resources Board 2022 Scoping Plan Update with regards to Natural and Working Lands Focus Area. California's forests currently represent our greatest asset for sequestering and storing carbon from the atmosphere. Despite this, California's current forest management policies prevent our forests from sequestering and storing as much carbon as they are potentially capable of. We write to urge you to advocate for stronger protections for California's Forests in order to meet our climate goals.

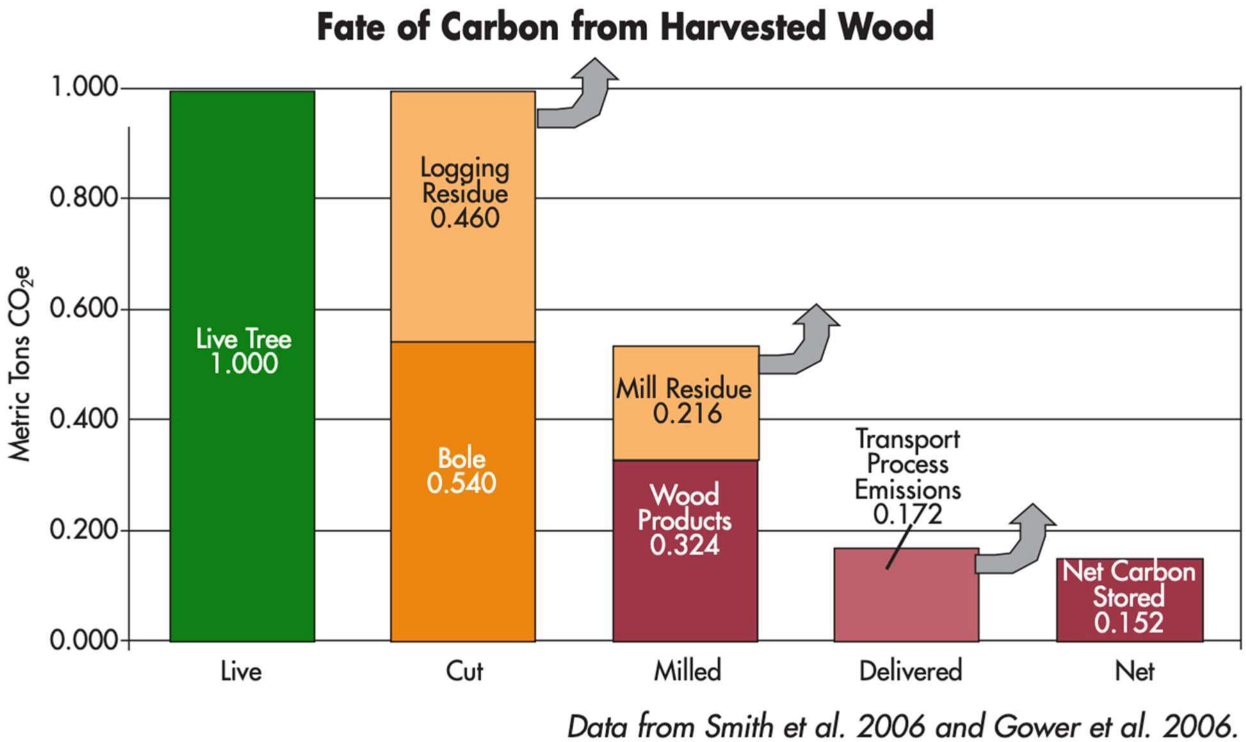
I. The Carbon Consequences of Logging California's Forests

Continuing to harvest timber from our forests at current rates is irreconcilable with California's climate goals. Timber harvesting is the largest emitter of CO_2 of any natural or human-caused forest disturbance type.[1] Timber harvests require the burning of fossil fuels while simultaneously reducing the capacity for forests to sequester carbon. In this way, they are a lose-lose action with regards to protecting the climate. Limiting timber harvesting and increasing forest protection on public lands is the best approach to increasing forest carbon uptake.[2] When not disturbed by timber harvest, our forests naturally sequester tremendous amounts of carbon. In fact, increasing forest protection is the lowest cost and the single most effective tool we have in meeting emission reduction targets.[3]

The timber industry likes to peddle the myth that storing carbon in forest products is a climate solution. This is patently untrue. The carbon emissions associated with the timber harvest and processing (emissions resulting from cutting, yarding, slash burning, transport, milling,

[1] Harris, N. L., et al. "Attribution of net carbon change by disturbance type across forest lands of the conterminous United States." *Carbon balance and management* 11.1 (2016): 1-21.
[2] Law, Beverly E., et al. "Land use strategies to mitigate climate change in carbon dense temperate forests." *Proceedings of the National Academy of Sciences* 115.14 (2018): 3663-3668.
[3] Moomaw, William R., Susan A. Masino, and Edward K. Faison. "Intact forests in the United States: Proforestation mitigates climate change and serves the greatest good." *Frontiers in Forests and Global Change* 2 (2019): 27.

manufacturing, and distribution to the marketplace) are immediately returned to the atmosphere.[4] California's climate goals necessitate a reduction in emission in the near term but timber harvesting directly contradicts that goal. Full life cycle analyses of wood products reveal that their creation is far more carbon intensive and costly to the climate than is often portrayed.[5] On average only 15.2% of carbon from a live tree is stored in a final wood product.[6] The graph below, which is based on data from two separate case studies of the life cycle of carbon in harvested trees, illustrates where and how carbon is lost to the atmosphere after a tree is harvested.



In addition to only a small percentage of the carbon ending up in wood products, the wood products, the carbon that does make it into homes and other structures typically ends up

[4] Harmon, Mark E., et al. "Modeling carbon stores in Oregon and Washington forest products: 1900–1992." *Climatic change* 33.4 (1996): 521-550.

[5] Ingerson, Ann. "Carbon storage potential of harvested wood: summary and policy implications." *Mitigation and Adaptation Strategies for Global Change* 16.3 (2011): 307-323;

[6] Gower, Stith T., et al. *Following the paper trail: The Impact of magazine and dimensional lumber production on greenhouse gas Emissions: a case study*. H. John Heinz III Center for Science, Economics and the Environment, 2006; Smith JE, Heath LS, Skog KE, Birdsey RA (2006) Methods for calculating forest ecosystem and harvested carbon with standard estimates for forest types of the United States. Gen. Tech. Rep. NE-343. US Department of Agriculture, Forest Service, Northeastern Research Station, Newtown Square, PA

burned or in a landfill within the typical lifetime of the home, which on average is 70-100 years.[7] That time frame is a fraction of the sequestration potential of old-growth forests, particularly our State's redwoods that if left growing can live, store, and sequester carbon for millennia.[8] California's forests hold more value as potential carbon reserves than as timberlands. From an economic perspective, the social cost of carbon greatly outweighs the value of timber.[9] By conducting irresponsible timber harvests today, we are making a short term profit in exchange for far greater costs (in terms of the effects of climate change) in the future.

That is why EPIC along with many scientists have begun calling for transforming our planet's forests into carbon reserves.[10] Leaving forests intact and unlogged allows them to store the greatest amount of carbon possible.[11] These carbon reserves should contain large, old trees which store disproportionally massive amounts of carbon compared to younger, smaller trees.[12] Research has found that, "Over time old-growth forests store approximately twice as much carbon as forests managed on a 100-year rotation, and forests managed on a 50-year rotation store about 38% as much as old growth".[13] Studies show that trees continue to grow and absorb carbon throughout their lives.[14] In other words, the longer a forest goes without being logged, the better it is at sequestering and storing carbon. At the same time, logging causes an immediate carbon releases and decreased sequestration potential over time.[15] Our belief is that, due to the crucial importance of mitigating climate change, transforming our forests into carbon reserves would provide more benefit for the people of California than industrial timberlands ever could.

Here in Northwestern California, we are blessed with the coast redwood (*Sequoia sempervirens)*. Coast redwood forests sequester more carbon than any other forest type in the

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[7] O'Connor, Jennifer. "Survey on Actual Service Lives for North American Buildings (PDF), September 2004." *Woodframe Housing Durability and Disaster Issues Conference*. 2006.

[8] Sillett, Stephen C., et al. "Aboveground biomass dynamics and growth efficiency of Sequoia sempervirens forests." *Forest Ecology and Management* 458 (2020): 117740.

[9] Nordhaus, William D. "Revisiting the social cost of carbon." *Proceedings of the National Academy of Sciences* 114.7 (2017): 1518-1523.

[10] Kun, Zoltán, et al. "Recognizing the importance of unmanaged forests to mitigate climate change." *GCB Bioenergy* 12.12 (2020): 1034-1035.

[11] Moomaw, William R., Susan A. Masino, and Edward K. Faison. "Intact forests in the United States: Proforestation mitigates climate change and serves the greatest good." *Frontiers in Forests and Global Change* 2 (2019): 27.

[12] Mildrexler, David J., et al. "Large Trees Dominate Carbon Storage in Forests East of the Cascade Crest in the United States Pacific Northwest." *Frontiers in Forests and Global Change* 3 (2020): 127.

[13] Harmon, Mark E., William K. Ferrell, and Jerry F. Franklin. "Effects on carbon storage of conversion of old-growth forests to young forests." *Science* 247.4943 (1990): 699-702.

[14] Stephenson, Nathan L., et al. "Rate of tree carbon accumulation increases continuously with tree size." *Nature* 507.7490 (2014): 90-93;

[15] Battles, J. J., et al. "California forest and rangeland greenhouse gas inventory development." *State of California Air Resources Board. Sacramento, CA* (2013).

world.[16] One team of scientists put their importance for fighting climate change this way: "Coast redwood (*Sequoia sempervirens*) stands have the largest measured biomass per acre making the argument for use of the species in long-term carbon sequestration projects self-evident."[17] So, it stands to reason that California should consider transforming more of its redwood forests into carbon reserves rather than commercial timberlands. This is not to say that only coast redwood forests would be more valuable as carbon reserves. Along with the co-benefits of habitat connectivity, clean water, fire protection, and others, transforming any of our forests into carbon reserves would provide substantial benefits to the public.

II. Myths About Wildfire

As you are well aware, in recent years wildfire has become a significant source of carbon emissions from California's Natural and Working lands. One talking point that has been raised by the timber industry is that this is the result of decreased logging activities. The argument goes that if the timber industry were permitted to extract more timber from our forests then there would be less fuel to burn and the forest fires would be less intense. This argument is not borne out by the best available evidence.

First off, it's important to remember that most of the carbon in a forest remains after a wildfire.[18] In fact, total annual emissions from wildfires over entire regions are generally much less (~10% in active fire seasons) than total annual emissions from logging in the same region.[19] This is because during a fire only a small portion of a trees' biomass (mainly twigs and leaves) is

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[16] Hudiburg, Tara W., et al. "Regional carbon dioxide implications of forest bioenergy production." *Nature Climate Change* 1.8 (2011): 419-423; Sillett, Stephen C., et al. "Aboveground biomass dynamics and growth efficiency of Sequoia sempervirens forests." *Forest Ecology and Management* 458 (2020): 117740.

[17] Jones, Dryw A., and Kevin A. O'Hara. "Carbon storage in young growth coast redwood stands." In: Standiford, Richard B.; Weller, Theodore J.; Piirto, Douglas D.; Stuart, John D., tech. coords. Proceedings of coast redwood forests in a changing California: A symposium for scientists and managers. Gen. Tech. Rep. PSW-GTR-238. Albany, CA: Pacific Southwest Research Station, Forest Service, US Department of Agriculture. pp. 515-523. Vol. 238. 2012

[18] Campbell J, Donato DC, Azuma D, Law B. 2007. Pyrogenic carbon emission from a large wildfire in Oregon, United States. *Journal of Geophysical Research Biogeosciences* 112: Article G04014; Meigs GW, Donato DC, Campbell J, Martin J, Law BE. 2009. Forest fire impacts on carbon uptake, storage, and emission: The role of burn severity in the Eastern Cascades, Oregon. *Ecosystems* 12:1246–1267; Mitchell SR. 2015. Carbon dynamics of mixed- and high-severity wildfires: pyrogenic CO2 emissions, postfire carbon balance, and succession. In D.A. DellaSala and C.T. Hanson (eds.) The Ecological Importance of Mixed-Severity Fires: Nature's Phoenix. *Elsevier Publications*, Amsterdam, Netherlands.

[19] Meigs GW, Donato DC, Campbell J, Martin J, Law BE. 2009. Forest fire impacts on carbon uptake, storage, and emission: The role of burn severity in the Eastern Cascades, Oregon. *Ecosystems* 12:1246–1267;Campbell J, Harmon ME, Mitchell SR. 2012. Can fuel-reduction treatments really increase forest carbon storage in the western US by reducing future fire emissions? *Frontiers in Ecology and Environment* 10: 83- 90; Law BE, et al. 2018. Land use strategies to mitigate climate change in carbon dense temperate forests. Proceedings of the National Academy of Sciences of the United States of America 115: 3663-3668; Oregon Global Warming Commission. 2018. Forest Carbon Accounting Project Report.

actually combusted. Moreover, about half the carbon in burned forests remains within soils for nearly a century, the rest of the soil carbon builds over millennia.[20] If allowed to do so, growth of surviving trees and new vegetation sequester carbon will typically offset emissions within about 5-50 years.[21]

Second, it must be stressed that timber harvesting actually increases wildfire intensity. In recent years, across the entire western U.S., fires burned with less intensity on lands that had the highest protections from logging.[22] Bradley et al. 2016, a comprehensive study of forest lands including over 1500 fires and 9.5 million hectares of land, concluded that "Forests with higher levels of protection [less logging] had lower severity values even though they are generally identified as having the highest overall levels of biomass and fuel loading. Our results suggest a need to reconsider current overly simplistic assumptions about the relationship between forest protection and fire severity in fire management and policy."[23] Weather and climate are the most important predictors of wildfire intensity with logging intensity being the second most important factor.[24] Even selective logging thins the canopy and stand allowing for greater in-canopy and in-stand wind speeds that fuel higher intensity fires.[25] Cruz et al. (2014) also found that thinning in all scenarios increased fireline intensity and in the most likely scenario also increased in-stand wind speeds and the associated crowning potential of the fire.[26] In a retrospective post-fire study of three management types, uncut (no treatment of natural fuels) and partial-cut stands (treated and untreated slash), the uncut forest had the least fire damage while the region's partial-cut stands with the untreated slash suffered the most severe damage.[27] The 1996 Sierra Nevada Ecosystem Project Report, commissioned by Congress, concluded: "Timber harvest, through its effects on forest structure, local microclimate, and fuel accumulation, has increased fire severity more than any other recent human activity."[28]

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[20] Singh NS, et al. 2012. Fire-derived organic carbon in soil turns over on a century scale. *Biogeosciences* 9:2847-2857.

[21] Meigs GW, Donato DC, Campbell J, Martin J, Law BE. 2009. Forest fire impacts on carbon uptake, storage, and emission: The role of burn severity in the Eastern Cascades, Oregon. *Ecosystems* 12:1246–1267; Mitchell SR. 2015. Carbon dynamics of mixed- and high-severity wildfires: pyrogenic CO2 emissions, postfire carbon balance, and succession. In D.A. DellaSala and C.T. Hanson (eds.) The Ecological Importance of Mixed-Severity Fires: Nature's Phoenix. *Elsevier Publications,* Amsterdam, Netherlands.

[22] Bradley, Curtis M., Chad T. Hanson, and Dominick A. DellaSala. "Does increased forest protection correspond to higher fire severity in frequent-fire forests of the western United States?." *Ecosphere* 7.10 (2016): e01492.

[23] Id.

[24] Zald, Harold SJ, and Christopher J. Dunn. "Severe fire weather and intensive forest management increase fire severity in a multi-ownership landscape." *Ecological Applications* 28.4 (2018): 1068-1080.

[25] Banerjee, Tirtha. "Impacts of forest thinning on wildland fire behavior." *Forests* 11.9 (2020): 918.

[26] Cruz, Miguel G., Martin E. Alexander, and Jelmer E. Dam. "Using modeled surface and crown fire behavior characteristics to evaluate fuel treatment effectiveness: a caution." *Forest Science* 60.5 (2014): 1000-1004.

[27] Weatherspoon, C. Phillip, and Carl N. Skinner. "An assessment of factors associated with damage to tree crowns from the 1987 wildfires in northern California." *Forest Science* 41.3 (1995): 430-451.

[28] Erman, Don C. *Status of the Sierra Nevada: Sierra Nevada Ecosystem Project*. Centers For Water & Wildland Resources, University of California, 1996.

Some have argued that we should increase timber harvest in order to reduce wildfire emissions and thereby reduce carbon emissions. This would be a terrible mistake. Campbell et al. (2012) determined that thinning forests to avoid high-severity fire would reduce stored forest carbon and increase overall carbon emissions. Because the chance of a fire burning on any given acre of forest is low, forest managers must treat many more acres than will ever actually burn. This causes thinning to end up removing more stored carbon than would be released by fire in most years. The study concluded that "we found little credible evidence that such efforts [fuel reduction treatments] have the added benefit of increasing terrestrial C stocks" and "more often, treatment would result in a reduction in C stocks over space and time." Chiono et al. (2012) analyzed the carbon balance of thinning and prescribed fire treatment scenarios in the Sierra Nevada compared to a no treatment scenario. In all of the fuel treatment scenarios they analyzed "treatment related emissions exceeded the avoided wildfire emissions conferred by treatment." Their study concluded "[d]ue to the significant emissions associated with treatment and the low likelihood that wildfire will encounter a given treatment area, forest management that is narrowly focused on C accounting alone would favor the no-treatment scenarios."

Simmonds et al. (2021) recently found that California's fuel-reduction plans (understory treatment, prescribed burning, thinning) actually produced 29.1 and 25.5 times more carbon emissions than they prevented for Scenario's A and B, respectively.[29] They found that the activity that had the greatest benefit in reducing carbon emissions was forest protection and the associated enhanced ecosystem carbon uptake.[30] At the same time, they found that both of the State's current GHG reduction scenarios fell drastically short of achieving their GHG reduction targets set forth by California Senate Bill 32 and Executive Order 2-3-05.[31] As the climate continues to warm, wildfires in California will only grow more severe.[32] This creates a terrible feedback loop where California's warming climate feeds larger and larger wildfires that produce greenhouse gas emissions. Therefore, it is incumbent upon California not to engage in climate "strategies" that actually increase emissions like those suggested by the timber industry. Otherwise, we will continue to increase wildfire risk in the name of wildfire mitigation.

The best way to help trees survive a fire is to allow them to grow to their full size. Douglas et al. (2010), found that in Mendocino coast redwood forests, trees greater than 40 cm (~16 in)

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[29] Simmonds, Maegen B., et al. "Impacts of California's climate-relevant land use policy scenarios on terrestrial carbon emissions (CO2 and CH4) and wildfire risk." *Environmental Research Letters* 16.1 (2021): 014044.
[30] Simmonds, Maegen B., et al. "Impacts of California's climate-relevant land use policy scenarios on terrestrial carbon emissions (CO2 and CH4) and wildfire risk." *Environmental Research Letters* 16.1 (2021): 014044.
[31] Simmonds, Maegen B., et al. "Impacts of California's climate-relevant land use policy scenarios on terrestrial carbon emissions (CO2 and CH4) and wildfire risk." *Environmental Research Letters* 16.1 (2021): 014044.
[32] Williams, A. Park, et al. "Observed impacts of anthropogenic climate change on wildfire in California." *Earth's Future* 7.8 (2019): 892-910.

Diameter at Breast Height (DBH) had a nearly 100% survival rate for fires of all intensities.[33] Wildfire overwhelmingly kills the smallest trees, which like kindling used to start a fire, burn easily and completely. Therefore, in effect, thinning by removing the largest highest market value trees, creates a forest composed of kindling, extremely susceptible to wildfire. Those killed trees then release some of their carbon and contribute to the climate crisis. But, if we stopped harvesting trees and allowed them to reach their full size, we would create forests that could better survive wildfires and thus reduce the amount of carbon emitted by them.

III. The Impacts of Salvage Logging

Adding insult to injury, California regularly conducts "salvage logging" operations after wildfires. Salvage logging or post-fire logging is the process of harvesting timber from recently burned trees. In addition to severe ecosystem damage,[34] post-fire logging compounds the negative climate impacts of wildfires.[35] Contrary to popular belief, most of the carbon in a fire-killed tree remains on the ground and is not immediately released into the atmosphere.[36] Post-fire logging takes the carbon that remained on the forest after the fire (the carbon that did not burn) and puts it through the same process that releases considerable amounts of carbon discussed above.[37]

Research on the impacts of post-fire logging on GHG emissions highlights the negative impacts of this practice. Boone et al. (2019) directly compared the total aboveground biomass (TAGB) of salvage logged sites and sites that were not salvaged log 15 years and 29 years after the Apple fire and Warner Creek fires.[38] They found that "land use (salvage logging and plantations) resulted in significantly lower TAGB than the burned late successional natural forests" that were not salvage logged.[39] In particular, they found that the total aboveground carbon at the salvage logged sites was 49% and 42% that of the high severity sites 29 years post-fire.[40] That means that after 29 years of regrowth there is about half as much carbon in post fire logged sites as

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[33] Douglas, Robert B., and Tom Bendurel. "Post-fire response of coast redwood one year after the Mendocino Lightning Complex Fires." In: Standiford, Richard B.; Weller, Theodore J.; Piirto, Douglas D.; Stuart, John D., tech. coords. Proceedings of coast redwood forests in a changing California: A symposium for scientists and managers. Gen. Tech. Rep. PSW-GTR-238. Albany, CA: Pacific Southwest Research Station, Forest Service, US Department of Agriculture. pp. 363-371. Vol. 238. 2012.

[34] Lindenmayer, D. B., and R. F. Noss. "Salvage logging, ecosystem processes, and biodiversity conservation." *Conservation Biology* 20.4 (2006): 949-958.

[35] Donato, D. C., et al. "Post-wildfire logging hinders regeneration and increases fire risk." *Science* 311.5759 (2006): 352-352.

[36] Campbell, J. L., J. B. Fontaine, and D. C. Donato (2016), Carbon emissions from decomposition of fire-killed trees following a large wildfire in Oregon, United States. *J. Geophys. Res. Biogeosci*., 120, doi: 10.1002/2015JG003165.

[37] Ingerson, Ann. "Carbon storage potential of harvested wood: summary and policy implications." *Mitigation and Adaptation Strategies for Global Change* 16.3 (2011): 307-323;

[38] Kauffman, J. Boone, et al. "Forest structure and biomass reflects the variable effects of fire and land use 15 and 29 years following fire in the western Cascades, Oregon." Forest Ecology and Management 453 (2019): 117570.

[39] *Id.*

[40] *Id.*

those that regenerate naturally. Powers et al. found a similar reduction in stored carbon following post-fire logging.[41] This is particularly harmful because the carbon in wood harvested during salvage logging is typically released into the atmosphere during that 30 year period.[42]

Making matters even worse, post-fire logging hinders regeneration and increases future fire risk which means post-fire logging will actually contribute additional carbon emissions in the future.[43] A scientific study of post-fire logging, showed that it causes a four-fold increase in fine fuels and that increase can last for 15 years.[44] Fine fuels tend to cause wildfires to rapidly spread which is more likely to kill young trees and set back forest recovery. Unlogged fire areas (the controls) had lower levels of fine fuels but had higher levels of large fuels. Large fuels do not tend to exacerbate the spread of fire but they can heat the soil. However, soil heating is a patchy phenomenon that forests have evolved with and can tolerate. Retaining the large wood is also important for wildlife habitat and soil conservation. The scientific consensus in the fuel management literature is that it is more important to control small fuels. Studies of the portions of the Biscuit fire that were previously burned by wildfire, reveal that logging did not reduce the severity of subsequent fires, and in fact post-fire logging appeared to increase the severity of subsequent wildfires.[45] Post-fire logging also typically removes the largest logs that act as water “reservoirs” and are least prone to drying.[46] In sum, salvage logging releases considerable emissions, reduces future carbon sequestration potential, and increases the likelihood of future carbon emitting wildfires.

IV. A chance to do better: Jackson Demonstration State Forest

While the evidence outlined above applies to all of California’s forests, there is one forest on which we would like to focus in particular. Jackson Demonstration State Forest (JDSF) is a

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[41] Powers, Elizabeth M., et al. "Post-fire management regimes affect carbon sequestration and storage in a Sierra Nevada mixed conifer forest." Forest Ecology and Management 291 (2013): 268-277.

[42] Law, Beverly E., et al. "Land use strategies to mitigate climate change in carbon dense temperate forests." Proceedings of the National Academy of Sciences 115.14 (2018): 3663-3668.

[43] Donato, D. C., et al. "Post-wildfire logging hinders regeneration and increases fire risk." *Science* 311.5759 (2006): 352-352.

[44] J.D. McIver, and R. Ottmar. 2007. Fuel mass and stand structure after post-fire logging of a severely burned ponderosa pine forest in northeastern Oregon. Forest Ecology and Management. Volume 238, Issues 1-3 , 30 January 2007, Pages 268-279.

[45] Jonathan R. Thompson, Thomas A. Spies, and Lisa M. Ganio. 2007. Reburn severity in managed and unmanaged vegetation in a large wildfire. *Proceedings of the National Academy of Sciences. PNAS* published online Jun 11, 2007; Kristen Harma and Peter Morrison. Analysis of Vegetation Mortality and Prior Landscape Condition, 2002 Biscuit Fire Complex. *Pacific Biodiversity Institute* February 14, 2003

[46] Amaranthus, M.P.; Parrish, D.S.; and D.A. Perry. 1989. Decaying Logs as Moisture Reservoirs After Drought and Wildfire. In: Alexander, E.B. (ed.) Proceedings of Watershed '89: Conference on the Stewardship of Soil, Air, and Water Resources. USDA-FS Alaska Region. RIO-MB-77. p. 191-194.

48,652 acre, state owned, coast redwood forest located in Mendocino County. California purchased most of the land that would become JDSF in 1947 with the goal of demonstrating sustainable timber production for private timber companies. Since then, CAL FIRE has operated the forest as a commercial timberland under a management plan approved by the Board of Forestry. Numerous timber harvests have occurred under State management, including the harvesting of many old-growth groves in the name of "sustainable forestry". CAL FIRE has thankfully stopped harvesting old-growth trees, but they continue to harvest mature second growth trees, some of which are more than 100 years old. These incredibly rare mature second growth trees are some of California's best hope for creating new old-growth coastal redwood groves that can begin to replace the magnificent forests we lost.[47] As they continue to grow, these trees will sequester carbon at an astonishing pace and are among California's best tools for meeting our carbon neutrality goals.[48]

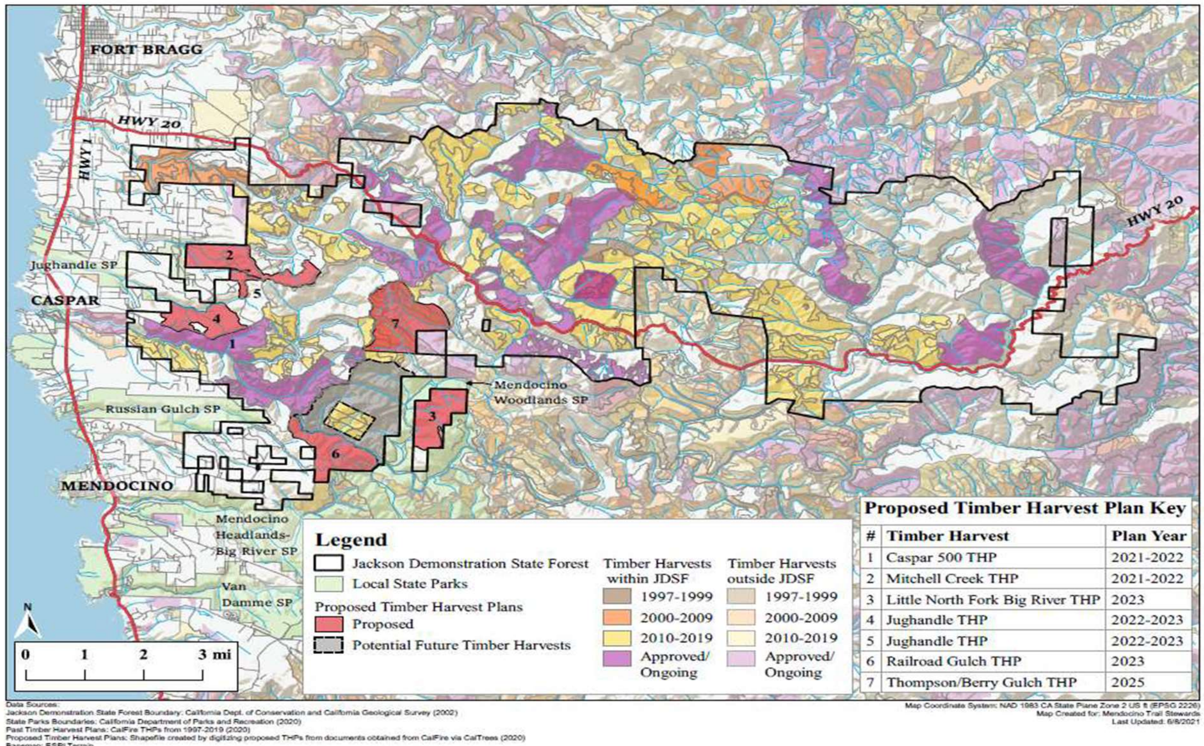
Despite all this, very little protects the forest from ongoing logging. JDSF is still designated as a commercial timberland by the Board of Forestry and CAL FIRE's primary mandate is to conduct timber harvests. Last year, CAL FIRE proposed a suite of timber harvest plans for the Western portion of JDSF. The map below shows these timber harvest plans as well as all timber harvest plans conducted in JDSF since 1997. The Western portion is both the most heavily recreated portion of JDSF and is also home to many of the oldest stands of trees. These timber harvest plans would close popular trails, degrade northern spotted owl habitat, and cut down large, second growth trees. Currently, local activists are tree-sitting in a 200-year-old tree measuring 77" DBH. This tree alone contains a substantial amount of carbon already and will continue to sequester it for the rest of its incredibly long life if it is allowed to. The tree was marked for harvest in the "Caspar 500" Timber Harvest Plan which was approved by CAL FIRE last year. The tree, referred to by locals as the "Mamma tree", has become a rallying point for folks in Mendocino County who don't believe logging these irreplaceable trees is the best use of our public lands. In response to community outrage, CAL FIRE recently unmarked the Mamma tree and some of its neighbors, but the fact that it was marked for harvest in the first place epitomizes the current mismanagement of JDSF.

The following map illustrates CAL FIRE's extensive timber management regime within JDSF.

[47] Burns, E. E., R. Campbell, and P. D. Cowan. "State of Redwoods Conservation Report." Save the Redwoods League, San Francisco. (2018).

[48] Sillett, Stephen C., et al. "Aboveground biomass dynamics and growth efficiency of Sequoia sempervirens forests." *Forest Ecology and Management* 458 (2020): 117740; Van Pelt, Robert, et al. "Emergent crowns and light-use complementarity lead to global maximum biomass and leaf area in Sequoia sempervirens forests." *Forest Ecology and Management* 375 (2016): 279-308.

Proposed Timber Harvest Plans in Jackson Demonstration State Forest as of June 2021



California cannot continue to operate JDSF as if there is no climate emergency. Our coast redwood trees are our best tools for sequestering carbon quickly and for a long period of time.[49] Every timber harvest emits considerable CO2 emissions and seriously reduces our forests' capacity to store carbon.[50] CAL FIRE has three main justifications as to why they should continue conducting timber harvesting in JDSF. We will address each of these in turn.

First, CAL FIRE argues that timber harvesting is necessary for fire prevention. As discussed above, timber harvesting, as CAL FIRE regularly practices it, actually increases the risk of wildfire. CAL FIRE THPs regularly leave slash or small fuels lying on the forest floor. This kindling will cause any eventual wildfires that break out in JDSF to burn hotter and quicker than they otherwise would have. The slash shown in the photo below is a byproduct of commercial timber harvesting on JDSF and reveals that fire prevention is not CAL FIRE's main objective.

[49] Jones, Dryw A., and Kevin A. O'Hara. "Carbon storage in young growth coast redwood stands." In: Standiford, Richard B.; Weller, Theodore J.; Piirto, Douglas D.; Stuart, John D., tech. coords. Proceedings of coast redwood forests in a changing California: A symposium for scientists and managers. Gen. Tech. Rep. PSW-GTR-238. Albany, CA: Pacific Southwest Research Station, Forest Service, US Department of Agriculture. pp. 515-523. Vol. 238. 2012.a

[50] Harris, N. L., et al. "Attribution of net carbon change by disturbance type across forest lands of the conterminous United States." *Carbon balance and management* 11.1 (2016): 1-21.

Second, CAL FIRE argues harvesting trees is necessary to promote late seral characteristics. The argument goes that the forest is overstocked and that harvesting some trees will make more nutrients and water available for the survivors allowing them to grow larger, faster. While there is some evidence that thinning may be appropriate in very dense and very young stands of redwoods, recent research indicates that older second growth coastal redwood forests rejuvenate more successfully without human intervention.[51] Researchers who conducted a direct comparison of a second growth stands that were being actively managed for late seral characteristics with second-growth stands that were allowed to naturally recover without human intervention, determined that "tree canopy cover, native species cover and richness, richness of coast redwood associated species, and the cover of Trillium ovatum (western wake robin) were significantly higher in naturally recovering versus actively managed stands."[52] The reason is that active management disturbs ecosystems which are necessary for tree growth. "Although the temptation to manipulate a regenerating forest so that management goals can be reached in a human time scale is compelling, the ecological costs of continued disturbance, particularly when using the same tools that caused the original damage, must be considered."[53]

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[51] Hanover, A., & Russell, W. (2018). Understory Recovery in Coast Redwood Communities: A Case Study Comparing a Naturally Recovering and an Actively Managed Forest. *Open Journal of Forestry*, 8, 489-499.
[52] *Id.*
[53] Russell, Will, Jeff Sinclair, and Kristin Hageseth Michels. "Restoration of coast redwood (Sequoia sempervirens) forests through natural recovery." *Open Journal of Forestry* 4.02 (2014): 106.

Even if this is the stated objective, CAL FIRE regularly cuts down the largest trees within their THP areas. Look at the size of the following trees that were marked for harvest in the Caspr 500 CAL FIRE Timber Harvest Plan. The largest tree in this grove is 77" DBH. This is a timber harvest plan whose stated purpose is to promote late successional forest characteristics. How does harvesting the largest trees in the plan area promote late successional forest characteristics?

Finally, CAL FIRE argues that they have a legislative and regulatory mandate to conduct timber harvest and to perform research and demonstration. To some extent, this is true. CAL FIRE has a legislative mandate to operate JDSF as a commercial timberland and the Board of Forestry has created a management plan that mandates considerable timber harvest. But this gets to the heart of the issue. What is more worthwhile in 2021, demonstrating how to cut trees down or demonstrating how to store carbon? Our State Demonstration Forests have the potential to be laboratories of carbon sequestration and storage. Scientists could study what management methods actually sequester the most carbon and could demonstrate those techniques to other forest managers across the State. These lands are publicly owned and are meant to be managed in the public interest. With a simple change in legislation (or even a change in regulation) this forest could become one of California's greatest assets for sequestering carbon. Please consider supporting our efforts to transform Jackson into a State Carbon Reserve.
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Sincerely,

Matt Simmons
Legal Fellow
Environmental Protection Information Center
145 G Street, Suite A
Arcata, CA 95521