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We Cannot Effectively Fight Climate Change Without Increasing Forest Protection

To Solve the Climate Crisis, is Forest Protection Optional? No. To prevent temperature rise of more than 1.5 degrees Celsius, and avoid the most extreme impacts of climate change, it is not enough to move beyond carbon fuel consumption. We must also substantially increase forest protection, from logging and development, in order to pull large quantities of CO2 out of the atmosphere (Erb et al. 2018). If we transition out of the carbon fuel economy, and also take bold steps to increase forest protection, and to reestablish forests where they were lost long ago to agriculture, we can hold temperature rise to 1.5 degrees Celsius. In fact, forest protection represents approximately ***half or more*** of the climate change mitigation needed to hold temperature rise to 1.5 degrees Celsius (Erb et al. 2018). Moreover, logging in US forests emits 10 times more carbon than fire and tree mortality from native bark beetles *combined*, and our forests could sequester and store far more carbon if we increased protections from logging (Harris et al. 2018).

Pro-Logging Policy-Makers Claim Our Forests Are "Overgrown". What Does This Mean? This is a highly misleading claim, and is a form of climate change denial because it denies the fact that, due in large part to the impact of decades of logging, we currently have a deficit of carbon in our forests relative to historical levels (McIntyre et al. 2015). In fact, calling a forest ecosystem "overgrown" is the same as stating that we need less carbon in our forests and, as a result, less carbon storage and less potential for carbon sequestration. Pro-logging politicians and organizations also promote the myth that historical forests were all "open" with "low" tree densities, relying on some U.S. Forest Service studies. But these studies have been soundly discredited because they only included historical records for mature conifer trees, and omitted stacks of historical evidence of high densities of small trees and non-conifers, like oaks, that have always existed in our forests (DellaSala and Hanson 2015, Baker et al. 2018).

Some Have Claimed That "Thinning" Helps Keep More Carbon in the Forest. Is This True? No. Proponents of logging claim that forest fires are "carbon bombs" and promote logging as a supposed fix, but this too is a form of climate science denial. "Thinning", and other forms of commercial logging, conducted under the guise of fire management, cause a substantial net loss of forest carbon storage, and a net increase in carbon emissions, relative to no logging (Campbell et al. 2012), and logging strongly tends to *increase* fire intensity (Bradley et al. 2016). You simply can't keep more carbon in our forests by pulling more carbon out of them. In such logging operations, 28% of the carbon in felled trees is emitted from the burning of logging "slash" debris (branches from felled trees), and 53% of the remaining tree carbon is then lost almost immediately to the atmosphere through the milling and manufacturing process (Harmon et al. 1996). This means that about *two-thirds* of the carbon stored in the trees that are logged is emitted into the atmosphere. In stark contrast, even in large forest fires, only about 3% of the carbon in trees is consumed and emitted (Meigs et al. 2009). Further, the recent unpublished reports of high carbon emissions from forest fires, disseminated by some state and federal agencies, are based on a discredited U.S. Forest Service model ("FOFEM"), which exaggerates carbon emissions by nearly threefold (French et al 2011). In reality, fire consumes only about 11% of the carbon in forest vegetation, duff, litter, and soil (Campbell et al. 2007), and the release of nutrients as a result of a fire stimulates rapid and massive forest regrowth (Meigs et al. 2009, Hanson 2018). Within a decade or less after fire, the forest pulls more carbon out of the atmosphere than was emitted during a fire (Meigs et al. 2009, Campbell et al. 2016).

Does Logging Affect Forest Carbon Storage in Other Ways Too? Yes. Logging not only removes the carbon stored in trees from forest ecosystems, but it also compacts and damages soils, removes vital nutrients that are stored in trees, and disturbs the carbon contained in soils (Elliot et al. 1996, Helmisaari et al. 2011, Achat et al. 2015). All of these impacts from logging combine to significantly reduce forest productivity (the rate at which trees and plants will grow), which substantially reduces the capacity of our forest ecosystems to absorb, sequester, and store CO2 over time.

Is "Biomass" Logging Carbon Neutral, or "Renewable Energy"? No. All of the carbon stored in trees that are logged and then incinerated for biomass energy becomes CO2 emissions. Incinerating trees for energy produces <u>more</u> CO2 emissions than burning coal, for equal energy produced (Sterman et al. 2018).

What Does Forest Protection Have to Do With Impacts to Coastal Communities from Sea-Level Rise? The science is clear: we cannot solve the climate crisis solely by stopping fossil fuel consumption—we must also substantially increase forest protection to pull more CO2 out of the atmosphere. Unless we take bold action to curb human-caused climate change – including protecting forests around the country from logging, within the next 20 to 70 years 25% or more of the residences in hundreds of U.S. towns and cities will be under sea water, severely impacting some of the nation's largest coastal cities, such as New York City, Boston, Jersey City, and Honolulu, as well as Long Beach, Oxnard, and Richmond in California (Strauss et al. 2015). Within this same timeframe, at least 414 additional U.S. towns and cities will be even more heavily impacted, with at least 50% of residences being overwhelmed by seawater, including Miami, New Orleans, Norfolk, VA, as well as Sacramento, Stockton, and Huntington Beach in California. Today residents in 17 U.S. towns are starting to relocate due to climate caused sea level rise.

Is the U.S. Globally Relevant in Terms of Logging's Climate Impacts? Yes. Many people do not know that more logging and deforestation occurs annually in the U.S., including on our public lands, than in any other nation in the World (Hansen et al. 2013, Prestemon et al. 2015). To do our part to mitigate climate change and to have credibility to leverage forest protection globally as a climate change solution, the U.S. must demonstrate leadership on forest protection.

References

Achat, D.L., et al. 2015. Forest soil carbon is threatened by intensive biomass harvesting. Scientific Reports 5: Article 15991.

Baker, W.L., C.T. Hanson, and M.A. Williams. 2018. Improving the use of early timber inventories in reconstructing historical dry forests and fire in the western United States: reply. Ecosphere **9**: Article e02325.

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.

Campbell, J., D. Donato, D. Azuma, and B. Law. 2007. Pyrogenic carbon emission from a large wildfire in Oregon, United States. Journal of Geophysical Research Biogeosciences 112: Article G04014.

Campbell, J.C., J.B. Fontaine, and D.C. Donato. 2016. Carbon emissions from decomposition of fire-killed trees following a large wildfire in Oregon, United States. Journal of Geophysical Research: Biogeosciences 121: 718-730.

Campbell, J.L., M.E. Harmon, and S.R. Mitchell. 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.

DellaSala, D.A., C.T. Hanson. 2015. The ecological importance of mixed-severity fires: nature's phoenix. Elsevier Inc.,Waltham, MA.

Elliot, W.J., et al. 1996. The effects of forest management on erosion and soil productivity. Symposium on Soil Quality and Erosion Interaction. July 7, 1996, Keystone, CO.

Erb, K.H., et al. 2018. Unexpectedly large impact of forest management and grazing on global vegetation biomass. Nature 553: 73-76.

French, N.H.F., et al. 2011. Model comparisons for estimating carbon emissions from North American wildland fire. Journal of Geophysical Research 116: Article G00K05.

Hansen, M.C., et al. 2013. High-resolution global maps of 21st-century forest cover change. Science 342: 850-53.

Hanson, C.T. 2018. Landscape heterogeneity following high-severity fire in California's forests. Wildlife Society Bulletin 42: 264-271.

Harmon, M.E., et al. 1996. Modeling carbon stores in OR and WA forest products: 1900-1992. Climatic Change 33: 21- 50.

Harris, N.L., et al. 2016. Attribution of net carbon change by disturbance type across forest lands of the conterminous United States. Carbon Balance Management 11: Article 24.

Helmisaari, H.S., et al. 2011. Logging residue removal after thinning in Nordic boreal forests: Long-term impact on tree growth. Forest Ecology and Management 261: 1919-27.

McIntyre, P.J., et al. 2015. Twentieth-century shifts in forest structure in California: Denser forests, smaller trees, and increased dominance of oaks. Proceedings of the National Academy of Sciences of the United States of America 112: 1458-1463.

Meigs et al. 2009. Forest fire impacts on carbon uptake, storage, and emission: the role of burn severity in the eastern Cascades, Oregon. Ecosystems 12: 1246-67.

Prestemon, J.P., et al. 2015. The global position of the U.S. forest products industry. U.S. Forest Service, e-Gen. Tech. Rpt. SRS-204.

Sterman, J.D., L. Siegel, and J.N. Rooney-Varga. 2018. Does replacing coal with wood lower CO2 emissions? Dynamic lifecycle analysis of wood bioenergy. Environmental Research Letters 13: Article 015007.

Strauss, B.H., et al. 2015. Carbon choices determine US cities committed to futures below sea level. Proceedings of the National Academy of Sciences 112: 13508-13.