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The Myth of "Overgrown" Forests

Forests today are not "overgrown". In fact, due to logging, which has been removing vast numbers of trees from public and private forests in the U.S. for many decades, we currently have far less biomass, and therefore carbon, in most of our forests than they would otherwise naturally have.[1] In the western U.S., for example, the most current and comprehensive research concludes that, historically (before fire suppression and logging), forest density was highly variable. "Open" forests with relatively low tree densities were a minor portion of the forested landscape, including in ponderosa pine and mixed-conifer forests. The majority of these forest types were moderately to very dense historically, with hundreds of seedlings, saplings and small trees per acre, and several dozen or more mature/old trees per acre, often with dense shrub understories.[2] This variability in density was shaped by mixed-intensity fire, which included both small and very large patches of high-intensity fire. These high-intensity fire patches typically covered between 22% and 39% of the total area burned in wildfires (the remaining 61% to 78% was comprised of low/moderate-intensity fire). Recent studies by U.S. Forest Service scientists, claiming that historical tree densities in western forests were much lower than they are today, left out of their assessments data on small tree density, and density of non-conifer trees like oaks. When this error was corrected by subsequent researchers, and these missing data were included, it was determined that historical tree density was on average 7 times higher than claimed by the Forest Service in ponderosa pine forests, and 17 times higher in mixed-conifer forests.[3]

Dense forests do not burn more intensely. Logging interests claim that dense, mature and old forests will burn more intensely due to "fuel accumulation", often referencing decades of fire suppression to claim that we must log forests that haven't burned in a long time. 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, forests with the highest biomass levels and strongest environmental protections from logging, and mature/old forests with higher densities of trees per acre.[4] 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.[5] In fact, such forests often burn less intensely, and this is true even years after trees die and later fall to the ground.[6] 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.

Dense forests are not more susceptible to tree mortality from native beetles or drought. In fact, denser, older forests tend to be ***less*** susceptible to such mortality.[7] Forests share information and nutrients from tree to tree through a vast network of mycorrhizal fungi filaments in the soil, and a single teaspoon of soil in a natural forest may contain several dozen miles of such filaments. It benefits trees to be close to one another. Researchers have concluded that thinning, conducted under the guise of preventing tree mortality from native bark beetles, kills far more trees than the drought or beetles otherwise would.[8]

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, logging tends to increase, not decrease, fire intensity,[9] and this is also true where logging is focused on the removal of dead trees, as in post-fire logging.[10] 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.[11] We saw the tragic consequences of this as the Camp fire raced through thousands of acres that had been logged in previous years (post-fire logging and thinning on private and public lands; see map @ https://johnmuirproject.org/2019/01/logging-didnt-stop-the-camp-fire/) before devastating the town of Paradise.

Not only does logging fail to curb wildfires, where logging is conducted under the guise of "thinning" for fire management or "forest health", the science shows that it causes a large overall net loss of forest carbon and a large net increase in carbon emissions relative to fire alone,[12] especially since most of the carbon in trees removed from the forest through logging ends up in the atmosphere almost immediately, incinerated as "slash" and mill residues, with very little ending up in wood products.[13] Even in a large, intense wildfire, only about 2% to 3% of the carbon in the trees is actually consumed—mostly seedlings and saplings, and some needles and small twigs in some of the mature trees.[14] Most of the carbon removed from forests in "thinning" logging projects is in the form of mature/old trees. This means nearly all the wood, and carbon, removed from forests by thinning for "fuel reduction" is literally non-combustible in a forest fire.

Protecting forests, and allowing them to increase their biomass and carbon, is essential to climate change mitigation. Because U.S. forests currently have much less carbon/biomass than they did historically, due to many decades of logging, our forests have enormous climate change mitigation potential to draw down atmospheric carbon as they grow, but only if we protect public forestlands from logging and increase protections on current private forests.[15] Increasing the amount of carbon stored in our forests, by keeping them standing and letting them grow, will also help prevent extinction of many imperiled forest species.[16]

Endnotes

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