Earth Law Center
2023 Report

PACIFIC NORTHWEST FORESTS

ESSENTIAL FOR ADDRESSING AND MITIGATING CLIMATE CHANGE

I. FORESTS ARE ESSENTIAL REMOVERS OF CARBON DIOXIDE FROM THE ATMOSPHERE.

In order to mitigate climate change, the level of carbon dioxide in the atmosphere needs to be reduced. This reduction can be achieved by two methods: reducing carbon dioxide emissions (i.e., sources) or removing carbon dioxide from the atmosphere through so-called sinks. Forests are essential carbon dioxide sinks that are estimated to capture and store 25% of global human emissions.[1] Since no alternative sink technologies have been proven at scale, further enhancement of forest-based carbon dioxide removal will be a critical component of any collective global strategy to mitigate climate change.[2]

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[1] Harris et al., Attribution of net carbon change by disturbance type across forest lands of the conterminous United States, Carbon Balance Manage (2016) 11:24, 1.
[2] Harris et al., Attribution of net carbon change by disturbance type across forest lands of the conterminous United States, Carbon Balance Manage (2016) 11:24, 1.

II. But not all forests are equally efficient at removing carbon dioxide. Larger, older forests store a disproportionate amount of carbon over time and also provide many more beneficial ecosystem services.

Next to providing other important services for ecosystems, older forests not only provide habitats for a wider range of biological diversity, but they are a significant and cost-effective method of mitigating carbon dioxide: primary (unlogged) forests store 30-60% more carbon than logged forests, with up to half of the carbon being stored in the largest (oldest) 1% of the trees – these large, old trees store a disproportionate amount of carbon over time due to the larger surface area of their leaves as well as their massive carbon-storing trunks and roots.[3]

If one stops to reflect for a second, this becomes obvious – how could a small sapling store as much carbon as a massive old tree? The sapling’s trunk and branches are far smaller, its roots far shorter, and its leaves far fewer – and all these parts of the tree store carbon. Therefore, one cannot hold all trees equal in terms of their ability to capture and store carbon – as a result, it becomes clear that chopping down an old tree and replanting it with a sapling cumulatively removes far less carbon than if the old tree were simply left alone. For instance, a tree that is 100 cm in diameter adds the equivalent biomass of an entire 10-20 cm tree each year.[4]

Newly planted forests require many decades to a century before they capture and store substantial quantities of carbon and recent research shows that natural forests hold 40 times more carbon than managed plantations that are harvested periodically.[5]

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[3] Dominick DellaSala & William Moomaw, Scientists announce importance of the world’s primary forests and large, old trees in climate regulation and biodiversity conservation, 2.
[4] Moomaw et al., Intact Forests in the United States: Proforestation Mitigates Climate Change and Serves the Greatest Good, Front. For. Glob. Change 2:27 (2019), 4.
[5] Moomaw et al., Intact Forests in the United States: Proforestation Mitigates Climate Change and Serves the Greatest Good, Front. For. Glob. Change 2:27 (2019), 2.

III. LETTING OLDER INTACT FORESTS GROW TO THEIR ECOLOGICAL POTENTIAL - TERMED PROFORESTATION - IS THE BEST APPROACH TO CLIMATE MITIGATION.

In particular, proforestation is a better approach than planting new forests (termed afforestation), replacing forests on deforested or recently harvested land (termed reforestation), or substituting wood for more carbon intensive building materials.
he main shortcoming of planting new forests and replacing logged forests with new trees is that the young trees do not remove nearly as much carbon as the much bigger old trees – thus neither strategy will remove enough carbon in the critical next decades.[6] In contrast, letting older intact forests grow is an immediate, low-cost, highly effective, simple, safe, natural solution that does not rely on uncertain or untested technologies, does not require much additional land or other tradeoffs with societal needs, and also provides many other ecosystem services including benefits to biodiversity.[7]

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[6] Moomaw et al., Intact Forests in the United States: Proforestation Mitigates Climate Change and Serves the Greatest Good, Front. For. Glob. Change 2:27 (2019), 2.
[7] Moomaw et al., Intact Forests in the United States: Proforestation Mitigates Climate Change and Serves the Greatest Good, Front. For. Glob. Change 2:27 (2019), 7-8.

Harvesting trees and substituting the wood for more carbon intensive materials (i.e. concrete and steel) in buildings is sometimes advocated as benefiting carbon dioxide reduction more than the forests themselves. However, studies have recently indicated that the long-term mitigation benefits related to product substitution may have been overestimated 2 to 100 times. Although product substitution may have limited climate mitigation benefits in specific situations, this requires a case-specific consideration of the value and duration of the carbon displacement, the longevity of constructed buildings, and the nature of the forest supplying building materials.[8] In general, however, Pacific temperate forests can store carbon for many hundreds of years, which is much longer than is expected for buildings which are generally assumed to outlive their usefulness or be replaced within several decades.[9] These forests are "carbon-ready" now and do not require new technologies or infrastructure to immediately mitigate climate change.[10]

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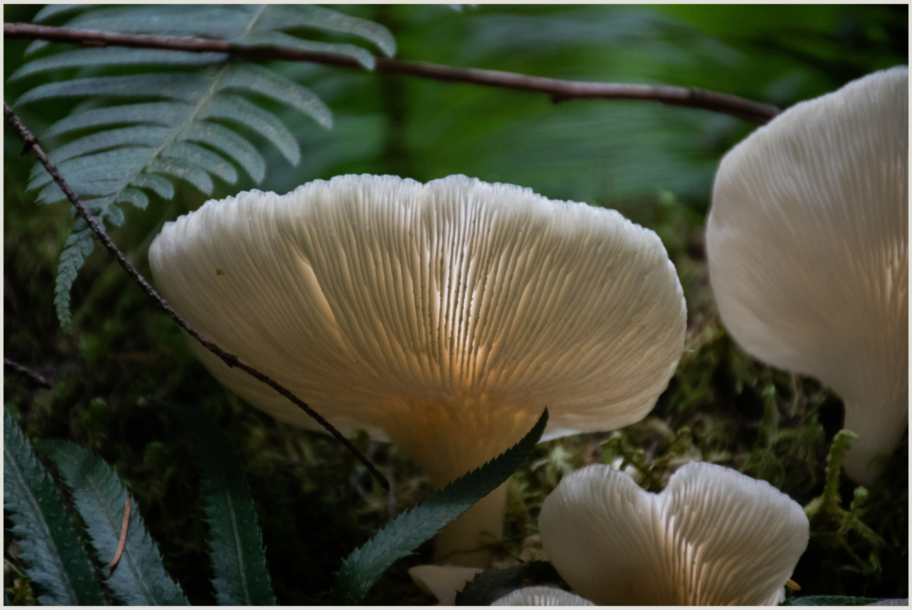
[8] Mark E. Harmon, Have product substitution carbon benefits been overestimated? A sensitivity analysis of key assumptions, Environ. Res. Lett. 14 (2019) 065008, 1.
[9] Law et al., Land use strategies to mitigate climate change in carbon dense temperate forests, PNAS Latest Articles (2018), 4.
[10] Law et al., Land use strategies to mitigate climate change in carbon dense temperate forests, PNAS Latest Articles (2018), 5.

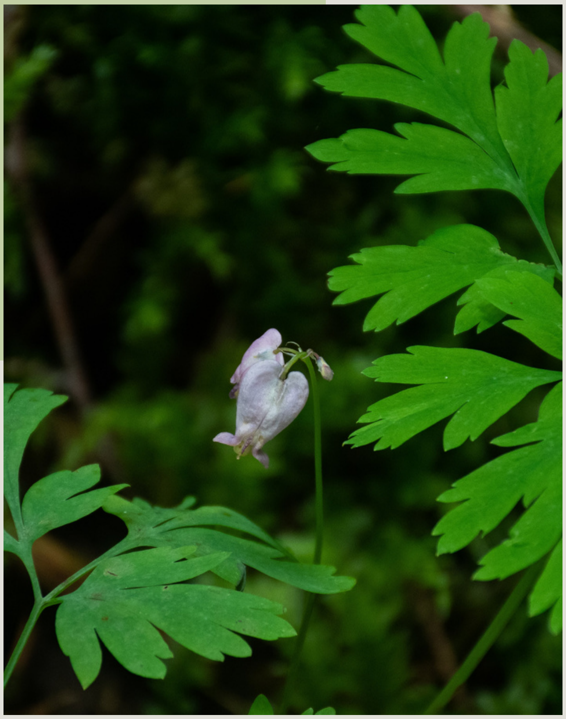
IV. The Pacific Northwest holds a great amount of such high carbon density forests and thus their potential role in carbon reduction is greater than in most other regions.

The Pacific Northwest has some of the highest carbon density forests in the world, which can store carbon in trees for 800 years or more – this biomass can even exceed that of tropical forests.[11] Substantial remnants of productive, high-biomass old-growth forests have survived here, while in other temperate forest regions they have been eliminated for centuries.[12] For instance, one study investigating carbon removal by forests found that less than 3% of all forest lands in the conterminous United States are covered by "high-biomass" forests (i.e. forests that remove and retain levels of carbon above a certain high threshold) and that the Pacific Northwest holds 56.8% of them.[13] Moreover, the Pacific Northwest holds 77.2% of forests with "very high" biomass.[14]

These temperate forests not only have high carbon densities, but also a lower vulnerability to mortality.[15] Unfortunately, as of 2013, in Oregon only 9% of these "high biomass" forests had a high-protection status, while in Washington it was only 31%.[16] Since the forests in the Pacific Northwest have some of the highest biological potential to store carbon, the potential role of these forests in climate change mitigation is greater than in most other regions.[17] A different study recently identified the forests in the Pacific Northwest as having the "highest preservation priority" (an indicator based on carbon removal and biodiversity considerations) in the western US.[18] US temperate and boreal forests remove enough carbon to reduce annual US net emissions by 11% and have the potential for much higher removal rates.[19]



[11] Law et al., Land use strategies to mitigate climate change in carbon dense temperate forests, PNAS Latest Articles (2018), 1.
[12 Krankina et al., Carbon balance on federal forest lands of Western Oregon and Washington: The impact of the Northwest Forest Plan, Forest Ecology and Management 286 (2012) 171–182, 171.
[13] Krankina et al., High-Biomass Forests of the Pacific Northwest: Who Manages Them and How Much is Protected?, Environmental Management (2014), 1.
[14] Krankina et al., High-Biomass Forests of the Pacific Northwest: Who Manages Them and How Much is Protected?, Environmental Management (2014), 6.
[15] Law et al., Land use strategies to mitigate climate change in carbon dense temperate forests, PNAS Latest Articles (2018), 1.
[16] Krankina et al., High-Biomass Forests of the Pacific Northwest: Who Manages Them and How Much is Protected?, Environmental Management (2014), 1.
[17] Krankina et al., Carbon balance on federal forest lands of Western Oregon and Washington: The impact of the Northwest Forest Plan, Forest Ecology and Management 286 (2012) 171–182, 180.
[18] Law et al., Strategic Forest Reserves can protect biodiversity in the western United States and mitigate climate change, Communications Earth & Environment (2021)2:254, 3.
[19] Moomaw et al., Intact Forests in the United States: Proforestation Mitigates Climate Change and Serves the Greatest Good, Front. For. Glob. Change 2:27 (2019), 1.



V. Conclusion: Pacific Northwest forests are essential for addressing and mitigating climate change.

The Pacific Northwest still holds a great amount of older intact forests, offering immediate, low-cost, and proven removers of carbon dioxide from the atmosphere at a much higher rate than younger forests.

As a result, the Pacific Northwest forests have a far greater potential role in carbon reduction than forests in other regions. Simply letting these older intact forests grow to their ecological potential is one of the best approaches to mitigating climate change.

Our mission is to transform the law to recognize, honor and protect Nature's inherent rights to exist, thrive and evolve.