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Comments: Dear Secretary Vilsack and Secretary Haaland,

On July 15, 2022 a request was published in the Federal Register seeking input on the development of a definition for old-growth and mature forests on federal lands and requesting public input on five questions.

Thank you for seeking input on the development of a definition for old-growth and mature forests on Federal land. I also want to thank you for advancing President Bidens Executive Order on Strengthening the Nation's Forests, Communities, and Local Economies of April 2022.

The executive order:

1. Recognizes the critical importance of America's mature and old-growth forests to combatting the climate and biodiversity crises;
2. Directs federal forest agencies to conserve remaining mature and old-growth forests on federal lands.
3. Commits the Department of Agriculture and the Department of the Interior to develop a suite of policies that address threats to mature and old-growth forests on federal lands.
4. Directs the agencies to define, identify, and complete a publicly available inventory of old-growth and mature forests on Federal lands by Earth Day 2023.
5. Requires analysis of the threats to mature and old-growth forests on Federal lands, including from wildfires and climate change

To quote President Biden; "Strengthening America's forests, which are home to cherished expanses of mature and old-growth forests on Federal lands, is critical to the health, prosperity, and resilience of our communities - particularly in light of the threat of catastrophic wildfires. Forests provide clean air and water, sustain the plant and animal life fundamental to combating the global climate and biodiversity crises, and hold special importance to Tribal Nations. We go to these special places to hike, camp, hunt, fish, and engage in recreation that revitalizes our souls and connects us to history and nature. Many local economies thrive because of these outdoor and forest management activities, including in the sustainable forest product sector...Despite their importance, the world's forests are quickly disappearing; only a small fraction of the world's mature and old-growth forests remains. Here at home, the primary threats to forests, including mature and old-growth forests, include climate impacts, catastrophic wildfires, insect infestation, and disease. We can and must take action to conserve, restore, reforest, and manage our magnificent forests here at home and, working closely with international partners, throughout the world."

Protecting our mature and old-growth forests from intervention on federal public land is the quickest and most-cost effective policy the U.S. can undertake to mitigate green house gasses and save our endangered species. We are short on time to correct the climate crises and your employment of the executive order in the near future is essential to provide protection.

The old-growth and mature forests contain the greater percentage of carbon stored in federal forests and provide habitat and biodiversity benefits and are important sources of drinking water for communities.

Until the inventory is complete it's essential that all intervention such as thinning, shelterwood cut, group selection, fuel break, restoration, reforestation, wild fire risk reduction, hazardous fuel reduction etc. must be stopped so that an accurate assessment can be done and the mature and old-growth forest/trees protected. Any intervention will continue to release carbon dioxide into the atmosphere contributing to the climate crises and the loss of the forest's important role of carbon sequestration, biodiversity and habitat. These forests will also provide the recovery of old growth ecosystems that have been decimated by logging.

These are the requested five questions with my input:

1. What criteria are needed for a universal definition framework that motivates mature and old-growth forest conservation and can be used for planning and adaptive management?

My response:

1. Mature and old-growth forests do not need adaptive management, they are adapted to the climate and the environment and should be left alone.
2. Scientific assessment of carbon stores in forests based on scientific data that determines goals for carbon storage.
3. Primary forests that includes forests that have been damaged by wildfire and other natural disasters.
4. Habitat for endangered species and species of concern.
5. Community water source for wells and irrigation.
6. Community recreation sites
7. Mature and old-growth forests need to be identified for the purpose of maintaining an ecosystem that promotes biodiversity, clean air, clean water, healthy soils, resilience, recreation and wild habitat
8. Identify elements of concern such as logging, mining, grazing and ORV use that degrade old growth and mature forests ecosystems .
9. Determine site specific areas of conservation based on ecology and community needs. For instance a Juniper old-growth forest will have a different ecosystem than a Douglas fir forest.

2. What are the overarching old-growth and mature forest characteristics that belong in a definition framework?

My response:

The framework must recognize the carbon sequestration potential of the landscape and ecosystems within, which old-growth and mature forests are found.

Old-growth and mature forests may have large trees, layering, snags, rich soils, predator prey food sources, diversity of tree species, nutrient cycling, pollinators, climate buffering water regulation, downed wood and species that inhabit the old-growth such as Pacific Fisher, Martens, Northern Spotted Owls, Pileated Woodpeckers and rare plants.

3. How can a definition reflect changes based on disturbance and variation in forest type/composition, climate, site productivity and geographic region?

My response:

The definition needs to reflect ecosystems: recovery and ability to mitigate climate change by carbon sequestration and featuring characteristics that promote clean air, clean water, imperiled species, and spiritual renewal.

4. How can a definition be durable but also accommodate and reflect changes in climate and forest composition.

My response:

The definition if tailored for carbon sequestration will be durable, flexible and reflective of the environment.

5. What, if any, forest characteristics should a definition exclude?

My response:

Future forest management needs to be done with climate change as a priority knowing that any wood cutting releases carbon.

Plantation forests under 50 years of age in the future, after the inventory, can be modified to create a more diverse forest that is not as susceptible to wildfires.

President Bidens Executive Order raises two issues; how to mitigate climate change and how to manage wild fires.

Please consider the following science based information for determining your treatment plans for our federal forests.

A. "Many environmental advocates and academics believe mechanical thinning projects, unless surgically applied, are an ineffective, expensive, Sisyphean task that damage forest soils, remove carbon and need to be regularly revisited as smaller trees and vegetation grow back. They believe such treatments actually increase fire risks by opening up the canopy, drying out the soil and allowing wind driven fires to spread faster." Dominic DellaSala, chief scientist at Wild Heritage, an organization focused on forest protection.

B. Older trees and forests make essential contributions to mitigating climate change as natural climate solutions. Lindenmayer, D.L., et al. 2012. Global decline in large old trees. *Science* 338: 1305 (2012); DOI:10.1126/science.1231070

C. They store vast amounts of carbon accumulated over decades to centuries and are continuously sequestering additional carbon as they grow and age. Stephenson et al 2014. Rate of tree carbon accumulation increases continuously with tree size. https://www.researchgate.net/publication/259766087_Rate_of_tree_carbon_accumulation_increases_continuously_with_tree_size

D. Cutting down older trees and forest stands emits a substantial amount of carbon back into the atmosphere as it can take at least a century to make up the carbon lost in logging old trees.(1

In the Northeast US, for example, protected forests that have been allowed to age without human disturbance cover just 5 percent of the region's land area but store 30 percent of the total aboveground forest carbon.(2 In temperate rainforests of the Pacific Northwest, older forests can have higher biomass carbon density per acre than both boreal and tropical forests. The majority of the most carbon-dense forests in this region are on federal lands and have benefited from reduced logging levels.(3

1. Buotte et al. 2019. Carbon sequestration and biodiversity co-benefits of preserving forests in the western United States. *Ecological Applications*. <https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/eap.2039?2>. Lu et al 2013. A Contemporary Carbon Balance for the Northeastern Region of the United States. *Environmental Science and Technology*. https://harvardforest1.fas.harvard.edu/sites/harvardforest.fas.harvard.edu/files/publications/pdfs/Lu_EnviroSciTech_2014.pdf;

Miller et al 2016. National parks in the eastern United States harbor important older forest structure compared with matrix forests. *Ecosphere*. <https://esajournals.onlinelibrary.wiley.com/doi/10.1002/ecs2.1404>;

Dinerstein et al 2020. A Global Safety Net to reverse biodiversity loss. *Science*. <https://www.science.org/doi/10.1126/sciadv.abb2824>;

Jung et al, 2020. Areas of global importance for terrestrial biodiversity, carbon, and water. *Biology*. <https://www.biorxiv.org/content/10.1101/2020.04.16.021444v1.full>;

Keeton et al 2011. Late-Successional Biomass Development in Northern Hardwood-Conifer Forests of the Northeastern United States. *Forest science*. https://www.researchgate.net/publication/233579700_Late-Successional_Biomass_Development_in_Northern_Hardwood-Conifer_Forests_of_the_Northeastern_United_States

3. Keith et al. 2009. Re-evaluation of forest biomass carbon stocks and lessons from the world's most carbon-dense

E. Mature and old-growth trees and forests support adaptation to the impacts of climate change that ecosystems and people across the country are already experiencing. For instance, older forests maintain water balance in

forested watersheds,(4 which helps reduce the impacts of flooding and drought. (5 They also produce the highest outputs of ecosystem services like clean drinking water (6 and provide climate refugia for diverse fish and wildlife.

4. Jiang, Y., et al. 2019. Linking tree physiology constraints with predictions of carbon and water fluxes at an old-growth conifer forest. *Ecosphere* <https://doi.org/10.1002/ecs2.2692>?5. Nagy, R.C. et al. 2011. Water resources and land use and cover in a humid region: the southeastern United States. *J. Environmental Quality* <https://doi.org/10.2134/jeq2010.0365>

6. Furniss et al. 2010. Water, Climate Change, and Forests: Watershed Stewardship for a Changing Climate. USDA. https://www.fs.fed.us/pnw/pubs/pnw_gtr812.pdf; DellaSala, D.A., J.R. Karr, and D.M. Olson. 2011. Roadless areas and clean water. *Journal of Soil and Water Conservation* 66:78A-84A. doi:10.2489/jswc.66.3.78A

F. Across all forest types and regions, older trees and forests provide vital habitat for many plants and wildlife, particularly imperiled species. For example, the availability of dead, dying, and downed wood (increasingly removed from forests for biofuels, mass timber, or other uses of so-called "low-grade wood") is critical for the viability of many species, from insectivorous bats that help to keep insect pests in check to pine marten to a wide range of beneficial invertebrates.(7 Many of the nation's most imperiled bird species are adapted to older forests and rely upon complex forest structure for their survival, including snags and large living trees.(8 .In general, the biodiversity found in older forests tends to be far higher compared to logged forests across the country.

7. Thorn et al 2020. The living dead: acknowledging life after tree death to stop forest degradation. *Frontiers in Ecology and the Environment*. <https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/fee.2252>

8. Askins 2015. The Critical Importance of Large Expanses of Continuous Forest for Bird Conservation. Connecticut College. <https://digitalcommons.conncoll.edu/cgi/viewcontent.cgi?referer=&httpsredir=1&article=1025&context=biofacpub>

G.. Conserving mature forests and trees is consistent with U.S. federal agency's efforts to protect communities from the risk of wildfire. Mature trees often have thicker protective bark and mature forests with trees from different species and at different ages have multiple layers of vegetation-called "canopies"--that protect microclimates under their shade, keep temperatures cooler and enable the forest to retain more moisture in the air and soil (Lesmeister et al. 2019, Zald et al. 2018), making them better able to survive fires.

??H.Mature and old growth forests prevent erosion and flooding by the extensive networks of root systems in old, undisturbed forests that absorb rainfall efficiently, prevent runoff, stabilize water table levels and retain soil moisture. These processes regulate the flow across the land surface and help secure slopes, prevent water and wind erosion, while managing the transport of nutrients and sediments (Watson et al. 2016, DellaSala et al. 2011, Creed et al. 2016, Moomaw et al. 2019).

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I.Intact forests allow for generations of fish wildlife to build homes and raise their young, protected by the multi-layered shade of varied-age trees and nurtured by a stable foundation of forest microorganisms. Cavities in old trees and fallen logs are among the most favored nesting spots for birds and other forest dwellers. Older forests moderate latitude, altitude, rainfall and temperature (Watson et al. 2016).

The Significance of Carbon Emissions from Logging on Federal Forests (article intact)
(<https://www.climate-forests.org>)

Scientific research indicates that logging on federal forests is a substantial source of carbon dioxide emissions to the atmosphere that is at least comparable to and likely greater than levels associated with wildfires.

Emissions from logging scale up faster than those from fire. When mature trees are logged, a significant proportion of their carbon is emitted to the atmosphere shortly after logging, even when accounting for carbon stored in wood products that are made from the logged trees. In contrast, when mature trees are affected by fire, they often survive with their carbon stores intact-protected by adaptations such as thick bark and high crowns-

and continue to grow. Even when severe fire does kill these mature trees, field research indicates that only a relatively small amount of their carbon is combusted into the atmosphere, and the remainder can remain in the forest for decades or even centuries, as the trees slowly decompose. This is why, even in dry forests, on a per acre basis, emissions from logging are generally greater than those from wildfire and often substantially so-up to 8 times greater in certain circumstances.

As a result, total national carbon emissions from logging exceed those from fire, even though in many areas more acres of land are affected by fire. The government's own assessment found this to be true on forests owned and managed by the federal government across the country, where overall fire affects many more acres than logging. In a first-of-its-kind assessment from 2018 focused on carbon emissions associated with federal lands, the United States Geological Survey estimated that across the conterminous U.S., carbon emissions from logging of federal forests were more than double those from fire on those lands.

Other assessments of carbon emissions across all forests in the United States, including forests on state and private land, corroborate the disproportionate relationship between logging and fire emissions. A comprehensive 2016 study of forests across all ownerships in the conterminous U.S., for example, found that carbon losses from logging were more than five times higher than from all other disturbance sources combined-including fire, insects, wind, land conversion, and drought. Other independent studies underscore logging's larger carbon impact., Government reporting on U.S.-wide emissions is similar: wildfire emissions reported in EPA's greenhouse gas inventory are approximately one-third of the logging emissions reported in the Second State of the Carbon Cycle Report from the U.S. Global Change Research Program., And a recent assessment of carbon emissions incorporating the intense 2020 fire season found that even in the more fire-prone western United States, the ten-year average emissions from logging were significant, including in comparison to fire-50 TgCO₂/year and 60 TgCO₂/year respectively.

Taken together, these studies-which approach carbon emission assessment using different assumptions and analytic directions-uniformly demonstrate the ongoing significance of carbon emissions from logging, particularly in the timeframes critical to meeting U.S. commitments under the Paris Agreement.

Indeed, they collectively indicate that logging across federal forests remains a source of carbon emissions at least comparable to fire, and likely larger. Given these emissions, the only way USFS and BLM can meet the direction set out in President Biden's Executive Order to "conserv[e] old growth and mature forests on federal lands," is by ensuring such forests are protected from logging, while allowing for necessary measures to manage wildfire.

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Thank you for the opportunity to respond to a Request for Information in the Federal Register.

I live in a valley in Southern Oregon surrounded by Late Successional Reserves that are the definition of local mature and old-growth. I am fortunate to have the experience of living among these stately diverse forests with the following characteristics:

1. Rare conifer species such as Alaskan Yellow Cedar, Brewers Spruce and a diversity of pines, firs, cedars, oaks, shrubs and plants.

2. Local creeks with Coho salmon.

3. Dense canopies of greater than 60% .
4. Mycelium rich soil retaining water and giving nutrients to the forest.
5. Presence of lichen that indicate mature and old growth forests.
6. Presence of Pacific fishers, Martens, Northern Spotted Owls, Pileated Woodpeckers, butterflies, pollinators and migrating birds.
7. Forests that offer continuous connectivity for wildlife.
8. Forest that have an abundance of downed wood and snags.
9. I delight in finding rare plants such as Gentner's Fritillary and Clustered Lady's Slipper.
10. The presence of many free flowing creeks and springs.
11. The presence of Research Natural Areas.
12. Hiking trails that I use often for the experience of mature and old-growth forests.
13. The availability of herbs and mushrooms for wild crafting.
14. Mitigation of severe weather events.

Although the old-growth forests in another's environment may not be the same as mine they will offer the important benefits of carbon sequestration and habitat for their ecosystem.
I'm thankful for the magnificent of the forests.

Cheryl Bruner