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Comments: Please accept our substantive comments, links to pdf source materials, and letters from >200 scientists and >200 NGOs asking for an immediate moratorium on mature/OG and large tree logging.

Wild Heritage Comments on the Notice of Intent to Prepare an Environmental Impact Statement for Land Management Plan Direction for Old-Growth Forest Conditions Across the National Forest System Wild Heritage, a Project of the Earth Island Institute, is a science-based conservation organization dedicated to protecting the Earth's primary (unlogged) forests, including our nation's exceptionally important and imperiled mature and old-growth forests (herein MOG). We appreciate the opportunity to submit these comments to the public record regarding conservation options for MOG based on best available science as it pertains to the relevant presidential executive orders (cited herein) and forest-climate policies (national and international, cited herein). And we applaud the decision by the Forest Service to establish a National Old-Growth Monitoring Network (NOGMN). We request that you open that up to scientists that can contribute to monitoring and evaluation procedures using the latest remote sensing technologies and that you include mature in the network and not just old growth. The NOGMN will need to be budgeted for ensuring that it has the necessary resources and attention within USDA and is sustainable. Monitoring MOG nationwide should be based on a network of permanent plots at long-term ecological sites (newly established plots and paired up with the LTER Network) that collectively build on the Forest Inventory and Assessment (FIA) distribution by increasing plot sampling and coverage as a means for validating remote sensing monitoring. We request that you include in the old growth EIS a specific budget and plan for creating and supporting the NOGMN collaboratively through an inclusive and transparent process that assures the use of best available science from independently published scientists as well. The NOGMN also needs to include levels of protection and representation of MOG within protected areas using standard GAP analysis procedures inherent in conservation biology approaches (e.g., how much (%) of MOG is within GAP 1 and 2 vs GAP 3 and 4, see DellaSala et al. 2022a 33 ) as well as rates of logging and other land-use impacts within MOG in comparison to an historical baseline of when MOG was abundant before European colonization and expansive development. That baseline is essential for determining how long it will take to grow MOG back within a network of conservation reserves to make the system more functional and restore ecosystem integrity. Throughout our comments, we underscore the main reason that MOG is at all-time lows in distribution and abundance is because of historic and ongoing logging, and related cumulative land-management stressors that have pushed them to the brink of systemic collapse. We are concerned that the agency has lost sight of these causal mechanisms and is instead overly focused on futile attempts to ameliorate large-scale natural disturbances like wildfires and insects that are beyond management control. We provide evidence-based science that MOG ecosystems are dynamic with built in adaptive features that confer resistance (e.g., large, thick bark trees for fire resistance) and resilience (e.g., "seed-rains," epicormic branching, and sprouting following fire mortality) to natural disturbances that clearly differ from areas where anthropogenic stressors amplify and accumulate disturbances that exceed thresholds/tolerances (i.e., the main reason why hundreds of species and ecosystem types are listed under the Endangered Species Act and/or the IUCN Red List is logging and related actions, DellaSala et al. 2022a). Therefore, we request that you recognize the hundreds of species listed in MOG due to land-use disturbances as in DellaSala et al. 2022a. While we acknowledge that climate change is amplifying natural disturbance effects in MOG, the only control you have over any disturbance at meaningful scales is to reduce anthropogenic stressors from logging (e.g., clearcutting, selective removals, large-tree thinning, shelterwood, biomass extraction for energy, post-disturbance logging, "forest health" logging, "restoration" and "resilience" logging, logging for early seral forests). Additional stressors that compromise and degrade ecosystem integrity under your control include road building, mining, ORVs, livestock grazing, and invasive species that accumulate across spatial and temporal gradients with the combined effect of forest degradation and greatly

diminished ecosystem integrity. Clearly, treating natural disturbances as the main "threat" to forests, while downplaying anthropogenic stressors as the principal threat, whether historic or ongoing, runs counter to developing conservation options rooted in principles of conservation biology and ecosystem integrity. The Forest Service has a unique responsibility to steward the nation's MOG as the main management agency of this biodiverse, carbon rich, natural climate solution that is otherwise exceptionally rare on nonfederal lands (DellaSala et al. 2022a). We note that based on an independent inventory of MOG, >50 million acres (76% of the total) of federal MOG are vulnerable to logging, as they are not within formally protected areas (DellaSala et al. 2022a). That is, the Forest Service has only protected 24% of its MOG, which is below the minimum 30 x 30 target. A GAP status analysis would demonstrate that and should be done using the agencies' MOG dataset along with published MOG datasets (e.g., DellaSala et al. 2022a) and entered into the NOGMN as the current condition. There is also concern that the agency has increased timber sales within MOG recently in anticipation of potential restraints via this EIS process. This is why over 200 NGOs and 20082 scientists (attached as an appendix) are requesting a moratorium on timber sales within MOG on all the national forests, including the Tongass, to allow the development of conservation options without further MOG losses. This request also includes removing the Tongass exemption to MOG logging as the exemption is clearly inconsistent with the transition underway. Both the exemplary transition of the Siuslaw National Forest in Oregon, an early adopter of the Northwest Forest Plan, and the transition out of old-growth logging underway on the Tongass, should be expanded to all national forests with sufficient resources/assistance provided to help rural communities diversify. Link the Old Growth EIS to Executive Order 14008 (30 x 30) and International Forest-Climate Policies and Pledges. While the NOI cites Executive Order (EO) 14072 ("Strengthening the Nation's forests, communities, and local Economies" - i.e., the national MOG inventory for "conservation purposes"), the NOI did not mention EO 14008 ("Tackling the Climate Crisis at Home and Abroad" - i.e., 30 x 30). In EO 14008, the president specifically directed federal agencies to begin setting-aside up to 30% of the nation's lands and waters by 2030; thus, the EIS should include such a conservation alternative. Additionally, there is no mention in the NOI of US commitments to nationally determined contributions (NDCs) to the Paris Climate Agreement via carbon sinks and reservoirs (Article 5), and the Glasgow Forest Pledge to end deforestation and forest degradation by 2030 signed by the president. Managing MOG as natural climate solutions by ceasing logging within them would be exemplary of the Glasgow Forest Pledge and is consistent with the White House "roadmap for nature-based solutions." Additionally, the NOI appears to downplay the importance of mature forests that need protection as well from logging to begin making the old-growth ecosystem whole again. Develop a Conservation Alternative for MOG that Prohibits Logging and Related Actions. As requested by the scientists and NGOs (below), a recent moratorium requested by top scientists in the Conversation, and related science herein, we request a conservation alternative for MOG with the following issues analyzed. (1) Protect from logging and related anthropogenic threats (as noted above) all remaining mature and old-growth forests and large trees on all Forest Service land designations to better comply with EO 14008 (30 x 30), the Glasgow Forest Pledge, and the Paris Climate Agreement Article 5. This alternative should include a GAP status analysis of MOG in terms of what actually is protected using GAP status codes 1 and 2 to define protection (or in this case "conservation"). The conservation alternative should include how best to elevate the protection of MOG to contribute to the 30 x 30 targets (GAP 1 and 2 level). Importantly, while Late-Successional Reserves (LSRs, Northwest Forest Plan) and Inventoried Roadless Areas (IRAs) offer some protections, they do not qualify as GAP 1 or 2 (or IUCN protection equivalents) given that there are exemptions for some forms of logging and mining within these designations. However, by prohibiting logging of live and dead trees >80 years old, a MOG protection status may warrant GAP 2.5 designation such as the case of inventoried roadless areas (DellaSala et al. 2022a, DellaSala et al. 2023). This protection standard should carry through all plan revisions and all forest types be they wet or dry forests given their unique biodiversity, clean water (DellaSala et al. 2022a), and superior carbon accumulation rates in large trees (Birdsey et al. 2023). Once properly analyzed for GAP status 1 and 2, the Forest Service can look to ways to elevate GAP 2.5 to a higher protection status so it can be assessed relative to 30 x 30. (2) Prioritize fire-risk reduction nearest homes (see Cohen 2000, Schoennagel et al. 2017, Calkin et al. 2023, Law et al. 2023) and in flammable young tree plantations (see Bradley et al. 2016, Zald and Dunn 2018 for

high flammability of plantations) where risks are highest.137 MOG should be the lowest priority for mechanical treatment ("thinning") as they serve as138 irreplaceable climate and wildfire refugia ("resilience" and "resistance" to fires) (see139 Lesmeister et al. 2019, Lesmeister 2021 for spotted owl habitat as fire refugia).140 (3) The focus of treatments within dry MOG should be on prescribed and cultural burning141 practices (not pile burning, which is damaging to soils and below-ground processes).142 Removing large trees is not necessary prior to conducting burning, which can be introduced143 under low fire weather to minimize escaped fires (Knapp et al. 2005, Knapp et al. 2006,144 Knapp et al. 2007 - only the abstract is available online given paywall restrictions - van145 Mantagem et al. 2011, van Mantagem et al. 2016).146 (4) Increase natural wildland fire use for ecosystem benefits under safe conditions (DellaSala et al. 2022b, Baker et al. 2023a). Wildland fire use can accomplish substantially more and148 faster fuel reduction with myriad ecosystem benefits and carbon storage largely intact149 (DellaSala et al. 2017, Harmon et al. 2022), as compared to expansive mechanical150 treatments that accomplish little to alter fire behavior in severe fire weather and if scaled-up151 would damage ecosystems and cause more emissions than the fires (e.g., see Harris et al.152 2016, Law et al. 2018, DellaSala et al. 2022b).153 (5) Close and obliterate roads to reduce unwanted ignitions in transportation planning for fire154 risk reduction (see Balch et al. 2017 for highest fire risks closest to populated areas).155 Nationwide, more than 80% of wildfires are human-caused with greatest risks of unwanted156 ignitions in areas with dense populations and high road densities (Balch et al. 2017). This157 ignition factor is something you can control through effective transportation planning158 involving road closures, road obliteration, closing the national forests during extreme fire159 weather conditions, as for example, during heat domes and droughts. Thus far, the Forest160 Service has focused on fuels and not human-caused ignitions, a much bigger problem you161 can limit.162 (6) Expand the restoration objectives of the Aquatic Conservation Strategy (ACS, watershed163 analysis) under the Northwest Forest Plan to all national forests. This should include road164 obliteration of failing and degrading roads, restrictions on logging out to at least two165 dominant tree heights within riparian areas; designate beavers as a keystone species of166 conservation concern for water storage, flood abatement, riparian restoration; remove167 livestock near streams, springs, wetlands, and seeps; expand culvert repair and culvert168 enlargement for flood abatement; and prohibit post-disturbance "salvage" logging. Logging169 needs to be reduced at watershed scales - and not just riparian buffers. Mass wasting events,170 fire intensities, and ambient temperatures all increase with logging and road building, and171 this should be acknowledged3, along with livestock grazing, as the top threats to aquatic172 systems with and without MOG.173 (7) Analyze and reduce cumulative impacts from ineffective and damaging wildfire174 suppression tactics (DellaSala et al. 2022b), mining, livestock grazing (Beschta et al. 2012,175 Kauffman et al. 2022), ORVs, biomass utilization, and energy development affecting MOG176 regionally and nationally. The agencies' "Introductory Report" on MOG threats downplays177 these cumulative factors by instead focusing on severe natural disturbances you cannot178 control.179 (8) Reject any proposal to use the national forests as repositories for pumping carbon180 underground that would create substantial infrastructure impacts.181 182 Overall, we anticipate that this alternative would have far lower cumulative impacts than all183 other alternatives that emphasize intensive "active management" that otherwise lead to184 forest degradation (and damaged ecological integrity) (DellaSala et al. 2022b). In this185 context, natural disturbances are not treated as a "threat" per se but rather are monitored as186 part of the NOGMN while shifting approaches toward working with natural disturbances187 like wildfires for ecosystem benefits. Any thinning in MOG should prohibit logging of188 economically valued trees as this incentivizes forest degradation. Instead, large trees could189 have lower branches pruned or trees killed and left on site - or tipped into streams - to190 promote structural development (see below).191 192 For all alternatives, we request that the Forest Service take a "hard look" at direct, indirect,193 and cumulative impacts of anthropogenic disturbances (threats), including within the194 surroundings where logging is much greater for contextual purposes. The agencies' threat195 assessment is inadequate and not based on best available science for the reasons noted.196 197 Provide Greater Transparency on the MOG Inventory198 199 We are generally supportive of your MOG inventory of 200 regional vegetation types. This200 is a good first step toward establishing a current timeline of existing conditions for the201 NOGMN. It should also include potential or historic MOG distribution as a baseline and202 means for tracking progress or departures in restoring ecosystem integrity nationally and203 regionally on federal lands. A proper baseline would include estimating potential MOG204 from back-casting techniques (e.g., historical accounts, potential vegetation and disturbance205

dynamics) to compare with current and potential future conditions with and without MOG206 protections (run simulations on MOG conservation status by 2030 to determine current207 protection levels and what's needed by 2030 to comply with EO 14008).208209 Importantly, the agency inventoried 24.7M acres of "old-growth forest conditions" and210 68.1M acres of "mature forest conditions," representing 17 and 47 percent, respectively, of211 144.3M acres. In contrast, DellaSala et al. (2022a) report 53.8M acres of combined MOG212 on national forests. The DellaSala inventory was based on LiDAR mapping of the relative213 structural scorings derived from three proxies related to canopy height, canopy density, and214 biomass at 30-m resolution. Importantly, their remote sensing MOG estimates included215 validation of remote sensing mapping by using overlapping FIA plot data. It is unclear why216 the agencies' combined MOG estimate (92.8M ac) is nearly twice that of DellaSala et al.217 (2022a) and whether it included any validation of MOG structure classes. Thus, we request218 that you provide the specific mapping methods and MOG thresholds and contrast that with219 independent methods to determine levels of uncertainty and ensure that the agencies'220 inventory is on par with rigorously established MOG inventory procedures that have gone221 through peer-review. The metadata and datasets (including raster files) should be222 immediately entered into a NOGMN database for open access to all published (peer223 reviewed) inventory approaches.224225 The Threat Analysis Needs to Clearly Separate Out Natural Disturbances (i.e., "pulse226 disturbances") from Cumulative Land-Use Stressors (i.e., "press disturbances") as227 Distinctly Different Effects on Ecosystem Integrity228229 We note that the NOI definition of a "threat" and the agencies' "Introductory Report" are230 far too simplistic as follows: "In the analysis, the term "threat" indicated a change in forest231 structure resulting in a reclassification of the forest condition but not necessarily a loss of232 ecological function and integrity."233234 This definition lumps all disturbances together so long as they result in a reclassification of235 forest condition. It is not based on best available science as noted herein.236237 Most importantly, logging nearly eliminated all (99%) of the MOG in the eastern US (north238 to south) during the late 1800s-1900s, sweeping westward as timber supply in MOG areas239 was exhausted. Logging accelerated in the Pacific NW (PNW) and across the West in240 response to the post World War II housing boom and other factors, eliminating nearly all241 MOG on nonfederal lands and in some regions (PNW) wiping out all but 20% of the MOG242 on federal lands (Strittholt and DellaSala 2006). In the 1950s, logging picked up on the243 Tongass rainforest in response to two 50-year pulp contracts that began targeting the most244 productive, highest volume old growth stands where the biggest trees were selectively245 removed (Albert and Schoen 2013, DellaSala et al. 2022c). In the eastern Oregon and246 Washington Cascades and Blue Mountains, most of the largest trees were high graded247 during the 1960s (Henjum et al. 1993), necessitating the "eastside screens" in 1994 to248 protect trees >21 inches dbh. In a rush to judgement (without a proper EIS), the screens249 were removed in the final days of the Trump administration that redefined large trees as250 >150 years old, up to which could be logged, even though large trees (>21 in dbh) of all251 species remain at historic lows and are critically important for wildlife and as carbon252 repositories (Mildrexler et al. 2020, 2023). These protections need to be restored in the OG253 amendment process.254255 Historic logging (and ongoing albeit at lower levels) is therefore the main threat and reason256 for why MOG were nearly liquidated nationally (DellaSala et al. 2022a) and the threat257 analysis needs to reflect this more than natural disturbances. In particular, even though rates258 of MOG logging have dropped recently, the legacy effect of logging remains a major threat259 to MOG ecosystems still responding to widespread losses. MOG remains largely in 8260 regions in the conterminous US (see DellaSala et al. 2022a). The federal MOG distribution261 within these regions is especially important as climate refugia (Lesmeister et al. 2019,262 2021) and carbon sinks (DellaSala et al. 2015b). We request that you acknowledge your263 unique role in protecting and stewarding what's left of the nation's most biodiverse, carbon264 dense MOG and how widespread forest degradation is a consequence of decades of logging265 and road building even if those rates have slowed on federal lands. Every acre of MOG is266 now irreplaceably important to the resilience and recovery of the entire ecosystem (i.e.,267 context and importance of the federal lands are magnified by high rates of logging in268 the surroundings).269270 There are clear differences in "forest reclassification" due to natural disturbances vs.271 logging-related disturbances and this too needs to be properly acknowledged. Wildfire272 dynamics and epizootics are part of the natural ecosystem processes that forests are273 uniquely adapted to even as structure and reclassification changes in severe events. Severe274 natural disturbances produce a critical pulse of biological legacies associated with high275 levels of biodiversity and intact carbon stores within the ensuing underappreciated complex276 early

seral forests that are as diverse as old growth (Swanson et al. 2011, DellaSala et al. 2014, DellaSala et al. 2017). Natural disturbances in these forests jump start the trajectory from pioneering stages toward MOG over decades via interconnected seral stages (Donato et al. 2012). The Forest Service has not unequivocally established that natural disturbances are currently or soon to be overriding recovery objectives of MOG as in fact the Introduction Report indicates the opposite: Figure on p. 2 of the Introduction Report shows fire, insects, disease together account for 2.8% OG loss, but losses are offset by a 3.8% gain OG, net +1%. Notably, the report states, "despite the threats highlighted in this analysis, the RPA assessment predicted an increasing trend in the amount of mature and old-growth forests on NFS and BLM lands until at least mid-century. We present published evidence that wildfire and beetle-drought severities are not increasing beyond historic bounds (Baker et al. 2023a,b), and thus we request that the Forest Service conduct a statistically robust analysis of MOG recruitment vs loss, including confidence intervals around any observed trends (these data should be made available to the public in a data portal complete with raster files for GIS analysis). To do otherwise, is not statistically valid nor best available science. Visual graphs of disturbance acreages by type are not validation in themselves nor should unrelated disturbances (anthropogenic vs. natural) be grouped on the same graph given clear differences. This Table from DellaSala et al. (2014) show that there are marked differences in forest conditions between logged areas (chronic disturbance) vs natural disturbances (pulse disturbances) that function as pulse disturbances important in the maintenance of ecological integrity. In sum, you should not place natural disturbances on the same graphs as human disturbances or treat natural disturbances similar to logging, road building, and related "active management" practices in terms of impacts to carbon storage, carbon sequestration, carbon flux (especially gross emissions from logging) wildlife habitat, water quality, and ecosystem processes. The pulse of biological legacies (particularly large live and dead trees, ground processes, seed banks, mycorrhizae) are uniquely created or maintained by wildfires and epizootics but removed by logging. Severe natural disturbances produce complex early seral forests (Swanson et al. 2011, DellaSala et al. 2014) that are as biodiverse as MOG and are interconnected from pioneering to old growth stage and back again. Logging breaks this cycle (DellaSala et al. 2014, DellaSala et al. 2022c), leading to compounded disturbances and widespread forest degradation (Paine 1998, abstract only). The long-term persistence of MOG depends mainly on the only disturbance factor you can control - logging and related practices. The Forest Service's Wildfire Crisis Strategy and threat assessment does not make that proper distinction, blames natural disturbances mainly for MOG losses, and fails to properly analyze cumulative impacts of its actions from widespread attempts to suppress, contain, and minimize natural disturbances that are far beyond control, leading to type conversions in places (forests to weed infested savannahs, collateral ecosystem damages, and climate harmful actions (DellaSala et al. 2022c). We note that while the NOI states, "current management practices may benefit from consistent direction to vulnerabilities and increase resilience to stressors," this consistent direction should start with a moratorium on MOG logging as requested below in letters to the president from scientists and NGOs to allow development of conservation alternatives in good faith. It should include placing all remaining MOG within a protective reserve network for the myriad ecosystem benefits, including long-term carbon storage, wildlife habitat, drinking water, and recreation, to name a few. Focusing on maintaining carbon stocks through the only meaningful scalable action you can take - cessation of logging of large trees and MOG on federal lands - would provide consistent direction across the national forest systems by recognizing the unique values of MOG from the eastern hardwoods and long-leaf wiregrass forests to the Great Lakes beach-maple and pine forest, to the old pines of the Rockies and southwest, to the massive coast redwoods and giant sequoia, to the towering Douglas-fir/spruce/hemlock forests of the Pacific Northwest, large pines and other conifers of the inland forests, and carbon-dense coastal rainforests from the Pacific NW to Alaska. Such a conservation alternative that set-asides MOG from logging and related activities would provide the consistency you seek. It needs to follow on the success of the National Roadless Conservation Rule that provided consistent direction for inventoried roadless areas across the national forest system. Carbon Stored in Mature Forests and Not Just Old-Growth Needs to be A Central Focus The Forest Service must recognize the importance of mature forests in long-term storage and maintenance of carbon stocks as well as old growth. Proforestation, the practice of allowing forests to mature to reach their true carbon potential (Moomaw et al.

2019), needs to be emphasized in a conservation alternative for MOG, as exemplified by the successful Northwest Forest Plan (NWFP). Reduction in logging levels that started in the 1990s under the Northwest Forest Plan (NWFP) shifted the region from a source of carbon emissions to a sink for long-term carbon capture and storage (Frankina et al. 2012, Law et al. 2018). This unanticipated benefit of the plan should be recognized in revision. Cessation of logging has been repeatedly demonstrated to have benefits not only to biodiversity but to carbon accrual and storage in large trees (e.g., Frankina et al. 2012, Law et al. 2018, Moomaw et al. 2019, Nagel et al. 2023). One such benefit is federal MOG is now considered among the most carbon dense (carbon stocks per acre) ecosystems on the planet (Smithwick et al. 2002, Keith et al. 2009, Frankina et al. 2014, Brandt et al. 2014, Law et al. 2021). The OG amendment therefore needs to include regional contributions of MOG to climate mitigation involving carbon capture and long-term stores (i.e., natural climate solutions). This includes how MOG protection can match up with US commitments to nationally determined contributions (NDCs) to the Paris Climate Agreement via carbon sinks and reservoirs (Article 5), the Glasgow Forest Pledge to end forest degradation, and the 30 x 30 presidential directive as noted. By a natural climate solution, we mean the protection from logging of carbon stored within MOG (large trees - live and dead - soils, etc) and by allowing mature forests to develop old growth characteristics over time via "proforestation" (Moomaw et al. 2019). What matters most in a climate emergency, is keeping additional carbon from logging out of the atmosphere (Mackey et al. 2013) rather than storing a small amount in short-lived (relative to MOG) wood product pools (Keith et al. 2015, Harmon 2019, Hudiburg et al. 2019). Protection is the most effective natural climate solution and best climate smart forestry option (Moomaw et al. 2019, Mackey et al. 2015, Mackey et al. 2022). This particular statement by the IPCC scientist Dr. Brendan Mackey et al (2022) points to the flaws in net carbon accounting methods often used by the forestry industry given that what matters most is not net carbon but keeping additional emissions out of the atmosphere by protecting existing carbon stocks (sinks and reservoirs): "All CO<sub>2</sub> emissions from, and atmospheric removals into, forest ecosystem carbon stocks now matter and should be counted and credited to achieve the deep and rapid cuts in emissions needed over the coming decades. Accounting and reporting systems therefore need to show gains and losses of carbon stocks in each reservoir. Changing forest management in naturally regenerating forests to avoid emissions from harvesting and enabling forest regrowth is an effective mitigation strategy that can rapidly reduce anthropogenic emissions from the forest sector and simultaneously increase removals of CO<sub>2</sub> from the atmosphere." We repeat our concern here that net carbon flux is the wrong indicator of the importance of forests because it ignores the need to keep gross emissions from logging out of the atmosphere. Instead, the agency should allow mature forests and large trees to age for carbon uptake and long-term carbon storage to reach their ecological potential. Forests take at least a decade to restart carbon capture at meaningful scales after logging, and very little carbon is stored in short-lived wood product pools with over 80% of a logged forests' carbon winding up in the atmosphere at some point. Thus, no form of logging or tree planting can be considered "climate smart" or compensatory for the carbon debt created by logging, especially in a global climate emergency (Keith et al. 2009, Mackey et al. 2014, Moomaw et al. 2019, Harmon 2019, Mildrexler et al. 2020, 2023, Mackey et al. 2022, Ripple et al. 2022, DellaSala et al. 2022a, DellaSala et al. 2023, Birdsey et al. 2023). That distinction is further illustrated as follows and needs to be included in the EIS. The severity of forest degradation and the extent of the carbon debt from logging depends on what logging methods are used, how much forest biomass is removed (timber volume removed converts to emissions), and where removals occur (MOG vs plantations, see Law et al. 2018, Law et al. 2021, Moomaw and Law 2023, Birdsey et al. 2023, DellaSala et al. 2023, Peng et al. 2023). The greatest carbon losses take place when most of the forest biomass is removed (clearcuts, postfire salvage) and especially the removal of large, carbon-rich trees within MOG forests (e.g., > 21 inches dbh, Mildrexler et al. 2020, 2023). Those losses are not "temporary" as the carbon debt created by logging can last for centuries, a luxury of time we no longer have in the climate emergency (Hudiburg et al. 2019, Moomaw and Law 2023). In sum, the carbon costs of wood harvest have been grossly underestimated, including wood substitution that is overvalued (Harmon 2019). Removing large trees for any perceived reduction in fire risks is also unrealistic as it would require massive amounts of thinning to get to scale. This is because of the extremely low chance of a site encountering a fire when flammable vegetation is reduced, high levels of treatment uncertainty due to

the climate signal overwhelming on-the-ground efforts, expansive co-lateral damages from thinning (DellaSala et al. 2022b), and significant emissions from logging that can exceed those from all natural disturbances combined (Harris et al. 2016, Law et al. 2018, DellaSala et al. 2022a, Moomaw and Law 2023). Carbon losses also occur whenever commercial thinning is involved and not just clearcut logging (Law et al. 2018, Mildrexler et al. 2020, 2022, Bartowitz et al. 2022). The Bartowitz et al. citation in this call-out box is exemplary of the thinning problem noted and needs to be considered any EIS alternative for significant limitations and expansive co-lateral damages. "While prescribed fire has been shown to decrease fire risk (Kolden, 2019) and increase carbon storage (Wiedinmyer and Hurteau, 2010), removal of biomass through large-diameter tree thinning or logging produces mixed outcomes for fire risk mitigation and forest resilience (Sohn et al., 2016) and reduces forest carbon storage and sequestration for decades to centuries (Campbell et al., 2012; Bartowitz et al., 2019; Stenzel et al., 2021). The misconception that trees need to be saved from wildfire through harvest (Zinke, 2018; Infrastructure Investment and Jobs Act, 2021; Table 2) may lead to unintended consequences through increased logging. These consequences include increased fire risk, a decreased forest carbon sink, decreased forest resiliency, and loss of the forest as a natural climate solution (Hudiburg et al., 2013; Law et al., 2018; Zald and Dunn, 2018; Stephens et al., 2020). Notably, logging contributes to the dangerous feedback with extreme fire weather (see below). Any assumptions about temporary carbon losses from "active management" that offset natural disturbances would require detailed carbon life cycle analysis and independent verification (see Law et al. 2018, Harmon 2019, Hudiburg et al. 2019). We request that a life cycle analysis of carbon leaving the forest from logging in the EIS be conducted and verified independently (e.g., published in the peer-reviewed literature). Additionally, we request that carbon storage in MOG becomes a central focus of the EIS along with the co-functionality benefits that come from protecting MOG with high carbon stores (i.e., biodiversity, clean drinking water, recreation; Brandt et al. 2014, Law et al. 2021). Exceptions within the Wildland-Urban Interface (WUI) and Alaska's Tongass are Outdated, Completely Ineffective, and Should be Dropped. We note that this statement in the NOI is outdated and not based on best available science: "Exceptions to this standard may be allowed if the responsible official determines that actions are necessary: to reduce fuel hazards on National Forest System land within the wildland-urban interface to protect a community or infrastructure from wildfire[hellip]". Notably, under the "Healthy Forest Restoration Act," the WUI can extend out to 1.5 miles from the nearest structure in "at-risk" communities, which in some cases can include nearly an entire county! Human-caused ignitions that spill over into urban areas; however, are mostly coming from private lands where logging is most intense and roads are extensive (human-caused ignition risk is highest) and not from federal lands (Downing et al. 2022). Notably, the most effective wildfire risk reduction measures for communities is to work from the home-out and not the wildlands-in. Home-out fire risk reduction is within 50-100 feet of the structure itself (Cohen 2000). This is why many scientists are calling for a new relationship with wildfire management by working with wildfire for ecosystem benefits and focusing surgically on fire risk reduction with home-out treatments (Schoennagel et al. 2017, Calkin et al. 2023, Law et al. 2023). Thus, the Forest Service should tighten up WUI management to mean home-out and a very narrow zone around ingress and egress roads to limit damages to urban areas and allow for escape routes. Treating beyond the home-ignition zone is completely ineffective in reducing fire losses to homes as stated by the agencies' own researchers (Calkin and Cohen). We underscore here that many of the largest fires were human caused (Balch et al. 2017) as exemplified by the Dixie Fire in California (<https://www.yahoo.com/news/california-college-professor-pleads-guilty-194850298.html?guccounter=1>). Additionally, backburning to reduce fire intensity in fire operations sometimes can contribute to fire spread rates and high severity burns when escaped burning happens in red-flag conditions. This is almost never reported in fire incident reports and is no doubt contributing to recent upticks in wildfires blamed instead on natural factors. Closing roads and access during extreme fire weather is the only way to limit this and is directly in your ability to limit unwanted ignitions. More comprehensive fire incident reports are also need to track backburning influences in fire perimeter and severity determinations. We note that the Tongass OG exemption is especially controversial and inconsistent with efforts to transition the Tongass out of old growth logging: "Exceptions to standards 2 and 3 may be granted by the Regional Forester in Alaska if necessary to allow for implementation of the Southeast Alaska

Sustainability Strategy and the rationale must be included in a decision document." There is no need for this exemption as there is ample second growth to meet the Tongass timber targets with no further old growth logging. The Forest Service should instead concentrate its resources on the transition by further assisting rural communities and the timber industry (small mills) in making the needed wood processing changes to young logs coupled with value-added manufacturing instead of shipping logs and jobs overseas. Notably, the timber industry on the Tongass is a mere 100 or so jobs that can better be served in less destructive ways by shifting to value-added manufacturing of young trees with a redirection of Forest Service subsidized logging to the second growth transition. The Tongass continues to be a money losing national forest with the industry floated on subsidized old growth logging that is destructive to the ecosystem and irresponsible to communities that eventually will run out of supply due to overcutting (which is what has happened historically, nationally). That subsidy should be redirected to the transition.

**Conclusions**

The NOI does not go far enough in meeting the president's executive orders (especially 30 x 30), the Glasgow Forest Pledge (end forest degradation), the Paris Climate Agreement (Article 5 on carbon sinks and reservoirs), and the White House roadmap on nature-based solutions. Importantly, there are no clear standards for the inclusion of mature forests that need to receive the same protections as old growth to begin restoring the integrity of MOG ecosystems and their myriad benefits. We have requested the following as a conservation alternative for analysis summarized in closing:

- (1) Fully fund the national old growth monitoring network (and include mature forests) and make the network monitoring transparent and inclusive of independent researchers to increase plot and remote sampling capacity. This should be a cooperative process that also determines an appropriate historical baseline to track progress toward making MOG whole again with clear targets for MOG protection via a GAP analysis and contributions toward 30 x 30 targets.
- (2) Remove from the timber base all MOG on all land-use designations.
- (3) In dry forests, focus treatments in MOG on prescribed and cultural burning where appropriate. Tree tipping (streams), snag creation, and lower branch pruning may be warranted to create structure in places.
- (4) Prioritize retention of carbon stores - and not just sequestration - by protecting all large trees (e.g., >21 inches, Mildrexler et al. 2020, 2023). Birdsey et al. (2023) provide large tree carbon accrual rates for several national forests using other diameter examples of large trees having the highest carbon accumulation rates.
- (5) Establish a network of MOG conservation areas (e.g., carbon reserves, Law et al. 2020, 2021) that is inclusive of threatened species and rare forest communities, drinking water source areas, and carbon dense forests (see DellaSala et al. 2022a).
- (6) Eliminate the exemptions for the Tongass and fuel treatments involving removal of economically valued trees within the WUI that are ineffective and outdated.
- (7) Redirect timber subsidies to enable nationwide transition out of MOG logging as in the example of the Siuslaw early adopter of the Northwest Forest Plan and the Tongass transition underway. This needs to expand to all national forests.
- (8) Expand the Northwest Forest Plan Aquatic Conservation Strategy to the national forest system.
- (9) Close and obliterate roads and close the national forests during extreme fire weather to limit human-caused ignitions.
- (10) Manage MOG to reduce cumulative human-caused disturbances - livestock grazing, roads, invasives, all forms of logging, mining, ORVs, biomass extraction to name a few.

The Forest Service has a unique opportunity to move its logging program out of controversial MOG whether those forests are wet or dry, and prohibit post-disturbance logging whenever MOG succumbs to natural disturbances. The agency needs to respond to the presidential directives (EO 14072 and 14008) together, the US commitment to the Glasgow Forest Pledge (ending forest degradation in this case), the Paris Climate Agreement (Article 5, sinks and reservoirs), and the White House roadmap to nature-based solutions. In the interim, the Forest Service needs to cease and desist all logging within MOG and large trees generally in good faith to allow the EIS to develop conservation options as proposed herein with strong protections for MOG and no further MOG logging losses.

ATTACHMENT: WildHeritageMOGcommentsletters2-2-24.pdf - Comments copy/pasted to text box; coded/completed.

Re: Request for an Executive Order to Place a Moratorium on Logging Mature and Old-Growth Forests, and Large Trees Generally, on National Forests and Bureau of Land Management (BLM) Lands While the Old Growth



EIS Proceeds Dear President Biden: We are scientists with backgrounds in forest ecosystems, climate change, and natural resources writing in response to the December 20, 2023 Notice of Intent for a National Old Growth Amendment in the Federal Register (Federal Register, Vol. 88, No. 243). We applaud your Executive Order 14008 directing federal agencies to protect 30% of the nation's lands and waters by 2030, and Executive Order 14072 directing the national inventory of mature and old-growth forests for conservation purposes, most of which are on National Forests and BLM lands. Because of the global loss of mature and old-growth forests, and large trees generally,<sup>1</sup> and their importance in mitigating the climate and biodiversity crisis on federal lands<sup>2</sup>, we fully support calls by fellow scientists for a moratorium<sup>3</sup> on logging in these critically important forests. Therefore, we request that you now direct the Forest Service and BLM to suspend all timber sales in mature and old-growth forests, and refrain from proposing new timber sales in these forests, while the federal agencies develop their Environmental Impact Statements that best comply with Executive Order 14072 in securing a national network of conservation areas. We are concerned that the Administration's proposed old-growth Amendment "does not alter or prescribe any substantive standards for the management of old growth forests" that in the meantime remain vulnerable to dozens of timber sales nationally and efforts by the Forest Service to increase logging of these forests before any substantive conservation takes hold. We are also concerned that the proposed Amendment excludes mature forests, and includes a loophole that would allow logging of old-growth forests under certain conditions. Additionally, based on an independent inventory of mature and old-growth forests in the conterminous United States, and the Tongass rainforest in Alaska, more than 50 million acres of mature and old-growth forests<sup>2,4</sup> are vulnerable to logging. In particular, the Amendment exempts the Tongass, the nation's highest concentration of old-growth forests and forest carbon<sup>4</sup>, from further analysis, which is inconsistent with your efforts to transition this forest out of old-growth logging. The Glasgow Leaders' Declaration on Forests and Land Use was signed by 141 countries, including the United States, at the COP26. The declaration pledges to end global deforestation and forest degradation by 2030 (emphasis added). Additionally, the United States is committed to the Paris Climate Agreement that "encourages Parties to conserve and enhance, as appropriate, sinks and reservoirs of GHGs that are referred to in Article 4, paragraph 1(d) of the Convention, including forests" (emphasis added). Following through on these commitments in practice is crucial for climate change mitigation<sup>5</sup>. Logging and associated road building in mature and old-growth forests and the removal of large trees on federal lands is the main form of forest degradation and is therefore inconsistent with your global commitments and relevant executive orders. We ask that you lead by example in signaling to the world that the United States takes its commitment seriously in halting the global biodiversity and climate crises by now directing federal agencies to enact the strongest protections for the nation's mature and old-growth forests and large trees as natural climate solutions and a flagship initiative of your roadmap for nature-based solutions. Doing so would be a legacy gift of your Administration to the nation and the planet.

Commenter also appended a letter that is the same as letter 1225, which has already been coded. That appendix was not copied/pasted into the text box as it is a duplicate.