Data Submitted (UTC 11): 9/20/2024 4:00:00 AM
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Comments: Thank you for the opportunity to comment on the Draft Environmental Impact Assessment (DEIS) regarding the Land Management Plan Direction for Old-Growth Forest Conditions Across the National Forest System (65356).

Woodwell Climate Research Center (Woodwell) is a scientific research organization that works with a worldwide network of partners to understand and combat climate change. We bring together hands-on research experience, and 38 years of policy impact to find societal-scale solutions that can be put into immediate action by policymakers and decision makers. Scientists from Woodwell work in more than 20 countries on six continents, collaborating with a wide range of partners, including national subnational and local governments, nonprofit organizations, universities, and private sector companies. Throughout Woodwell's history, our scientists have been among the world's leaders in studying natural climate solutions and the role of forests in maintaining a stable climate.

The Forest Service is proposing to amend all land management plans for the 128 planning units of the National Forest System to include consistent direction to conserve and steward existing and recruit future old-growth forest conditions and to monitor their condition, in order to foster the long-term resilience of old-growth forest conditions and their contributions to ecological integrity.

We greatly appreciate the effort to conserve and improve stewardship of existing old-growth forests and foster creation of additional forest areas having old-growth conditions. Remaining old-growth forests are threatened by natural disturbances and logging despite their unique and highly valued contribution to biodiversity and climate mitigation. We strongly support the stated intent of the Forest Service to prioritize conservation and stewardship of the agency's mature and old-growth (MOG) forests, which are vital to society and irreplaceable, as directed by Executive Order 14072 "Strengthening the Nation's Forests, Communities, and Local Economies" (White House 2022).

SUMMARY: In contrast to current alternatives, we request a preferred alternative that prohibits the commercial logging of large, old trees from all mature and old-growth forests on the national forest system lands, with few exceptions as necessary to protect lives and property. We object to the Forest Service's continued emphasis on logging MOG under the guise of "improving" resilience, and worse, accepting economic/social reasons for harvesting the large trees that are essential elements for combating climate change. The 17% of federal forest land classified as old-growth and the 47% of mature forest area should be about conservation and meeting national and international goals of protecting biodiversity and carbon stocks through strict set-aside policies. Human impacts on protected areas should be limited to ensure protection of the conservation values, and as indispensable reference areas for scientific research and monitoring. [A table outlining these recommendations is on page 7.]

Our comments are organized around the three broad questions for comment presented in the DEIS, plus an additional set of comments that address important issues that were omitted from consideration in the DEIS or are based on inadequate scientific literature review. We conclude by recommending that the Forest Service select and modify "Alternative 3" rather than the "preferred" Alternative 2.

ATTACHMENT: Woodwell FS DEIS Comment 9.20.2024.pdf - this is the same content that is coded in text box; it was also included as an attachment

Ques-on 1 (paraphrased): Does the approach outlined in the DEIS appropriately consider place-based informa-on and current land management direc-on about old-growth forest management?

The proposed amendment allows too much ?exibility and continues policies that are inconsistent with sustaining and increasing old-growth forests for climate mitigation. As stated in the DEIS: [ldquo]The proposed amendment recognizes that there is no single management prescription or de?nition that applies to all of the forest types across the National Forest System[rdquo]. However, the amendment allows excessive ?exibility at the unit level to implement proactive management practices as determined locally. We recognize that forest ecosystems and management history are highly varied and that some ?exibility is required in applying management actions to speci?c ecosystems and conditions (Palik et al. 2024).

However, the draI fails to provide su?cient guidance at the forest level to achieve a nationally consistent approach that aligns with the mandates of Executive Order 14072 by allowing land managers to plan harvesting of large trees in MOG forests thinning or other operations. Large trees should not be harvested from areas that have mandates to restrict logging for commercial purposes, such as Wilderness and Inventoried Roadless Areas. For example, as stated on p. 16 of the DEIS, [ldquo]None of the alternatives require all areas currently meeting the de?nition (and associated criteria) of old-growth forest to be retained as such. Standard 2.a (DEIS p. 29) allows vegetation management to occur in areas currently meeting the de?nition (and associated criteria) of old-growth forest for the purposes of proactive stewardship.[rdquo]

Furthermore, we note that the Forest Service has failed to suspend existing or planned actions that are not in compliance with the proposed alternatives. Many projects are moving forward nationally that include harvesting of large trees and mature forests from areas where such harvests for commercial purposes are prohibited. For example, a few of the projects that include signi?cant harvesting in old- growth forests include Telephone Gap in Vermont, Black Ram in Montana, Central and West Slope in California, and Jellico in Kentucky. Actions in these projects that target large trees or old-growth forests should be suspended until the EIS is completed.

We suggest that the DEIS should tighten guidelines for management units that speci?cally prohibit harvesting of large trees in mature forests and any trees in old-growth forests, with just a few exceptions to protect human health or built structures. Ongoing and planned projects that target large trees and old-growth forests should be immediately suspended and re-evaluated upon enactment of the updated rules.

Ques-on 2 (paraphrased): What would be the impacts if Standard 3 would be updated to read as: [ldquo]Proac-

ve stewardship in old-growth forests shall not result in commercial -mber harvest.[rdquo]

Strengthening protection of MOG forests from timber harvests would bene?t climate mitigation and biodiversity goals nationwide, while having little e?ect on timber supplies. Current and proposed standards are too weak and allow commercial timber harvest in roadless and wilderness areas, including areas currently or potentially having old-growth characteristics. Clearly stating that commercial timber harvest is prohibited in roadless and wilderness areas, and enforcing this standard, would result in increased protection from unnecessary logging for other purposes such as fuel reduction, while allowing limited exceptions for public safety and protecting structures from wild?re. There would be almost no impact on timber supplies for industry since only a small fraction of the national timber harvest, about 4%, is from Forest Service lands (Oswalt et el. 2019). State and private lands contain su?cient timber now and will in the future to meet projected demand, especially if management practices on private lands were to be improved.

The proposed old-growth amendment does not change allowable practices on lands suitable for multiple uses including timber production. But what is proposed in this DEIS leaves a major opening to enact commercial timber harvests as part of the approach to thinning for the purpose of reducing wild?re risk. Widespread, unchecked thinning will stymie any aiempt to reduce logging of large trees and old- growth, and would be counter to the mandates contained in EO 14072. The amendment fails to propose a special status for roadless and old-growth areas similar to that governing tree harvesting in wilderness areas, even though this neglect is highly unlikely to create a shortfall in the national supply of timber, or to harm other values of MOG.

Ques-on 3: Do current standards and guidelines provide enough restric-ons to protect current and future old-growth forests from future -timber harvest?

Current standards and guidelines fail to provide enough restrictions to protect current and future old- growth forests from future timber harvest. There are many examples of ongoing and planned actions across the National Forest system that include harvest of trees in current or proposed old growth as described under Question 2. It is therefore critical that current loopholes in guidance for land managers be closed and replaced with guardrails that strictly prohibit commercial harvest of live trees and old- growth forests. Broadly speaking, despite multiple-use mandates from Congress, the Forest Service only sets performance targets for timber harvesting, re?ecting the agency[rsquo]s historical bias towards active management and logging (Burnei and Davis 2002). To remedy this, timber targets should be ended, or new targets should be established for other forest uses, speci?cally for carbon storage, increased protection, and expansion of mature and old-growth forests.

The new National Old Growth Amendment to the 2012 Planning Rule must require without exemption environmental review of plans and projects that quanti?es the impacts of active management and logging on atmospheric carbon and carbon sequestration. Furthermore, environmental review of projects should not be avoided by substituting larger-scale reviews of forest plans and assessments at the forest or regional level that obscure the impacts of speci?c actions at smaller scales. This is a typical tactic used by proponents of active management and logging to avoid accountability for speci?c actions that have negative impacts on carbon stocks (Brack et al. 2021; Ter-Mikaelian et al. 2015).

The Forest Service is implementing inconsistent de?nitions for mature and old-growth forests, and what constitutes a [ldquo]large tree[rdquo] (USDA Forest Service 2024). This sets the stage for regional or local

interpretations that can ignore national direction to maintain and increase the area of old growth, and restricts the potential use of remote sensing which is able to provide high-resolution spatial data that would enable e?ective management at the district or project scale. Why not have consistent national de?nitions of mature and old-growth forests? There are plenty of examples of forest de?nitions that easily transcend regional and forest type diversity as exempli?ed by periodic forest resources assessments that include regional and state-level statistical compilations (Oswalt et al. 2019). Instead of allowing local and inconsistent de?nitions to be the norm, it is possible to de?ne MOG and large-tree terminology in consistent terms while allowing regional di?erences following national guidelines. For example, a large tree could be de?ned by a diameter limit associated with the range of tree diameters present on the landscape for speci?c regions and forest types (see appendix for example of an approach). Published examples of this approach illustrate how this could be accomplished using forest inventory data (Birdsey et al. 2023a; Hessburg et al. 2020).

The DEIS Largely Ignores Climate Change Mi-ga-on -- The DEIS fails to comply with the EO 14072 mandate to consider the GHG impacts of active management and harvesting of old-growth and large trees. Rather, the DEIS is focused almost entirely on adapting to climate change and reducing risk of wild?re, in the name of promoting resilient forests, implying that resilient forests can be created with active management, and that they would store more carbon over the long term.

EO 14072 Section 2 recognizes the distinctive role that Federal forests play in sustaining ecological, social, and economic bene?ts throughout the nation and calls particular attention to the importance of mature and old-growth forests on Federal lands for their role in contributing to nature-based climate solutions by storing large amounts of carbon. Instead of following this direction, the DEIS states that [ldquo]The intent of this amendment is to foster the long-term resilience of old-growth forests and their contributions to ecological integrity across the National Forest System.[rdquo] There is little or no mention of the important role of large trees and old-growth forests to contribute to nature-based climate solutions. Furthermore, the stated purpose of the proposed amendment (p. S5-S6) omits mention of the essential role of MOG forests; rather, the main and only stated purpose is to implement [ldquo]ecological forest management[rdquo] and [ldquo]geographically informed adaptive strategies.[rdquo]

Peer-reviewed scienti?c studies tell a di?erent story. Justi?cation for many of the provisions in the DEIS are not based on the [ldquo]best available science[rdquo] as required by NEPA. Rather, the authors select scienti?c references that support existing practices that fail to protect large trees and old-growth forests, and ignore those that argue for greater protection. As stated, [ldquo]The proposed amendment recognizes the importance of proactive stewardship[rdquo] while failing to consider the bene?ts of increasing protection from logging in terms of avoiding emissions and loss of sequestration capacity.

Mature and old-growth forests with large trees have characteristics that are bene?cial for climate change mitigation and other ecosystem values such as biodiversity (Lutz et al. 2018), and represent a signi?cant portion of the CO2 that needs to be removed from the atmosphere by the land (Lawrence et al. 2022).

MOG forests store far more carbon than younger managed forests, and in most cases can continue to accumulate carbon for centuries if not logged or severely disturbed (Birdsey et al. 2023b; Law et al. 2018; Leverei et al. 2020). For example, large trees in MOG forests on federal lands store between 41 and 84 percent of the total biomass carbon stock (Birdsey et al. 2023b; Mildrexler et al.

2020). Furthermore, the largest trees in MOG forests accumulate carbon faster than smaller trees (Mildrexler et al. 2020; Mildrexler et al. 2023; Stephenson et al. 2014). And older undisturbed MOG forests also continue to

pack away carbon annually in their woody debris and soils, which are largely protected from e?ects of severe disturbance.

Selective referencing and carbon cycle accoun-ng mislead about the state of science

The review of carbon cycle and management literature is incomplete and misleading. Here we highlight some of the missing and misleading literature, and conclude that the DEIS is not based on the [ldquo]best available science[rdquo] with respect to impacts of management on the carbon cycle. Beginning on p. 75 of the DEIS (also see Ecological Impacts Analysis Report, Section 5.3), the review ignores literature other than that supporting active management and advocating for the bene?ts of transferring carbon from the forest to harvested wood products (HWP) while largely ignoring emissions from active management and logging, and the long time it can take to repay the [ldquo]carbon debt[rdquo] (i.e. the amount of carbon emitted). There is no mention of the bene?ts of protecting carbon stocks in MOG forests and letting forests continue to accumulate carbon -- only discussion of risks that in many regions are quite small.

Methods to assess impacts on carbon stocks should be as comprehensive as practical, including at minimum the following accounting elements: impacts on all forest ecosystem carbon pools as de?ned by the FS FIA program; carbon dioxide emiied as a result of vegetation management; and carbon retained in harvested wood products while in use or deposited in land?lls. Reducing net emissions by substituting wood for other building materials may be signi?cant in some cases, and indirect e?ects such as [ldquo]leakage[rdquo] should also be assessed, if and when appropriate methods and data are available.

Unfortunately, the DEIS and supporting Ecological Impacts Analysis omit consideration of carbon dioxide emiied as a result of vegetation management and harvesting, which misleads by portraying active management as more bene?cial that passive management (which is not discussed at all).

Besides the fact that harvesting MOG forests emits large quantities of stored carbon and creates a carbon debt, until the forest is restored the land is no longer able to sequester carbon as rapidly as before the logging took place (Bartowitz et al. 2022; Law et al. 2018). The impacts of harvesting on forests in the U.S. are signi?cantly greater, on average, than all other disturbances combined (Harris et al. 2016). Increasing demand for wood products is expected to accelerate net emissions from logging and wood processing (FAO 2022; Peng et al. 2023; USDA 2023a). Older forests with larger trees are generally more resistant to threats from natural disturbances (Lesmeister et al. 2021), and avoiding logging would make MOG forests more resilient to other threats in the long run by maintaining or increasing ecosystem integrity (Rogers et al. 2022).

Instead of acknowledging the importance of protecting forest carbon stocks and allowing MOG forests to continue growing and accumulating carbon, which in many regions can proceed for decades to centuries, the DEIS only references literature that highlights the importance of harvested wood products and active management to enhance resilience.

Recommendation to select and modify alternative 3

We strongly recommend selecting and modifying alternative 3 rather than the [ldquo]preferred[rdquo] alternative

2.

The preferred alternative 2 prohibits proactive stewardship in old-growth forests for the purpose of

timber production but still allows commercial logging under the guise of proactive management to improve resilience and achieve desired conditions at the fastest rate. Alternative 3 is far more responsive to EO 14072. It includes stronger protection from commercial logging, even though it does not mention the value of large trees and old growth as a natural climate solution. Alternative 3 should also include restrictions on harvesting [ldquo]large[rdquo] trees in mature forests that could become old growth, based on their superior resistance to ?re in most forest ecosystems and their signi?cant contribution to carbon stocks and high rates of carbon accumulation compared with smaller trees.

Statements that achieving desired conditions would be quickest in alternative 2 are not based on any evidence or scienti?c studies regarding carbon stocks. In fact, research has clearly shown that active management involving tree removal will incur a carbon debt that could take many decades to recover before there would be a net increase in carbon stock and accumulation. So, it seems illogical that alternative 2 would achieve desired results regarding carbon more quickly than other alternatives.

However, it may be argued that active management could reduce ?re risk in some ecosystems more quickly than allowing forests to grow into older age classes, but this would mainly apply to selected forest types in the West, east of the mountain ranges, and should not be construed as representing forests nationwide.

Thank you for your consideration of these comments and proposed changes. Below is a summary table of our recommendations, as well as an appendix including: An Approach to Determine Minimum Diameters of Large Trees on the National Forest System.

Sincerely,

[see pdf for signature]
Summary table of key comments:[table in pdf]
Comment [row 1]

Question 1. Too much ?exibility at the unit level that could lead to failure to protect large trees and old-growth forests (DEIS p. 16, 29).

Proposed resolution [row 1]

Tighten guidelines for forest management actions to prohibit harvesting of large trees as de?ned by analysis of FIA data.

Comment [row 2]

Question 2. Proposed standards do not strengthen protection of MOG forests from commercial timber harvests,

which should be a priority to attain climate mitigation and biodiversity goals nationwide (DEIS p. S-5, S-14, 32).

Proposed resolution [row 2]

Restrict commercial harvest in roadless and old- growth areas, similar to restrictions governing tree harvesting in wilderness areas, including harvesting intended to increase resilience. Increasing restrictions would not create a

timber shortage.

Comment [row 3]

Question 3. Current standards and guidelines fail to provide enough restrictions to protect current and future old-growth forests from future timber harvest (DEIS p. S-7, S-11, 33).

Proposed resolution [row 3]

Amend guidance that allows managers to enact commercial harvests to aiain other goals such as fuel reduction, and institute guardrails to protect MOG forests. Either end requirements to meet timber targets, or establish targets for other forest uses.

Comment [row 4]

The DEIS fails to comply with the EO 14072 mandate to consider the GHG impacts of active management and harvesting of old-growth and large trees. Rather, it is focused on reducing risk from wild?re in the name of promoting resilient forests.

Proposed resolution [row 4]

The DEIS needs to clearly acknowledge the importance of mature and old-growth forests on Federal lands for their role in contributing to nature-based climate solutions by storing large amounts of carbon, instead of focusing almost exclusively on adapting to climate change.

Comment [row 5]

In the DEIS and Ecological Impacts Analysis, the review of carbon cycle and management literature is incomplete and misleading. The DEIS is not based on the [ldquo]best available science[rdquo] with respect to impacts of forest management and timber harvesting management on the carbon cycle.

Proposed resolution [row 5]

The DEIS omits consideration of carbon dioxide emissions as a result of vegetation management and harvesting, an accounting error that must be corrected. Harvesting MOG forests emits large quantities of stored C and creates a [ldquo]carbon debt[rdquo] that can take

decades[mdash]centuries in some cases[mdash]to recoup.

Comment [row 6]

The [ldquo]preferred[rdquo] alternative 2 prohibits proactive stewardship in old-growth forests for the purpose of timber production but still allows commercial logging under the guise of proactive management to improve resilience.

Proposed resolution [row 6]

We request the Forest Service to select and modify alternative 3 that prohibits the commercial logging of large, old trees from all mature and old-growth forests on the national forest system lands, with few exceptions as necessary to protect lives and property.

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APPENDIX:

An Approach to Determine Minimum Diameters of Large Trees on the Na-onal Forest System

Dr. Richard Birdsey, Woodwell Climate Research Center and Dr. Dominick A. DellaSala, Wild Heritage
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Large, old trees represent the most important structural elements of mature and old-growth (MOG) forests that are associated with irreplaceable ecosystem services and biodiversity functions. However, there is no uni?ed de?nition of what constitutes a [ldquo]large[rdquo] tree that can guide management decisions in relation to the old growth amendment. While a MOG forest is much more than just the large trees, managing for large trees is emphasized in the plan amendment but the de?nition of large has yet to be fully realized or consistently applied. Here, we outline two approaches for seung minimum large tree diameters: (1) minimum diameter thresholds from the Forest Inventory and Analysis (FIA) de?nitions of old growth; and (2) tree diameter distributions associated with stand-age thresholds.

These approaches can be used to develop guidelines for managing large trees within MOG forests that take into account regional and forest type variations. We note that foresters have been de?ning large trees in their management plans for over a century based on return on investment in logging operations related to when trees have optimal economic value. Commonly used is the diameter-at-breast height (dbh) in relation to when trees culminate growth rates. Although individual tree growth rates are highly variable over time in most cases, their average dbh and biomass by age classes can be estimated and used to quantitatively identify a minimum dbh for de?ning large trees.

Mature and Old-growth Forest Inventory Approach

The USDA Forest Service (2024) recently published a national inventory of MOG. Regional de?nitions of old growth were used as the starting point for de?ning mature and old-growth forests for hundreds of forest types. The inventory document contains details of the variables used in most of the de?nitions. A matrix of regions x forest types (Table 1) shows which regions included large tree diameters as part of the old-growth de?nition. Empty cells in the matrix could be ?lled in by extrapolating estimates from adjacent regions or similar forest types, or by asking regional sta? to ?ll in the blanks. Empty cells could also be ?lled in using the new approach described herein. Or, the matrix could be replaced with an entirely new set of minimum diameters calculated from FIA data

Table 1. Minimum diameters (inches) of large trees associated with old-growth forests, according to de?nitions adopted by USDA Forest Service (2024). Note that these values were taken from an earlier draI of the published inventory and may not represent the ?nal versions of de?nitions. We note that smaller trees sizes are required for assessing mature tree large diameters and that these re?ect only old growth. The President[rsquo]s executive

order refers to mature as well as old growth.

[Table 1 in pdf: columns for "code-Forest type groups"and "Regions"]

Diameter Distribution Approach

The diameter distribution approach starts by de?ning a minimum age for a mature forest as the age associated with the [ldquo]culmination of net primary production[rdquo] or CNPP, based on FIA growth data. CNPP is functionally equivalent to [ldquo]culmination of mean annual increment[rdquo] (CMAI) which is familiar to foresters. It can be used for a national set of minimum tree diameters to de?ne [ldquo]large[rdquo] trees that accounts for regional and forest type variability for both mature and old-growth forests and has the advantage over the Table 1 approach that is old growth only and omits mature. The approach was ?rst documented in Birdsey et al. (2023) for de?ning the minimum stand age associated within a mature forest, followed by estimating the diameter distribution at the minimum stand age, and using that distribution to identify the minimum diameter of a large tree. The same approach could be used to de?ne a tree as large associated with old growth, by selecting a set of FIA sample plots around the minimum age classi?ed as old growth using FIA stand condition variables (e.g., as in Stanke et al. 2000), or another way to de?ne the minimum stand age, such as reviewing literature and ecosystem studies.

In Birdsey et al. (2023), FIA data were queried to display the distribution of tree diameters and live-tree biomass carbon at or near the CNPP age class for mature forests (Figure 1). Using this distribution of biomass by diameter class, the tree diameter associated with median biomass was calculated to represent the minimum diameter of a large tree associated with mature forests. Note that the minimum diameter using this example is much lower than the minimum diameters chosen by Region 6 for old growth in the FIA MOG inventory, because the diameter derived here represents the lower limit for [ldquo]mature[rdquo] rather than just the lower limit for [ldquo]old growth,[rdquo] and the lower limit for mature is associated with a younger stage of maturity than used by FIA (Woodall et al. 2023). Nonetheless, this approach gets at mature and not just old growth. This approach would set large tree protections at 13 inches in this forest type, considering both mature and old growth conditions.

[Figure 1 in pdf]

Figure 1. Distribution of biomass carbon stocks (total biomass summed over sample plots, in megagrams) by diameter class (inches) at and near the CNPP age for the Gifford Pinchot National Forest. These data represent all species and forest types, and were used to calculate the median dbh of 13 inches at CNPP of 45 years.

[figure 2 in pdf]

Figure 2. Distribution of biomass carbon stocks (total biomass summed over sample plots, in megagrams) by diameter class (inches) at and near minimum old-growth age for the Gifford Pinchot National Forest. These data represent all species and forest types, and were used to calculate the median dbh of 29 inches at age 200 years.

The diameter distribution approach could be used to ?ll in all of the cells of the matrix (Table 1) or only those cells in the matrix lacking lower diameter limits for large trees. To apply this approach to the FIA [ldquo]Growth Stage System,[rdquo] and to include a lower diameter limit for old growth, one would need to ?rst identify the lower age limit of a mature forest or the lower age limit of an old-growth forest (Woodall et al. 2023). Then the associated diameter limits could be easily derived by calculating the median tree diameter associated with biomass carbon stock. An example calculation for old-growth using the minimum old-growth age reported in the FIA MOG inventory is shown in Figure 2, which would set large tree protections at 29 inches. An alternative approach to

using the median to de?ne the lower dbh threshold for a large tree could be used, such as selecting a di?erent point on the diameter distribution, say one or two standard deviations (+/-) from the mean. This would allow for adjusting diameters down in productive old growth to protect more large trees and up in productive mature stands where large tree sizes are present at smaller size classes.

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