July 20, 2023

Chris French
Deputy Chief
National Forest System
USDA Forest Service
Submitted via Federal eRulemaking Portal www.regulations.gov

Re: Advance Notice of Proposed Rulemaking on Climate Resilience

Dear Mr. French:

The Wilderness Society appreciates the opportunity to comment on the Advance Notice of Proposed Rulemaking (ANPR) regarding potential policies to protect, conserve, and manage the national forests for climate resilience. (88 Fed. Reg. 24497, April 21, 2023). The ANPR is a key step in fulfilling the requirements of Executive Order 14072, which highlighted the importance of mature and old-growth (MOG) forests as a nature-based climate change solution and set forth the Administration's policy to conserve MOG forests.[1]

The Wilderness Society strongly encourages the USDA Forest Service to follow up on the ANPR by developing a Proposed Rule to improve climate resilience, including specific requirements to protect, conserve, and manage MOG forests. As discussed in our comments below, we recommend that the Forest Service promulgate a multi-part Climate Rule that addresses major threats and encompasses the following key elements of a comprehensive climate resilience strategy --

- wildfire management
- watershed protection and restoration
- MOG conservation

[1] Section 2(c) of Executive Order 14072 states, "Following completion of the [MOG] inventory, the Secretaries shall: … (ii) analyze the threats to mature and old-growth forests on Federal lands, including from wildfires and climate change; and (iii) develop policies, with robust opportunity for public comment, to institutionalize climate-smart management and conservation strategies that address threats to mature and old-growth forests on Federal lands."

- wildlife habitat connectivity
- tribal co-stewardship and indigenous knowledge

Our recommendations are intended to complement and strengthen the agency's 10-year Wildfire Crisis Strategy and are consistent with Congressional statutory direction. In addition, they reflect the on-the-ground experience and consensus-based management guidelines of numerous forest collaborative groups over the past two decades.[2]

Our comments also include preliminary thoughts on the Forest Service's recently completed MOG inventory.

Legal Framework

General Rulemaking Authority

The Forest Service has ample statutory authority to promulgate regulations addressing climate change and other threats to MOG forests. The Organic Administration Act of 1897, 16 U.S.C. 551, provides overall rulemaking authority to the USDA Forest Service:

> "The Secretary of Agriculture shall make provisions for the protection against destruction by fire and depredations upon the … national forests …; and he may make such rules and regulations and establish such service as will insure the objects of such reservations, namely, to regulate their occupancy and use and to preserve the forests thereon from destruction."

The Forest Service has adopted a wide array of regulations, including the Roadless Area Conservation Rule in 2001 and the Travel Planning Rule in 2005, based on the Organic Act's general statutory authorization. In rejecting a challenge to the Roadless Rule in 2011, the Tenth Circuit Court of Appeals stated:

> "The Organic Act gives the Forest Service broad discretion to regulate the national forests, including for conservation purposes…. The broad rulemaking authority granted the Forest Service under the Organic Act—to regulate "occupancy and use" of NFS lands and "to preserve the forests thereon from destruction" (for example, from road construction and logging)—is alone sufficient to support the Forest Service's promulgation of the Roadless Rule." *State of Wyoming v. U.S. Dep't of Agriculture*, 661 F.3d 1209, 1234 (10th Cir. 2011).

[2] The Wilderness Society has commissioned a report by Forest Stewards Guild analyzing how collaborative groups have addressed MOG forest conservation issues in documents prepared for the Collaborative Forest Landscape Restoration Program (CFLRP). The analysis found a broad zone of agreement among collaborative groups on protecting and restoring old growth as a primary component of forest restoration and fuel reduction. We intend to provide the report to the Forest Service once it is finalized.

Likewise, the Ninth Circuit Court of Appeals in 2002 ruled that "the general rulemaking authority of the 1897 Organic Act is sufficient to support the Roadless Rule's promulgation to achieve the objects of our National Forest System." *Kootenai Tribe of Idaho v. Veneman*, 313 F.3d 1094, 1117 n.20 (9th Cir. 2002).

The Multiple-Use Sustained-Yield Act of 1960 (MUSYA) supplemented the 1897 Organic Act by specifying five uses as purposes of the national forests: outdoor recreation, range, timber, watershed, and wildlife and fish. (16 USC 528). In upholding the legality of the Roadless Rule, the Tenth Circuit ruled that MUSYA "clearly authorized the Forest Service to regulate national forest lands for multiple uses." *State of Wyoming*, 661 F.3d at 1235.

Congressional Direction for Old-Growth Forests and Large Trees

Furthermore, Congress has repeatedly provided specific and consistent statutory direction to the USDA Forest Service to conserve old forests and large trees. Congress has enacted six laws during the past two decades that direct the agency to maintain and restore old-growth stands and/or maximize retention of large trees.

The Healthy Forests Restoration Act of 2003 (HFRA, 16 USC 6512) was the first law to provide statutory management direction for old-growth forests and large trees. Section 102(e)(2) of HFRA states that when conducting authorized hazardous fuels reduction projects, "the Secretary shall fully maintain, or contribute toward the restoration of, the structure and composition of old growth stands according to the pre-fire suppression old growth conditions characteristic of the forest type, taking into account the contribution of the stand to landscape fire adaptation and watershed health, and retaining the large trees contributing to old growth structure." In addition, Section 102(f)(1)(B) of HFRA requires the Forest Service to implement hazardous fuel reduction projects – outside of old-growth stands covered by Section 102(e)(2) – "in a manner that … maximizes the retention of large trees, as appropriate for the forest type, to the extent that the trees promote fire-resilient stands."

Congress provided similar management direction in 2009 when it established the Collaborative Forest Landscape Restoration Program (CFLRP). Section 4003(b)(1) of the Omnibus Public Lands Act (16 USC 7303) requires that proposals for the CFLRP must be based on a landscape restoration strategy that "(D) fully maintains, or contributes toward the restoration of, the structure and composition of old growth stands according to the pre-fire suppression old growth conditions characteristic of the forest type, taking into account the contribution of the stand to landscape fire adaptation and watershed health and retaining the large trees contributing to old growth structure." In addition, the strategy must undertake forest restoration treatments that reduce hazardous fuels by "maximizing the retention of large trees, as appropriate for the forest type, to the extent that the trees promote fire-resilient stands."

In 2014 and 2018, Congress again directed the Forest Service to conserve old-growth and large trees. Section 8204 in the forestry title of the 2014 Farm Bill (16 USC 6591a and 6591b) provided for the designation of insect and disease treatment areas and authorized the use of a categorical exclusion for a forest restoration treatment project that "maximizes the retention of old-growth and large trees, as appropriate for the forest type, to the extent that the trees promote

stands that are resilient to insects and disease." Similar language was included in the 2018 Fire Funding Fix (16 USC 6591d), which authorized use of a categorical exclusion for a restoration treatment project that "maximizes the retention of old-growth and large trees, as appropriate for the forest type, to the extent that the trees promote stands that are resilient to insects and disease, and reduce the risk or extent of, or increase the resilience to, wildfires."

Congress has recently reiterated direction to conserve old-growth and large trees. Harkening back to language that originally appeared in HFRA, Section 40803(g) of the Infrastructure Investment and Jobs Act of 2021 (16 USC 6592) requires the Forest Service to:

> "prioritize funding for projects … (3) that maximize the retention of large trees, as appropriate for the forest type, to the extent that the trees promote fire-resilient stands; … and (6) that fully maintain or contribute toward the restoration of the structure and composition of old growth stands consistent with the characteristics of that forest type, taking into account the contribution of the old growth stand to landscape fire adaption [sic] and watershed health, unless the old growth stand is part of a science-based ecological restoration project authorized by the Secretary concerned that meets applicable protection and old growth enhancement objectives, as determined by the Secretary concerned."

Finally, in Section 23001(a) of the Inflation Reduction Act of 2022, Congress appropriated $50,000,000 "for the protection of old-growth forests on National Forest System land and to complete an inventory of old-growth forests and mature forests within the National Forest System."

Taken together, this statutory direction provides a solid legal foundation for the Forest Service to adopt regulations requiring conservation of MOG forests.

Congressional Direction for Watershed Resilience

Watershed conservation has always been a fundamental purpose of the national forests, as stated in the Organic Act of 1897: "No national forest shall be established except to improve and protect the forest or for the purpose of securing favorable conditions of water flows…" (16 USC 472). The MUSYA likewise identified watershed conservation as one of the purposes of the national forests (16 USC 528). The 2018 Farm Bill amended the HFRA to provide specific direction to the Forest Service to establish a Watershed Condition Framework and Water Source Protection Program to guide watershed management and partnerships (16 USC 6543 and 6542). These laws provide ample authority for the Forest Service to promulgate regulations to improve and protect national forest watersheds from climate change, which poses one of the greatest system-wide threats to favorable water flows.

2012 Forest Planning Rule

Currently, the principal Forest Service regulation that addresses climate resilience is the 2012 Planning Rule (36 CFR 219). The Planning Rule was adopted under authority of the National Forest Management Act of 1976 (NFMA, 16 USC 1604), which requires the Forest Service to

adopt and periodically revise forest management plans for all national forests. Whenever the Forest Service revises a forest plan, the Planning Rule requires the agency planners to assess information about climate change and other system drivers, including the adaptability of terrestrial and aquatic ecosystems to change (36 CFR 219.6(b)(3)). Likewise, the Planning Rule requires the Forest Service to take into account climate change and ecosystem adaptability in designing plan components to maintain or restore the ecological integrity of ecosystems and watersheds in the plan area (36 CFR 219.8(a)(1)(iv)). The Rule defines "ecological integrity" to mean an ecosystem that is functioning "within the natural range of variation and can withstand and recover from most perturbations imposed by natural environmental dynamics or human influence" (36 CFR 219.19). Furthermore, the Rule requires plans to maintain viable populations of species of conservation concern in the plan area, and it defines a viable population as one that "continues to persist over the long term with sufficient distribution to be resilient and adaptable to stressors and likely future environments" (36 CFR 219.19). However, the Planning Rule lacks a definition of "resilient." Finally, the Rule requires monitoring of "changes on the plan area related to climate change and other stressors" (36 CFR 219.12).

While the 2012 Planning Rule provides sound regulatory direction to address climate change, the forest plan revision process takes too long to be an effective tool by itself to combat the climate crisis. During the decade since the Planning Rule was adopted, only a small number of forest plans have been revised, and it will likely take several more decades before the Planning Rule's requirements are phased in for all national forests. We simply cannot afford to wait for years and decades of plan revisions; regulatory direction to implement measures that will address the most pressing needs of climate resilience is needed immediately.

At the same time, we strongly encourage the Forest Service to amend the Northwest Forest Plan as rapidly as possible to improve climate resilience, including conservation of that region's unique, carbon-rich older forests. That multi-forest amendment process should be targeted to address the region's principal climate change issues and should be coordinated closely with the Forest Service's national climate resilience rulemaking to ensure consistency in management direction.

ANPR Context

The background section of the ANPR provides important context and sets the stage for the Forest Service's climate resilience policy. While we agree with most of the background information in the ANPR (including the damaging effects of climate change and related stressors), we have concerns about a few points.

First, it is incorrect to say that "the National Forest Management Act (NFMA) enacted in 1976 gives the Secretary of Agriculture broad authority to manage all forests that are in imminent danger of insect attack or disease." This erroneous statement presumably refers to a proviso in Section 6(m) of the NFMA, which generally prohibits the Forest Service from harvesting stands of trees before they have reached maturity ("culmination of mean annual increment" or CMAI). The NFMA makes an exception to the CMAI standard for "salvage or sanitation harvesting of timber stands which are substantially damaged by fire, windthrow or other catastrophe, or which

are in imminent danger from insect or disease attack" (16 USC 1604(m)). This exception to harvest stands in imminent danger of insect attack or disease in Section 6(m) is limited to stands that have not reached CMAI – it does not broadly apply to "all forests"; for example, it does not apply to mature and old-growth forests or to lands that are classified as unsuitable for timber production.

Second, we are concerned that the ANPR exaggerates the threat of insects and disease while downplaying the impact of commercial logging. Comparing the total acreage of national forest lands "disturbed" by insect/disease and timber harvest, as portrayed in Figure 2 in the ANPR, is an inappropriate apples-and-oranges comparison. As others have discussed (see, e.g., Franklin et al. 1987, Schowalter 2018), mortality is a critical process in the development of old growth and mature forests, and insects and diseases make important contributions to that process. Without mortality, we would not have old-growth forests, as the snags and down logs that are essential to the structure of many older forests would not develop. Similarly, without the death and consumption by fire of small trees in dry forests, the "parklike" structure of old growth forests could not develop. In many cases, insect outbreaks, even ones considered "catastrophic" by foresters and the general public, have served mainly to transition forests from uniform stands of dense trees to an open, complex structure more consistent with mature or old growth forest. It is inappropriate simply to look at where the probability of fire and insect and disease irruptions are high and conclude these represent a threat that needs to be "treated." The 2012 Planning Rule requires that national forests maintain or restore ecological integrity, or the dominant "composition, structure, function, connectivity, and species composition and diversity…within the natural range of variation" (36 CFR 219.8(a)(1) and 219.19). Understanding threat requires understanding the natural range of variation of mortality agents and their effects and the implications for the future of old growth and mature forests.

In contrast, commercial logging represents a direct threat to older forests, and one over which we have much greater control than the mortality factors discussed above. Commercial logging typically targets for removal the largest trees in a stand, thereby reducing a key element of old growth (large trees) and eliminating the contribution to coarse woody debris that these trees would eventually make to old growth structure. An assessment of threat should take into account not only the likely current and future existence of factors that threaten old growth and mature forest characteristics, but the probability of loss of old growth and mature forest character and our ability to influence these factors.

Furthermore, we are concerned that the ANPR downplays the impact of large-scale industrial logging of national forest lands that occurred during much of the 20th century. Figure 1 in the ANPR accurately depicts the massive volume of timber harvested between 1950 and 1995 – when total timber volume ranged from 4 billion board feet to 13 billion board feet; however, the ANPR says nothing about the continuing impacts of that industrial logging era on ecological integrity and climate resilience. For example, the liquidation of old-growth forests (and associated logging road construction) during that era – especially in relatively moist ecosystems -- has resulted in significant loss of biological diversity, degraded watershed health, and

fragmented habitat for imperiled fish and wildlife species. Furthermore, past high-grading of the largest, most valuable and fire-resilient trees in relatively dry ecosystems, coupled with a century of aggressive fire suppression, has resulted in vast expanses of unnaturally dense stands dominated by fire-intolerant young trees that are more susceptible to high-intensity stand-replacement wildfire. A truly science-based climate resilience policy must take into account these significant historical and on-going impacts.

Eastern Forests

We appreciate that the ANPR recognizes the differences between eastern and western forests and need for special consideration of eastern forests. Due to the impacts of "historic management and land use changes," very little old-growth forest remains in Regions 8 and 9, but there is much opportunity for previously logged forests to mature into old-growth.

The threats to MOG forests are different in the East and the West. In the East, timber harvests are a greater threat to mature and old-growth forests than are either wildfire or insects – a pattern that holds for both public and private forestland. Insects and disease also present a different biological threat in the East. Mixed species stands are more common in the East, and it is harder for pests or pathogens to kill most of a mixed stand for the simple reason that most pests are host-specific, often adapted to only a group of closely related host species. While it is true that insects and diseases affect stands in the East, they usually do not cause stand-replacing disturbances. The primary exception is southern pine beetle, which affects southern yellow pine species. Timber harvests that thin stands and increase their complexity can effectively reduce southern pine beetle risk. Most of the other truly damaging pests and diseases in the East are invasive species (e.g., hemlock woolly adelgid, beech bark disease, gypsy moth, emerald ash borer). These invasives can kill entire stands, but much more often they kill a minority of trees and do not affect a stand's status as mature or old growth. Silvicultural intervention is largely or completely ineffective against these agents.

Key Elements of Climate Resilience Rule

We recommend that the Forest Service promptly propose and adopt a multi-part climate resilience rule that aims to accomplish several important goals, including:

- Establishing forests that are resilient to wildfire and climate change.
- Prioritizing the threats posed to forests and communities by wildfire.
- Focusing on restoring, maintaining, and sustaining watershed health.
- Protecting older forests and re-establishing resilient old-growth conditions.
- Facilitating wildlife migration and survival in a changing climate.
- Providing opportunities for tribes to co-steward national forest land.

As discussed above, the Forest Service has ample statutory authority to adopt such a climate resilience rule, based on laws including the Organic Act, MUSYA, NFMA, HFRA, 2018 Farm Bill, and IIRA.

Part 1: Overarching Policy Direction

The climate resilience rule should begin with overarching policy direction to guide Forest Service managers' efforts to combat climate change through mitigation and adaptation measures. The Forest Service of the future will fulfill its multiple use mission by working to enhance the capacity of the National Forest System to store carbon, provide important but vulnerable ecosystem services such as drinking water, and sustain the biodiversity of landscape ecosystems in the face of climate change.

For starters, the rule should include a definition of "resilience," which is nowhere to be found in the 2012 Planning Rule or other current regulations. On the other hand, key concepts and definitions of the 2012 Planning Rule – such as ecological integrity, natural range of variation, and species viability – should be incorporated into the climate resilience rule. The rule should provide policy direction to guide national forest management immediately, regardless of whether local forest plans have been revised yet under the Planning Rule.

Overarching policy direction for climate resilience should also ensure that land management decisions are fair and inclusive of the public, including historically disadvantaged communities. To the extent possible, the rule should promote collaborative forest stewardship that engages stakeholders and Tribes in the achievement of forest climate resilience. The Collaborative Forest Landscape Restoration Program provides a model and lessons learned that can be built upon to advance collaborative management. Management should be guided by best available science, monitoring, and traditional knowledge that provide insights into how best to respond to climate change threats. The rule should incorporate a robust process of collaborative adaptive management that ensures continual improvement in scientific understanding and stakeholder involvement (see Cheng et al. 2019).

In addition, the rule should acknowledge the uncertainty with which we enter the future and incorporate mechanisms to spread risk. Recently, a group of scientists and managers, several from the USGS and U.S. Fish and Wildlife Service, proposed the Resist-Accept-Direct (RAD) framework that approaches land management with humility, implementing a portfolio of strategies, akin to a stock portfolio, acknowledging that we don't yet know which practices will prove most effective (CASC 2021). They suggest that we simultaneously implement a restoration-based strategy aimed at sustaining whole ecosystems, a forward-looking strategy that anticipates climate change and actively chooses winners, and a more passive, reserve-based strategy that hedges against mistakes made elsewhere. A climate resilience rule would be wise to adopt such an approach.

Part 2: Managing Wildfire

Altered fire regimes and increased fire severity are among the most direct impacts of climate change. "Hot drought," higher temperatures, and reduced relative humidities increase the likelihood of "fire weather" and the intensity with which fire burns, which can have devastating impacts on communities and ecosystems. Adapting to climate change will require adapting to more wildfire, necessitating a change in our approach to wildfire management. The proposed rule should accelerate implementation of the National Cohesive Wildland Fire Management Strategy and Confronting the Wildfire Crisis to (1) reduce the risks that wildfires pose to

communities, forests, habitat, and other forest resources; (2) ensure that national forests are resilient to wildfire in a changing climate; and (3) ensure that forests and communities in fire-prone regions can withstand climate-driven wildfires. The purpose is to achieve the Forest Service vision to safely and effectively extinguish fire, when needed; use fire where allowable; improve resilience of our natural resources; and as a Nation, learn to live with wildland fire.

The proposed rule should establish the policy of the Forest Service to –

- restore and maintain landscapes that are resilient to fire-related disturbances in accordance with management objectives;
- support fire-adapted communities, including human populations and infrastructure, that can withstand a wildfire without loss of life and property;
- deploy climate-smart forestry practices to improve the resilience of lands, waters, and wildlife;
- safely return fire to its essential role in forest ecosystems.

These policies should be implemented through the establishment of a national fireshed risk assessment, identification of priority firesheds, and collaborative community development and implementation of fireshed protection strategies and fire management plans stepped down to the local level through robust partnerships with community stakeholders and affected landowners. In achieving this "step-down," policy should support collaborative fire planning at the scale of the "project level" or "POD" (Potential Operational Delineation), involving landowners and other stakeholders in collaborative planning of activities, not just during fire events, but between them. PODs should be used to plan restoration activities and fuel treatments as well as to game operational strategies (including promoting beneficial fire) between incidents and planning for post-fire operations well in advance of wildfire events. Collaborative planning at this scale builds public support for operations during and after a fire and provides a viable way to "eat the elephant" of fuel treatment between them. If we continue to treat wildfires as surprise events to which we must react with unplanned operations and post-fire recovery, we will never turn the corner on the wildfire challenge.

Part 3: Watershed Protection and Restoration

The watershed function of the national forests is one of its oldest and most valued and yet is also among its most threatened by climate change. A changing climate heralds alteration of the most basic function of watersheds, with alteration of water quantity and quality, aquatic communities, and slope stability. Protection of watershed function is among the most important climate adaptation actions the Forest Service can take, given that one of five Americans rely on national forests for their drinking water. The proposed rule should enshrine in regulation the Forest Service's Watershed Condition Framework (WCF) and Water Source Protection Program (WSPP) to protect and restore significant watersheds within the National Forest System. The goal of these efforts should be to focus management activities on watershed health by protecting and enhancing water quality, securing drinking water supply, increasing resilience from climate change, improving ecological services, and safeguarding biodiversity.

In formalizing the WCF, the proposed rule should mirror the existing agency practice and the 2018 Congressional authorization. Specifically, the proposed rule should require regularly updated classification of watersheds, identification of priority watersheds, and the development

of watershed restoration action plans (WRAPs). Unlike existing policy, which allows management activities that seriously harm as well as improve watershed conditions, the proposed rule should prohibit activities that would lead to long-term degradation of watershed condition. The proposed rule should also enshrine the WSPP authorized by Congress in 2018 and establish regulations to implement the program, including the development of water source management plans and prioritizing restoration of source watersheds.

To help support the climate resilience rulemaking process, we encourage the Forest Service to study existing WRAPs for examples of restoration activities that are needed to improve watershed resilience to climate change. Such activities typically include road decommissioning and culvert replacements in wet, flood-prone areas, as well as fuel reduction treatments in dry, fire-prone areas.

Part 4: Protecting Older Forests

Protection of old growth and mature forests serves both to mitigate climate change and to adapt to it. Loss of old, large trees through logging, fire, and other severe disturbances sets in motion the release of vast amounts of stored carbon back to the atmosphere from wood products and the decomposition of ecosystem components. Older forests exhibiting their historical structure have also been shown to be more resilient to natural disturbances than the young, uniform forests that have replaced them. Any rule aimed at fostering climate resilience should have as a top priority the conservation of older forests. The proposed rule should provide a strategy aiming to maintain and restore old-growth forests throughout the National Forest System that is built around three key elements: (1) a general prohibition on cutting legacy trees over 100-150 years old, depending on whether they occur in the East or the West; (2) interim management provisions pending establishment of old growth emphasis areas, and (3) a process for the establishment and revision of old growth emphasis areas, as well as management direction for such areas that recognizes the fundamental ecological differences and needs of moist and dry forests.

The proposed rule should contain a general prohibition on harvesting legacy trees and science-based restrictions on timber harvest in mature forests between the date a final rule is promulgated and the date on which a particular region formally establishes the old growth emphasis areas. Narrow exceptions should allow for essential cutting, e.g., for public health and safety, as well as restoration in dry forests. The proposed rule should require Regional Foresters to establish old growth emphasis areas that would be managed to restore and maintain old-growth ecosystem integrity, reflecting scientifically determined regional old-growth targets. The rule should also contain management direction for the old growth emphasis areas.

Part 5: Maintaining Wildlife Habitat Connectivity

One of the most likely ecosystem responses to climate change is the movement of species, either actively through migration or passively through natural selection, from their current range to a more suitable climate. Maintaining the ability for species to move without encountering impenetrable barriers is one of the most obvious and essential climate adaptation actions we can take. The proposed rule should address wildlife habitat connectivity by ensuring that: (1) habitats for fish and wildlife are sufficiently interconnected both within the National Forest System and between the National Forest System and adjacent lands; (2) habitat connectivity, permeability,

and resilience are restored, maintained, improved, and conserved; and (3) habitat connectivity can withstand expected changes in environmental conditions due to a changing climate. Much of this section could be drawn from the BLM instruction memorandum on wildlife connectivity.[3]

This section or subpart of the proposed rule should require the agency to identify climate-sensitive, connectivity-dependent species, assess habitat connectivity, and identify habitat connectivity areas necessary to sustain fish and wildlife. The section should require the agency to manage habitat connectivity areas to facilitate priority species' movement and to identify priority projects to address barriers to habitat connectivity. Management actions that would impair priority species movement within habitat connectivity areas, such as building new roads, should be prohibited.

Including our habitat connectivity recommendations in the proposed rule will likewise help the Forest Service meet direction in the White House Council on Environmental Quality's (CEQ) guidance on ecological connectivity and wildlife corridors.[4] The CEQ guidance establishes a national policy to promote greater wildlife habitat connectivity as a means to sustain the nation's biodiversity and "enable wildlife to adapt to fluctuating environmental conditions, including those caused by climate change."[5] Pursuant to the CEQ guidance, federal agencies are expected to assess connectivity and corridor values on the public lands they manage; develop policies to "conserve, enhance, protect, and restore" corridors and connectivity, including in forest planning and management; and actively identify and prioritize actions that promote greater connectivity.[6]

Part 6: Supporting Tribal Co-Stewardship and Indigenous Knowledge

No one has endured more climatic change in North America than its Indigenous populations. The knowledge gained through these changes includes a storehouse of climate adaptation practices that should be brought to bear on the future of our national forests. The Forest Service should consult with Native American Tribes to develop the proposed rule and ensure it fully advances opportunities for tribal co-stewardship, incorporation of Indigenous Knowledge, respect for Tribal sovereignty and treaty rights, protection of Tribal cultural sites, and carrying out Tribal consultation in ways that honor the unique historic and current connections of Native American Tribes and Indigenous peoples to lands within the National Forest System.

MOG Inventory

The Wilderness Society appreciates the effort that went into the national inventory of old growth and mature forests. We recognize that there is no established "best" way to conduct such an inventory and welcome an inventory based on forest structure to complement the work we did based on carbon accumulation rates (Barnett et al. 2023) and the work of DellaSala et al. (2022)

[3] USDI Bureau of Land Management, Habitat Connectivity on Public Lands, Instruction Memorandum, Nov. 12, 2022, https://www.blm.gov/policy/im-2023-005-change-1

[4] White House Council on Environmental Quality, Guidance for Federal Departments and Agencies on Ecological Connectivity and Wildlife Corridors, Mar. 21, 2023, https://www.whitehouse.gov/wp-content/uploads/2023/03/230318-Corridors-connectivity-guidance-memo-final-draft-formatted.pdf

[5] *Id*. at 2.

[6] *Id*. at 2, 4.

based on remotely-sensed canopy cover, tree height, and aboveground biomass. The differences in inventory and location revealed by these three approaches show that there is still more work to be done before any single approach can be confidently relied upon to classify stages of forest development. Such work should involve collaborative research from the scientific and stakeholder communities, implemented through a process of adaptive management, built into any rule to address climate resilience of federal forests.

To illustrate some of the differences that remain to be addressed, we compared the Mature and Old Growth Inventory Technical Team's (MOGITT) inventory to ours and found that the MOGITT effort was far more inclusive in what it classified as both mature and old growth forest (MOG). The MOGITT methods resulted in almost twice the amount of MOG as ours did,[7] despite including only 7% more forest area (due to the inclusion of Alaska, which we omitted). MOGITT also recognized significantly younger and smaller diameter FIA plots as mature and old growth than we did.[8] It appears that the structural definitions used in the MOGITT effort, which were developed as "minimum thresholds" for old growth identification in the 1990s, led to inclusion of younger and less developed old growth and mature forest in their inventory of federal forests. In some cases, these differences led to such dramatic variances in area that we are at a loss to explain. For example, while consideration of Alaska led to inclusion of 10% more Fir/spruce/mountain hemlock than we analyzed, the MOGITT methods identified over seven times the amount of MOG. Similarly, Douglas-fir, despite analysis of the same area, was found to support over four times as much MOG under the MOGITT system. These differences are important, as these two FTGs account for almost one third of federal forestland. What is responsible for these differences? Has the application of minimum thresholds for old growth (and the additional "walking down" of these definitions for mature forest) set such a low bar for old forest inclusion that the majority of these forest type-groups (FTGs) may be considered MOG? The significance of these differences both for forest classification and conservation policy demand additional scientific attention.

The exception to the pattern described above occurred in alder/maple, loblolly/shortleaf, and longleaf/slash pine FTGs, which our models show reaching asymptotic carbon density (and therefore old growth) within only a few decades of stand development. We found alder/maple to reach 95% of asymptotic carbon density at 75 years, loblolly/shortleaf pine as early as 34 years on some sites, and longleaf/slash pine at 42 years, resulting in plots classified as old growth that

[7] The MOGITT methods found 97% more MOG, 137% more old growth, and 84% more mature forest than did the TWS method.

[8] For forest type-groups (FTGs) for which a t-test returned a statistically significant difference in stand age (excluding the rapidly developing alder/maple, loblolly/shortleaf, and longleaf/slash pine FTGs), every mature forest (13 out of 13 FTGs) and most old growth (12 out of 13 FTGs) is significantly younger under the MOGITT classification compared to ours. For the FTGs for which there is a significant difference in quadratic mean diameter (QMD), excluding the same three rapidly developing FTGs, most mature (8 out of 12 FTGs) and old growth (6 out of 7 FTGs) forests contain significantly smaller trees in the MOGITT system. Six FTGs showed no significant difference in mature stand age, and nine FTGs showed no significant difference in old growth stand age. Ten mature and 16 old growth pairings exhibited no difference in QMD.

are decades younger than under the MOGITT system. The inventory publication (FS-1215a) indicates that southern pine plots would need to be at least 80 years old to be classified as old growth under the MOGITT system (the minimum age of alder maple is not clear from the publication). The literature (see e.g., Peet and Christensen 1987) suggests that rapid development of loblolly pine stands may result in old growth characteristics (large trees, snags, down wood, constant peak biomass) after only a few decades, but the short-lived nature of these trees (and early culmination of mean annual increment) ensures that few stands reach great age. Should stands that are only a few decades old be classified as old growth or not? Because our classification was based on forest carbon accumulation rates, we found over one million hectares of loblolly/shortleaf pine qualified as old growth on the national forests, whereas the MOGITT system found a mere 15,464 hectares. Similarly, famously rare old-growth longleaf pine, estimated as covering less than 5,000 hectares total, was found to cover more than ten times that amount on the national forests alone under the MOGITT system and more than 70 times that amount using our method. Such dramatic differences demand further attention to determine what is most significant about these forests and their implications for conservation policy.

We are encouraged that FS-1215a describes the inventory as "initial" and includes an expectation that "a continual adaptive management process integrating new science, local conversations, and social processes will refine old-growth and mature forest working definitions over time." We share this expectation and ask that a collaborative adaptive management process and continual improvement of definitions of old growth and mature forests by the scientific and stakeholder communities be built into any rule or other policies developed to conserve old growth and mature forests. The germ of such collaborative adaptive management (see Cheng et al. 2018) has already been established in the monitoring program for the Northwest Forest Plan, where researchers from the Forest Service have collaborated with scientists from Oregon State University to improve definitions and inventory methods over time. Adaptive management of old growth and mature forest conservation under a new rule should expand participation to a broad community of interested scientists and other individuals through a formal program of adaptive management, such as was used in the implementation of the Collaborative Forest Landscape Restoration Program. Such a program could be structured around a set of regional collaboratives to reflect the diversity of regional forest types and conservation issues, coordinated by a national stakeholder body to provide consistency to the national program.

While we still do not entirely understand the Forest Inventory Growth Stage System (FIGSS) methodology (and therefore find Appendix 2 of FS-1215a unusable) and anxiously await the availability of Woodall et al. (in preparation), we applaud the thought that went into these methods and are encouraged by the potential for them to provide a richer and more sophisticated understanding of the characteristics that define older forest development across multiple forest types. In the one system currently in use that addresses a continuum of "old-growthness" and distinguishes mature and old-growth forests along that continuum, the Old Growth Structural Index (OGSI; Davis et al. 2015) is based on one to four measurable old-growth structure elements including (1) density of large live trees, (2) diversity of live-tree size classes, (3) density of large snags, and (4) percentage cover of down woody material. These four elements

were determined to be relevant to the characterization of old growth in the Pacific Northwest, but, as the OGSI system has already shown for ponderosa pine forests of the east side of the Cascades, all four may not be relevant to all forest types. Nevertheless, these same structural elements (plus stand age) form the basis for all old growth classification in the MOGITT system. The FIGSS approach appears to provide a means to identify old growth characteristics of greatest salience to the diversity of individual forest types across the country. We look forward to the further development of these concepts and to exploring their applicability to old forest classification and conservation.

It should be noted that among the four classification systems in use (OGSI, MOGITT, Dellasala et al., and ours), only OGSI quantifies old forest character as a continuous variable, and none incorporates a spatial component into the assessment of thresholds or quality. Davis et al. (2015) and Davis et al. (2023) both include an analysis of the extent of "core," "edges," and "fingers" of classified patches in the Pacific Northwest, which helps to understand the degree of MOG fragmentation and its consequences for biodiversity, but none of the four approaches incorporates vertical or horizontal spatial heterogeneity, both of which are critical aspects of old growth character in both frequent-fire and infrequent-fire forest types. We hope that, as has been accomplished through the 25 years of implementation monitoring of the Northwest Forest Plan, continued scientific attention to classification, inventory, and mapping methods will lead to breakthroughs and improvements that will address these shortcomings. The current effort to incorporate spaceborne LiDAR and other remote sensing technology is a promising development, but we must be careful not to place all of our aspirations on this yet-to-be-developed methodology. For example, spaceborne LiDAR is not likely to be able to quantify the horizontal spatial heterogeneity so crucial to dry, frequent-fire forests; it is limited in the area it will be able to cover for the foreseeable future; and it faces an uncertain funding outlook in the Congress. Improvements in classification and mapping will require "all hands on deck," not reliance on a single technology.

In addition to the need to incorporate spatial heterogeneity into characterization of older forests, there is a larger conversation to be had about how to incorporate the idea of old forest quality. Not all mature or old-growth forest is of equal value, even within a single forest type, and it is crucial to efforts to restore the old growth estate that we recognize these differences and manage for high old growth quality, not simply thin to the minimum threshold, as has been the practice in many restoration and fuel treatment projects. OGSI provides the conceptual beginnings of a focus on quality, and FIGSS may help improve those concepts, but far more attention is needed to managing for old forest quality than has been applied to date. We also need to expand our thinking to include culturally important characteristics of old forests, such as birch bark quality for canoe making or food plants, that have not been part of old-growth definitions to date. We look forward to working with Tribes and the scientific and stakeholder communities, through a formal process of adaptive management, to refine the classification, inventory, and restoration of our precious older forests.

Conclusion

The Wilderness Society encourages the Forest Service to follow up on the ANPR by developing a Proposed Rule to improve climate resilience. The Proposed Rule should include specific requirements to protect, conserve, and manage MOG forests, consistent with Executive Order 14072 and with statutory authorities and direction provided by Congress. We recommend that the Forest Service promulgate a Climate Rule that addresses major threats and encompasses key elements of a comprehensive climate resilience strategy, including wildfire management, watershed protection and restoration, MOG conservation, wildlife habitat connectivity, and tribal co-stewardship and Indigenous knowledge.

Thank you for considering our comments.

Sincerely,

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