Supervisor James Duran
Carson National Forest
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Taos, NM 87571
Sent via email to: comments-southwestern-carson-caminoreal@usda.gov July 17, 2024

Re: Taos Canyon Restoration Project Scoping Notice

Dear Supervisor Duran,

On behalf of WildEarth Guardians and The Forest Advocate, please accept these comments regarding the scope of the proposed Taos Canyon Forest and Watershed Restoration Project (Project) as described in the June 17, 2024 letter (Scoping Notice). Here the Forest Service proposes "to reduce fuel loading and restore forest structure, composition, and spatial distribution on approximately 83,000 acres of National Forest lands to maintain watersheds that are resilient to fire and protect adjacent communities." Scoping Notice at 1. We also hereby incorporate by reference comments submitted by Bryan Bird on behalf of Defenders of Wildlife.

WildEarth Guardians is a nonprofit conservation organization headquartered in Santa Fe, NM with offices in several western states. WildEarth Guardians has over 209,000 members and supporters across the United States and works to protect and restore wildlife, wild places, wild rivers, and the health of the American West. WildEarth Guardians and its members have specific interests in federal forest management and protecting or restoring the ecological integrity of public lands.

The Forest Advocate is a not-for-profit conservation organization focused primarily on Southwestern forests. The Forest Advocate has over 1,200 members and supporters in the Southwest and other regions. The Forest Advocate provides information, resources and perspectives concerning Southwestern forests through an active website and articles, and advocates for conserving and protecting forests, particularly federally managed forests.

Please add our organizations to the contact list to receive any future public notices regarding this project. We look forward to future engagement opportunities to ensure the Project achieves its purpose to truly restore ecological processes and functions.

Looking at the Project description, the Forest Service explains the project would, over the course of 10 years, potentially log trees across 54,731 acres and intentionally burn 83,265 acres within the project area. *Id.* at 3. The purpose of these actions would be in part to restore natural fire regimes, reduce wildfire threat to local communities, improve wildlife habitat, protect cultural resources, and provide firewood and wood products. *Id.* at 1. As we explain in our comments, the agency relies on several flawed rationales to support the need for this project, and the proposed actions will most certainly result in a loss of ecosystem integrity and will fail to maintain or restore watershed conditions. One large reason is due to the massive road construction proposed, 112.1 miles, which is quite alarming especially given these would occur on "existing road grades" indicating these could be decommissioned roads or unauthorized roads. *Id.* at 4-5. While the Forest Service states 95.5 miles would be decommissioned after use (with no timeframe for completion), given that the proposed road construction occurs on existing templates, we are skeptical that the agency will not use these again in the future just as it is now. Equally concerning is the proposal to add 17.7 miles of these roads to the transportation system, and leave 141.4 of unauthorized roads (labeled "undetermined") on the ground without ensuring their removal: "At least 141.4 miles of undetermined non-system roads would be unused and made available for decommissioning." Scoping Notice at 5. To be clear, making these roads "available" for decommissioning fails to ensure their removal and use in future projects. The Forest Service must consider the total road network, both system and non-system, in its analysis as we explain below. The agency also states that 51 miles of new and temporary road construction would take place, though it does not specify how many miles would be temporary, but that 4.9 miles would be added to the system as motorized trails. Here the Forest Service must ensure it demonstrates compliance with the minimization criteria under the Travel Management Rule, and do so within the context of all motorized trails currently displayed on the Motor Vehicle Use Map. *See* 36 CFR 212.55(b).

Further, we are very concerned that the agency has not provided any size limits for trees to be logged or cut, no indication of the amount of trees that will be removed, and no indication of which tree species will be cut. Finally, we are quite alarmed over the proposed action to use ground-based equipment to mechanically remove trees on slopes up to 75% grade, "including but not limited to harvesters and forwarders or feller-bunchers and forwarders." Scoping Notice at 3. Clearly this is in support of timber production because we cannot envision any ecological justification for steep slope logging, rather the damage to soils and loss of habitat will likely negate any supposed benefits the agency may assert this action will achieve. In addition, the Forest Service must ensure any approved actions are consistent with President Biden's Executive Order 14072 meant to conserve mature and old growth forests in order to retain and enhance carbon storage. We are particularly concerned about large tree removal, particularly on moderate and steep slopes, and within any old growth stands. Commercial logging of large trees in old growth stands would be inconsistent with EO 14072. Should the agency proceed with this action, it must take a hard look at the potential environmental consequences, and ensure it is consistent with Executive Order 14072, as we explain below.

In addition to these issues, our comments below explain more of our concerns with the proposed actions that the agency must consider in a detailed environmental analysis. The agency must clearly explain its rationale for designating the area as a "high-risk fireshed" and consider scientific studies that demonstrate the proposed action may not meet the project's purposes, particularly to "protect and restore infrastructure and water resources." Scoping Notice at 6. We are deeply concerned that the Forest Service is using the "authorized emergency action" provision in PL 117-58 to increase timber production and risk escaped burns for "10 year or more." As such, the agency must undertake a comprehensive analysis of this project under existing NEPA regulations since it may be substantially impactful to both ecosystems and nearby communities.

I. Flawed rationales for the claimed purpose and need related to vegetative management.

The Forest Service provides cursory rationales to support its tree removal and intentional burning proposals, namely by citing departures from historic conditions, threats from natural disturbances (wildfire, insects and diseases), and increased wildfire risks. The agency's underlying assumptions are both highly controversial and uncertain, thereby necessitating detailed environmental analysis under an EIS. To ensure that the agency has taken the required "hard look," courts hold that the agency must utilize "public comment and the best available scientific information." *Biodiversity Cons. Alliance v. Jiron*, 762 F.3d 1036, 1086 (10th Cir. 2014) (internal citation omitted). As such, the Forest Service must adequately demonstrate that the widespread use of specific proposed treatments under the proposed actions will improve ecosystem resilience, and that attempting to attain such a goal will in fact restore ecological integrity. In doing so, we caution the Forest Service not to rely on uncertain and controversial assumptions that the proposed treatments will effectively achieve the intended purposes and meet the stated needs.

A. Climate Change & Historical References

As noted above, the agency relies heavily on departures from historic conditions to support the project's purpose and need. Yet, when relying on such historic conditions to inform vegetative treatments, the Forest Service must account for the fact that climate change is fundamentally altering the agency's assumptions about the efficacy of the proposed actions. In fact, recent science calls into question findings that some forested landscapes historically experienced low-severity wildfire and current trends toward higher severities are substantially departed from historic ranges of variability. Specifically, researchers explained,

> The structure and fire regime of pre-industrial (historical) dry forests over ~26 million ha of the western USA is of growing importance because wildfires are increasing and spilling over into communities. Management is guided by current conditions relative to the historical range of variability (HRV). Two models of HRV, with different implications, have been debated since the 1990s in a complex series of papers, replies, and rebuttals. The "low-severity" model is that dry forests were relatively uniform, low in tree density, and dominated by low- to moderate-severity fires; the "mixed-severity" model is that dry forests were heterogeneous, with both low and high tree densities and a mixture of fire severities. Here, we simply rebut evidence in the low-severity model's latest review, including its 37 critiques of the mixed-severity model. A central finding of high-severity fire recently exceeding its historical rates was not supported by evidence in the review itself. A large body of published evidence supporting the mixed-severity model was omitted. These included

> numerous direct observations by early scientists, early forest atlases, early newspaper accounts, early oblique and aerial photographs, seven paleo-charcoal reconstructions, >18 tree-ring reconstructions, 15 land survey reconstructions, and analysis of forest inventory data. Our rebuttal shows that evidence omitted in the review left a falsification of the scientific record, with significant land management implications. The low-severity model is rejected and mixed-severity model is supported by the corrected body of scientific evidence.

Baker et al., 2023. In other words, the Forest Service cannot rely on one interpretation of historic reference conditions to formulate its vegetation treatments. Rather, the agency must look beyond HRV and inform restoration objectives based on reference sites that reflect current ecological conditions of the project area. Such sites would have experienced broadscale disturbances in areas that have a passive management emphasis. In addition, the Forest Service should analyze how those reference conditions may change over the next 50 -100 years based on the best available climate models. It is likely that such analysis will indicate the best management approach is to allow for natural adaptation as a recent study suggests:

> Forests are critical to the planetary operational system and evolved without human management for millions of years in North America. Actively managing forests to help them adapt to a changing climate and disturbance regime has become a major focus in the United States. Aside from a subset of forests wherein wood production, human safety, and experimental research are primary goals, we argue that expensive management interventions are often unnecessary, have uncertain benefits, or are detrimental to many forest attributes such as resilience, carbon accumulation, structural complexity, and genetic and biological diversity. Natural forests (i.e., those protected and largely free from human management) tend to develop greater complexity, carbon storage, and tree diversity over time than forests that are actively managed; and natural forests often become less susceptible to future insect attacks and fire following these disturbances. Natural forest stewardship is therefore a critical and cost effective strategy in forest climate adaptation.

Faison et al. 2023. In fact, Forest Service actions that seek to resist natural adaptation need careful evaluation to determine if such resistance will in fact meet restoration goals, especially given that "in a time of pervasive and intensifying change, the implicit assumption that the future will reflect the past is a questionable basis for land management (Falk 2017)." Coop et al., 2020. While it is useful to understand how vegetative conditions have departed from those in the past, the Forest Service cannot rely on those departures to define management actions, or reasonably expect the action alternatives will result in restoring ecological processes.

Given changing climate conditions, the Forest Service should emphasize reference conditions based on current and future ranges of variability, and less on historic departures. Further, the agency needs to shift its management approach to incorporate the likelihood that no matter what vegetation treatments it implements, there are going to be future forest wildfire-triggered conversions to other vegetation types. As such, the Forest Service cannot rely on the success of resistance strategies, as Coop 2020 explains:

> Contemporary forest management policies, mandates, and science generally fall within the paradigm of resisting conversion, through on-the-ground tactics such as fuel reduction or tree planting. Given anticipated disturbance trajectories and climate change, science syntheses and critical evaluations of such resistance approaches are needed because of their increasing relevance in mitigating future wildfire severity (Stephens et al. 2013, Prichard et al. 2017) and managing for carbon storage (Hurteau et al. 2019b). Managers seeking to wisely invest resources and strategically resist change need to understand the efficacy and durability of these resistance strategies in a changing climate. Managers also require new scientific knowledge to inform alternative approaches including accepting or directing conversion, developing a portfolio of new approaches and conducting experimental adaptation, and to even allow and learn from adaptation failures.

Coop et al., 2020. Further, equally important to acknowledging the limitations of resistance strategies is the fact that other pertinent scientific findings show warming and drying trends are having a major impact on forests, resulting in tree die-off even without wildfire or insect infestation. See, e.g., Parmesan, C. 2006; Breshears et al. 2005; Allen et al. 2010, 2015; Anderegg et al. 2012; Williams et al. 2013; Overpeck 2013; Funk et al. 2015; Millar and Stephenson 2015; Gauthier et al. 2015; Ault et al. 2016 ("business-as-usual emissions of greenhouse gases will drive regional warming and drying, regardless of large precipitation uncertainties"); Vose et al. 2016 ("In essence, a survivable drought of the past can become an intolerable drought under a warming climate").

Given the fallacies of using historic conditions as a reference for desired conditions and the uncertainty that treatments will maintain or restore ecological integrity in the context of climate change and likely forest conversion scenarios, the Forest Service must reevaluate its assumptions about its proposed vegetative treatments. In fact, many of the agency's assumptions run contrary to the most recent science regarding the impact of logging on wildfire behavior, resilience of the forest to large-scale disturbances, and ability to provide quality wildlife habitat. Many of the scientific studies cited within our comments call into question the Forest Service's assumption that its proposed actions will achieve the stated purpose and need. Ultimately, the agency cannot assert that there is broad consensus in the scientific literature that commercial timber harvest or thinning in combination with prescribed fire reduces the potential for high severity wildfire to the extent characterized in the project scoping letter. In fact, such an approach has been broadly questioned within the scientific literature:

> Fire suppression policies and "active management" in response to wildfires are being carried out by land managers globally, including millions of hectares of mixed conifer and dry ponderosa pine (Pinus ponderosa) forests of the western USA that periodically burn in mixed severity fires. Federal managers pour billions of dollars into command-and-control fire suppression and the MegaFire (landscape scale) Active Management Approach (MFAMA) in

> an attempt to contain wildfires increasingly influenced by top down climate forcings. Wildfire suppression activities aimed at stopping or slowing fires include expansive dozerlines, chemical retardants and igniters, backburns, and cutting trees (live and dead), including within roadless and wilderness areas. MFAMA involves logging of large, fire-resistant live trees and snags; mastication of beneficial shrubs; degradation of wildlife habitat, including endangered species habitat; aquatic impacts from an expansive road system; and logging-related carbon emissions. Such impacts are routinely dismissed with minimal environmental review and defiance of the precautionary principle in environmental planning. Placing restrictive bounds on these activities, deemed increasingly ineffective in a change climate, is urgently needed to overcome their contributions to the global biodiversity and climate crises. We urge land managers and decision makers to address the root cause of recent fire increases by reducing greenhouse gas emissions across all sectors, reforming industrial forestry and fire suppression practices, protecting carbon stores in large trees and recently burned forests, working with wildfire for ecosystem benefits using minimum suppression tactics when fire is not threatening towns, and surgical application of thinning and prescribed fire nearest homes.

DellaSala et al., 2022. This article comes in response to an article, Prichard et al. 2021, that we see the Forest Service typically cite to support its proposed actions and assert broad scientific consensus as to their efficacy. Yet, even here the researchers raise several factors that the Forest Service must address in a detailed analysis. For example, they explain:

> Fuel reduction treatments are not appropriate for all conditions or forest types (DellaSala et al. 2004, Reinhardt et al. 2008, Naficy et al. 2016). In some mesic forests, for instance, mechanical treatments may increase the risk of fire by increasing sunlight exposure to the forest floor, drying surface fuels, promoting understory growth, and increasing wind speeds that leave residual trees vulnerable to wind throw (Zald and Dunn 2018, Hanan et al. 2020).

Such conclusions indicate that treatments within areas of mesic site conditions may not be appropriate. In addition, Prichard et al, 2021 explains the following:

> In other forest types such as subalpine, subboreal, and boreal forests, low crown base heights, thin bark, and heavy duff and litter loads make trees vulnerable to fire at any intensity (Agee 1996, Stevens et al 2020). Fire regimes in these forests, along with lodgepole pine, are dominated by moderate- and high-severity fires, and applications of forest thinning and prescribed underburning are generally inappropriate.

Ultimately, what the agency proposes is a long-term active management regime that will require repeated tree cutting and burning since nowhere does the Forest Service state it has any plans to allow unmanaged wildfire to play a natural ecological role. This equates to perpetual management with logging and prescribed burning which is hardly ecological restoration, and the Forest Service's misguided efforts to mimic natural disturbance patterns fail to allow natural processes to function that creates even more novel ecosystems with unknown long-term results.

B. Assumptions And Uncertainty About Vegetation Treatments And Wildfire

The agency states that project objectives include "Reducing fuel loadings and the threat of severe wildfire to infrastructure and the adjacent communities of Pot Creek, Talpa, Canon, Taos. Scoping Notice at 1. This implies that the agency proposes to utilize fuels treatments in order to reduce risk of homes and other structures within communities burning, since communities are largely comprised of homes and other buildings. It is well-established that vegetation management activities beyond 100 feet surrounding homes and other structures has no additional influence on whether a structure survives a fire. Cohen 2000, Syphard et al. 2014, DellaSala and Hanson 2015. We request that the agency clarify how reducing fuel loadings will reduce the threat of severe wildfire to adjacent communities more effectively than addressing the home ignition zone that will do more to protect property than the proposed action.

Ultimately, we question the agency's assumptions that reducing tree densities and fuel loadings will result in less intense fire behavior. Science shows that fuel treatments have a modest effect on fire behavior, and that fuel reduction does not necessarily reduce wildfire. Lydersen, et al., 2014 (explaining that reducing fuels does not consistently prevent large forest fires, and seldom significantly reduces the outcome of large fires). Studies from the Forest Service's own Rocky Mountain Research Station refute the Forest Service's assumptions that vegetation treatments will result in less intense fire behavior. Calkin, D.E., et al., 2014 (explaining, "[p]aradoxically, using wildfire suppression to eliminate large and damaging wildfires ensures the inevitable occurrence of these fires").

Large fires are driven by several conditions that completely overwhelm fuels. Meyer, G and Pierce, J. 2007. Because weather is often the greatest driving factor of a forest fire, and because the strength and direction of the wildfire is often determined by topography, fuels reduction projects cannot guarantee fires of less severity. Rhodes, J. 2007, Carey, H. and M. Schumann, 2003.

Vegetation treatments based on historical reference conditions to reduce high-intensity wildfire risk on a landscape scale are undermined by the fact that land managers have shown little ability to target treatments where fires later occur. Barnett, K. et al, 2016, Rhodes, J. and Baker, W. 2008 (finding that fuel treatments have a mean probability of 2-8% of encountering moderate- or high- severity fire during the assumed 20-year period of reduced fuels). Analysis of the likelihood of fire is central to estimating likely risks, costs and benefits incurred with the treatment or nontreatment of fuels. If fire does not affect treated areas while fuels are reduced, treatment impacts are not counterbalanced by benefits from reduction in fire impacts. Results from Rhodes and Baker 2008 indicate that "even if fuel treatments were very effective when encountering fire of any severity, treatments will rarely encounter fire, and thus are unlikely to substantially reduce effects of high-severity fire."

Fuel treatments could even make fire worse—exacerbating the problems the Forest Service is claiming to address. Fuel reduction may actually exacerbate fire severity in some cases as such projects leave behind combustible slash through at least one dry season, open the forest canopy to create more ground-level biomass, and increase solar radiation which dries out the understory. Graham, R.T., et al, 2012, Martinson, E. J. and P. N. Omi, 2013 (finding that in about a third of cases reviewed mechanical fuel reductions increased fire spread). Also fuel reduction can exacerbate fire spread by opening up a forest to wind penetration.

We question the wisdom of attempting to control wildfire instead of learning to adapt to fire. See Schoennagel, T., et al., 2017 (explaining, "[o]ur key message is that wildfire policy and management require a new paradigm that hinges on the critical need to adapt to inevitably more fire in the West in the coming decades"). The Forest Service must recognize that past logging and thinning practices may have actually increased risk of intense fire behavior on this landscape. *But instead of learning from these past mistakes, here the Forest Service is committing to the same mistakes by proposing widespread tree cutting and repeated burning across the landscape.*

We also question the need to reduce naturally-ignited wildfire, a natural forest process. While some may view wildfires as tragic and the aftermath as a destruction zone, natural ecology shows otherwise. Further, in 2019 conservation scientists Dr. Dominick DellaSala and Dr. Chad Hanson published a study disputing the assumption that high-severity has increased in recent decades. In this megafire trend study, the researchers analyzed data on large high-severity burn patches across 11 western dry pine and mixed-conifer forests over three decades. They found no significant increase in the size of large high-severity burn patches since the early 1990s. DellaSala, Hanson, 2019. Most research studies define high severity as 90% tree mortality. Moritz et al. 2014. Therefore, the Forest Service may be overestimating any increase of the amount of high severity wildfire that has been occurring in recent decades. Baker, 2023. This leads to a bias towards carrying out widespread and intensive fuel treatments to respond to the ostensive increase in high intensity fire.

Impacts from climate change, including changing weather patterns and drought, are the driving factors for wildfires. *Id.* Instead of focusing on thinning and prescribed burning to manage the forest, the Forest Service should focus on how it needs to change its practices to adapt to the changing climate. At an absolute minimum, these studies demonstrate that the proposed treatments are controversial, ill-supported, and have the potential for significant impacts requiring preparation of an EIS.

C. Assumptions and Uncertainty About Vegetation Treatments and Insects

The Forest Service cites a need to control insects and disease as one rationale for this project and the use of an emergency authority to expedite issuing a decision. Scoping Notice at 6. Yet, the best available science brings into question many of the Forest Service's underlying assumptions about the efficacy of vegetation treatments in reducing the effects from what can be characterized as a natural response to changing climate conditions. See Hart, S.J., et al., 2015 (finding that although mountain pine beetle infestation and fire activity both independently increased with warming, the annual area burned in the western United States has not increased in direct response to bark beetle activity); see also Hart, S.J., and D.L. Preston. 2020 (finding "[t]he overriding influence of weather and pre-outbreak fuel conditions on daily fire activity . . . suggest that efforts to reduce the risk of extreme fire activity should focus on societal adaptation to future warming and extreme weather"); see also Black, S. H., et al., 2010 (finding, inter alia, that thinning is not likely to alleviate future large-scale epidemics of bark beetle); see also Six, D.L., et al., 2018 (study that found during mountain pine beetle outbreaks, beetle choice may result in strong selection for trees with greater resistance to attack, and therefore retaining survivors after outbreaks—as opposed to logging them—to act as primary seed sources could act to promote adaptation); see also Six, D.L. et al., 2014 (noting "[s]tudies conducted during outbreaks indicate that thinning can fail to protect stands").

In the EMNRD document, New Mexico Forest Health Conditions, 2023, the New Mexico Forestry Division states, acknowledging the beneficial role of bark beetle in ecosystem function:

> However, bark beetles do play a beneficial role in ecosystem function by killing stressed, over-mature, overstocked, or otherwise unhealthy trees. Bark beetle-killed trees are eventually replaced by juvenile trees that resist disturbance, recover more quickly, and maintain structure and function better than forest stands with old trees. Furthermore, canopy structure disturbance from bark beetle-caused tree mortality can increase the amount of sunlight reaching the forest floor and increase the number of snags and woody debris. This, in turn, can increase the species richness of flora and fauna in an area.[1]

Ultimately, science provides only weak support for vegetative treatments as a way to improve forest resilience to large-scale disturbances such as high severity crown fire and insects, and numerous studies question this approach or have found it to be ineffective. In addition, all mechanized treatments guarantee damage to ecosystem components, including soils, mycorrhizal networks, aquatics, and vegetation; they also have the potential to spread exotic plants and pathogens.

The Forest Service claims fuel treatments will help prevent outbreaks of bark beetle, but they virtually always leave slash through the next warm season, when a bark beetle outbreak could occur. Slash should not be left on the ground through the warm season following thinning treatments. This could precipitate a bark beetle outbreak throughout large sections of the Carson National Forest. This risk must be addressed.

New Mexico Forest Health Conditions, 2023 at 5.3 The State Forestry Division also states "In 2023 there was a substantial statewide decrease in mortality from bark beetles compared to 2022 (Fig. 2), most likely due to improved drought conditions in late 2022 and early 2023 resulting in healthier

[1] *See* Ex. 1 - New Mexico Forest Health Conditions, 2023 Report

trees and their ability to withstand damage causing agents. 2023 had the lowest recorded tree mortality since 2010."

Id. Currently the trajectory of bark beetle mortality does not appear to be increasing. To maintain this equilibrium, it is important to not precipitate bark beetle outbreak due to stressing tree stands by aggressive thinning which produces large amounts of thinning slash.

1. Concerns about ips bark beetle outbreak from thinning slash

There is no acknowledgement in the Scoping Notice that bark beetle outbreaks from thinning slash is a substantial concern. There is no discussion in the Scoping Notice concerning mitigations to reduce bark beetle outbreaks from slash piles. The agency must provide Project Design Features (PDFs) or Mitigation Measures related to minimizing bark beetle outbreaks from treatment activities.

It is well-known that thinning can exacerbate bark infestations and precipitate outbreaks, both by creating a disturbance from the impacts of heavy machinery compacting soils and from direct impacts to residual trees, and as an effect of slash being left either in lop and scatter or in piles, especially if slash is over 3" in diameter. The Arizona College of Agriculture and Life Sciences slash management guide states:

> In the southwestern U.S., thinning is advocated by land managers as a means of reducing fuel loads, improving residual tree growth, and as a preventive measure for reducing subsequent amounts of bark beetle-caused tree mortality (DeGomez 2006a). The thinning prescriptions are quite diverse, and their application can result in significantly different stand structures. In most cases large amounts of downed material (i.e., slash) are created and left in the field, due to lack of developed markets for small diameter trees. This material, if left on the ground, has inherent value and ecological functions (e.g., nutrient cycling and wildlife habitat), while at the same time creates host material for many bark beetle species, specifically those in the genus Ips (hereafter referred to as ips). Forest managers and forest health specialists tend to agree that fresh slash left untreated on the forest floor increases risks from bark beetle infestations and eventually wildfire, but those who are managing for other forest attributes are prone to recommend leaving some of the slash untreated to serve as habitat for a variety of fauna that contribute to a healthy forest condition (Brown et al. 2003).

Managing Slash to Minimize Colonization of Residual Trees by Ips and Other Bark Beetle Species Following Thinning in Southwestern Ponderosa Pine at 1.21.[2] The density of the stand treated has a substantial impact on the likelihood of a bark beetle outbreak because more thinning slash tends to increase bark beetle infestation. The Forest Service must consider in their analysis the benefits of light thinning, or of thinning in stages so potential bark beetle impacts can be decreased. The slash

[2] *See* Ex. 2 - Managing Slash to Minimize Colonization of Residual Trees by Ips and Other Bark Beetle Species Following Thinning in Southwestern Ponderosa Pine.

management guide goes on to state: "Treatment of dense stands typically results in the creation of greater amounts of slash than treatment of less dense stands. Generally, the greater the amount of slash the greater the number of ips beetles emerging in a given area (Reid 1957)." *Id.*

The bark beetle management guide also states:

> The time of year slash is created can have a significant impact on subsequent ips brood production, and top-kill of big trees and tree mortality rates (Hall 1947, Buckhorn 1957, Steed and Wagner 2004, Fettig et al. 2006a, Hayes et al. 2008, Fig. 7). For example, studies by Buckhorn (1957) demonstrated that ponderosa pine mortality caused by ips in Oregon was greatest when slash was generated between the period of February and July, as compared to August through January. Slash material produced from January through June is generally most optimal for ips colonization and brood production, and is considered the "hazardous period" for creating slash (Sartwell 1970). Conversely the "safe period" for producing slash is generally from July through December (Parker 1991). During this period, host material declines in suitability over time as phloem moisture is reduced. The drying of the phloem within the slash is thought to be a major factor in reducing the opportunity of attacking ips to successfully complete their lifecycle (Redmer et al. 2001).

Id. Considering the local climate is getting warmer and drier, the Forest Service must consider stronger safeguards to protect the surrounding forest during fuels treatment activities. Thinning to a higher remaining tree density, reducing the size of thinning treatments, and thinning in stages to reduce the amount of thinning slash that is produced at a time should be considered.

The Forest Service must provide information, analysis and PDFs and Mitigation Measures to reduce the likelihood of bark beetle outbreak from thinning slash. Strategies should include greatly reducing the amount and aggressiveness of logging and thinning proposed.

2. Spruce Budworm

The Project area is composed largely of spruce/fir, which indicates the agency intends to log spruce/fir since logging is proposed for the majority of the project area. The only justification for tree removal in spruce/fir would be a substantial spruce budworm outbreak, or the imminent potential of such an outbreak. There is no current indication of a spruce budworm outbreak to an extent that it would create more ecosystem damage than benefit. According to the NMRED 2023 Forest Health Conditions report, "Defoliation on state and private lands in 2023 increased by 25% from 2022 levels, due to increases in western spruce budworm activity. Douglas-fir tussock moth caterpillars were responsible for 2,600 acres of defoliation in 2023." Forest Health Conditions, 2023 at 10. However, overall statewide spruce budworm activity on all land types in New Mexico from 2013-2023 is on a substantially downward trend, decreasing by approximately 20%. *Id. See* Figure 8. The amount of defoliation by Western spruce budworm in New Mexico is currently moderate at most, and likely beneficial to overall forest structure and ecosystem integrity.

Generally, forests can benefit from moderate levels of defoliators such as Western spruce budworm. The Forest Service states in their online wildlife guide, "Some of the mortality associated with western spruce budworm defoliation contributes to the formation of canopy gaps, increasing structural diversity."[3] Conservation biologist Derek E. Lee states:

> ...forests in the western United States have evolved to naturally self-thin uncompetitive trees through forest fires, insects, or disease. Forest fires and other disturbances are natural elements of healthy, dynamic forest ecosystems, and have been for millennia. These processes cull the weak and make room for the continued growth and reproduction of stronger, climate-adapted trees. Remaining live trees are genetically adapted to survive the new climate conditions and their offspring are also more climate-adapted, resistant, and resilient than the trees that perished. Without genetic testing of every tree in the forest, indiscriminate thinning will remove many of the trees that are intrinsically the best-adapted to naturally survive drought, fire, and insects.

Lee, DE, 2017.[4]

There is likely a negative association between drought and Western spruce budworm in the Southwest. A 2019 study on drought in relation to Western spruce budworm outbreaks in the Western U.S. states:

> Similar to past conclusions, we found that drought facilitates the initiation of WSBW outbreaks in the Northwest. In contrast, in the Southwest, which is on average drier, outbreaks were not associated with drought. No clear relationship existed between defoliation area growth rates after an outbreak begins (i.e., during the continuation stage) and moisture metrics in the Northwest, but in the Southwest, increases of defoliation area may have been related to higher spring moisture availability, although correlations were weak. Thus, other factors were more influential during the continuation stage than climate.

Xu B., et al. 2019 at 12. This study indicates that there may be no reason to expect an increase of Western spruce budworm from the continuation of the Southwestern drought. In fact, increasing drought is likely to generally reduce tree densities through drought stress and beetle attack, so there are not strong indications that Western spruce budworm will increase. The agency needs to develop a better understanding of whether a Western spruce budworm outbreak is probable, and if so, whether the proposed silvicultural treatments can/will reduce adverse impacts from Western spruce bud moths on the Project landscape without significant adverse impacts to the project landscape. The agency should develop light-handed and specific silvicultural protocols that address potential spruce budworm outbreaks without causing substantial adverse impacts. This should be considered within an EIS.

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[3] *See* https://apps.fs.usda.gov/r6_decaid/views/western_spruce_budworm.html (Last Accessed, 7/16/2024).

[4] *See* Ex. 3 - Proposed forest thinning will sabotage natural forest climate adaptation, resistance to drought, fire, insect outbreaks.

Overall, the Forest Service must carefully and fully consider the impacts of its proposed action within the context described above and demonstrate the efficacy of specific treatments in a detailed environmental analysis.

D. Assumptions and Uncertainty about Vegetation Treatments and Restoration of Natural Processes and Function

The Forest Service states, "Project objectives include, Re-establishing fire-adapted forests, including restoration of natural fire regimes and forest structure, and maintaining a healthy forest condition with managed fire. Scoping Notice at 1. The agency also states, "Prescribed fire refers to deliberately burning an area under specified and controlled conditions, constraining the fire within a predetermined area and intensity to promote resource benefits such as maintaining a diversity of plants important for ecosystem health and wildlife habitat or reducing fuel levels. The intent of the proposed mechanical and prescribed fire treatments is to improve forest health by re-establishing natural fire regimes, associated forest structure, and species composition while reducing wildfire threat to communities and infrastructure." *Id.* at 3. Yet when one observes past treatments in Northern New Mexico National Forests that generally share landscape characteristics with the Project area landscape, there is little apparent progress towards restoration of forest structure, composition, density, and landscape patterns that create uneven-aged landscapes more resilient to disturbances so natural ecological processes and function may return to their characteristic roles within the ecosystem. In fact, one observes highly altered landscapes, with weakened trees (some turning brown and losing needles), either an absent or uncharacteristic understory, and apparently damaged and less productive soils. This appears to hold true, regardless of the age of the treatments.

In such treatments, the previously existing understory is generally decimated. There are very few young trees, and what remains are often even-aged trees, and in an unnatural structure, often individual trees with even (and large) spaces in-between. Tree groupings that were providing structural support for the group are often reduced to one to two trees, and these remaining trees sometimes simply blow over due to the loss of support. The soils between the trees appear dried out and desiccated.

In many of these areas, uncharacteristic amounts of scrub oak and other weeds have come in, and sometimes invasive weeds and grasses. This creates a fire hazard that has the potential to cause wildfire to go up into the tree crowns. They are creating conditions in which highly flammable surface fuels exist. The apparent solution is to burn more frequently, and then the same types of uncharacteristic vegetation grow back again. Over-burning does not support healthy soils or understory.

In his 2017 research article, Dr. William Baker stated "Fires that are too frequent can reduce the ecological roles of the forest floor in replenishing soil nutrients and organic matter, enhancing absorption of water and nutrients, and providing habitat for microbial communities, potentially reducing long-term forest productivity." Baker, 2017. This is precisely what can be observed to be occurring and can be directly attributed to the fuel treatment strategy proposed in the Scoping Notice.

Conifer saplings are often killed in broadcast prescribed burns, virtually eliminating the emergence of a new generation of conifers. The cycle continues to repeat. This is an ecological trap that assures a forest will never return to a state of "forest health," or resemble any "natural" state.

While the Forest Service cutting/burning treatments clearly reduce stand density, they are not, at least so far, improving the ecological integrity of forest stands, particularly ecosystem processes and function. As such, the Forest Service must demonstrate how broadscale logging and burning described in the Scoping Notice, will in fact, restore ecosystem integrity. The Forest Service seems to assert and assume that it need only alter forest stand structure and composition, and that doing so will restore ecosystem processes and function. Such an assumption is without merit. The activities described in the Scoping Notices may be as detrimental to the purpose of ecosystem integrity as past activities that brought forests into their current condition. Trees losing needles, turning brown and some dying, as we can often observe in treated areas, does not indicate improved ecological conditions.. The Forest Service must clearly address the uncertainty and scientific controversy at the heart of the proposed action, namely that logging and burning effectively restores ecosystem integrity.

II. Expand project's purpose to include the Forest Service's duty to identify the minimum road system.

Over twenty years ago, the Forest Service recognized the challenges related to its oversized and deteriorating road system. In 2001, the Forest Service promulgated the Roads Rule (referred to as "subpart A").[5] The Roads Rule created two important obligations for the agency. One obligation is to complete a Travel Analysis Report and identify unneeded roads to prioritize for decommissioning or to be considered for other uses.[6] Another obligation is to identify the minimum road system needed for safe and efficient travel and for the protection, management, and use of National Forest system lands.[7]

Under subpart A, the Forest Service has a substantive duty to address its over-sized road system. Identifying a resilient future road system is one of the most important endeavors the Forest Service can undertake to restore aquatic systems and wildlife habitat, facilitate adaptation to climate change, ensure reliable recreational access, and operate within budgetary constraints. This underlying substantive duty must inform the scope of, and be included in, the agency's NEPA analysis. After 20 years since finalizing the subpart A rules, the Forest Service can no longer delay in addressing this

[5] 36 C.F.R. part 212, subpart A. 66 Fed. Reg. 3206 (Jan. 12, 2001).
[6] 36 C.F.R. § 212.5(b)(2).
[7] *Id.* § 212.5(b)(1).

duty. Yet, the Forest Service fails to incorporate this duty within the project's purpose and need, thereby failing to ensure the road system provides for the protection of Forest Service System lands, reflects long-term funding expectations and minimizes adverse impacts. See 36 C.F.R. 212.5(b).

As such we urge the agency to include subpart A compliance as part of the project's purpose, especially given the likelihood that the agency will need to evaluate its road system within the project area in order to comply with NEPA. In doing so, we urge the Forest Service to update its previous Travel Analysis Report to reflect any changed circumstances. In addition, we urge the Forest Service to recognize that roads and motorized trails provide vectors for human wildfire ignitions, which is a risk that should be included in any Travel Analysis Process.

Complying with subpart A is a win-win-win approach: (1) it's a win for the Forest Service's budget, closing the gap between large maintenance needs and inadequate (and declining) funding through congressional appropriations; (2) it's a win for wildlife and natural resources because it reduces negative impacts from the forest road system; and (3) it's a win for the public because removing unneeded roads from the landscape allows the agency to focus its limited resources on the roads we all use, improving public access across the forest and helping ensure roads withstand strong storms.

III. The Forest Service must analyze the direct, indirect and cumulative impacts of the proposed action.

NEPA requires the FS to prepare a detailed statement by the responsible official on "the reasonably foreseeable environmental effects of the proposed agency action."[8] A critical part of this obligation is presenting data and analysis in a manner that will enable the public to thoroughly review and understand the analysis of environmental consequences. Toward this end, NEPA requires the agency to "ensure the professional integrity, including scientific integrity, of the discussion and analysis in an environmental document," and "make use of reliable data and resources in carrying out this Act."[9] The Data Quality Act expands on this obligation, requiring that influential scientific information use "best available science and supporting studies conducted in accordance with sound and objective scientific practices."[10] The Forest Service may not ignore topics if the information is uncertain or unknown, and acknowledge where information is lacking or uncertain in a detailed statement. The Agency must also clarify the relevance of the information to the evaluation of foreseeable significant adverse effects, summarize the existing science, and provide its own evaluation based on theoretical approaches in a manner that is not arbitrary or capricious.

The Proposed Action must be considered as a cumulative impact in relation to the 389,000 acres recently burned in the 2022 SFNF agency-ignited wildfires. a significant proportion of which burned in the CNF.

[8] 42 U.S.C. 4332 (C)(i), 2023.
[9] 42 U.S.C. 4332 (D)
[10] Treasury and General Government Appropriations Act for Fiscal Year 2001, Pub.L. No. 106-554, § 515.

A. Disclose site-specific information

The agency states "Specific locations, size, and treatment prescriptions would be determined following detailed analysis that would be undertaken in the early phases of the project, to better understand on-the-ground conditions, future fire behavior, and ecological response based on different treatment options." Scoping Notice at 5. The FS should provide within an EIS detailed, site-specific information regarding existing conditions and how the proposed action will affect forest resources including wildlife, wildlife habitat, streams and riparian areas. We are particularly interested in the disclosure regarding site-specific impacts to any at-risk wildlife. At a minimum, the Forest Service must disclose the location of proposed activities in relation to wildlife that may be present in the project area and important wildlife habitat, as well as perennial or ephemeral streams and riparian areas.

B. A special note on Mexican Spotted Owl (MSO)

According to the MSO Recovery Plan (USFWS 2012), in 1993 the U.S. Fish and Wildlife Service (FWS) listed the Mexican Spotted Owl (MSO) as threatened under the ESA for two primary reasons: alteration of its habitat as the result of timber-management practices, and the threat of these practices continuing as evidenced in existing national forest plans. The 2012 revision of the recovery plan lists stand-replacing fire as the most significant threat to the MSO, in addition to human disturbances such as logging, grazing, and recreation. Yet, we explain below, there is significant controversy about the impact wildfires have on MSO populations.

There is no mention of MSOs in the entire Scoping Notice. It is unknown if there are MSO habitats in the Project area, and what types. The Forest Service must identify all MSO habitat and protected activity centers and explain how such habitat will be protected and restored.

The closest the agency comes to identifying a purpose in need in relation to MSOs is that project objectives include "improving wildlife habitat and sustaining both common and uncommon native species." Also:

> Therefore, by targeting the source of exposure in these specific areas and working with partners and stakeholders to set common goals across shared landscapes, strategic fuels management projects can reduce wildfire impacts not only to homes and communities but also on air quality, municipal watersheds, wildlife habitat, and other values at risk.

Scoping Notice at 1. The threats to MSO recovery the agency implies are premised on the need, in part, to reduce wildfire occurrence. However, as we explained above, there is a great deal of uncertainty regarding the efficacy of tree cutting (especially logging) and prescribed burning in preventing severe wildfires at a landscape-scale and this includes within MSO habitats. Additionally, the Forest Service must disclose how much timber it intends to produce within MSO habitats. It must also identify the protected activity centers subject to any thinning and prescribed burning. We caution the Forest Service from simply relying on the 2012 MSO Recovery Plan compliance since it entirely relies on the assertion that burned forest is somehow degraded or lost as MSO habitat. This assertion is made in spite of the fact that no statistically significant negative effects of fire on MSO are reported anywhere in the recovery plan, and nearly all burned sites studied were equivalent to unburned sites in every way. Remarkably, in this documented absence of any significant negative effects of fire on MSO, the MSO Recovery Plan decides habitat alteration from fire must somehow indirectly affect MSO and is therefore, in some as yet undetected manner, a threat.

The Project analysis should not take the same leap in logic as the MSO Recovery Plan and assert that because fires burn the forest and kill trees, it must be bad for MSO. To do so would be to disregard not only the MSO and fire studies summarized in the 2012 Recovery Plan, but also subsequent studies of fire effects on MSO and other subspecies of Spotted Owl.

Specifically, we refer to information published in Lommler, M.A. 2019.[11] This PhD thesis from Northern Arizona University examined MSO site occupancy, breeding and habitat selection 13-15 years after a large fire (462000-ac, 36.6% burned at high severity) and subsequent salvage logging. In Chapter 3, Lommler used appropriate occupancy modeling with covariates to examine effects of fire and salvage logging on site occupancy and found significant positive effect of percent area composed of MCD forest, significant negative effect of salvage logging, and no significant effect of fire. In Chapter 4, he examined nest and roost habitat selection; model averaged coefficients showed basal area of large trees and forest cover were significant positive effects, and no significant fire effects were found. In summary, Lommler's results show that MSOs would be significantly harmed in terms of occupancy and nesting/roosting habitat should the agency implement the proposed action as roughly described.

Also relevant are publications by Lee 2018 and Lee 2020. Since there are so few studies of fire effects on MSO specifically, the best available science is found in studies of fire and all Spotted Owl subspecies. In these two systematic reviews and meta-analyses of all published fire effects on Spotted Owls from across their entire range and including all 3 subspecies, Lee found: Fifteen papers representing more than 20 fires, 425 burned territories and 37 radio-tracked owls reported 50 effects from fire that could be differentiated from post-fire logging. These meta-analyses examined key life history parameters in response to fires as they have burned through spotted owl habitat in recent decades under existing forest structural, fire regime, and climate conditions, including multiple "megafires" with large patches of high-severity burn. Spotted Owls were usually not significantly affected by fire, as 83% of all studies and 60% of all effects found no significant impact of fire on mean owl parameters. When all available data are examined objectively in meta-analysis, the larger pattern is revealed that high-severity fire patches from climate-changed wildfire events are still used

[11] *See* Ex. 4 - Lommler 2019 PhD occupancy breeding habitat selection Rodeo Chediski

by spotted owls for foraging in proportion to their availability, and more high-severity fire significantly increases reproduction, but no strong consistent negative effects are apparent. The strength of meta-analysis as an evidence-based decision support tool is that it enables managers and decision-makers to justify management decisions using patterns and trends from all available data. Contrary to current perceptions and recovery efforts for the Spotted Owl, fire does not appear to be as significant of a threat to owl populations and the Forest Service and wildfire has arguably more benefits than costs for Spotted Owls. Lee (2018) found significant positive effects on foraging habitat selection and recruitment from forest fires, and significant positive effects on reproduction from high-severity fire. The absence of any widespread, consistent, and significant negative fire-induced effects and the presence of significant positive effects indicated forest fire is not the outsized threat to spotted owl populations that it is described to be. Therefore, fuel-reduction treatments intended to mitigate fire severity in spotted owl habitat may be unnecessary and counterproductive to the species' recovery.

C. Consider impacts from roads and motorized use.

Site-specific analysis is crucial to NEPA's goal of ensuring informed and science-based decision-making. In order to fully comply with NEPA, the Forest Service must also adequately assess and disclose numerous impacts related to forest roads and the transportation system generally including impacts from road presence, temporary and permanent road construction, and motorized use. The Forest Service must consider these impacts in the context of climate change, increased instances of human wildfire ignitions, and impacts to wildlife. The Forest Service must also assess and disclose the cumulative impacts of forest roads, access and fire; and forest roads and climate change.

The best available science shows that roads cause significant adverse impacts to National Forest resources. See, e.g., 66 Fed. Reg. at 3208 ("Scientific evidence compiled to date [2001] suggests that roads are a significant source of erosion and sedimentation and are, in part, responsible for a decline in the quality of fish and wildlife habitat."). WildEarth Guardians, 2020 Exhibit 3 (entitled, "The environmental Consequences of Forest Roads and Achieving a Sustainable Road System") provides a literature review that discloses the extensive and best available scientific literature—including the Forest Service's General Technical Report synthesizing the scientific information on forest roads (Gucinski 2001)—on a wide range of road-related impacts to ecosystem processes and integrity on National Forest lands. Erosion, compaction, and other alterations in forest geomorphology and hydrology associated with roads seriously impair water quality and aquatic species viability. Roads disturb and fragment wildlife habitat, altering species distribution, interfering with critical life functions such as feeding, breeding, and nesting, and resulting in loss of biodiversity. Roads facilitate increased human intrusion into sensitive areas, resulting in poaching of rare plants and animals, human-ignited wildfires, introduction of exotic species, and damage to archeological resources. Given these widely accepted ecological impacts from roads and motorized use, we urge the Forest Service to conduct a robust analysis of its road-related proposed actions.

1. Use an appropriate baseline

The logical place to begin this requisite analysis is to use an accurate baseline to compare project alternatives. In order to fully disclose the environmental consequences between alternatives as NEPA requires, the Forest Service must differentiate between the existing condition in its No Action Alternative and the legal baseline of system roads and trails. The CEQ recognizes the baseline and no-action alternative can, and sometimes do differ.[12] As such the analysis of the transportation system and related impacts in this project area should recognize and build on this distinction. Specifically, the agency must differentiate between the miles of national forest system roads and the network of non-system within the agency's jurisdiction. The baseline should only include the former and be separate from the no action that retains the existing condition. Such an approach is necessary in order to fully disclose the environmental consequences of the no action alternative. Yet, by failing to include a baseline of only system roads and trails in its analysis, the Forest Service risks not properly disclosing the effects of the no-action alternative, which would then skew the analysis for any action alternative. Adding existing road prisms to the National Forest System is not a simple administrative action, and the agency cannot just assign road numbers in INFRA by claiming there are no immediate on-the-ground actions or direct effects from expanding the road system. While there may be no immediate effects because the unauthorized roads are part of the existing condition, the fact remains that the Forest Service must account for their potential environmental consequences. In addition, by not distinguishing between system and unauthorized roads and trails, the agency cannot properly disclose the environmental consequences from those unauthorized routes that will still persist on the ground. Where the proposed action fails to authorize their physical removal or effectively prevent motorized use, the analysis must assume these unauthorized roads and trails will continue to result in harmful environmental impacts. As such, the Forest Service must account for these consequences in its analysis. Overall, by not distinguishing the legal baseline from the existing condition, the agency cannot demonstrate compliance with NEPA.

2. Forest Roads, Human Access and Fire

Often, the intersection between forest access and human wildfire ignitions receives little attention, yet one study found that humans ignited four times as many fires as lightning. This represented 92% of the fires in the eastern United States and 65% of the fire ignitions in the western U.S. Nagy et al., 2018. Another study that reviewed 1.5 million fire records over 20 years found human-caused fires were responsible for 84% of wildfires and 44% of the total area burned. Just this year, the Congressional Research Service found that "[m]ost wildfires are human-caused, 89% of the average number of wildfires from 2018 to 2022."[13] These human-caused fires undoubtedly align with access.

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[12] See, e.g. , FSH 1909.15, 14.2; Council on Environmental Quality's (CEQ) Forty Most Asked Questions (1981), #3 (explaining "[t]here are two distinct interpretations of 'no action'"; one is "'no change' from current management direction or level of management intensity," and the other is if "the proposed activity would not take place").
[13] "Wildfire Statistics" *Congressional Research Service* (2023). https://sgp.fas.org/crs/misc/IF10244.pdf (last accessed, 7/16/2024).

In fact, forest roads can increase the occurrence of human-caused fires, whether by accident or arson, and road access has been correlated with the number of fire ignitions. Syphard, A.D. et al. 2007; Yang, J. et al. 2007; Narayanaraj, G. and M.C. Wimberly, 2012. In addition to changes in frequency, human-caused fires change the timing of fire occurring, essentially extending the wildfire season much longer compared to lightning-started fires. Nagy et al., 2018. Roaded areas create a distinct fire fuels profile which may influence ignition risk and burn severity. Narayanaraj & Wimberly, 2012; Ricotta et al., 2018. Forest roads create linear gaps with reduced canopy cover, and increased solar radiation, temperature, and wind speed. Invasive weeds and grasses common along roadsides also create fine fuels that can be combustible. These edge effects can change microclimates far into the forest. *Id.* Further, there is an increase in the prevalence of lightning-caused fires in roaded areas that may be due to roadside edge effects. Latham et al., 2009. Furthermore, heavily roaded and intensively managed watersheds leave forests in a condition of high fire vulnerability. Hessburg & Agee, 2009.

Yet despite the stated need to establish a resilient future forest, the FS proposes 112.1 miles of new road construction or reconstruction across all vegetation communities. This increases the need to demonstrate how the agency will enforce road closures. Given the scope and scale of the agency's proposal and the stated need to reduce instances of wildland fires, the FS must consider human caused ignitions in a detailed statement.

3. Avoid over-reliance on BMPs, resource protection measures or design criteria

The Forest Service cannot rely on best management practices, design features/criteria or resource protection measures as a rationale for omitting proper analysis. Specifically, when considering how effective BMPs are at controlling nonpoint pollution on roads, both the rate of implementation, and their effectiveness should both be considered. The Forest Service tracks the rate of implementation and the relative effectiveness of BMPs from in-house audits. This information is summarized in the National BMP Monitoring Summary Report with the most recent data being the fiscal years 2013-2014. Carlson et al. 2015. The rating categories for implementation are "fully implemented," "mostly implemented," "marginally implemented," "not implemented," and "no BMPs." "No BMPs" represents a failure to consider BMPs in the planning process. More than a hundred evaluations on roads were conducted in FY2014. Of these evaluations, only about one third of the road BMPs were found to be "fully implemented." *Id.* at 12.

The monitoring audit also rated the relative effectiveness of the BMP. The rating categories for effectiveness are "effective," "mostly effective," "marginally effective," and "not effective." "Effective" indicates no adverse impacts to water from project or activities were evident. When treated roads were evaluated for effectiveness, almost half of the road BMPs were scored as either "marginally effective" or "not effective." *Id.* at 13.

Further, a technical report by the Forest Service entitled, "Effectiveness of Best Management Practices that Have Application to Forest Roads: A Literature Synthesis," summarized research and monitoring on the effectiveness of different BMP treatments for road construction, presence and use. Edwards et al. 2016. The report found that while several studies have concluded that some road BMPs are effective at reducing delivery of sediment to streams, the degree of each treatment has not been rigorously evaluated. Few road BMPs have been evaluated under a variety of conditions, and much more research is needed to determine the site-specific suitability of different BMPs (Edwards et al. 2016, also see Anderson et al. 2011). Edwards et al. (2016) cites several reasons for why BMPs may not be as effective as commonly thought. Most watershed-scale studies are short-term and do not account for variation over time, sediment measurements taken at the mouth of a watershed do not account for in-channel sediment storage and lag times, and it is impossible to measure the impact of individual BMPs when taken at the watershed scale. When individual BMPs are examined there is rarely broad-scale testing in different geologic, topographic, physiological, and climatic conditions. Further, Edwards et al. (2016) observes, "[t]he similarity of forest road BMPs used in many different states' forestry BMP manuals and handbooks suggests a degree of confidence validation that may not be justified," because they rely on just a single study. *Id.* at 133. Therefore, ensuring BMP effectiveness would require matching the site conditions found in that single study, a factor land managers rarely consider.

Climate change will further put into question the effectiveness of many road BMPs (Edwards et al. 2016). While the impacts of climate will vary from region to region (Furniss et al. 2010), more extreme weather is expected across the country which will increase the frequency of flooding, soil erosion, stream channel erosion, and variability of streamflow (Furniss et al. 2010). BMPs designed to limit erosion and stream sediment for current weather conditions may not be effective in the future. Edwards et al. (2016) states, "[m]ore-intense events, more frequent events, and longer duration events that accompany climate change may demonstrate that BMPs perform even more poorly in these situations. Research is urgently needed to identify BMP weaknesses under extreme events so that refinements, modifications, and development of BMPs do not lag behind the need." *Id.* at 136.

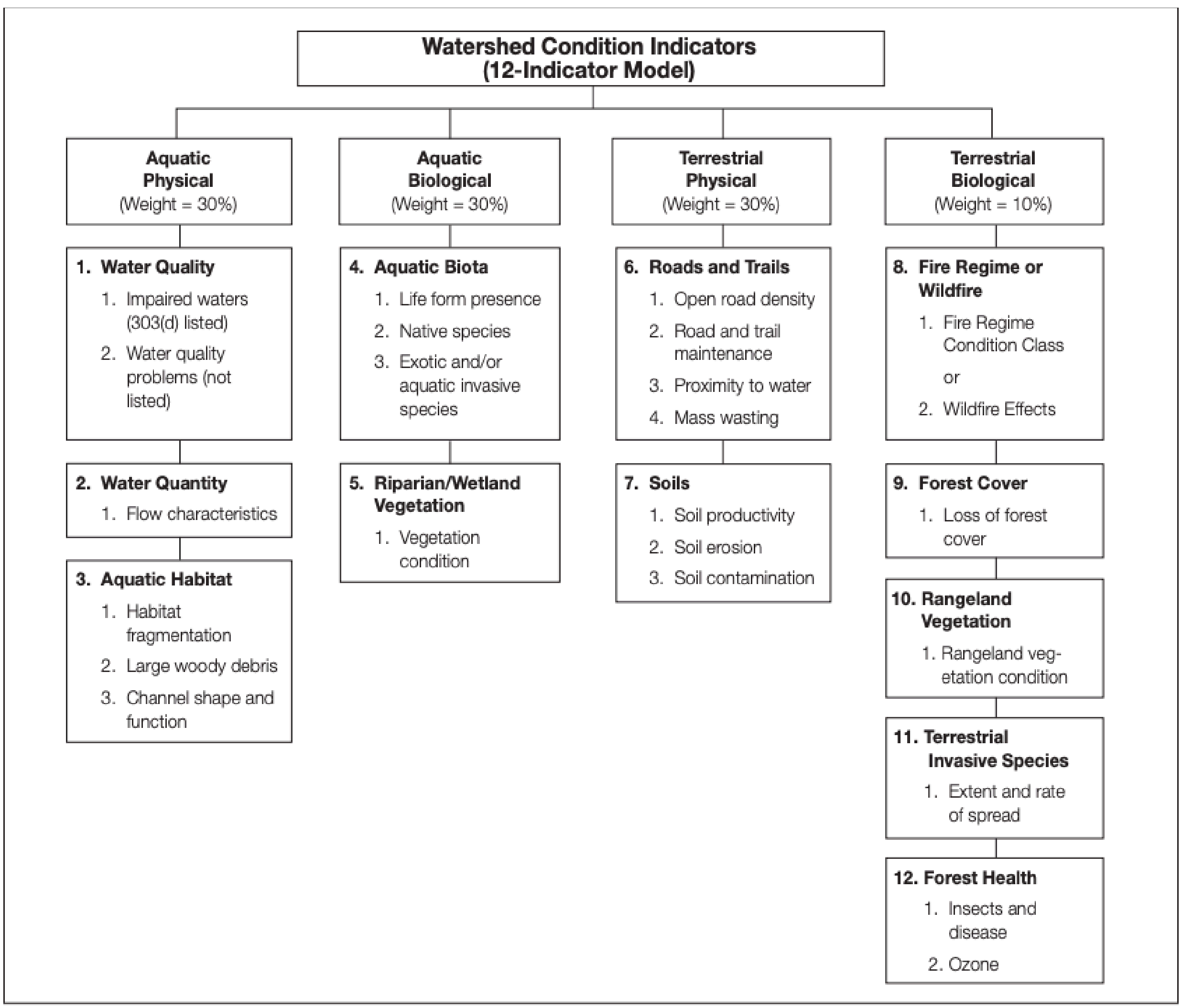
Significant uncertainties persist about BMP or resource protection measures effectiveness as a result of climate change, compounded by the inconsistencies revealed by BMP evaluations, which suggests that the Forest Service cannot simply rely on them to mitigate project-level activities. This is especially relevant where the Forest Service relies on the use of BMPs instead of fully analyzing potentially harmful environmental consequences from road design, construction, maintenance or use, in studies and/or programmatic and site-specific NEPA analyses.

It would be arbitrary and capricious for the Forest Service to assume 100 or even 80 - 90 percent proper BMP implementation and effectiveness as a rationale for not determining potential sedimentation without BMP application. Moreso, the Forest Service must demonstrate how BMP effectiveness will be maintained in the long term, especially given the lack of adequate road maintenance capacity, which is a serious omission given the agency's acknowledgement that it has inadequate funding and must prioritize roads open to passenger vehicles for annual maintenance.

D. Consider impacts to watersheds, water quality and water quantity.

Consider and disclose the direct, indirect, and cumulative impacts of the proposed action to water quality, water quantity and overall watershed conditions. In order to take a hard look at the potential environmental consequences to watershed conditions from the proposed actions, the Forest Service must provide a detailed analysis, and absent a more tailored and specific watershed assessment we recommend utilizing the Watershed Condition Framework (WCF) in a manner that addresses each applicable indicator and attribute. *See* Figure 1 below.

Figure 1. WCF Indicator and Attributes[14]



[14] *Id.* at 6, Figure 2.

We are particularly interested in the Road and Trail indicator and attributes. Here it is important to note that for classification purposes, and thus analysis purposes under NEPA, the Watershed Condition Classification Guide (WCCG)[15] clarifies the meaning of its road attribute as follows:

> For the purposes of this reconnaissance-level assessment, the term "road" is broadly defined to include roads and all lineal features on the landscape that typically influence watershed processes and conditions in a manner similar to roads. Roads, therefore, include Forest Service system roads (paved or nonpaved) and any temporary roads (skid trails, legacy roads) not closed or decommissioned, including private roads in these categories. Other linear features that might be included based on their prevalence or impact in a local area are motorized (off-road vehicle, all-terrain vehicle) and nonmotorized (recreational) trails and linear features, such as railroads. Properly closed roads should be hydrologically disconnected from the stream network. If roads have a closure order but are still contributing to hydrological damage they should be considered open for the purposes of road density calculations.

WCCG at 26. Road densities, the proximity to water, maintenance and mass wasting are essential attributes to consider when determining potential watershed impacts. The Forest Service must consider these attributes, especially the effects of any necessary road-related actions such as construction, reconstruction, and road use. Further, when analyzing the impacts to water quality and water quantity, the FS must provide site-specific analysis of the location of riparian areas, water springs, fens, wetlands, etc., in the project area, and then disclose the foreseeable adverse impacts from the proposed action.

E. Consider the role of mycorrhizal fungi in restoring and maintaining ecological integrity.

1. General Mycorrhizal Scientific Background

Study after study has revealed that soil biota, particularly fungi that form symbiosis with plant roots (mycorrhizae), provide a suite of ecosystem services that support the integrity and resiliency of natural and human communities (Markovchick et al. 2023), especially forests. Mycorrhizae are known to reduce erosion and nutrient loss (e.g. Burri et al. 2013; Mardhiah et al. 2016), increase plant water use efficiency and water retention and cooling capacity in the landscape (Querejeta et al. 2006; Gehring et al. 2017; Wu & Xia 2005), store carbon in the ground (e.g. Orwin et al. 2011; Nautiyal et al. 2019), help plants adapt changes in climate (Gehring et al. 2017; Patterson et al. 2019), and resist pests and pathogens (Reddy et al. 2006; Rinaudo et al. 2010).

Many reports suggest that beneficial native fungi, including native mycorrhizae are rare and frequently in decline. The Survey and Manage Standards and Guidelines of the Northwest Forest Plan found that 55% of the 234 fungal taxa in the program were found at fewer than 20 locations,

[15] https://www.fs.usda.gov/biology/resources/pubs/watershed/maps/watershed_classification_guide2011FS978.pdf

and 42% were found at 10 or fewer sites (Molina 2008). For comparison, the Eastern prairie fringed orchid (Platanthera leucophaea) is extant in 59 populations and listed as threatened (USFWS 2019), while its relative, the chaparral rein orchid (Platanthera cooperi) is found at 162 locations and is considered vulnerable (The Calflora Database 2022).

The decline of mycorrhizal fungi can be more difficult to assess because this category includes fungi that do not form large fruiting bodies above ground, such as with Arbuscular mycorrhizal fungi (AMF). However, many studies report declines in mycorrhizal fungi due to various causes including land use change, invasive species, pollution deposition, and herbicide use (e.g. Meinhardt & Gehring 2012; Swaty et al. 2016; Lilleskov et al. 2019). Climate change also appears to be threatening the type of mycorrhizal fungi known to best support carbon sequestration called ectomycorrhizal fungi (EMF)(Baird & Pope 2021).
In some cases, the dangers facing beneficial fungi mirror those for other species, and the same conservation strategies could benefit fungi (Minter 2011). For example, Clemmensen et al. (2013) found that habitat fragmentation, a common threat to biodiversity, is also a concern for mycorrhizal fungi and conservation mycology. Thus, conservation programs targeting the mitigation of fragmentation could benefit both charismatic taxa and lesser known taxa like mycorrhizal fungi. However, Cameron et al. (2019) documented geographic mismatches between terrestrial aboveground and soil (including mycorrhizal) biodiversity, finding that these mismatches cover 27% of the earth's terrestrial surface. Thus, efforts to protect areas of aboveground biodiversity may not sufficiently reduce threats to soil biodiversity (Cameron et al. 2019).

Even within areas that are protected, disturbances such as logging and thinning (Wiensczyk et al. 2002), the treatment of invasive vegetation with pesticide (Helander et al. 2018), or self-reinforcing soil legacies left after invasion by exotic vegetation (e.g. Meinhardt & Gehring 2012), may quietly continue to reduce beneficial fungi, if these impacts are not recognized and specifically addressed as part of land management planning (Davoodian 2015; May et al. 2018; Willis 2018; Markovchick et al. 2023). These effects are not short-term, and ripple throughout the ecosystem, as evidenced by study after study that shows the need for and effectiveness of restoring diverse native mycorrhizal communities after various kinds of disturbance. For example, Pankova et al. (2018) found that a single fungicide application left mycorrhizal inoculum and plant outcomes far from reference levels even after five years.

While much of the science demonstrating the importance of mycorrhizal interactions is recent, the concepts are not new. For example, the Forest Service's own scientists (Harvey et al., 1994) invoked the relationship between chemical properties and biological properties: "Productivity of forest and rangeland soils is based on a combination of diverse physical, chemical and biological properties." In addition, due to its biodiversity, soil, far from being an inert, non-biological substrate, has been called the "poor man's tropical rainforest" (Giller 1996). The soil microbial world is known to be a foundational driver determining the habitat type, health, resiliency, and ecosystem services of natural areas (e.g. Singh & Gupta 2018; Cameron 2010; Wubs et al. 2016; Peay et al. 2016). Over 1,000 scientists and 70 institutions have urged agencies to recognize the broad relevance of the microbial world to sustaining healthy ecosystems and life on earth, and protect and harness this utility in responding to climate change (Cavicchioli et al. 2019). Yet, the USFS continues to ignore microbial communities when considering the tools available to support and enhance forest resilience, and when considering the impacts of their actions.

2. A Special Note on Common mycorrhizal networks

Although the exact function of common mycorrhizal networks (the roots of separate plants linked by a network of fungal strands) is challenging to ascertain under field conditions, even critics recognize their existence in the field and demonstrated functions under controlled conditions (e.g. Karst et al. 2023). For example, these underground networks are known to share resources between trees, shrubs, and other understory plants in the field, with some plants known as mycoheterotrophs being entirely dependent on this setup (e.g. Karst et al. 2023; Selosse et al. 2006). Under laboratory conditions, the use of autoradiography, dye tracers, and air gap treatments provide convincing evidence that resources are shared via the connections between plants provided by mycorrhizal fungi, including carbon (e.g. Finlay et al. 1986; Brownlee et al. 1983; Wu et al. 2001), phosphorus (e.g. Finlay 1989), water (e.g. Warren et al. 2008; Plamboeck et al. 2007; Egerton-Warburton et al. 2007), and defense signals (Babikova et al. 2013). This ability to spread resources (Peay et al. 2016) in the field would reduce risk and increase the inherent stability of ecosystems the way that financial portfolios reduce the risk of investing (Schindler et al. 2015).

While trees communicate chemically all the time through the volatile organic chemicals they produce wafting through the air, research indicating communications and resources are shared through soil, root systems, and common mycorrhizal networks (e.g. Babikova et al. 2013; Bingham & Simard 2011; Simard et al. 2015) poses special new questions for the land and natural resources communities, due to the ability of land management actions to impact the soil community. If the ability of trees to communally send stronger insect control signals or share resources in times of need is impacted by current tree density reduction practices, as suggested by the scientific literature referenced herein, then the government would be liable for ignoring this large body of science, and the impact of its actions. Even the critics of the available current technologies acknowledge that given what we know about plant and fungal biology, these underground linkages, "should be common" (Karst et al. 2023), and the indications of the science are clear - this issue is not constrained to one or a few environments or biomes.

3. To comply with NEPA, the Forest Service must consider soil function, mycorrhizal interactions and impacts to mycorrhizal assisted ecosystem services in a detailed environmental analysis.

Many kinds of activities and disturbance can harm soil biota, including mycorrhizal fungi. Examples include the changes to microclimates and soil compaction caused by logging and thinning activities, the application of herbicides and pesticides, pollution deposition, and the presence of, and soil legacy left behind by, non-native vegetation (Wiensczyk et al. 2002; Hartmann et al. 2014; Meinhardt & Gehring 2012; Koziol & Bever 2017; Helander et al. 2018). Appropriately protecting and restoring native mycorrhizal diversity and abundance offers a crucial tool to support forest resiliency. Conversely, when mycorrhizae are not protected from these effects, or are not appropriately restored, this can negatively impact forest regeneration and resiliency for many years. Unfortunately, soil biota like mycorrhizal fungi are frequently ignored in forest planning and projects, despite Forest Service policies requiring their protection (Markovchick et al. 2023), and a regulatory and legal framework requiring their consideration and mitigation of impacts to them.

The Forest Service may not ignore topics if the information is uncertain or unknown. Where information is lacking or uncertain, the Forest Service must make clear that the information is lacking, the relevance of the information to the evaluation of foreseeable significant adverse effects, summarize the existing science, and provide its own evaluation based on theoretical approaches. As such, the Forest Service has a mandatory duty to analyze the direct, indirect and cumulative impacts of the proposed action on soil function, mycorrhizal interactions and impacts in a detailed environmental analysis.

F. Consider Impacts to Mature and Old Growth Stands

On Earth Day 2022, President Biden issued an executive order requiring the Forest Service and Bureau of Land Management (BLM) to "define, identify, and complete an inventory of old-growth and mature forests" on their respective lands and to "make such inventory publicly available."[16] The order set forth a number of actions each agency must complete. First, the agencies must "define" mature and old-growth forests, "accounting for regional and ecological variations." *Id.* Second, after the agencies have defined mature and old-growth forests, they must then "identify" where those forests are and "complete an inventory" of those forests and make that inventory available to the public. *Id.* Third, after the inventory process is complete, the agencies must then (i) "coordinate conservation and wildfire risk reduction activities, including consideration of climate-smart stewardship of mature and old-growth forests," with other agencies, States, Tribal Nations, and private landowners, (ii) "analyze threats to mature and old-growth forests," and (iii) "develop policies" that address threats to mature and old-growth forests." *Id.*

Since that time, the administration has taken several steps to meet the intent and direction of EO 14072, the latest of which was issuing "Amendments to Land Management Plans to Address Old-Growth Forests Across the National Forest System Draft Environmental Impact Statement." *See* 89 FR 52039. The Forest Service first announced it was preparing this Draft EIS in its December, 2023 Notice of Intent (NOI). *See* 88 FR 88042. Preceding this notice, the Forest Service issued an Advanced Notice of Public Rulemaking (ANPR). *See* 88 FR 24497. WildEarth Guardians

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[16] *See* Strengthening the Nation's Forests, Communities, and Local Economies, 81 FR 24851, 24852 (Apr. 22, 2022) ("EO 14072").

joined several organizations in submitting comments to both the ANPR and NOI that are pertinent to the Project.[17]

The ANPR explains that EO 14072 "calls particular attention to the importance of Mature and Old-Growth (MOG) forests on Federal lands for their role in contributing to nature-based climate solutions by storing large amounts of carbon and increasing biodiversity." *Id.* at 24498. Elsewhere, the ANPR stresses "the importance of mature and old-growth forests" for "large tree retention and conservation" and that "[o]lder forests often exhibit structures and functions that contribute ecosystem resilience to climate change." *Id.* at 24502-24503. Finally, the ANPR states the MOG inventory that is currently "being developed" will "help inform policy and decision-making on how best to conserve, foster, and expand the values of mature and old-growth forests on our Federal lands." *Id.* at 24501. Further, the NOI states the following:

> This proposed amendment is intended to create a consistent approach to manage for old-growth forest conditions with sufficient distribution, abundance, and ecological integrity (composition, structure, function, connectivity) to be persistent over the long term, in the context of climate amplified stressors.

88 FR 88043. In order to meet this intent, each national forest unit must recognize commercial logging of both mature trees and old-growth stands as a threat to current and future distribution, abundance and the ecological integrity of old-growth ecosystems. In order to ensure agency projects are consistent with EO 14072 and the subsequent policy actions, Forest Service Deputy Chief Chris French issued a memo requiring "any projects proposing vegetation management activities that will occur where old growth forest conditions (based on regional old growth definitions) exist on National Forest System lands shall be submitted to the National Forest System Deputy Chief for review and approval."[18]

To ensure the Project is consistent with the national policy direction, the Forest Service must conduct a stand-level inventory of all old-growth forests proposed for vegetation management. As part of this inventory, the Forest Service must also identify potential old-growth from mature stands that currently exhibit some old-growth characteristics. In other words, to meet the intent of EO 14072, the APNR and the NOI, the Forest Service must do more than just maintain current old-growth forests, it must also ensure the Project's proposed actions do not eliminate or slow the recruitment of future old-growth ecosystems. Again, this requires a detailed examination of stand conditions throughout the Project Area, and the Forest Service provides a coarse-scale inventory that serves as a starting point for the requisite detailed analysis.

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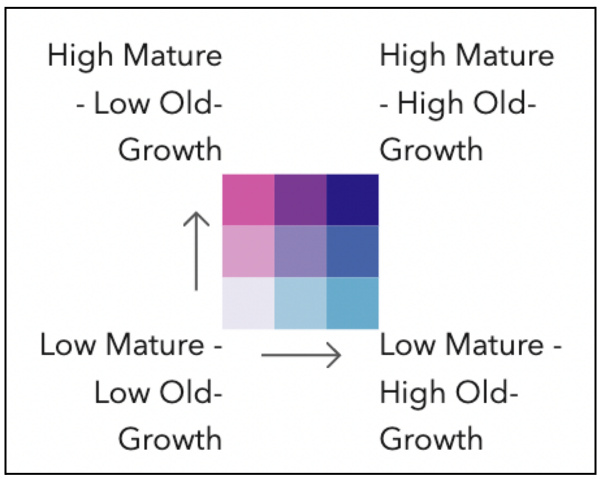
[17] *See* Ex. 5 - Climate Forest Coalition Comments re: APRM per 88 Fed. Reg. 24,497.pdf. *See* Ex. 6 - Climate Forest Coalition comments re: NOI per 88 FR 88042; *See also* Ex. 7 - Wild Heritage Comment re: NOI per 88 FR 88042.

[18] *See* Ex. 8 - Memorandum from Chris French to Regional Foresters on Review of Proposed Project with Management of Old Growth Forest Conditions (Dec. 18, 2023) ("French Memo").

Specifically, the Forest Service developed a Climate Risk Viewer[19] to "help inform policy and decision-making on how best to conserve, foster, and expand the values of mature and old-growth forests on our Federal lands." 88 FR 24501. The map displays MOG estimates on Forest Service land within 250,000-acre fireshed polygons, which are considered "the appropriate scale for statistical inference using FIA plots." *Id.* The matrix colors indicate the degree of mature or old-growth forest within each polygon (light-to-dark pink = low-to-high mature forest; light-to-dark blue = low-to-high old-growth forest). *Id.* Polygons classified as "low" indicate 0-25,000 acres of mature or old-growth forest, "intermediate" (25,000-75,000 acres), and "high" (75,000-250,000 acres). *Id.*

Figure 2: Mature and Old-Growth Estimates in Forest Service Climate Risk Viewer.



The Project area is within polygons with low old-growth and medium-to-high mature forests that must be allowed to develop into old-growth ecosystems. ***The Forest Service must further refine this inventory in a detailed statement and disclose the exact amount of mature and old growth trees in the project area at the stand level, and how the proposed action may affect these inventories.*** In doing so, we urge the agency to consider other approaches from independent researchers. Specifically, in September 2022, researchers published the "first comprehensive and spatially explicit assessment of MOG in the conterminous United States," and made the result publicly available. DellaSala DA, et al. (2022). Another approach utilizes carbon as the basis for defining maturity. Here scientists explained the following:

> Our approach requires addressing two components: (1) individual trees referred to as the "larger" trees in a forest; and (2) mature forest stand development represented by stand age. This method for identifying larger trees in mature stands— and the related assessment of above-ground live carbon stocks and annual carbon accumulation—is intended to be broadly applicable and readily implementable independent of how mature stands are defined. We

[19] The Forest Service Climate Risk Viewer is available at: https://storymaps.arcgis.com/collections/87744e6b06c74e82916b9b11da218d28?item=8.

settled on defining stand maturity with respect to the age of maximum Net Primary Productivity (NPP), which is estimated as the annual net quantity of carbon removed from the atmosphere and stored in biomass (see section 2.2 for definitions of key terms).

Birdsey et al., 2023. Researchers then provided the following definition: "Mature forests are defined as stands with ages exceeding that at which accumulation of carbon in biomass peaks as indicated by NPP," and used Culmination of Net Primary Productivity (CNPP) "to describe the age at which NPP reaches a maximum carbon accumulation rate." With this approach, scientists used FIA plot data for 11 national forests in the lower 48 states including those dominated by frequent-fire return intervals associated with dry pine and dry mixed conifer forest sites.

National Forest	Average CNPP age (Years)	Diameter threshold (Inches/cm)
Gifford Pinchot	45	13/33
Malheur	45	12/30
Black Hills	75	14/36
Chequamegon-Nicolet	45	9/23
Green and White Mountains	35	12/30
Appalachian Forests	35	11/28
White River	55	6/15
Flathead	45	8/20
Arizona Forests	75	12/30
Central California Forests	50	16/41
Arkansas Forests	40	10/25
Average of all Forests	50	11/28

Tree diameters represent the lower age bound of mature forests (i.e., age at CNPP). Detailed ages and tree diameters by forest type are shown in supplementary Table 2.

Both Birdsey et al. (2023) and DellaSala et al. (2022) demonstrate the ability to define mature forests, quantify their capacity to store carbon, and provide a specific inventory, which we urge the Forest Service complete as part of a detailed analysis necessary to comply with NEPA. In fact, DellaSala et al., 2022 explains how mature forests "provide superior values compared to logged forests as natural climate solutions" to meet the objectives of EO 14072. *Id.* at 16 (citations omitted). But "the current status quo management of MOG and low protection levels on all lands presents unacceptable risks at a time when the global community is seeking ways to reduce the rapidly accelerating biodiversity and climate crises." *Id.* at 16-17 (citation omitted).

Further, we urge the Forest Service to recognize that as they mature, forests sequester and accumulate massive amounts of atmospheric carbon stored mainly in large trees and soils making an invaluable contribution to climate smart management and international climate commitments. Stephenson et al. 2014, Mildrexler et al. 2020. Other studies demonstrate that unmanaged forests can be highly effective at capturing and storing carbon. Luyssaert et al., 2008.

In addition, several studies demonstrate that maintaining forests rather than cutting them down can help reduce the impacts of climate change. "Stakeholders and policy makers need to recognize that the way to maximize carbon storage and sequestration is to grow intact forest ecosystems where possible." Moomaw, *et al.*, 2019. Another report concludes:

> *Allowing forests to reach their biological potential for growth and sequestration, maintaining large trees* (Lutz et al 2018), reforesting recently cut lands, and afforestation of suitable areas *will remove additional CO2 from the atmosphere*. Global vegetation stores of carbon are 50% of their potential including western forests because of harvest activities (Erb et al 2017). Clearly, western forests could do more to address climate change through carbon sequestration *if allowed to grow longer*.

T. Hudiburg *et al.*, 2019. Further, a June 2020 paper from leading experts on forest carbon storage reported:

> *There is absolutely no evidence that thinning forests increases biomass stored (Zhou et al. 2013).* It takes decades to centuries for carbon to accumulate in forest vegetation and soils (Sun et al. 2004, Hudiburg et al. 2009, Schlesinger 2018), and it takes decades to centuries for dead wood to decompose. We must preserve medium to high biomass (carbon-dense) forest not only because of their carbon potential but also because they have the greatest biodiversity of forest species (Krankina et al. 2014, Buotte et al. 2019, 2020).

B. Law, et al., 2020.[20] Further, to address the climate crisis, agencies cannot rely on the re-growth of cleared forests to make up for the carbon removed when mature forests are logged. One prominent researcher explains: "It takes at least 100 to 350+ years to restore carbon in forests degraded by logging (Law et al. 2018, Hudiburg et al. 2009). If we are to prevent the most serious consequences of climate change, we need to keep carbon in the forests because we don't have time to regain it once the forest is logged (IPCC, 2018)." *Id.*

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[20] *See* Ex. 9 - B. Law et al., 2020. The Status of Science on Forest Carbon Management to Mitigate Climate Change.

Clearly the role of mature and old-growth forests to store carbon and serve as a natural climate-crisis solution must be part of any detailed project-level analysis. As such, we fully support a letter from numerous scientists calling on the Forest Service to suspend all timber sales in mature and old-growth forests, and refrain from proposing new timber sales in these forests, while the Forest Service works to comply with Executive Order 14072.[21]

G. The Forest Service must account for greenhouse gas emissions and provide a total carbon budget.

The Forest Service must take a hard look at the total greenhouse gas emissions from its proposed actions and provide a total carbon budget. Such analysis would utilize readily available methods and models that represent high quality information and accurate greenhouse gas accounting. Research, including studies done by the U.S. government, indicates that logging on federal forests is a substantial source of carbon dioxide emissions to the atmosphere. Notably, logging emissions – unlike emissions from natural disturbances – are directly controllable. Models and methods exist that allow agencies to accurately report and quantify logging emissions for avoidance purposes at national, regional, and project-specific scales. As such, the Forest Service has the ability and responsibility to disclose estimates of such greenhouse gas emissions using published accounting methods with the express purpose of avoiding or reducing the greenhouse gas associated with logging, and acknowledge the substantial carbon debt created by logging mature and old-growth trees and forests on federal lands. Hudiburg et al., 2019.

In particular, we recommend that:

1. The agency should identify and assess the carbon stock of mature and old-growth forests and trees given the substantial carbon value of such trees and forests; (Mackey, B., et al. 2013; Krankina, O., et al. 2014; Law, B.E., et a. 2021).
2. The agency should identify and assess ***gross*** emissions from logging, particularly logging mature and old-growth trees and forests on federal lands, and including the emissions from logging on site and downstream emissions through the entire chain of custody of milling, manufacturing, and transportation; and
3. The agency should provide a high standard of scientific support for any asserted offsets of gross emissions, including discussion of timing factors that address the carbon debit created from logging vs avoiding logging and allowing stocks to further accrue. Moomaw et al., 2019. We also note that storing some carbon in short-lived wood product pools is not compensatory as an offset or avoidance for using other carbon-intensive materials in construction. Harmon, M.E. 2019.

<u>The Forest Service must disclose direct and indirect climate pollution from removing, transporting, and milling wood</u>. This includes emissions from loss of stored carbon during the removal at the

[21] *See* Ex. 10 - Feb 27, 2024. Scientists Letter. Request for an Executive Order to Place a Moratorium on Logging Mature and Old-Growth Forests.

forest (in-boundary) and manufacturing and transport process (out-of-boundary). Such analysis would disclose the GHG emissions from logging on site through the entire chain of custody of milling, manufacturing, and transportation, including:

- construction, reconstruction, and maintenance of logging access routes;
- all forms of logging operations (clearcut, selective, postfire, commercial thinning, etc), including any herbicides, insecticides and related treatments;
- transport of logs to mills;
- milling of the wood; and
- transport of products to other sectors.

These emissions and others are all foreseeable impacts of logging projects. In some cases, these impacts may be considerable. We note that in addressing the impacts of coal mine expansions, federal agencies have disclosed the GHG emissions of equipment used to mine coal and to transport it to market. Land management agencies can and should make similar projections for GHG pollution associated with vegetation removal projects.

The Forest Service routinely asserts that the impacts of logging on carbon stores will be minimal because carbon from logged trees will be stored long-term in forest products. Such assertions are contrary to research indicating that much of the carbon stored in removed trees is lost in the near term, and little carbon is stored long-term in wood products. For example, a 2019 study evaluated the quantification of biogenic emissions in the state of Washington, which included GHG emissions from logging, but not decomposition of wood products. The study concluded that the failure to address decomposition losses amounted to as much as a 25% underestimation of carbon emissions. Hudiburg et. al., 2019.

Losses from decomposition vary over time and also depend on the lifetime of the wood product being produced from the timber. Paper and wood chips, for example, have very short lifetimes and will release substantial carbon to the atmosphere within a few months to a few years of production. Bioenergy production and burning has been found to release more emissions than burning even coal, including methane. Product disposal in landfills results in anaerobic decomposition that also releases methane. Methane has a global warming potential about 30 times that of carbon dioxide over 100 years, and over 80 times that of carbon dioxide over 20 years, magnifying the impact of disposal of short term wood products. Forster et al., 2021.[22]

Longer term wood products can store carbon for many decades, but this depends on the life of the product. To give a sense of the larger picture, a study modeling carbon stores in Oregon and Washington from 1900-1992 showed that only 23% of carbon from logged trees during this time period was still stored as of 1996. Similarly, > 80% of carbon removed from the forest in logging operations in West Coast forests was transferred to landfills and the atmosphere within decades. In addition, Hudiburg (2019) concludes that state and federal carbon reporting had erroneously

[22] *See* https://www.ipcc.ch/report/ar6/wg1/chapter/chapter-7/ (last accessed 7/16/2024).

excluded some product-related emissions, resulting in a 25-55% underestimation of state total CO_2 emissions from logging. Many of the aforementioned decomposition emissions could be avoided if trees were left standing, especially by protecting carbon stocks from logging of mature and old-growth trees and forests on federal lands.

The detailed NEPA analyses we are calling for would disclose the trade-off and the importance of maintaining the stock value of mature and old-growth trees. In so doing, the analysis would quantify *both* the short-term *and* long-term gross *and* net impacts of logging projects. This will allow agencies to disclose and assess the trade-offs between increasing GHG emissions via logging now – when decreases are most sorely needed – versus alleged increases in storage later. Detailed NEPA analysis would also avoid ignoring short-term carbon losses due to logging based on the erroneous assumption that the residual forest will have significantly reduced potential to have its carbon stores diminished by high-severity fires. Decades of research, however, call these sorts of blanket assertions into question. Moreover, this is not a basis for failing to disclose emissions from the logging itself, especially in comparison to fire. Research shows that emissions from logging greatly exceed those from all natural disturbances combined (fire, insects, wind storms). Harris et al., 2016; Merrill et al., 2018; Zald & Dunn, 2018.

Further, the CEQ recently issued Guidance clarifying that agencies must address the emissions and storage impacts of project-specific vegetation removal projects, "such as prescribed burning, timber stand improvements, fuel load reductions, and scheduled harvesting."[23] We support this direction. In addition, the Forest Service should also assess emissions from pile burning related to forestry operations, as such actions can intensify carbon release.

The nature of the climate change emergency is based on multiple points of emission sources, with each contributing to the problem cumulatively. Therefore, project level analysis is a critical undertaking and one for which land management agencies now have the tools to quantify the contribution of each federal action, including in cumulative effects analyses.

Given the significant climate impact of logging on federal lands, it is critical that agencies estimate and quantify greenhouse gas emissions associated with each individual logging project and provide annual estimates associated with total logging on federal lands. Agencies should expand their abilities and expectations around accounting for logging emissions as a significant contributor to climate change in tandem with continued progress in fire emissions accounting that more accurately captures actual carbon emissions from forest fires. Barowitz et al., 2022; Harmon et al., 2022.

H. Consider Wildfire Burn Probability When Analyzing Climate Costs and Benefits

The likelihood of a wildfire encountering a fuels-reduced stand in the project area is an important aspect to consider in calculating climate costs and benefits. As already noted, fuel treatments have a

[23] *See* CEQ, National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change, 88 FR 1196; 88 FR 10097.

mean probability of 2-8% of encountering moderate- or high- severity fire during the assumed 20-year period of reduced fuels (Barnett, K. et al. 2016 and Rhodes, J. and Baker, W. 2008).

In a modeling study conducted in the Sierra National Forest, researchers found that ". . . results generally confirmed that fire-treatment encounters are rare, such that median suppression cost savings are zero . . ." (Thompson et al. 2017). At the national scale, ". . . roughly 1% of US Forest Service forest treatments experience wildfire each year, on average. The effectiveness of forest treatments lasts about 10–20 years, suggesting that most treatments have little influence on wildfire" (Schoennagel, T., et al. 2017). In other words, the PEA is unrealistic in assuming climate benefits largely because treated areas rarely encounter wildfires during the period when fuels are reduced.

Within the Project analysis, the Forest Service must calculate the likelihood of a wildfire encountering a fuels-reduced stand in the Project area and take that calculation into consideration while calculating climate costs and benefits.

Further, researchers examining frequent-fire forests in southwestern Oregon have determined that:

> Carbon (C) losses incurred with fuel removal generally exceed what is protected from combustion should the treated area burn
>
> Even among fire-prone forests, one must treat about ten locations to influence future fire behavior in a single location
>
> Over multiple fire cycles, forests that burn less often store more C than forests that burn more often
>
> Only when treatments change the equilibrium between growth and mortality can they alter long-term C storage

Campbell et al. 2012. In addition to the above findings, these researchers question the "unrealistic assumptions regarding treatment efficacy (and) wildfire emissions." This includes the likelihood that "(e)xtending treatment efficacy by repeated burning of understory fuels . . . come(s) at the cost of more frequent C loss" and modeling that shows ". . . a low-frequency, high-severity fire regime stores substantially more C over time than a high-frequency, low-severity fire regime . . ." (Campbell et al. 2012). These conclusions suggest that the Forest Service cannot assume the Project will produce insignificant carbon emissions and result in overall climate benefits, rather the agency must fully consider and address the potential for carbon loss in a detailed environmental analysis.

I. Consider the potential for escaped prescribed burns

There was no consideration in the Scoping Notice of the potential for escaped prescribed burns. The environmental assessment and/or the EIS must provide disclosure or analysis of the direct, indirect, or cumulative impacts of prescribed burns going out of control, and analysis of the potential for escaped prescribed burns. Project-specific mitigations must be provided to prevent escaped prescribed burns, and to decrease the likelihood and impacts of such escapes. This is especially critical due to the Forest Service having ignited unintended wildfire, with disastrous results, on a total of 387,350 acres of forest in and adjacent to the Santa Fe National Forest (SFNF), and up into the Carson National Forest, in 2022. This occurred in the course of implementation of three separate prescribed burns, resulting in the ignitions of the Hermits Peak Fire, the Calf Canyon Fire and the Cerro Pelado Fire.

Given the three 2022 SFNF agency-precipitated wildfires, it would be outrageous and gross negligence if the Forest Service does not disclose or analyze the risk and potential for escaped prescribed burns and provide mitigations specific to the Project. Fuels treatments clearly have the possibility of placing human lives, homes, and livelihoods in imminent danger. During agency-ignited wildfires of 2022, over 900 structures were destroyed and 3 people were killed in post-fire flooding. Thousands of people were made homeless and lost the value of their land and the economic support they derived from their land. These events strongly indicate that implementing greatly increased amounts of prescribed burns, with decreasing safer burn windows due to the warming climate, creates extremely high risk of unintentional fire. Within an EIS, the agency must show how they plan to implement the proposed fuels treatments without putting nearby communities and forest as substantive risk of agency-ignited high severity fire.

J. Consider Impacts To Air Quality

The Forest Service proposes to intentionally burn up 83,265 acres over the course of 10 years through pile, jackpot and broadcast fires. Scoping Notice at 4. The Forest Service must acknowledge and account for the amount of smoke these activities will produce and their effects on people's health in nearby communities. We caution the agency against simply relying on local Air Quality Index (AQI) monitoring station data to determine to what extent the health of nearby residents are being impacted by intentional burns. On days when the AQI is in the moderate range (51-100, considered acceptable except for sensitive individuals), residents sometimes report they can smell the smoke and see it, or that the smoke has gotten inside their homes. This can even happen when the AQI is in the good range (0-50). Vulnerable residents have indicated that they are adversely impacted at these levels. A 2016 study from the Harvard T.H. Chan School of Public Health found that death rates among people over 65 are higher in zip codes with more fine particulate air pollution (PM2.5) than in those with lower levels of PM2.5. Shi et al., 2016. The harmful effects from these particles were observed even in areas where concentrations were less than a third of the current standard set by the Environmental Protection Agency (EPA). PM2.5 is the most harmful component of wood smoke, including smoke from prescribed burns. PM2.5. can cause premature death in people with heart or lung disease, nonfatal heart attacks, irregular heartbeat, aggravated asthma, decreased lung function, and increased respiratory symptoms, such as irritation of the airways, coughing or difficulty breathing. Dr. Ann McCampbell, 2021 at 5.[24] Local residents have also reported headaches, sore throats, burning eyes and noses, dizziness, brain fog and a generally ill feeling during prescribed burns.

In addition to the six common pollutants harmful to public health and the environment that are the basis of the pollution standards in the National Ambient Air Quality Standards (NAAQS) set by the Environmental Protection Agency, i.e. carbon monoxide, lead, nitrogen dioxide, ozone, sulfur dioxide, and particulate matter (PM10 and PM2.5), the EPA states in their online guide "Wood Smoke and Your Health" that wood smoke contains several other toxic chemicals including benzene, formaldehyde, acrolein and polycyclic aromatic hydrocarbons,, and suggests that these chemicals may be impacting public health when wood smoke is in the air.[25] The Forest Service must take a hard look at these public health impacts that may be exacerbated under the Project's proposed action. In New Mexico, smoke from intentional burns may also contain heavy metals, including uranium, as the trees draw up heavy metals from the soil, which are volatilized when trees burn. These chemicals are toxic in numerous ways to the human body. Heavy metal toxicity from intentional burn smoke should be considered. Intentional burn smoke may also contain residues of fire accelerants such as potassium permanganate, gas and diesel, and neither the amounts of such chemicals in the air during intentional burns, nor the possible risks of breathing these chemicals when volatilized into smoke have been measured or evaluated by the Forest Service. The 2002 risk assessment prepared for the US Forest Service concerning the residues of fire accelerant chemicals, which while outdated is still the agency's operative risk analysis, states "Risks from inhalation exposures were outside the scope of this assessment, requiring a complex analysis of simultaneous exposure to the products of burning vegetation to accurately depict the overall risk from inhalation at a prescribed burn." Residues of Fire Accelerant Chemicals, Vo.. 1 at 23.[26] This risk assessment does evaluate the amounts and risk of fire accelerants that remain in soils and waterways, but since fire accelerants are largely burned in fire, it stands to reason that most of the chemical residues would most likely be volatilized into the smoke, and may become inhalation exposure risks. The exposure risk from fire accelerants that would be used during implementation of intentional burns must be considered as well.

The Forest Service must include, within an EIS, a thorough analysis of the impacts of the smoke emitted from the Project's proposed action, and how human health may be impacted given the public health impacts that are already occurring from current levels of intentional burn emissions. There must also be a consideration of whether agency-predicted high-severity fire reduction and ecosystem benefits are enough to accept the serious impacts on public health that many local area residents and their doctors believe would occur from implementing intentional burning across the Project area. The agency must weigh realistic high severity fire mitigation (which is a gamble at best)

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[24] *See* Ex. 11 - Human Health Effects Of Wildland Smoke by Ann McCampbell, MD October 25, 2021
[25] *See* https://www.epa.gov/burnwise/wood-smoke-and-your-health (last accessed, July 16, 2024).
[26] *See* Ex. 12 - Residues Of Fire Accelerant Chemicals Risk Assessment

and ecosystem benefits against the amount of human health impacts and suffering that are likely to occur. This consideration must take into account actual Carson NF fire history, including any instances of escaped intentional burns that have precipitated wildfires. The Forest Service must provide specific mitigations to reduce the effects of prescribed burn smoke on surrounding populations, specific to the project area, local landscape, and climate, proximity, and vulnerability of potentially affected communities.

K. Cumulative Effects

In addition to providing robust analysis that discloses the site-specific direct and indirect effects, the agency must also take a hard look at cumulative impacts. Toward this end, it is vital that the results of past monitoring be incorporated into project analysis and planning. We request the following be disclosed:

- A list of all past projects (completed or ongoing) implemented in the analysis area.
- A list of the monitoring commitments made in all previous NEPA documents covering the analysis area, and the monitoring results.
- A description of any monitoring, specified in those past projects for the analysis area, which has yet to be gathered and/or reported.
- A summary of all monitoring of resources and conditions relevant to the proposal or analysis area as a part of the Forest Plan monitoring and evaluation effort.
- A cumulative effects analysis that includes the results from the monitoring required by the Forest Plan.
- A list of approved watershed and wildlife improvement actions from past NEPA decisions that remain incomplete due to a lack of funding.

Please provide an analysis of how well those past FS projects met the goals, objectives, desired conditions, etc. stated in the corresponding NEPA documents, and how well the projects conformed to forest plan standards and guidelines. Such an analysis is critical for validating the agency's current proposed action under the Project. Without analyzing the accuracy and validity of the assumptions used in previous NEPA processes one has no way to judge the accuracy and validity of the current proposal. The predictions made in previous NEPA processes also must be disclosed and analyzed because if these were not accurate, and the agency is making similar decisions, then the process will lead to failure. For instance, if in previous processes the FS said they were going to do a certain monitoring plan or implement a certain type of management and these were never effectively implemented, it is important for the public and the decision maker to know. If there have been problems with agency implementation in the past, it is not logical to assume that implementation will be proper this time. If prior logging, prescribed fire and other "forest health treatments" have not been monitored appropriately, the Forest Service must demonstrate how it can ensure the beneficial results it asserts in the scoping document will in fact occur. The agency has an obligation to demonstrate consistency with all the applicable directions in the Forest Plan, and to provide robust cumulative effects analysis as NEPA requires.

IV. Demonstrate Compliance with the Clean Water Act

Under the Clean Water Act ("CWA"), states are responsible for developing water quality standards to protect the desired conditions of each waterway within the state's regulatory jurisdiction. 33 U.S.C. § 1313(c). Water bodies that fail to meet water quality standards are deemed "water quality-limited" and placed on the CWA's § 303(d) list. The CWA requires all federal agencies to comply with water quality standards, including a state's anti-degradation policy. 33 U.S.C. § 1323(a). The FS must ensure all activities in this proposal comply with the CWA. In particular, it must ensure its proposal for logging, and the associated road reconstruction, maintenance, and ongoing log hauling other uses of these roads, will not cause or contribute to a violation of water quality standards. We strongly caution the Forest Service against relying on best management practices as the sole mechanism for CWA for the reasons explained above. At a minimum, the agency must ensure its analysis does not assume 100 percent BMP effectiveness and include water quality analysis that compares alternatives with and without the use of BMPs in order to disclose the potential sedimentation resulting from the project activities. At bottom, the Forest Service must demonstrate that it is not contributing sediment to water quality limited stream segments, or exceeding any road-related total daily maximum loads for sediment, and ensure compliance with Montana's antidegradation rules. We caution the agency against over-reliance on best management practices in complying with the CWA requirements as we explained above.

V. Demonstrate Compliance with the Infrastructure Investment and Jobs Act, PUBLIC LAW 117–58—NOV. 15, 2021 Section 40807, "Authorized Emergency Action."

The Forest Service states "The Secretary of Agriculture, Tom Vilsack, has determined that the Forest Service may carry out Authorized Emergency Actions under section 40807 of the Infrastructure Investment and Jobs Act (PL 117-58) on National Forest System lands in 250 identified high-risk firesheds.

The agency provides the following direction in their documents concerning implementing the Secretary's direction on Authorized Emergency Action: "This section authorizes the Secretary to determine that an emergency exists where implementation of emergency actions is necessary to achieve relief from hazards threatening human health and safety or to mitigate threats to natural resources on National Forest System land and adjacent lands.

'Implementing Secretary's Direction on Authorized Emergency Actions"' USDA 3/10, 2023. The agency states that emergency actions are taken for the following reasons, and explains their reasons for requesting emergency action for the Project:

> Emergency actions are taken to achieve relief from threats to public health and safety, critical infrastructure, or ot mitigaté threats to natural resources: Projects proposed under an emergency authority must be: approved by the Agency. The reason for requesting this emergency authority on this project is to mitigate harm to life and property adjacent to

> National Forest System land; control insects and disease; remove hazardous fuels; and protect and restore infrastructure and water resources.

Scoping Notice at 5. The Forest Service must clarify the nature and extent of any emergency that they deem exists in the Project area. Specifically, what are the hazards threatening human health and safety that will have a high probability of being mitigated by the Project Proposed Action? Are such hazards greater than the hazards of the aggressive treatments the agency proposes, which includes massive amounts of pile, jackpot and broadcast burns.? Is the potential ecological damage from treatments such as aggressive logging, including steep slope logging, and burning thousands of slash piles proportionate to the potential hazards threatening human health and safety from the existing condition? We request that this question be considered in the context of the three wildfires, the Hermits Peak Fire, the Calf Canyon Fire and the Cerro Pelado fire, due to prescribed burn escapes that ignited in the SFNF, and spread up into the CNF, in 2022. We also request when the human health impacts from smoke from naturally-ignited wildfire is considered, that the human health effects of agency-ignited wildfire and intentional burns be equally considered.

We also request that the agency consider both the hazards of slash piles remaining through a warm season and how the proposed actions may result in drawing bark beetles, thus promoting bark beetle outbreaks, in relation to any need to control insect outbreaks. Also consider the lack of evidence that there is an ecologically damaging level of spruce budworm outbreak occurring, and that a moderate level of defoliating insect outbreak is natural and beneficial to forests.

The best available science must be utilized for making an emergency determination

We do not believe the Project area and surrounding communities are in an emergency situation that requires the types of actions outlined in the Proposed Action. Continuing on a trajectory of more frequent and aggressive fuels treatments, especially prescribed burns, while the safer windows for such burns are decreasing due to a warmer climate, increases the probability of harm coming to life and property adjacent to the National Forest System land. The aggressive logging may create an increased risk of insect outbreak and create conditions that exacerbate wildfire risks. Past projects have not been restorative to infrastructure and water resources, and in fact have caused damage to infrastructure and degradation of watersheds. An emergency would be much more likely to be created by going forward with this extreme Proposed Action, especially without completing an EIS with a range of alternatives.

The Forest Service must explain which of the authorized emergency actions listed in Section 40807 of the Infrastructure and Jobs Act, are applicable and specifically how they will effectively address the supposed "emergency situation" in the Project area.

> AUTHORIZED EMERGENCY ACTIONS.—After making an emergency situation determination with respect to National Forest System land, the Secretary may carry out

> authorized emergency actions on that National Forest System land in order to achieve reliefs from hazards threatening human health and safety or mitigation of threats to natural resources on National Forest System land or adjacent land, including through—
> (A) the salvage of dead or dying trees;
> (B) the harvest of trees damaged by wind or ice;
> (C) the commercial and noncommercial sanitation harvest of trees to control insects or disease, including trees already infested with insects or disease;
> (D) the reforestation or replanting of fire-impacted areas through planting, control of competing vegetation, or other activities that enhance natural regeneration and restore forest species;
> (E) the removal of hazardous trees in close proximity to roads and trails;
> (F) the removal of hazardous fuels;
> (G) the restoration of water sources or infrastructure; (H) the reconstruction of existing utility lines; and (I) the replacement of underground cables.

Infrastructure Investment and Jobs Act at Section 40807 (b)(2). We also request that the agency define which threats to natural resources must be mitigated, given that mixed-severity fire is natural and beneficial to landscapes, at least in moderate amounts.

VI. The Forest Service must complete a Programmatic EIS for the Wildfire Crisis Strategy Landscape Program.

The Forest Service states "Specific treatments would be phased across the project area for the next 10 years or more, as part of the Forest Service's Enchanted Circle Wildfire Crisis Strategy Landscape." Scoping Notice at 3. The Enchanted Circle Wildfire Crisis Strategy Landscape is a part of the Forest Service's 2022 Wildfire Crisis Strategy, "Confronting the Wildfire Crisis: A Strategy for Protecting Communities and Improving Resilience in America's Forests," which now comprises at least 21 priority landscapes that will receive active management per the Wildfire Crisis Strategy program. Nationally, the Forest Service asserts there are 250 designated high-risk firesheds. Scoping Notice at 5. Yet, at no time has the Wildfire Crisis Strategy been analyzed to comply with NEPA, a glaring omission given it is clearly a national program with major significant effects.

"A programmatic NEPA review is used to assess the environmental impacts of a proposed action that is broad in reach, such as a program, plan, or policy (see 40 CFR 1502.4)." 45 CFR § 900.207. The Wildfire Crisis Strategy is a "proposed action that is broad in reach, such as a program, plan, or policy."

A project should not be proposed within this program without the completion of the Programmatic EIS first. We request that once a PEIS is completed for the Forest Service's Wildfire Crisis Strategy, that the analysis process for the Project be reinitiated.

VII. Formatting of Project analysis

The agency formatted the Scoping Notice so that no sections could be copied and pasted to place into comments. That makes a document very user unfriendly and time-consuming to work with, as a commenter needs to be able to paste in specific passages of a Forest Service document in order to be able to comment on such passages. Please format further Project analysis so passages can be cut and pasted into comments.

Cordially,

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Exhibits

1. New Mexico Forest Health Conditions, 2023 Report
2. Managing Slash to Minimize Colonization of Residual Trees by Ips and Other Bark Beetle Species Following Thinning in Southwestern Ponderosa Pine.
3. Proposed forest thinning will sabotage natural forest climate adaptation, resistance to drought, fire, insect outbreaks.
4. Lommler 2019 PhD occupancy breeding habitat selection Rodeo Chediski
5. Climate Forest Coalition Comments re: APRM U.S per 88 FR 24497
6. Climate Forest Coalition comments re: NOI per 88 FR 88042
7. Wild Heritage Comment re: NOI per 88 FR 88042.
8. Memorandum from Chris French to Regional Foresters on Review of Proposed Project with Management of Old Growth Forest Conditions (Dec. 18, 2023) ("French Memo").
9. B. Law et al., 2020 The Status of Science on Forest Carbon Management to Mitigate Climate Change.
10. Feb 27, 2024. Scientists Letter. Request for an Executive Order to Place a Moratorium on Logging Mature and Old-Growth Forests.
11. Human Health Effects Of Wildland Smoke by Ann McCampbell, MD October 25, 2021
12. Residues Of Fire Accelerant Chemicals Risk Assessment

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