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April 15, 2024

Sent via CARA: https://cara.fs2c.usda.gov/Public//CommentInput?Project=54965

Re: Encino Vista Landscape Restoration Project Environmental Assessment

Dear Ranger Sando:

WildEarth Guardians, The Forest Advocate and the Santa Fe Forest Coalition respectfully submit these comments regarding the U.S. Forest Service's Preliminary Environmental Assessment (PEA) for the Encino Vista Landscape Restoration Project proposed for approximately 130,305 acres located on the Coyote and Cuba Ranger Districts of the Santa Fe National Forest. We also hereby incorporate by reference comments submitted by Peggy Darr on behalf of Defenders of Wildlife.

The overarching purpose of the project is "to restore overall forest health, lower uncharacteristic high severity fire risk, improve watershed health, and protect wildlife habitat across the project area." PEA at 11. It is important to note that the 2012 Forest Planning Rule provides direction and definitions for maintaining or restoring ecosystem and ecological integrity, which provides a more concrete foundation for projects such as the EVLRP than the undefined and nebulous "forest health" term used in the PEA. To be clear, the Santa Fe National Forest is not sick, and it certainly doesn't need any chainsaw medicine. Conditions do exist that require real restoration activities to return natural ecological process and function, but that is not what the agency proposes with its logging and thinning. More legitimately, the project's purpose also is to "to improve and maintain a transportation system in a manner that reduces negative impacts to watershed health." *Id.* But here the agency glaringly omits decommissioning to reduce road densities that would improve watershed conditions.

To achieve these purposes, the agency proposes to implement a variety of activities across "approximately 74,693 acres of stands suitable for varying treatment types which include: mechanical thinning, hand thinning, mastication, fuels redistribution, and use of prescribed fire." PEA at 34. To be clear, this includes a range of both commercial logging and non-commercial thinning with associated road activities. The Forest Service proposes aggressively removing trees to achieve basal area reductions as displayed in "Table 6: Prescriptive summary for each ERU utilizing group selection silvicultural method," which includes creating "small gaps and regeneration openings" that are essentially clearcuts. *Id.* at 35. Under the proposed action, the Forest Service would authorize logging trees up to 24 inches at breast height (dbh), which will have a substantial effect upon old growth habitat and large tree retention within the project area contrary to the agency's assertion otherwise. Further, the agency proposes to construct 8 miles of temporary roads using unauthorized routes when available, and utilize a number of system roads to implement project activities: "[u]p to 362 miles of open MVUM roads, of the 761 total miles of existing National Forest System Roads (NFSRs), would serve as the primary access for restoration activities…Opportunity to utilize known

unclassified/ unauthorized routes would be preferred." *Id.* at 38. In addition, the agency proposes commercial harvest across 7,903 acres that will utilize 84 miles of system road. *Id.* at 39. It is unclear if those 84 miles are in addition to the 362 miles of open roads the project would require.

I. Failure to provide an adequate range of alternatives

NEPA requires agencies to "[r]igorously explore and objectively evaluate all reasonable alternatives" to a proposed action – an analysis that is considered the "heart" of an EIS. 40 C.F.R. § 1502.14. Here the Forest Service fails to consider a reasonable range of alternatives, and in turn fails to provide a strong basis for comparison among opportunities or impacts. For example, the agency provides arbitrary and capricious rationales for dismissing several recommendations for a more conservation oriented approach to restore the ecological integrity of the project area. Specifically, the Forest Service dismisses an alternative that would cap tree thinning at 9 inches dbh as insufficient to meet the project's purpose and need. PEA at 31. Yet, the agency fails to consider reducing the diameter limits at all, retaining the maximum 24 inches dbh threshold, which allows entry into old growth stands. Rather than considering a more protective diameter limit, the agency simply dismisses the one offered by commenters. In addition, commenters urged the agency to consider an alternative that did not include thinning within Inventoried Roadless Areas, asserting that the proposed action was necessary to maintain roadless characteristics. *Id.* at 32. Yet, the Forest Service analysis fails to support such conclusions, and the agency's response over represents the actual acres that would be thinned: "Approximately 13,024 acres (10%) of the total project area consists of IRAs." *Id.* In fact, the actual acres included in all treatment acres is just 3,069.9 acres representing just 22.6% of all the IRAs. *Id.* at 135, Table 38. In addition to these examples, the Forest Service failed to include an alternative that would reduce road densities to the amount that would provide for properly functioning watersheds, as explained below.

Further, much of the project area is available for cattle grazing, which is also degrading watershed function and the area's overall ecological integrity. To ensure an appropriate range of alternatives for this project, the Forest Service should include a "no grazing" alternative and all action alternatives should include a provision allowing for voluntary grazing retirement followed by permanent closure of the allotments. We suggest the following:

> To protect important wildlife, hydrology, soil, upland, riparian, and stream resources on allotments within the area managed by the Forest Service, permittees should be allowed to voluntarily retire their grazing leases, followed by the Forest Service closure of the grazing allotment. This can make permittees eligible for compensation from a third party conservation group. With this compensation ranchers could create more secure and certain financial opportunities while protecting and enhancing the resource values the Forest Service is required to protect. Voluntary retirement of one or all of the permits in the project area could result in a permanent retirement of domestic livestock use on the allotment allowed by that permit. This would benefit livestock ranchers, the publicly managed lands, and the environment.

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

The Forest Service provides cursory rationales to support its vegetation treatments, namely by citing departures from historic conditions, threats from natural disturbances (wildfire, insects and diseases), and increased wildfire risks due to past wildfire suppression grazing, logging and infrastructure development. *Id.* at 12. The agency's underlying assumption that it can manipulate vegetation to address decades of mismanagement is 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 actually "restore overall forest health, lower uncharacteristic high severity fire risk, improve watershed health, and protect wildlife habitat." *Id.* at 11. 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 following:

> 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 gasses 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 changing 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

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 across a broad landscape such as the Encino Vista project area. 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, which draws fire up into the crowns.[1]

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. It is well-established that communities (homes) are best protected from fire by home hardening, and judicious removal of fuels within the surrounding 100 ft radius. Syphard et al. 2014, Cohen, 2000.[2] The Forest Service needs to address the fact that addressing the home ignition zone will do more to protect property than the proposed action.

[1] See Ex. 1 - Declaration of Dr. Joseph Werne In Support Of Plaintiffs: Unite the Parks v. U.S. Forest Service, E.D. Cal (2021) Case 1:21-cv-00518-DAD-HBK.
[2] See also, Ex. 2 containing a series of articles featuring Dr. Cohen.

We also question the need to reduce 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. 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 asserts there is a need to reduce the threat of insects, specifically bark beetles and spruce budworm, but the agency fails to provide supporting information for this need, rather it states,

> The two most prevalent types of damaging insects are bark beetles and defoliators such as western spruce budworm. Since 1997, 13,005 acres of forest have suffered mortality due to bark beetles, and 58,183 acres have been damaged by defoliating insects. These insects are not uncommon to find in the forest at low population levels and often cause undetectable level of damage and mortality. However, when stand densities are high or climate conditions cause stress on trees, these low population levels can explode into epidemic populations.

PEA at 15. The Forest Service fails to provide sufficient analysis to demonstrate how current conditions are leading to epidemic populations, and simply asserting that such occurrences could happen is insufficient to comply with NEPA's hard look mandate. Further, the agency fails to incorporate the fact that insects are a natural thinning agent and related mortality is precisely the kind of disturbance event that forests need to maintain proper ecosystem function and overall integrity. In addition, the Forest Service must recognize that insects related mortality serves as a natural thinning agent that can reduce wildfire severity risks. A 2016 study suggests that "In contrast to common assumptions of positive feedbacks, we find that insects generally reduce the severity of subsequent wildfires. Meigs, GW., et all, 2016. Further, 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").

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 Santa Fe National Forest. The Forest Service fails to address this risk in its analysis.

The agency states in section 1.3.2, Forest Health, Desired Conditions: "While insects and diseases are a natural part of functioning ecosystems, the desired condition is to keep these infestations and infections from becoming large-scale or more destructive than historically recorded. By managing for appropriate densities for each ERU, overall tree and stand stress can be reduced and allow trees the resources necessary to build resistance to many of the insects and diseases identified within the project area." PEA at 15. This assumes that managing for appropriate densities within each ERU will successfully reduce overall tree and stand stress, and will allow trees more resources necessary to build resistance to many of the insects and diseases identified within the project area. There is no information or data provided as to whether that has been successful in comparable ERUs in the SFNF in the past. In fact, trees in treated areas in the SFNF often appear to be more stressed than in areas where treatments did not occur, likely due to the soil and understory disturbances and the substantial decreases in canopy cover..

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.

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 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 PEA that bark beetle outbreaks from thinning slash is a substantial concern. There is no discussion in the PEA concerning mitigations to reduce bark beetle outbreaks from slash piles. There are no 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. 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).

[3] *See* Ex. 3 - New Mexico Forest Health Conditions, 2023 Report.

Managing Slash to Minimize Colonization of Residual Trees by Ips and Other Bark Beetle Species Following Thinning in Southwestern Ponderosa Pine at 1.21.[4] 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 did not consider in their analysis the benefits of light thinning, or of thinning in stages so potential bark beetle impacts can be decreased. The slash 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.

Within an EIS, 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 agency states, "Western spruce budworm would increase as stands become denser and overall stress from tree competition would encourage outbreaks from other insects and disease." PEA at 42. This is possibly true, but not necessarily to a strong degree. It is necessary to look at the benefits of treating with a possibility of reducing Western spruce budworm, compared to the benefits of Western spruce existing on the landscape. The adverse impacts of the potential ecological damage and risk from treatments must be a substantial part of the comparative evaluation. As noted above,

[4] *See* Ex. 4 - Managing Slash to Minimize Colonization of Residual Trees by Ips and Other Bark Beetle Species Following Thinning in Southwestern Ponderosa Pine.

thinning creates a potential for bark beetle outbreak due to slash piles remaining on the ground through the subsequent dry season. Any vegetation cutting activities require either pile burns or broadcast burns, which clearly present a substantial risk for prescribed burn escapes in the SFNF, based on past history..

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."[5] 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.[6] The Forest Service states:

> Fires will likely be more frequent and widespread. Insects such as western spruce budworm and spruce beetle are likely to proliferate in stressed and weakened trees, and mortality is likely to increase because of these outbreaks. However, past spruce budworm outbreaks have been associated with periods of increased moisture, and warmer, more drought-prone conditions could reduce budworm activity and temper the severity of future outbreaks.

EA at 64. We agree that 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:

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[5] *See* https://apps.fs.usda.gov/r6_decaid/views/western_spruce_budworm.html (Last Accessed, 4/15/2024).
[6] *See* Ex. 5 - Proposed forest thinning will sabotage natural forest climate adaptation, resistance to drought, fire, insect outbreaks

> 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. However, the agency states: "Western spruce budworm would increase as stands become denser and overall stress from tree competition would encourage outbreaks from other insects and disease." PEA at 42. 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 EVLRP landscape without significant adverse impacts on 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.

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

The Forest Service states, "The SFNF has identified the need to restore forest structure, composition, density, and landscape patterns to create uneven-aged landscapes more resilient to disturbances so natural ecological processes may return to their characteristic roles within the ecosystem" EA at 13. Yet when one observes past treatments in the SFNF, that generally share landscape characteristics with landscape contained within the EVLR Project area, 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 may return to their characteristic roles within the ecosystem. In fact, one observes highly uncharacteristic 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. See Figures 1 - 3 below. PDFs and Mitigation Measures Plant 1, Plant 2, and Plant 3, which are practices to limit and control the spread of noxious or invasive weeds, have long been identified as Forest Service policy, and yet these adverse impacts have not been avoided.

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.

Figure 1. La Cueva Fuel Break Project, thinned in 2013.

Although this project is designated as a fuel break, it was a standard prescription for that time. Note the degraded understory and trees that appear to be losing vitality, and some of which have died.

Intentionally Left Blank

Figure 2. Santa Fe watershed thinning/burning treatments, near the Black Canyon Campground.

This area was thinned in the 1990's with 2-3 prescribed burns since. Note that the understory appears desiccated and the soils appear dry and unproductive. The trees are lacking in vitality and some appear to be dying.

Intentionally Left Blank

Figure 3. Previously treated area in the northwest section of the EVLRP, with a pile burn scar.

Note the degraded forest floor with uncharacteristic vegetation and some trees with apparently declining vitality.

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. The agency states, "Two factors that contribute to stand-replacing crown fires are surface fuels and canopy fuel distribution." 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 PEA.

Conifer saplings are often killed in such 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.

The Forest Service states:

> Forest health is defined by the vigor and condition of the forest stands, and the presence of insects and diseases that affect the sustainability of the forest. Stand density is the dominant factor affecting the health and vigor of the forest. Past activities have produced highly stressed ecosystems, higher densities of small-diameter trees, increased closed-canopy conditions, increased fuel loadings, altered species composition, and reduced site productivity. These conditions have lowered the resilience of existing ecosystems, making them more at risk from stressors (e.g., prolonged drought, nonnative invasive species, climate fluctuations) and disturbance (e.g., more large, uncharacteristic fires, increased insects, and disease outbreaks) (USDA, 2022b).

PEA at 14. The agency also states, "Stand improvement thinning would improve diameter growth rates by reducing tree competition and density. When trees are released by cutting a competing tree, any prompt acceleration of growth is largely from an increase in water and nutrients supplied by the roots (Smith et al. 1997). PEA at 45.

While the Forest Service cutting/burning treatments clearly reduce stand density, they are not, at least so far, improving the health and vigor of forest stands. There is no reasoning provided in the PEA that would assure that forest stand health and vigor will improve in treated areas in the future. These activities may be as detrimental to the purpose of forest health as past activities that brought forests into their current condition. Trees losing needles, turning brown and some dying, does not indicate improved vigor and health. Even when that does not occur, remaining trees often appear spindly, as they were originally part of a grouping which functioned as a larger organism.

In regards to the agency's reference for the statement above, Smith et al. 1997, for some reason the Forest Service chose to use a highly outdated version of "The Practice of Silviculture, Applied Forest Ecology." by Smith et al. They used the 9th edition from 1997, even though there was a largely revised version published in 2018, the 10th edition. The edition published in 1997 pre-dated the beginning of the current drought cycle the SFNF is experiencing, and was written during a period of cooler and wetter forest conditions. In the current climate, it is yet unknown if stand "improvement" thinning would improve diameter growth, and the results of thinning in the SFNF in recent decades indicate that thinning would likely not have that beneficial effect.

The Forest Service must evaluate and explain why cutting and burning treatments in similar landscapes have not met their objectives and have seemingly degraded forest health before continuing with more of the same, or similar treatments. The agency has not utilized a range of the best available science to develop silvicultural strategies. The agency must also provide a strategy backed by a full range of the best available science that would genuinely meet the stated purpose and need in regard to forest health.

As such, the Forest Service must prepare an EIS to carefully consider these impacts and determine the efficacy of specific treatments. They must also develop and consider a conservation alternative.

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").[7] 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.[8] Another obligation was to identify the minimum road system needed for safe and efficient travel and for the protection, management, and use of National Forest system lands.[9]

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 22 years since finalizing the subpart A rules, the Forest Service can no longer delay in addressing this 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).

This failure may stem from a fundamental misunderstanding of the Travel Analysis Process. The Forest Service states the following:

> In 2008, to meet subpart A of the Travel Management Regulation (36 CFR Part 212), the SFNF produced a Travel Analysis Report (TAR)[2], which analyzed and identified a minimal transportation system for the entire Forest, including the EVLRP area.
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> The TAP is not a NEPA process; it is an integrated ecological, social, and economic approach to transportation planning, addressing both existing NFSRs and future roads.

We agree that the TAP process does not result in a NEPA decision, which is why the Santa Fe NF 2008 TAP could only arrive at a ***recommended*** minimum road system, and only through subsequent, NEPA-level process could these recommendations be fully considered with the resulting identification of the minimum road system. In other words, it is incorrect for the Forest Service to assert that its 2008 TAP met subpart A requirements. This fact is further supported by internal Forest Service direction from 2012. *See* Memorandum from Leslie Weldon to Regional Foresters et al. on Travel Management, Implementation of 36 CFR, Part 212, Subpart A (Mar. 29, 2012), page 2

[7] 36 C.F.R. part 212, subpart A. 66 Fed. Reg. 3206 (Jan. 12, 2001).
[8] 36 C.F.R. § 212.5(b)(2).
[9] *Id.* § 212.5(b)(1).

("The next step in identification of the [minimum road system] is to use the travel analysis report to develop proposed actions to identify the [minimum road system] . . . at the scale of a 6th code subwatershed or larger.").[10] In the PEA, the Forest Service provides a link to its travel management planning page that includes the 2008 TAR, which was clearly produced in support of the Travel Management Rule's (TMR) subpart B planning that designates roads, trails and areas for summer off-road vehicle use: "The purpose of this report is to explain our comprehensive examination of the roads network on the Santa Fe National Forest before we begin the environmental analysis process to designate the routes according to the Travel Management Rule." 2008 TAR at 3. However, the analysis did arrive at a recommended minimum road system of 3,737 miles of road and 3,239 miles of unneeded roads. Yet, it is unclear if the agency made this recommended through the lens of complying with the TMR's subpart A direction given this explanation, "The logic used by the staff specialists in forming recommendations asked whether there are resource reasons not to designate and whether there will be access or recreational value provided by designating." 2008 TAR at 36. Further, the webpage provided in the PEA includes a link to the TAP Appendix that lists recommendations for each road, but it was password protected and could not be accessed.

As such we urge the agency to include subpart A compliance as part of the project's purpose, especially given the high road densities in the project area and the number of known unauthorized roads. *See* PEA at 19, Table 3. In doing so, we urge the Forest Service to update its previous Travel Analysis Report to reflect any changed circumstances. In fact, this update was anticipated by the agency and reflected in the 2008 TAR: "Travel Analysis is an iterative, not a one-time, process. When conditions change, additional analysis may point to the need for revisions in the recommendations. In fact, the Travel Management designation process that will follow this process will likely result in additional information and, perhaps, decisions that will then be reflected in changes to the recommendations in this report." 2008 TAR at 3. Another reason to update the TAR is that conditions have changed over the last 15 years affecting both risks and benefits of the road system. For example, the 2008 TAR only considered roads as a benefit for the purposes of fire suppression activities, and did not account for the increased risk of human-ignitions facilitated by road access. Additionally, changes have likely occurred regarding the abundance and distribution of fish and wildlife habitats considered in the report, which include the following:

- Mexican spotted owl protected activity centers
- Northern goshawk post-family fledging areas
- Jemez Mountain salamander essential habitat
- peregrine falcon areas
- Rio Grande cutthroat trout core areas
- elk crucial winter range
- elk calving areas.

2008 TAR at 32. Finally, the 2008 TAR also suffers from many of the flaws documented in the WildEarth Guardians' report titled, "A Dilapidated Web of Roads - The Forest Service's Departure

[10] *See* Ex. 6 - Memorandum from Leslie Weldon to Regional Foresters et al. on Travel Management, Implementation of 36 CFR, Part 212, Subpart A (Mar. 29, 2012)

From a "Sustainable" Forest Road System.[11] For example, the Forest Service failed to explain what particular combination of factors led a road to be classified as high risk or high benefit, or what methods it used to rank or score each road to make a recommendation to keep a specific road segment. Rather, the agency explains the following:

> The logic used by the staff specialists in forming recommendations asked whether there are resource reasons not to designate and whether there will be access or recreational value provided by designating. If there are values provided and no resource reasons not to designate, the route would likely be recommended for designation. If there are resource reasons not to designate that can not be mitigated, then the route would likely not be designated.

2008 TAR at 36. The explanation suggests that the minimum road recommendations were based on whether or not to designate a road or trail for summer motorized recreation, and not necessarily to support compliance with subpart A of the TMR. When coupled with the age of the 2008 TAR, this lack of clarity further supports our call for a revised forest wide Travel Analysis Report. Given that is outside the geographic scope of the project, it would be reasonable for the Forest Service to provide a project-specific TAR for just the EVLRP planning area, and one that recommends a minimum road system that is both environmentally and fiscally sustainable. The Forest Service should then revise its purpose and need for the EVLRP to include complying with subpart A and, additionally, to implement the recommended minimum road system through road decommissioning and performing critical maintenance. In support of meeting this expanded purpose and need, the agency must provide the requisite supporting analysis that demonstrates how the identified minimum road system can be adequately maintained within current and projected Forest Service budgets, and how it provides for the protection of Forest Service lands.

Complying with subpart A and implementing a minimum road system 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."[12] 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

[11] *See* Ex. 7 - A Dilapidated Web of Roads - The Forest Service's Departure From a "Sustainable" Forest Road System
[12] 42 U.S.C. 4332 (C)(i), 2023.

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."[13] 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."[14] 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.

A. Disclose site-specific information

The FS should provide detailed, site-specific information regarding existing conditions and how the proposed action will affect forest resources including wildlife, wildlife habitat, streams and riparian areas. This includes site-specific impacts to any at-risk wildlife and aquatic resources, including species of conservation concern such as the Rio Grande cutthroat trout. At a minimum, the FS must disclose the location of proposed activities in relation to wildlife and fish-bearing streams that may be present in the project area and important wildlife and aquatic habitats, as well as perennial or ephemeral streams and riparian areas. As it stands, the Forest Service only provides a map of the roads to be improved, but fails to illustrate the total road system or location of unauthorized routes, or those routes that will be utilized as temporary roads.

Further, the Forest Service explains that it plans to conduct silvicultural "treatments" that includes "small gaps" and "regeneration openings" that will achieve basal area reductions listed in Table 6 of the PEA across 4 different ERUs. PEA at 34. The agency also states that it will create shaded fuel breaks along unspecified ridges and forest roads. *Id.* at 51. The Forest Service provides a map of its "Commercial Timber Rx," but still fails to disclose where it will create "small gaps" or "regeneration openings," fails to disclose the size of such openings within each logging unit, and fails to illustrate where it will place "shaded fuel breaks" along specific roads and ridgelines. The agency also states that trees up to 24" dbh may be logged, but fails to disclose the amount of mature trees and old growth trees that will be commercially logged within these areas. In fact, the analysis does not reveal the total acres to be logged until it explains the number of roads it needs to perform the commercial logging operations:

> Within the project area, 7,903 acres are currently identified as meeting the criteria for mechanical commercial thinning treatment, which includes 84 miles of NFSRs required to accompany treatments (Table 9).
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> Up to approximately 8 miles of temporary roads could be created and for the completion of silviculture treatment activities.

[13] 42 U.S.C. 4332 (D)

[14] Treasury and General Government Appropriations Act for Fiscal Year 2001, Pub.L. No. 106-554, § 515.

PEA at 39. The Forest Service must provide more details regarding the location of its commercial timber units, specifically the size and location of small gaps, regeneration openings, and shaded fuel breaks. The Forest Service must also disclose the amount of timber it expects to produce. The information is especially important regarding potential impacts to at-risk species. For example, the agency concluded that the proposed action may affect and would likely to adversely affect (LLA) Jemez mountain salamander (JMS), partly due to the fact that "[c]ommercial thinning (and associated road maintenance work) would impact up to 940 acres of suitable JMS habitat." *Id.* at 88. Yet, the agency fails to disclose where commercial timber operation would occur within JMS habitat or the miles and location of the associated road work. Rather than taking the requisite hard-look at the potential impacts, due in part to the failure to disclose the proper information, the agency arbitrarily asserts that stand-replacing fires "would have greater long-term adverse effects to JMS and habitat loss than the proposed action," and that project design features would reduce the potential for adverse impacts. *Id.* at 89. The Forest Service does not provide any discussion or evidence regarding the efficacy of its proposed design features, and sets a strawman argument by assuming all JMS habitat would be subject to stand-replacing wildfires absent implementation of the proposed action. None of which is supported by the agency's analysis. Similarly, the Forest Service determined the proposed action would likely affect, but not adversely affect Mexican spotted owls. *Id.* 86. "The effect determination is based upon the application of best management practices, project design features, 2022 SFNF LMP components and quality of location information for this species." Ironically, the quality of location information lacks the specificity of precisely where it will conduct commercial logging across the 3,067 acres of MSO habitat (1,734 acres in Recovery Canyon Nest/Roost, and 1,333 acres in Recovery Foraging Habitat). *Id.* The Forest Service states that "Indirect effects to MSO RCNR and RFH would have mostly negligible effects in terms of canopy loss. This is due to the project design which focuses on cutting trees less than 9 inches dbh and below within treated areas." *Id.* Yet, the agency shows trees up to 18 inches dbh within mixed conifer ERUs may be logged, (PEA at 35, Table 6), and the MSO Checklist and Implementation Guide states that within Recovery Foraging/Non-breeding Habitat trees up 24 inches dbh may be logged. PEA Appendix B at 10. At the very least, the information is unclear, and appears contradictory. The agency must disclose precisely where it will locate commercial timber operations within each MSO habitat type, the precise silvicultural treatments proposed (including dbh limits) and the actual amount of timber produced within MSO habitat. In addition, the Forest Service cannot simply rely on Appendix B to demonstrate compliance with the Endangered Species Act as the agency has yet to show it is actually increasing MSO populations where it has been utilized.

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

As noted above, the agency's analysis regarding as it relates to MSO recovery is insufficient. It does not reflect the best available scientific information, and will not support the recovery of MSO on the Santa Fe National Forest. The Forest Service explains the following:

> The project area contains a total of 32,489 acres of RCNR habitat which includes five known PACs. The project area contains 22,269 acres of RFH which includes canyon rim edges and adjacent areas that are composed of mixed conifer forest. Many other forest types in the

> project area are considered "other woodland types" within the revised recovery plan and do not contain specific management recommendations.

PEA at 82.

The threats to MSO recovery the agency asserts in its analysis are premised on the need, in part, to reduce wildfire occurrence: "Overall, the implementation of the proposed action will focus on meeting desired ecological conditions within the project area, improving wildlife habitat and create more resilient forests which can resist catastrophic wildfire." PEA at 87. However, as we explained above, there is a great deal of uncertainty regarding the efficacy of tree cutting and prescribed burning in preventing severe wildfires at a landscape-scale and this includes within MSO recovery habitat. Additionally, as we noted, the Forest Service needs to clarify how much timber it intends to produce within MSO recovery habitat. It must also identify the protected activity centers subject to any thinning and prescribed burning, especially given the following disclosure:

> No commercial thinning is proposed in PACS. There are 2,613 acres of PAC acres included within the total RCNR habitat acres above. Although PACs are independent of Recovery habitat within the revised recovery plan, the acres were not removed at this time but will be removed for the BA and final EA.

Id. at 86. This begs the question of how much precommercial thinning and burning will occur with the PACs. The Forest Service also needs to clarify the diameter limits and basal area reductions it will conduct within MSO habitat. The agency provides a table showing that within mixed conifer stands that it proposes there will be ">30% of diameter distribution is within both the 12-18" and >18" DBH classes. Minimum BA is 120 BA with 12 trees per acre over 18" in DBH." *Id.* at 35, Table 6. At the same time, the agency states the following:

> Indirect effects to MSO RCNR and RFH would have mostly negligible effects in terms of canopy loss. This is due to the project design which focuses on cutting trees less than 9 inches dbh and below within treated areas.

Id. at 87. As we commented above, the MSO Checklist and Implementation Guide (PEA, Appendix B) shows trees up to 24 inches dbh could be cut. The agency must clarify these discrepancies.

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.

The Forest Service explains that its proposed action will move the project area closer to the agency's desired conditions:

> The desired condition is for reduced fuel loads in areas where vegetative conditions would contribute to high-intensity crown fire, rapid rates of spread and high flame lengths, and

where wildfire would cause damage to resources and values at risk (for example, residential properties, critical infrastructure, watershed, MSO (Mexican Spotted Owl) habitat and the WUI.

PEA at 18. Those desired conditions are based, in part, on the 2022 Santa Fe National Forest Land Management Plan (Revised Plan). We raised numerous concerns with the Revised Plan that persist, and therefore are included in the following sections.

Further, the Recovery Criteria for MSO given in USFWS (2012) are: 1) Owl occupancy rates must show a stable or increasing trend after 10 years of monitoring; and 2) Indicators of habitat conditions (key habitat variables) are stable or improving for 10 years in roosting and nesting habitat. The Forest Service failed to include any monitoring information that demonstrates a stable or increasing trend toward recovery, or utilize the indicators of habitat conditions in the project analysis. Absent this information, the agency cannot demonstrate that the proposed action will in fact support MSO recovery. To be clear, we fundamentally reject the notion that adherence to the MSO Checklist and Implementation Guide (PEA, Appendix B) will satisfy the agency's monitoring requirements. As it stands, the Forest Service has yet to demonstrate MSO populations within the region are on a trend toward recovery by relying on its MSO Checklist and Implementation Guide. Our concern is that the agency assumes these administrative procedures are sufficient to demonstrate compliance with the Endangered Species Act and the overall recovery of the species. Nothing in the PEA supports this assumption.

1. 2012 MSO Recovery Plan & Revised Plan FEIS

According to the 2012 MSO Recovery Plan, in 1993 the U.S. Fish and Wildlife Service (FWS) listed the Mexican spotted owl as threatened under the Endangered Species Act. Two primary reasons were cited for the original listing of the Mexican spotted owl in 1993: 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.

The Santa Fe Revised Plan Final EIS ("FEIS") states that threats to MSO include "departure in seral state conditions amount of coarse woody debris, and snag density from loss of dense, old-growth mixed conifer forest, changes in fire regime, and from stand-replacing fire." FEIS, Vol. 1, p. 122. In another section, the Final EIS lists these threats to MSO: "Risk of loss of ecological condition and habitat fragmentation of Frequent Fire Forest from wildfire outside the natural range of variability; vegetation management and fire (both unplanned natural ignition and prescribed), fuelwood collection, ungulate grazing, recreation, natural disturbance (e.g., insect outbreaks, drought), and climate change." FEIS, Vol. 1, p. 135.

The revised plan focuses on eliminating the threat of stand-replacing fire but does not provide any plan components to protect MSO from vegetation management (logging and other mechanical

treatments). Ongoing (not just historic) timber harvesting continues to pose real threats to MSO. Direct effects of mechanical thinning on MSO have not been studied, so the best available science comes from studies of other spotted owl subspecies. Studies that have examined the impact of logging within a spotted owl territory have found that any reduction in canopy cover by logging harms owls by negatively impacting owl occupancy, reproduction, and survival.[15] The FEIS and Final Plan fail to address the potential harms caused by mechanical thinning in MSO habitat.

In addition, the Final Revised Forest Plan and EIS overstate the threats of stand-replacing fire, as does the EVLRP EA. The analysis of fire in the Final Plan and FEIS is incompatible with MSO recovery and disregards the best available science. Uncharacteristic fire is defined in the Final Plan and FEIS as large-scale, stand-replacing fire that does not normally occur as a part of the fire regime for the ERU involved. The FEIS repeatedly states large-scale, high-severity fire is a threat to MSO, but this assertion does not reflect the best available science on the topic. No studies to date have adequately documented significant negative effects of fire on MSO population parameters of site occupancy, survival, reproduction, or habitat selection.

The 2012 MSO Recovery Plan 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 Final Plan and FEIS, and thus the EVLRP takes the same leap in logic as the MSO Recovery Plan and asserts that because fires burn the forest and kill trees, it must be bad for MSO. To do so, they 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.

2. Scientific controversy and uncertainty

Here we provide information published in Lommler, M.A. 2019.[16] 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

[15] See, for example: Blakesley et al. 2005, Seamans and Gutiérrez 2007, Stephens et al. 2014, Tempel et al. 2014, Tempel et al. 2016.
[16] See Ex. 8 - Lommler 2019 PhD occupancy breeding habitat selection Rodeo Chediski

of occupancy and nesting/roosting habitat provisions under the Revised Plan, specifically the basal area and canopy cover reductions for mixed conifer-dry and Ponderosa pine ERUs.

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 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 analysis fails to adequately demonstrate otherwise; rather, 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.

The Forest Service must consider these findings in an EIS, and any assertion that the EVLRP proposed action would not significantly affect MSO or MSO recovery habitat would be arbitrary and capricious, and be a violation of NEPA.

3. Demonstrate Consistency with 2020 Commitments to WildEarth Guardians

On December 24, 2019, WildEarth Guardians sent six separate Notices of Intent ("NOI") to sue for alleged violations of the Endangered Species Act to the U.S. Forest Service, the U.S. Department of Interior, and the U.S. Fish & Wildlife Service ("FWS"). These NOIs sent to national forests in Arizona and New Mexico generally raise concerns regarding the effects from the ongoing implementation of the forest plans for six national forests on the conservation and recovery of the Mexican spotted owl. In response, the Forest Service set forth in its Oct. 26, 2020 settlement letter to WildEarth Guardians with several commitments that apply to the Santa Fe National Forest as well

based on the best available scientific information, and the 2012 Recovery Plan direction as we explained above.[17] These commitments include as follows:

- Continue monitoring owl population trends on National Forest System lands in the Southwest Region through 2025, consistent with the 2012 Recovery Plan. *See* 2012 Recovery Plan at 77, 323-333.
- Conduct protocol occupancy surveys prior to ground-disturbing activities within Recovery Habitat to identify and protect owls, and designate Protected Activity Centers (PACs) if surveys detect an owl and the data meets the definition of an owl site. *See* 2012 Recovery Plan at 74, 259, 299-322. If the agency elects not to conduct such surveys, the Forest Service must *assume owl presence within the project area not surveyed* plus a buffer of 0.5 miles and implement management constraints and mitigation measures recommended by the Recovery Plan for areas occupied by nesting and roosting owls. *See* 2012 Recovery Plan at 261-63.
- Apply the adaptive management framework suggested by the Recovery Plan and assess the effects of mechanical and prescribed fire treatments on MSO and its habitat in PACs outside of core areas based on "rigorous and quality controlled management experiments" developed collaboratively between the Forest Service and FWS to determine the effects of mechanical treatments within Recovery Habitat but outside of PAC core areas on owl and owl habitat; and prescribed fire treatments within Recovery Habitat on owls and owl habitat. *See* 2012 Recovery Plan at 282-83, 297, 385. This includes pre-, during, and ***post-treatment monitoring*** of MSO in treatment and reference PACs. In addition, for future projects the Forest Service and FWS plan to develop and implement future project-specific, comprehensive, and sound monitoring plans and incorporate these plans into the proposed actions and resulting BiOps for suitable projects.

To be clear, the EVLRP should be considered a future project under the commitment, and the Forest Service should provide details for post-treatment monitoring. It must also disclose and analyze the region-wide owl population trends based on the latest monitoring data in an EIS. We were unable to find any information regarding region-wide owl population trends based in the PEA. Further, it must assume owl presence within the project area not surveyed plus a buffer of 0.5 miles, and implement management constraints and mitigation measures recommended by the Recovery Plan for areas occupied by nesting and roosting owls.

4. Failure to Demonstrate Compliance with the Endangered Species Act

The Forest Service has an independent duty to demonstrate compliance with the Endangered Species Act (ESA). Under Section 7(a)(2) of the ESA, the Forest Service has an independent duty to consult with FWS to ensure the EVLRP is not likely to (1) jeopardize the continued existence of any threatened or endangered species, or (2) result in the destruction or adverse modification of the critical habitat of such species. See 16 U.S.C. § 1536(a)(2). For MSO, the Forest Service has a duty to

[17] *See* Ex. 9 - FS NOI Response Stipulation Agreement FINAL, 2020-10-27

demonstrate how this project complies with the ESA, and also how this project is consistent with the MSO programmatic Biological Opinion for the Revised Plan. As it stands, the PEA fails to provide sufficient analysis to demonstrate compliance with the ESA.

5. Failure to Demonstrate Compliance with the Revised Plan in Violation of NFMA

Under the National Forest Management Act (NFMA), the Forest Service has a duty to demonstrate how the proposed actions under the Rim Country Project will be consistent with the three applicable forest plans and their components to protect MSO and MSO critical habitat. 16 U.S.C. § 1604(i); 36 C.F.R. § 219.15. A project or activity must be consistent with all applicable plan components, including the desired conditions, standards, and guidelines. *See All. for the Wild Rockies v. United States Forest Serv.*, 907 F.3d 1105, 1110 (9th Cir. 2018). Here, the Forest Service fails to demonstrate how the proposed actions will be consistent with the Santa Fe Revised Plan. The Forest Service provides an appendix meant to demonstrate consistency with the Revised Plan. PEA, Appendix D. But the agency's proposal itself and the analysis fail to provide sufficient detail or site-specific information to evaluate compliance with the Forest Plans as part of the NEPA process. Instead, the agency largely relies on its MSO Checklist and Implementation Guide (PEA, Appendix B) and project design features (PEA, Appendix C) to achieve consistency with the plans and reduce any potential impacts on resources, including impacts to MSO. Looking more closely at the agency's Revised Plan consistency review it directs the following to demonstrate consistency with the Revised Plan's component FW-ATRISK-G-2:

> Pre-treatment surveys and habitat identification would be conducted according to the MSO Recovery Plan and U.S. Forest Service Region 3 MSO Habitat Management Strategy. The process includes habitat assessment, development of a pre-implementation compliance review checklist, and Habitat Checklist for Planning projects that involve prescribed fire and Forest thinning within MSO recovery habitat.

PEA, Appendix D at 11. Looking at the compliance review checklist, information that must be disclosed in the EA include the following:

- Protected Activity Centers identified in the project/action area. These are mapped and total acres are displayed;
- Recovery Habitat includes all mixed-conifer, riparian forests, and pine-oak for some Ecological Management Units (EMUs);
- Recovery Nest/Roost Habitat identified and delineated in the project/action area. At least the minimum percentages as indicated by Table C.3 are designated for the project area and/or the unit. Where available, contemporary stand exam data should be used. Absent stand exam data, other sources of information may be used, such as: imputed nearest neighbor, LiDAR, Landsat remote sensing, geophysical modeling, slope, aspect, regional recovery habitat map, living map, field examination, etc.;
- Recovery Foraging/Dispersal Habitat (also known as foraging/non-breeding) identified and delineated in the project/action area. This includes all recovery habitat not identified as nest/roost.

The agency's analysis for the EVLRP lacks information on PACs, maps displaying Recovery Habitat, Recovery Nest/Roost Habitat or Recovery Foraging/Dispersal habitat. We acknowledge the agency did disclose the percentages of Recovery Canyon Nest/Roost and Recovery Foraging Habitats, along with the acres and percent of the proposed action components. PEA at 86, Table 26. However, we find no corresponding maps, and no information about the PACs or foraging/non-breeding habitat that may be present within the analysis area. These are just a few examples of where the agency's analysis fails to demonstrate compliance with the Revised Plan.

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 (both system and non-system) temporary road construction, and motorized use (including unauthorized use of closed roads and non-sytem routes). 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. Given there are 761 miles of system roads in the project area, in addition to 44 miles of known unauthorized routes, it is essential for the agency to properly analyze and address its failing and sprawling network of roads and routes across the project area. PEA at 19, Table 3.

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 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.[18] 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

[18] See Ex. 10 - The environmental Consequences of Forest Roads and Achieving a Sustainable Road System.

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.[19] As such the analysis of the road 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. We acknowledge that the Forest Service did disclose the miles of system roads and unauthorized routes, but the analysis of the No Action alternatives failed to account for the environmental consequences of its non-system routes, instead it lumped all of them together. This fails to distinguish the environmental impacts between system roads and non-system routes. 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 properly disclosing the effects of the no-action alternative, which would then skew the analysis for any action alternative. For example, the Forest Service explains that it will construct 8 miles of temporary roads in support of its silvicultural activities, and that these roads would be located on existing, unauthorized routes wherever possible. PEA at 57. 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, both for the harmful impacts and for the benefits of fully removing them after use. *Id.* Without differentiating between system and unauthorized roads in the analysis, the Forest Service would fail to adequately disclose the direct, indirect and cumulative effects to lands, water, and wildlife from using those non-system routes serving as temporary roads, and for leaving the remaining 36 miles of unauthorized routes on the ground. Ideally, expanding the purpose and need to comply with subpart A of the TMR and to implement the minimum road system would address those remaining 36 miles by authorizing their decommissioning. In addition, without fully accounting for unauthorized roads any finding of no significant impact will be arbitrary and capricious, and a violation of 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."[20] These human-caused fires undoubtedly align with access. In fact, forest roads can increase the occurrence of human-caused fires, whether by accident or

[19] 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").
[20] "Wildfire Statistics" *Congressional Research Service* (2023). https://sgp.fas.org/crs/misc/IF10244.pdf (last accessed, April 15, 2024).

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 to retain all the system and unauthorized roads in the project area, minus the 8 miles used as temporary roads that would be removed after use. The result is there will be 435 miles of roads where public motorized use is prohibited. The Forest Service must demonstrate how it will enforce those road closures, and the potential for human-caused wildfire ignitions from any lack of enforcement capacity. In addition, the Forest Service must disclose and discuss the potential for human-caused wildfire ignitions facilitated by road access within the Wildlands Urban Interface, especially given the project's purpose is to "reduce potential wildfire hazard to wildland urban interface (WUI) areas." As part of this analysis, the agency must actually delineate the WUI, the proposed actions within the WUI, and the roads and motorized trails within the WUI. 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, and part of that consideration is disclosing the number of human-ignited wildfires that have occurred within the region that would otherwise have been prevented had there been no road access.

D. 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.

E. Failure to properly analyze impacts to watersheds, water quality and water quantity.

The Forest Service failed to properly disclose or consider 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, water quality and water quantity from the proposed actions, the Forest Service must provide a more detailed analysis, including additional information about the methods used to estimate sedimentation under the Forest Service Watershed Erosion Prediction Project (WEPP), and separately specific rankings under the Watershed Condition Framework (WCF), *See* Figure 4 below. We recognize the agency utilized the GRAIP-Lite model "to analyze all NFSRs within the project area. GRAIP-Lite is a geospatially based analysis tool that predicts and routes sediment from roads through the hydrologic network." PEA at 123. While generally a useful tool, the model is not as robust as performing full GRAIP inventories and it is unclear if the Forest Service utilized sufficient existing GIS data to in its GRAIP-Lite model or if it calibrated the model to account for data gaps:

> GRAIP_Lite can be implemented using only existing GIS data, or it can be supported using a field-collected calibration data set to inform a statistical estimation of vegetation cover and delivery curves. Existing GRAIP data can be used to supply this calibration data set or new calibration data can be collected in areas where existing GRAIP data is not available or applicable.

Nelson et al., 2019. The Forest Service did not explain how it calibrated the GRAIP-Lite model in its analysis of the EVLRP. Such omission is not minor given that "[c]alibration data is collected in the field using GPS and data entry at each site." *Id.* In other words, the GRAIP-Lite model can be a useful tool to estimate road-related sedimentation within a subwatershed, but it must utilize field collected data, either from previous applicable GRAIP inventories or from newly collected field data. We urge the Forest Service to explain how it calibrated its model. Further, the agency explains the following regarding the GRAIP-Lite model results:

> The analysis indicates 155 miles of road segments open to the public (on the MVUM) should be further evaluated for road drainage and surfacing improvements. Additionally, 100 miles of road segments not open to the public (not on the MVUM) should be further evaluated for road drainage improvements or decommissioning. Appendix F includes the project's Road Atlas and List of Priority Roads resulting from the GRAIP-Lite modeling. Roads and road segments are listed by watershed and amount of sediment delivery by ton.

PEA at 55. To be clear, the date shown in Appendix F in Table 1 only displays 55 miles of roads open to the public and omits 100 miles of closed roads. Further, it is unclear if the agency asserts

that only 155 miles of system roads are causing sedimentation concerns given the following explanation:

> Out of the 761 total miles, 362 miles of roads open to the public are identified within the project area, approximately 80 miles of roads will be maintained under the SFNF's annual road maintenance plan. Of the approximately 210 miles (65 percent) that have unacceptable levels of erosion[1], and of those, 55 miles are delivering the majority of sediment to streams (Appendix F). The remaining 399 miles of roads are closed to public for motorized use. In which there are 195 miles of maintenance level (ML) 1 roads (closed to all users) and 204 miles of administrative use only roads. Of these 399 miles, 289 miles (78 percent) are badly eroding, and of those, 98 miles are delivering the majority of sediment to streams (Table 4, Appendix F). There are also 44 miles of documented unclassified or undetermined routes.

PEA at 18. In other words, are just 55 miles of open roads delivering a majority of road-related sedimentation? Or is it 155 miles of combined open and closed roads that are a concern? Or is it really the 210 miles that have unacceptable levels of erosion? And what about the entire 761 miles of system roads, or the 44 miles of unauthorized roads. The Forest Service must clarify precisely what level of road-related sedimentation is occurring from its road network in at least two ways, 1) by Maintenance Levels (see PEA Table 17 Summary of Existing Roads in the Encino Vista Project Area); and 2) by subwatershed. In addition, the Forest Service fails to disclose road conditions, which is especially important for closed roads, administrative use roads or maintenance level 2 roads that have dense vegetation grown in and where routine maintenance has been lacking or has been so infrequent that these roads are effectively impassable without reconstruction. In other words, the agency must identify those roads where routine maintenance is insufficient to provide access, and in those instances, it must analyze those roads as new construction given the likely harmful effects to watershed conditions and water quality that would result.

The Forest Service discloses there are eleven subwatersheds in the project area (HUC 12), eight are functioning at risk and three are functionally "impaired "meaning they exhibit low geomorphic, hydrologic, and biotic integrity relative to their natural potential condition. PEA at 118. "Eight of the eleven watersheds have streams impaired by temperature, nutrients, sedimentation/siltation, and turbidity pollutants." *Id.* "Several project area streams are impaired by temperature pollution (Cañones Creek, Rio Puerco de Chama, Rito Peñas Negras (NMED, 2022)." PEA at 18. Here it is important to note that two subwatersheds have TMDLs for sedimentation/siltation; the Headwaters Rio Cebolla and the Rito Peñas Negras. *Id.* at 119, Table 36. However, the Forest Service fails to disclose the actual TMDL for these two subwatersheds. Further, the agency fails to show how the proposed action will meet these TMDLs. Without such disclosure, the Forest Service cannot reasonably assert it is in compliance with the Clean Water Act, and the agency cannot arbitrarily claim that implementation of best management practices will ensure compliance with the law. In addition, other watersheds have sedimentation impairments with official 303(d) status including Cañones Creek, Coyote Creek, and Poleo Creek. *Id.* at 130, Table 37. Though these watersheds may not have specific TMDLs, the agency must show Clean Water Act compliance by not causing further impairment. Even though the Forest Service has yet to meet this hard-look mandate as NEPA requires, it did disclose some confusing information regarding sedimentation: "Analysis by the

WEPP model indicates the proposed action may result in an average of 118 tons/year15 of sediment, per watershed, delivered to waterbodies across the project area (above the average background rate of 109 tons/year, per watershed)." *Id.* at 126. Does this mean there would be a total of 227 tons/yr delivered per watershed under the proposed action? The background rate already results in watershed impairment or at-risk of impairment. There is no ability to withstand more than double the amount of sediment. The agency attempts to dismiss these high sedimentation levels by asserting they would only be short-term:

> Proposed road treatments are expected to off-set any short-term sedimentation by proposed activities and further reduce erosion and sedimentation from existing levels (model analysis indicates every year, 23 tons of sediment are delivered to streams from project area roads).

Id. The Forest Service defines "short-term," as five years. *Id.* at 124. But the agency explains that "[i]t should be noted that all treatments will not occur at the same time, or place. Treatments will occur over the course of 10-15 years for the entire project area." *Id.* at 142. But the agency fails to disclose the timing and location of project activities. It's a blank check in a black box. Without an implementation schedule that ensures short-term sedimentation will be limited to 5 years, there is no assurance that the analysis is accurate. Further, even within the hypothetical 5 year timeframe, the agency must still demonstrate compliance with the Clean Water Act by not exceeding established TMDLs or causing further watershed impairment. The agency will also need to demonstrate that fish and other aquatic species can maintain viable populations during this duration, this is especially true for the Rio Grande cutthroat trout, a species of conservation concern. The current analysis fails in each of these requirements, and the Forest Service cannot trade hypothetical benefits that may occur in the long-term to assert the short-term impacts, and likely legal violations, are acceptable as it did with its strawman argument. Here the Forest Service suggests that the increased sedimentation under the proposed action is somehow acceptable, a notion we wholly reject:

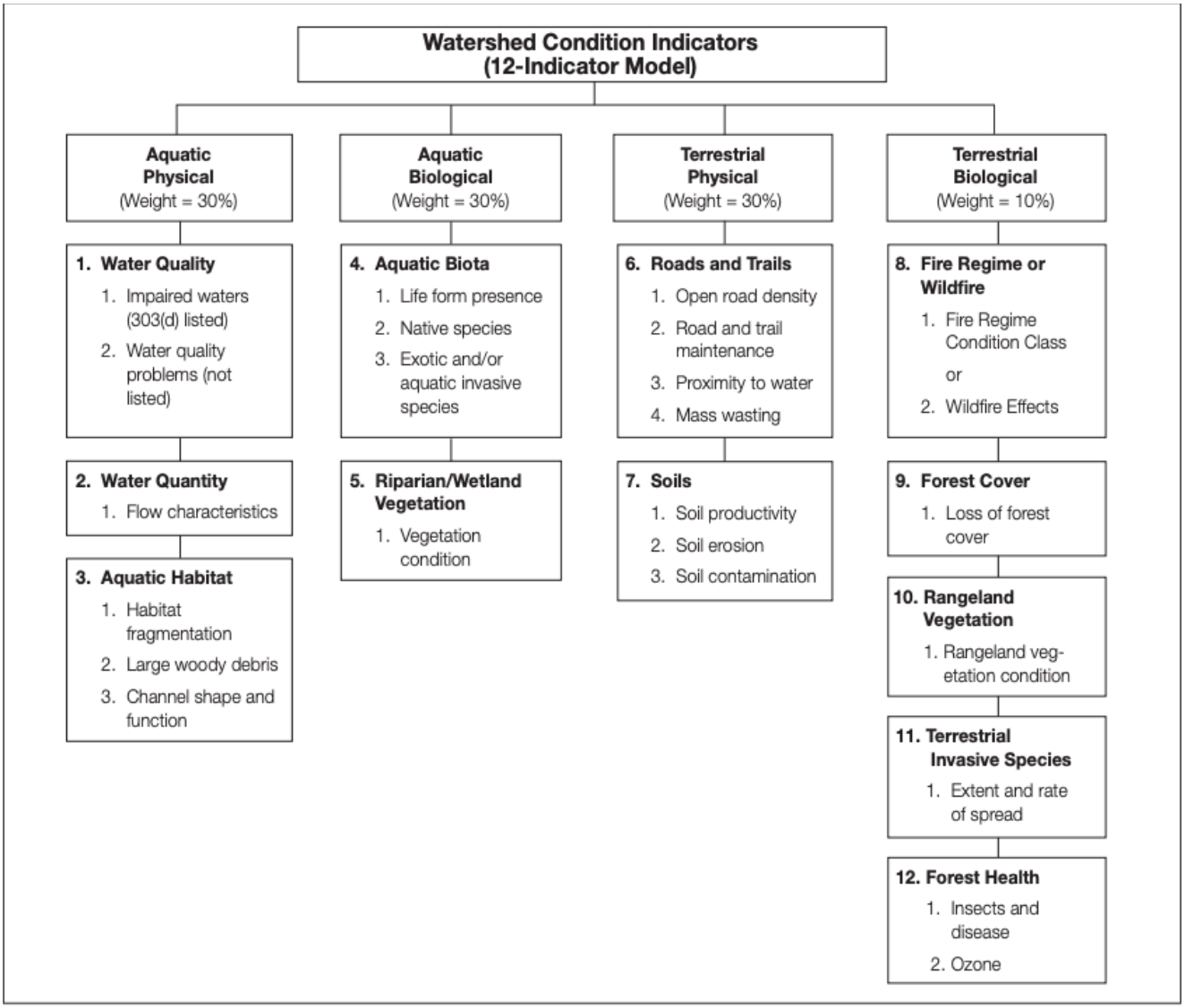
> While the analysis results do indicate a potential increase in sedimentation by the proposed action, sedimentation by a large high intensity wildfire (602 tons/year, average per watershed, which includes the background rate) dwarfs the volume potentially generated by project activities.

Id. Clearly, the agency is trading a hypothetical occurrence of a high-intensity wildfire (different from a high-severity wildfire?) for the very real impacts caused by the proposed action. It is unclear if the agency's arbitrary assertion relies on the unlikely event a high-intensity wildfire would occur across the entire watershed or other unrealistic scenarios. And it assumes that the proposed action will effectively prevent such wildfires from occurring 100 percent of the time, also a ridiculous assumption. Regardless, the comparison is immaterial because the agency must disclose the environmental consequences of the proposed action with the no action alternative, not some hypothetical worst case scenario. In this regard, the Forest Service analysis falls short.

As noted, the Forest Service discloses that roads are a significant cause of watershed impairment, and that the agency utilized the Watershed Condition Framework (WCF) to rank HUC 12 subwatersheds that are impaired or at-risk of impairment. *Id.* at 118-19, Table 36. Certainly the WCF and its condition class scores can be a useful tool to measure watershed function, but it does have its

limitations as we explain in Ex. 11.[21] Still, the WCF and its condition class scores provide useful information, particularly in regards to specific indicators and their supporting attributes as shown in Figure 4 below.

Figure 4. WCF Indicators and Attributes.



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)[22] 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

[21] See Ex. 11 - WCPR 2011 Policy Primer Watershed Condition Framework Synopsis and Review
[22] https://www.fs.usda.gov/biology/resources/pubs/watershed/maps/watershed_classification_guide2011FS978.pdf

> 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. Looking at the agency's analysis, it is unclear if the road density calculations relied on this more expansive definition of open roads. Road densities, the proximity to water, maintenance and mass wasting are essential attributes to consider when determining potential watershed impacts. Yet, the Forest Service only provided calculations for road-density, omitting measures or scores for the other attributes. PEA at 119, Table 36. In addition, the Forest Service only disclosed the current conditions under the WCF, and failed to show how these would change under the proposed action. In other words, there is no corresponding table showing changes to the WCF scores, for example, will any of the road densities actually decrease? Much of the agency's claimed watershed improvements stem from performing road maintenance, but even this attribute is not reflected in the WCF analysis, and further, the agency fails to show how the maintenance will improve overall watershed conditions. Will the proposed action actually move impaired watersheds to functioning at risk, or result in properly functioning watersheds?

Further, when analyzing the impacts to water quality and water quantity, the Forest Service 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. Regarding peak flows, this water quantity, the agency asserts that only broadcast burning is a concern, not the commercial logging or other vegetation removal. PEA at 128. The Forest Service does not address the loss of groundcover or the ability of compacted soils to absorb water, over the life of the project 10-15 years. Instead it asserts that groundcover will recover before other areas within each subwatershed will be intentionally burned. *Id.* Yet, the agency fails to specify the amount of groundcover required to reduce peak flows, or demonstrate how the proposed action will retain such groundcover. Given that the goal of the EVLRP is to establish and maintain fuel breaks, small gaps and regeneration openings in order to prevent future crown fires, precisely how much groundcover will be allowed to grow that would effectively absorb rain events, including severe storms that are increasing in frequency due to the climate crisis?

As stated above, in order to analyze erosion and sedimentation rates (tons/acre/year) the Forest Service used the WEPP model and additionally that "[t]he Fuel Management Erosion (FuME) interface was used to predict soil erosion and sedimentation associated with proposed fuel management activities including prescribed fire and roads. The model compares these outputs with erosion and sedimentation from wildfire." PEA at 123. Yet, it is unclear to what extent these model results informed the analysis given the following:

> "FuME model results for erosion and sedimentation by thinning activities were likely inaccurate (suspiciously and consistently low); therefore the total average sedimentation

> volume is not inclusive of all activities. Model results are still however useful for comparing alternatives; volumes should not be taken as absolute quantities."

Id. at 129, footnote. Given this disclosure, the Forest Service must provide additional information regarding how the FuME model informed the sedimentation analysis, and how the agency accounted for total average sedimentation volume for "all activities." This is particularly important for any vegetation management and road activities within riparian management zones and particularly within 300 ft of fish-bearing streams. In fact, the Forest Service fails to identify riparian management zones, the presence of aquatic species of conservation concern, or the road actions within these areas. Further, while the WEPP model can predict sedimentation rates, the Forest Service did not provide the actual model results for each subwatershed, instead it provided an overall estimate. *Id.* at 127. Clearly, the agency used its GRAIP-Lite model to determine sedimentation for some open roads, so it is unclear how the WEPP model results informed the analysis or the proposed action. It is also unclear how the agency utilized the WEPP model, specifically the data inputs it used, where the data came from, if or when the data was verified in the field, and finally, if the model assumed that all the BMPs proposed to address sedimentation were effective 100 percent of the time. The Forest Service must better explain its methods, provide more detailed results for the existing condition, and then actually compare the WEPP model results under each alternative.

Overall, the Forest Service must address the analysis gaps we explained above and demonstrate the proposed action will, in fact, actually improve watershed conditions, water quality and support viable populations of fish and other aquatic species, particularly for species of conservation concern.

F. Failure to consider the role of mycorrhizal fungi in restoring and maintaining ecological integrity

We appreciate that the Forest Service recognizes the importance of mycorrhizal fungi and that "[p]roject activities could adversely affect MYCORRHIZAE FUNGI in the soil by adversely affecting soil properties." PEA at 123. Most Forest Service project analyses fail to consider soil biota or the role of mycorrhizal fungi, so we commend the agency for considering this important issue, and offer the following comments to help improve the analysis. Specifically, it is unclear how the agency measured impacts to this resource as the analysis did not include any explanation of the methods or indicators used to address the issue. *Id.* The agency also omitted any discussion about the existing condition of soil biota or mycorrhizal fungi, particularly the presence or distribution of ectomycorrhizal (ECM) species most associated with tree species. Swaty et al., 2016. We recognize the challenges of providing such information given the lack of established Forest Service methods to provide this information, which is why we encourage the agency to consider adapting the methods in Swaty et al., 2016:

> In this study, we combined historical dominant vegetation data generated by the LANDFIRE program (www.landfire.gov) with data on mycorrhizal associations from the literature to generate a map of the mycorrhizal associations of the lower forty eight states of the USA prior to European settlement.

The Forest Service could use existing biophysical settings from the LANDFIRE program and the ECM associations to map the distribution and likely presence of these species. Then the agency could analyze how the proposed action would affect their presence and distribution.

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. 2023a), 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 to mycorrhizal related ecosystem services in a detailed environmental analysis. Unfortunately, the agency has yet to meet this requirement as it pertains to the PEA.

For example, the Forest Service states the following:

> Mechanical harvesting, especially in larger openings, has been shown to have some suppressive effects on mycorrhizae fungi, which live within the top four inches of soil (Anna, 2009) and are important for maintaining forest health.The proposed action includes group selection openings between 0.1 to 0.5 acres in size, which may result in a short-term decrease in mycorrhizae fungi in the soil. Because nutrient cycling, groundcover and root growth are expected to recover and increase following treatments, mycorrhizae populations are also expected to return rapidly (Philpott et al. 2018; Harvey et al. 1980; Reynolds et al. 2013; Johnson et al. 1991; Mann et al. 1988).

Id. at 126. We agree the mechanical harvesting will harm mycorrhizae fungi, but the impact is not limited to larger openings, rather it is anywhere soil compaction and tree removal will occur. Further, the agency fails to define what it considers a short-term decrease of mycorrhizae fungi in the soil, or how groundcover recovery may be affected by prescribed burns planned for areas where trees have been removed. Further, we caution the agency against assuming there will be short term recovery given the findings in Markovchick et al. 2023b:

> A key element of novelty in this study is our contribution to understanding the limitations of natural mycorrhizal recruitment and recovery even with sources nearby. Based on our results,

> low recruitment of EMF seems to be a factor underlying the success of proactively restoring diverse, native mycorrhizal fungal communities (summarized in Neuenkamp et al. 2019).

In other words, we caution the Forest Service from assuming there will be short-term decreases of mycorrhizae fungi in the soil, or that populations will rapidly return. The following sections detail the scientific background and ecosystem benefits of mycorrhizae fungi that must be considered in any project-level analysis. Ultimately, we urge the agency to recognize and incorporate the following important conclusion from Markovchick et al., 2023b:

> If the full diversity of the mycobiome and microbiome is not conserved, restored, and maintained resulting in its continued decline (e.g. Baird & Pope 2021; Mueller et al. 2022), many plants may lack their optimal symbionts in the future, resulting in cascading effects on the abilities of ecosystems to adapt to multiple stressors. Conversely, targeting the maintenance and support of the full diversity of the microbiome during land management, regeneration, restoration, and plant translocation could provide ecosystems with the highest chance of adapting at the pace of climate change and optimize the services provided by remaining natural areas.

1. General Mycorrhizal Scientific Background

Study after study has revealed that soil biota, particularly fungi that form symbioses with plant roots (mycorrhizae), provide a suite of ecosystem services that support the integrity and resiliency of natural and human communities (Markovchick et al. 2023a), 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, 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. Mycorrhizal Ecosystem Services
    a. Forest Service Ecosystem Services Policy & Direction

In 2005, the United Nations issued a report titled, "The Millennium Ecosystem Assessment" that significantly advanced the concepts and definitions of ecosystem services. The report identified four main categories:

- Provisioning Services such as food, clean water, fuel, timber, and other goods;
- Regulating Services such as climate, water, and disease regulation as well as pollination;
- Supporting Services such as soil formation and nutrient cycling; and
- Cultural Services such as educational, aesthetic, and cultural heritage values, recreation, and tourism.

Importantly, the Forest Service adopted these categories and definitions in its 2012 National Forest System Land Management Planning Rule

- (a) Integrated resource management for multiple use. The plan must include plan components, including standards or guidelines, for integrated resource management to provide for ecosystem services and multiple uses in the plan area.

- …Ecosystem services. Benefits people obtain from ecosystems, including:
    - Provisioning services, such as clean air and fresh water, energy, fuel, for- age, fiber, and minerals;
    - Regulating services, such as long term storage of carbon; climate regulation; water filtration, purification, and storage; soil stabilization; flood control; and disease regulation;
    - Supporting services, such as pollination, seed dispersal, soil formation, and nutrient cycling; and
    - Cultural services, such as educational, aesthetic, spiritual and cultural heritage values, recreational experiences, and tourism opportunities.

(36 C.F.R. § 219.10, § 219.19)

When defining soil function, the Forest Service internal directives provides the following:

- Soil biology. The presence of roots, fungi, and micro-organisms in the upper sections of the soil.
- Soil hydrology. The ability of the soil to absorb, store, and transmit water, both vertically and horizontally.
- Nutrient cycling. Soil stores, moderates the release of, and cycles nutrients and other elements.
- Carbon storage. The ability of the soil to store carbon.
- Soil stability and support. Soil has a porous structure to allow passage of air and water, withstand erosive forces, and provide a medium for plant roots. Soils also provide anchoring support for human structures and protect archeological treasures.
- Filtering and buffering. Soil acts as a filter to protect the quality of water, air, and other resources. Toxic compounds or excess nutrients can be degraded or otherwise made unavailable to plants and animals.

Forest Service Manual 2550.5 at 8-9. As detailed in the following section, ecosystem services provided by mycorrhizal fungi directly relate to those identified by the Forest Service as important

soil functions, and the significant benefits provided by mycorrhizal fungi must be considered in detailed environmental analysis.

b. Scientific Background on Mycorrhizal Ecosystem Services

Ecosystem services are defined as ecological functions and processes that contribute to human wellbeing (Costanza et al. 1997). Available data highlight the many and meaningful contributions of mycorrhizae to ecosystem services and integrity, ranging from drought resilience to pest control to climate stabilization (e.g. Christensen, 1989; Peay et al. 2016).

In the following sections, we include the definitions for each category from Costanza et al. (1997) and briefly review the fungal contributions. In Table 1, we highlight many of these studies and provide examples of some of the magnitudes of effects seen due to mycorrhizae (see effect sizes and percent changes).

Table 1: Some examples of mycorrhizal ecosystem services and effects sizes.

Ecosystem Service Category	Study	Effect Type	% Change[2]	Effect Size[3]
Climate	Clemmensen et al. 2013	carbon storage	50-70%	
Climate	Orwin et al. 2011	carbon storage	14%	
Climate	Nautiyal et al. 2019	carbon storage	82%	
Disturbance regulation	Auge et al. 2015	drought adaptation	111%	0.75
Disturbance regulation	Auge et al. 2015	drought adaptation	49%	0.4
Disturbance regulation	Auge et al. 2015	drought adaptation	24%	0.2
Disturbance regulation	Miozzi et al. 2020	reduction in disease severity	200%	
Disturbance regulation	Ruiz-Lozano & Azcón 1995	support plant growth	938%	2.34
Disturbance regulation	Ruiz-Lozano & Azcón 1995	support plant growth	3542%	3.60
Disturbance regulation	Stella et al. 2017	remove soil toxins	19%	
Disturbance regulation	Stella et al. 2017	remove soil toxins	41%	
Disturbance regulation	Stella et al. 2017	remove soil toxins	51%	
Disturbance regulation	Wulandari et al. 2016	increase plant health & growth at toxic site	125%	0.81
Disturbance regulation	Wulandari et al. 2016	increase plant health & growth at toxic site	200%	1.10
Disturbance regulation (Restoration)	Koziol & Bever 2017	support plant survival	40%	
Disturbance regulation (Restoration)	Koziol & Bever 2017	support plant growt/health	300%	
Disturbance regulation (Restoration)	Koziol & Bever 2017	increased leaves/tillers	200%	
Disturbance regulation (Restoration)	Koziol & Bever 2017	increased species richness	55%	
Disturbance regulation (Restoration)	Koziol & Bever 2027	increased species diversity	70%%	
Disturbance regulation (Restoration)	Maltz & Treseder 2015	support plant growt/health		0.63

Ecosystem Service Category	Study	Effect Type	% Change[2]	Effect Size[3]
Disturbance regulation (Restoration)	Neuenkamp et al. 2019	boost species richness	30%%	
Disturbance regulation (Restoration)	Neuenkamp et al. 2020	boost restoration plant growth		1.70
Disturbance regulation (Restoration)	Rua et al. 2016	support plant growt/health		0.25 to 1.25
Disturbance regulation, Pollination	Botham et al. 2009	support plant growt/health	30%	
Disturbance regulation, Pollination	Botham et al. 2009	support plant growt/health	23%	
Disturbance regulation, Water	Egerton-Warburton et al. 2008	support water uptake/movement	up to 7 µmol/m/hr	
Disturbance regulation, Water	Egerton-Warburton et al. 2008	support water uptake/movement	up to 6.5 µmol/m/hr	
Disturbance regulation, Water	Querejeta et al. 2006	drought adaptation	111%	0.75
Erosion control	Burri et al 2013	reduce erosion & increase soil stability	74%	0.94
Erosion control	Graf and Frei 2013	reduce erosion & increase soil stability	533%	1.85
Erosion control	Mardhiah et al 2016	reduce erosion & increase soil stability	16%	
Erosion control	Rillig et al 2010	reduce erosion & increase soil stability	116%	0.77
Erosion control	Rillig et al 2010	reduce erosion & increase soil stability	18%	0.17
Erosion control	Zheng et al 2014	reduce erosion & increase soil stability	267%	1.30
Erosion control	Zheng et al 2014	reduce erosion & increase soil stability	13%	0.12
Erosion control, Water	Andrade et al 1998	reduce erosion & increase soil stability	14%	0.13
Genetic resources	Ina et al. 2013	medical contributions by EMF	54%	0.43
Genetic resources	Ina et al. 2013	medical contributions by EMF	39%	0.33
Genetic resources	Ina et al. 2013	medical contributions by EMF	10%	
Genetic resources	Zeng et al. 2013	medical contributions by AMF	84-270%	
Habitat & biodiversity	Stevens et al. 2018	ecosystem abundance/diversity from AMF-contributed phosphorus	48%	
Habitat & biodiversity	Tracy & Markovchick 2020	habitat suitability for endangered bird	1.2 hectares	
Habitat & biodiversity	van der Heijden et al. 2015	land plants that rely on native mycorrhizae	86%	
Nutrient cycling	Bonneville et al. 2009	mineral weathering & supply	50-75%	1.61
Nutrient cycling	Quirk et al. 2015	mineral weathering & supply	400%	1.61
Nutrient cycling	Taylor et al. 2012	mineral weathering & supply	100%	0.69
Pest regulation	Abdalla & Abdel-Fattah 2000	pathogen reduction by AMF	80%	
Pest regulation	Babikova et al. 2013	residence time of pest controls	333%	
Pest regulation	Babikova et al. 2013	residence time of pests	186%	
Pest regulation	Karst et al. 2015	tree growth after pests	700%	2.08
Pest regulation	Karst et al. 2015	monoterpene production	500%	1.79
Pest regulation	Reddy et al. 2006	AMF reduction of pathogen	70%	-1.20
Pest regulation	Reddy et al. 2006	AMF reduction of pathogen	75%	-1.39
Pest regulation	Rinaudo et al. 2010	AMF reduction of invasive vegetation	45%	-0.60
Pest regulation	Rinaudo et al. 2010	AMF reduction of invasive vegetation	25%	-0.29
Pest regulation	Waller et al. 2016	AMF reduction of invasive vegetation	29%	-0.34
Pollination	Aguilar-Chama and Guevara 2012	flower mass	100%	0.69

Ecosystem Service Category	Study	Effect Type	% Change[2]	Effect Size[3]
Pollination	Cahill et al. 2008	pollinator visitation rates	193%	1.08
Pollination	Cahill et al. 2008	type of pollinators	shifted pollinator species	
Pollination	Gange and Smith 2005	flower number	63%	0.49
Pollination	Gange and Smith 2005	flower nectar sugar content	55%	0.44
Pollination	Gange and Smith 2005	pollinator visitation rates	33%	0.29
Pollination	Gange and Smith 2005	pollinator visitation rates	200%	1.10
Pollination	Gange and Smith 2005	pollinator visitation rates	100%	0.69
Pollination	Gange and Smith 2005	nectar production	50%	0.41
Pollination	Gange and Smith 2005	nectar production	81%	0.60
Pollination	Lu and Koide 1994	days to flowering	23%	0.26
Pollination	Lu and Koide 1994	flowering duration	76%	0.57
Pollination	Lu and Koide 1994	fruits produced	200%	1.10
Pollination	Lu and Koide 1994	fruits produced	350%	1.50
Pollination	Lu and Koide 1994	fruits produced	20%	0.18
Pollination	Poulton et al. 2001	flowers per plant	113%	0.75
Pollination	Poulton et al. 2001	flowers per plant	90%	0.64
Pollination	Wolfe et al. 2005	pollinator visitation rates	100%	0.69
Pollination	Wolfe et al. 2005	seed set	167%	0.98
Food & Raw materials	Elliot et al. 2020	small mammal diet	80%	
Food & Raw materials	Willis 2018	edible mushroom market	US$42B/yr	
Water	van der Heijden 2010	reduction in nutrient leaching due to AMF	60%	

Table 1 Notes:

A. See Markovchick et al. 2023a Supplement S1 for an expanded list of studies and more detailed explanation. Ecosystem service categories are abbreviated from Costanza et al. 1997, see Markovchick et al. 2023a for details.

B. Absolute value of percent change seen (always an improvement, but sometimes the improvement is an increase, and sometimes it is a decrease, for example in disease severity).

C. Effect size is either the statistic provided in the paper (there are various ways of calculating this and not all mean the same thing, see Sullivan and Feinn (2012) for a summary), or calculated as ln(mycorrhizal mean / control) from the statistics provided in the publication (if no effect size was calculated in the paper). This measure of effect size has the advantage of being directly related to percent change (Pustejovsky 2017), which can be calculated using the following equation: $(e^{\ln(R)} - 1) \times 100\%$. For example, an effect size of 0 indicates a 0% change, 0.5 indicates a 65% change, and 0.75 indicates a 110% change in the mean between treatment and control (Pustejovsky 2017).

i. Disturbance Regulation & Response

This category includes boosting the ability of ecosystems to respond to environmental fluctuations and dampening the influence of disturbances on the integrity of the ecosystem. Mycorrhizas assist in site clean-up, vegetation return, and protection of plants against toxins at polluted sites (e.g.

Wulandari et al. 2016). They reduce invasive vegetation (e.g. Rinaudo et al. 2010). Mycorrhizal fungi enhance plant water status, survival, and productivity, including during and after droughts (e.g. Querejeta et al. 2006; Kivlin et al. 2013).

ii. Erosion Control & Sediment Retention

This service category includes retaining soil within an ecosystem. Mycorrhizas increase the stability of soils through entangling soil particles in a "sticky string bag" to form soil aggregates. These aggregates are structured by hyphae and enhanced by stabilizing substances that hyphae secrete, such as glomalin (Rillig & Mummey 2006; Nautiyal et al. 2019). As a result, mycorrhizas play critical roles in stabilizing soil and protecting it from surface water flows (Mardhiah et al. 2016) and wind erosion (Burri et al. 2013).

iii. Food & Raw Materials

This category includes the portion of gross primary production consisting of food and raw materials. In addition to their use to promote crop production (Reddy et al. 2006; Rinaudo et al. 2010), 350 species of mushrooms (many of which are mycorrhizal fungi) are known to be used for food (Willis 2018). Many kinds of fungi, including some that are mycorrhizal, are used to create medicines, enzymes used in industry, and sustainable clothing, packaging, and construction materials (e.g. Bhat, 2000; Willis 2018).

iv. Gas & Climate Regulation

This category includes regulating the chemical composition of the atmosphere, global temperature, and other climatic processes mediated by organisms. Clemmensen et al. (2013) found that a majority of boreal forest soil-stored carbon is in roots and root-associated microorganisms (including mycorrhizal fungi). Orwin et al. (2011) found that improved plant nutrient access due to mycorrhizal symbioses increased carbon sequestration. Fungal hyphae also produce exudates that promote the formation of soil aggregates, stabilizing soil and supporting continued carbon sequestration in the soil (e.g. Nautiyal et al. 2019). Mycorrhizas compete with saprotrophs (decomposers) for soil nutrients, reducing decomposition (decomposition releases carbon) and increasing soil carbon storage (Read & Perez-Moreno 2003; Fernandez & Kennedy 2016).

v. Genetic Resources

This category includes unique biological materials and products, and their sources. An enormous variety of medical compounds are derived from or produced by fungi (see Markovchick et al. 2023a, Supplement S1). Mycorrhizal symbioses improve plant nutrition and enhance the active ingredients of medicinal plants (Zeng et al. 2013). The effects of fungal genetics likely cascade through ecosystems. For example, ectomycorrhizal fungi are linked via plant genetics to insects, lichens, pathogens, endophytes, and soil decomposing fungi and bacteria (Lamit et al. 2015). Given the role of fungi as foundational taxa that help to structure ecosystems (e.g. Tedersoo et al. 2014), their

genetic diversity may be crucial to conserving and supporting the genetic diversity at other community levels and stabilizing our ecosystems (e.g. Hazard et al. 2017).

vi. Habitat & Biodiversity

This category includes habitat for resident and migratory populations, a refuge for species and biodiversity. Nearly all plants depend on the presence of mycorrhizal fungi (van der Heijden et al. 2015). Fungal contributions to plant nutrition and performance cascade through ecosystems, influencing habitat quality and resource quantity for most terrestrial species. One recent modeling effort suggests that the biomass of organisms in the Serengeti would be reduced by half without just the phosphorus provided by arbuscular mycorrhizal fungi (Stevens et al. 2018). Another preliminary, smaller-scale model indicated that simply including appropriate mycorrhizal inoculation in restoration efforts could increase the useable habitat for an endangered bird from 0 to 1.2 hectares six years after restoration (Tracy & Markovchick 2020).[23] Exhibit 9.

vii. Nutrient Cycling & Soil Formation

This service category includes the processes involved in forming, cycling, storing, and processing soil and nutrients. With complex enzymatic capabilities that allow them to access nutrients bound in recalcitrant forms, mycorrhizal fungi can forage for nutrients and mine them (e.g. Fernandez & Kennedy 2016). They may also indirectly facilitate decomposition by free-living soil microbes as they forage for nutrients in soil organic matter (e.g. Talbot et al. 2008). Mycorrhizal fungi also structure soils and reduce nutrient losses (Rillig & Mummey 2006; Parihar et al. 2019), permitting retention of nutrients necessary to build fertile soils (van der Heijden 2010).

viii. Pest & Insect Regulation

This category includes regulation of populations, such as insect pests, invasive vegetation, and disease. Mycorrhizas and endophytes play key roles in this area. For example, Karst et al. (2015) found that mycorrhizas increase monoterpene production, a key chemical defense against herbivory. Mycorrhizal fungi also reduce viral symptoms, disease and invasive vegetation (e.g. Miozzi et al. 2020; Reddy et al. 2006; Rinaudo et al. 2010). Mycorrhizal fungi also appear to share pest warning signals through underground networks, permitting a coordinated call that attracts insects that control plant pests (e.g. attracting parasitoids that reduces aphids in Babikova et al. 2013).

ix. Pollination

This category is defined as moving and assisting floral reproduction. Our knowledge of fungal impacts on plant-pollinator interactions remains limited, and largely focused on arbuscular mycorrhizal fungi (Barber & Gorden 2015). However, these mycorrhizas can increase average flower

[23] *See* Ex. 12 - Tracy J, Markovchick L (2020) Using mycorrhizal fungi in restoration to improve habitat suitability for an endangered bird. RiversEdge West Riparian Restoration Conference; February 4-6; Grand Junction, Colorado, United States

number, flower mass, pollen tube length, seed production, nectar production and sugar content, pollinator visitation rates, and the number of fruits produced per plant (Aguilar-Chama and Guevara, 2012; Cahill et al. 2008; Gange & Smith 2005; Lu & Koide 1994; Poulton et al. 2001; Wolfe et al. 2005). Mycorrhizas could also assist plant reproduction under climate change in two ways: 1) they can decrease time to initial flowering and increase flowering duration, reducing potential mismatches between flowering and pollinator activity (Barber & Gordon 2015; Lu & Koide 1994), and 2) they can encourage clonal growth, which could assist plant survival if pollination is reduced or impossible (Botham et al. 2009).

x. Water Quality & Supply

This combined service category includes the regulation, retention, and cleansing of water. Mycorrhizas enhance nutrient retention in vegetation, mycelium and soils - decreasing leaching that negatively affects water quality (van der Heijden 2010). Mycorrhizal mycelia aggregate soil particles, improving soil porosity, and enhancing water infiltration and moisture retention (e.g. Augé et al. 2001; Rillig & Mummey 2006). They mediate hydrological functioning by modulating surface soil-to-water attraction and repellency (e.g. Rillig et al. 2010; Zheng et al. 2014). Mycorrhizal hyphae infiltrate bedrock and tiny soil pores to access water, and contribute to the soil-plant-atmospheric-continuum of water dynamics and nocturnal hydraulic lift of water to upper soil layers (Allen, 2009; Bornyasz et al. 2005; Querejeta et al. 2007).

3. 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, and one that must be considered in the project analysis.

G. Failure to take a hard look at grazing impacts

The EVLR Project area contains all or part of 13 grazing allotments: Chicoma, Coyote, Gallina River, Jarosa, Mesa Alta, Mesa Del Medio, Mesa Poleo, Palomas, Penas Negras, Polvadera San Pedro & Youngsville. 121,935 acres of the 130,305 project area or over 90% of the project area is contained within these grazing allotments. Table 29, PEA at 96. The agency states that while the PEA does not analyze grazing permits, grazing allotments, maximum forage consumption or provide for any other type of rangeland decision, it does analyze the potential impacts of the No Action and Proposed Action alternative on grazing and invasive species. Such widespread grazing has substantial cumulative impacts with the Proposed Action activities.

The Forest Service states regarding desired conditions for rangeland:

> Although this project will not include a range management decision, the SFNF LMP (USDA, 2022b) provides guidance for desired conditions for forest activities relating to grazing. The SFNF strives for sustainable and resilient landscapes which provide for ecosystem sustainability and resiliency. Forest activities should provide for wildlife and rangeland forage, native plant communities, and diverse age classes of shrubs, grasses and forbs relative to site potential, diverse. As well as maintaining grazing opportunities that contribute to social and economic sustainability of the local agricultural business and local employment, as well as traditional and generational ties to the land.

PEA at 26. Yet the agency states that purpose of the EVLRP is to "restore overall forest health, lower uncharacteristic high severity fire risk, improve watershed health, and protect wildlife habitat across the project area." The Forest Service states that the need for the EVLRP is to "move the forest toward desired conditions, as described in the SFNF LMP (USDA, 2022b), protect local communities and watersheds, protect and enhance wildlife habitat, and create a resilient forest landscape that may withstand unforeseen disturbances."

PEA at 11. Cattle destroy native vegetation, damage soils and stream banks, disrupt natural processes, and contaminate waterways with fecal waste. All this is currently occurring in the EVLR Project area. Many parts of the project area, both inside grazing allotments and outside have sustained severe ecological damage from grazing. This must be addressed, as such damage is in contradiction to the EVLRP purpose and need.

The agency states, "The introduction of heavy grazing, fire suppression and other human activities such as logging and infrastructure development have created an environment that is increasingly susceptible to large-scale, severe wildfire, and insect and disease episodes (Reynolds et al., 2013)"

PEA at 12. The Forest Service must consider the cumulative impacts of logging, thinning and prescribed burn activities with the impacts of grazing.

Many of the grazing allotments are overgrazed, increasing cumulative impacts. See Figure 5, below. Monitoring reports for these allotments since 2019 (at least) should be included in the project record and the impacts of any over-grazed allotments should be fully disclosed and considered, in relation to the cumulative impacts with the EVLRP Proposed Action.. The impacts from trespass cattle from these allotments into exclosures or into the Valles Caldera National Preserve must also be disclosed and analyzed.

Figure 5. West edge of Mesa Poleo —Taken by FR-103, south of FR-62B.

This area is proposed to be commercially logged. Note the understory is fully cropped down by cattle. The apparent risk of a crown-fire caused by dense undergrowth is nonexistent.

Cattle grazing causes sediment and bovine fecal waste products to be deposited into waterways, which can adversely affect native fish and vegetation. The impacts of grazing on the Rio Grande Cutthroat Trout population, which is a species of concern, must be analyzed. There is no discussion in the PEA regarding an analysis of how livestock grazing has impacted fire frequency and severity. This must be done. The proximity of grazing allotments to the Valle Caldera National Preserve must be considered as cattle have been entering into the Valle Caldera. The agency must consider how prescribed burns will impact fences and the ability to prevent trespass livestock use.

PDFs and Mitigation Measures Range 1-7 were in existence even while the current widespread damage from grazing has occurred. We warn the agency not to rely heavily on these Design Features and Mitigations.

The single most effective, efficient, and least costly way to meet the purpose (restore forest health and reduce fire risk, improve watershed health and improve wildlife habitat) and need (move the forest toward desired conditions, enhance wildlife habitat and create a resilient landscape that may withstand unforeseen disturbances) is to remove or significantly reduce livestock use of the area. As we noted above, the Forest Service must consider this as a reasonable alternative within the purpose and need to restore watershed conditions.

H. Failure to Consider 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."[24] 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.*

On April 20, 2023, the Forest Service and BLM took the first step in complying with EO 14072 by publishing *Mature and Old-Growth Forests: Definition, Identification, and Initial Inventory on Lands Managed by the Forest Service and Bureau of Land Management* (MOG Report).[25] The MOG Report "contains the first national inventory of old-growth and mature forests focused specifically on Forest Service and BLM lands." MOG Report 1. Importantly, the report's findings are only "*initial* estimates of old-growth and mature forests" on Forest Service and BLM lands. *Id.* (emphasis added). Indeed, throughout the MOG Report, the agencies repeatedly affirm the sequential nature of EO 14072 and that the current definitions and inventory are preliminary in nature:

- "The ***initial*** inventory and definitions for old-growth and mature forests are part of an overarching climate-informed strategy to enhance carbon sequestration and address climate-related impacts, including insects, disease, wildfire risk, and drought. ***Initial*** inventory results will be used to assess threats to these forests, ***which will allow***

[24] *See* Strengthening the Nation's Forests, Communities, and Local Economies, 81 Fed. Reg. 24851, 24852 (Apr. 22, 2022) ("EO 14072").
[25] *See* Ex. 13 Mature and Old-Growth Forests: Definition, Identification, and Initial Inventory on Lands Managed by the Forest Service and Bureau of Land Management (MOG Report).

consideration of appropriate climate-informed forest management, as required by subsequent sections of Executive Order 14072." MOG Report 1.

- "The ***initial*** inventory will ***then*** be used to assess threats to these forests, ***which will allow consideration of appropriate climate-informed forest management***, as required by subsequent sections of the Executive order." MOG Report 4.
- "***Once the definitions and inventory are established***, section 2c then calls on the Forest Service and BLM to:
    - Coordinate conservation and wildfire risk reduction…
    - Analyze the threats to mature and old-growth forests on Federal lands…and…
    - Develop policies…to institutionalize climate-informed management and conservation strategies that address threats to mature and old-growth forests on Federal lands."(MOG Report 10-11)
- "This ***initial*** inventory represents the current condition of forests managed by the Forest Service and BLM at the time of the most recent FIA measurement; it does not provide any information on resilience or climate response of these forests…The team plans to apply working definitions for old-growth and mature forest to prior FIA data, which will inform how these forests have changed over the past 10-20 years. In addition, ***the team will explore how old-growth and mature forests are distributed in additional land use allocations that are currently grouped into the 'other' category.***" MOG Report 26.
- "Executive Order 14072 section 2c and USDA Secretarial Memo 1077-004 provide some clarity on ***next steps*** following the initial classification presented here." MOG Report 26.

Contemporaneous to the publication of the MOG Report, the Forest Service also published an advance notice of proposed rulemaking (ANPR) that, in part, "[b]uilds on ongoing work to implement " EO 14072.[26] 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. WildEarth Guardians joined a number of organizations providing comments to the ANPR, much of which is relevant to the EVLRP.[27]

Direction from the MOG Report, combined with the ANPR and the latest Forest Service effort to enact a nationwide Forest Plan Amendment for managing old growth,[28] together indicates that at the

[26] *See* Organization, Functions, and Procedures; Functions and Procedures; Forest Service Functions, 77 Fed. Reg. 24497 (Apr. 21, 2023).
[27] See Ex. 14 - Coalition Comments re APRM U.S per 88 Fed. Reg. 24,497.pdf
[28] See U.S. Forest Service, Department of Agriculture, Land Management Plan Direction for Old-Growth Forest Conditions Across the National Forest System, 88 Fed. Reg. 88,042 (notice of intent published Dec. 20, 2023); see also multi-organizational comments in response (Ex. 15), and those from Wild Heritage (Ex. 16).

project level 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 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. For the southwest region, researchers looked across forests in Arizona (which is also representative of New Mexico forests) and determined that trees reached maturity at 75 years with an average 12 inches dbh.[29] See 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. The importance of identifying and preserving these forests cannot be overstated as they are part of "nature-based climate solutions" for mitigating the effects of anthropogenic climate change. MOG Report 3. 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).

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[29] https://www.frontiersin.org/files/Articles/1074508/ffgc-05-1074508-HTML/image_m/ffgc-05-1074508-t004.jpg

Table 2. Birdsey et al., 2023 Age & Size for Tree Maturity

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.

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. Further, forests have received increased global attention in climate fora (IUCN 2021) and in the scientific community as natural climate solutions. Moomaw et al. 2019. Notably, Article 5.1 of the Paris Climate Agreement calls on governments to protect and enhance "carbon sinks and reservoirs." Article 38 of the UNFCCC COP26 Glasgow Climate Pact emphasizes "the importance of protecting, conserving and restoring nature and ecosystems, including forests… to achieve the long-term global goal of the Convention by acting as sinks and reservoirs of greenhouse gasses and protecting biodiversity…" UNFCCC 2021.[30] The USA was also one of 140 nations at the COP26 that pledged to end forest degradation and deforestation by 2030. Logging both mature and old-growth forests is a form of forest degradation as it removes important forest structural features.

[30] *See* Ex. 17 - Article 38 of the UNFCCC COP26 Glasgow Climate Pact

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.[31] 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.*

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. In fact, the Forest Service owes a duty to the public to ensure that these forests remain standing so that they can continue to perform their vital function of "storing large amounts of carbon." MOG Report 3; *see also Light v. U.S.*, 220 U.S. 523 (1911) ("the public lands . . . are held in trust for the people of the whole country."); *Juliana v. U.S.*, 217 F.Supp.3d 1224, 1259 (D. Or. 2016) ("[t]he federal government, like the states, holds public assets . . . in trust for the people.") (*rev'd on other grounds*, *Juliana v. U.S.*, 947 F.3d 1159 (9th Cir. 2020)); *Selkirk-Priest Basin Ass'n Inc. v. State ex rel Andrus*, 899 P.2d 949, 952-54 (Idaho 1995) (public trust doctrine permits challenge to timber sales since increased sedimentation could impact trust resources).

As such, the Forest Service should not be logging any mature and/or old-growth forests at least until it has adopted protective measures to ensure the future recruitment of old growth ecosystems and measures to retain mature trees. Therefore, we are calling for a moratorium on mature and

[31] *See* Ex. 18 - B. Law et al., 2020 The Status of Science on Forest Carbon Management to Mitigate Climate Change.

old-growth logging considering EO 14072 "calls particular attention to the importance of (MOG) forests on Federal lands for their role in contributing to nature-based climate solutions by storing large amounts of carbon and increasing biodiversity." 77 Fed. Reg. 24497, 24498; *see also* MOG Report at 3. Continuing to cut down and remove mature and old-growth trees and forests absent a site-specific inventory and before protections are in place undermines the administration's focus on "nature-based climate solutions" for "storing large amounts of carbon."

When looking at the Forest Service's analysis of the EVLRP, it is clear that it provides at best a perfunctory inventory of mature trees and old growth stands:

> Midscale GIS data was used to allocate old growth in each of the forest types found in Table 11. Due to the limitation of data the allocations may not meet all the criteria in Table 11. For instance, dead and down woody material data is not available in midscale data sets. Therefore, the old growth allocations will be ground verified as the project is implemented. Some stands maybe dropped from is allocation and other maybe be added. Stands that are close to meeting old growth criteria may receive a treatment to move the stand closer to old growth in a shorter time frame.

PEA at 46. Results from applying the "midscale GIS data" to the forest types in Table 11 do not appear in the analysis. Further, the agency cannot wait until after the EVLRP decision to determine to identify old-growth stands. Such a delay fails to satisfy NEPA's hard-look mandate, and belies the agency's assertion that:

> The SFNF fully intends to manage 'mature and old-growth forests, to promote their continued health and resilience; retain and enhance carbon storage; conserve biodiversity; mitigate the risk of wildfires; enhance climate resilience; enable subsistence and cultural uses; provide outdoor recreational opportunities; and promote sustainable local economic development', as stated in EO 14072.

Id. at 16. In regards to mature trees, the Forest Service simply states, "Large and mature trees are found throughout the project area." *Id.* at 15. The fact that even mature trees were not discussed, considered, mapped or quantified in any meaningful way further exemplifies the agency's dereliction of its duties.

I. 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.

Certainly we recognize and appreciate that the Forest Service provides some details regarding the existing carbon stocks within the Santa Fe National Forest that partially addresses our first recommendation:

> Roughly 34.5% of the carbon stocks on the SFNF are stored in above-ground, live woody vegetation (> 1 inch diameter), with the remaining 65.5% of carbon stored in soil, organic matter on the forest floor, roots, snags, coarse woody debris, and small understory vegetation (Black et al., 2022).
>
> ---
>
> Table 22 shows reference condition, current condition, and projected biomass carbon stocks for major ERUs of the entire SFNF (USDA 2016). This information will be compared to estimated project carbon emissions and storage below.

PEA at 69. Given the data in Table 22 is now over 7 years old, and that significant changes have occurred across the forest, such as major wildfires burning across hundreds of thousands of acres, it is reasonable for the Forest Service to update its current conditions and the projected biomass carbon stocks. In addition, we appreciate that the Forest Service discloses that

> Calculations show that post prescribed burning, surface and ground carbon storage would be reduced by 478,791 tons, while thinning plus pile burning could remove an additional 124,338 tons. Compared to reported SFNF carbon stocks (Table 23 above) implementing the proposed action could reduce surface and ground forest carbon by 0.78%.

Id. at 76. The agency should have disclosed its calculations for the project area specific to each ERU as it did in Table 23. In addition, the comparison at a forest wide scale fails to illustrate the importance of losing more than 600,000 tons of carbon. Rather the comparison should be against the total carbon within the project area.

Without clearer and more accurate estimates, the Forest Service cannot provide the total carbon budget or effectively disclose direct and indirect climate pollution from removing, transporting, and milling wood. This includes emissions from loss of stored carbon during the removal at the 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,[32] magnifying the impact of disposal of short term wood products.

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 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."[33] 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

[32] Intergovernmental Panel on Climate Change, AR6 WG1 (2021): Forster, Piers; Storelvmo, Trude (2021). "Chapter 7: The Earth's Energy Budget, Climate Feedbacks, and Climate Sensitivity." Exhibit 19.
[33] CEQ, National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change, 88 FR 1196; 88 FR 10097.

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 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).

The Forest Carbon Assessment for the Santa Fe National Forest in the Forest Service's Southwest Region (Black *et al.* 2022) found that ". . . studies at large spatial and temporal scales suggest that there is a low likelihood of high-severity wildfire events interacting with treated forests, negating any expected C benefit from fuels reduction (Restaino and Peterson 2013)."

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 are contrary to the assumptions in the PEA finding the project will produce insignificant carbon emissions and result in overall climate benefits.

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.

I. Failure to consider the potential for escaped prescribed burns

The Forest Service states that "Prescribed burning may be conducted on up to approximately 74,600 acres over the life of the project and up to 8,000 acres per year." This includes broadcast, maintenance, jackpot, and pile burning. The PEA states:

> "A prescribed fire plan (burn plan) must be completed prior to the ignition of all planned prescribed fires. Burn plans are official site-specific implementation documents prepared by qualified personnel and approved by the agency administrator and include criteria for the conditions under which the fire would be conducted to meet management objectives. Prescribed fire planning has been updated as directed in the Chief's National Prescribed Fire Program Review (USDA, 2022c)."

EA at 37. This is essentially the only information provided concerning measures to ensure that the implementation of project prescribed burns will be undertaken with a high level of safety. It states that burn plans are "official site-specific implementation documents," but that is entirely different than considering burn plans and protocols through a NEPA process, which is required. The PEA provides no disclosure or analysis of the direct, indirect, or cumulative impacts of prescribed burns going out of control, nor analysis of the potential for escaped prescribed burns. Nor are any project-specific mitigations provided to prevent escaped prescribed burns, or to decrease the likelihood and impacts of such escapes. In fact, there is no mention within the entire PEA of the potential for an escaped prescribed burn, despite the Forest Service having ignited unintended wildfire, with disastrous results, on a total of 387,350 acres of forest in and adjacent to the SFNF 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 agency-precipitated wildfires, it can only be considered outrageous and gross negligence that the Forest Service did not disclose or analyze the risk and potential for escaped prescribed burns and provide mitigations specific to the EVLRP. It puts human lives, homes, and livelihoods in imminent danger. During the fires 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.

During the past decade, from 2014-2023, while the Forest Service ignited fire which precipitated the burning of 387,076 acres, only 27,016 acres were burned by all other causes, including all other human-caused ignitions.[34] This means that the Forest Service caused the ignition of 14.3 times as

[34] *See* Ex. 20 - Santa Fe National Forest Fire History.

much wildfire in the past decade than was ignited by all other causes. It is clear that in the past decade, Forest Service prescribed burns were by far the most hazardous activity that occurred in the SFNF, and so should be considered exceedingly high risk going forward absent strong evidence to the contrary. The agency has not presented such evidence, so any proposed prescribed fire treatments should receive in-depth and project-specific analysis within an EIS.

The Hermits Peak Fire, The Calf Canyon Fire and the Cerro Pelado Fire, which together burned a total of 387,350 acres, follow several other land management agency escaped prescribed burns that have occurred in New Mexico since the year 2000. The sum of acreage burned by wildfires precipitated by prescribed burn escapes since 2000 is a total of 441,588 acres. This demonstrates a clear pattern of prescribed burn escapes in New Mexico, and suggests conditions are such that comprehensive analysis must be done for specific projects before prescribed burns can reasonably and responsibly be undertaken.

– The prescribed burn that precipitated the Cerro Grande Fire in May of 2000 was ignited by the National Park Service on Cerro Grande, a summit on the rim of the Valles Caldera. The conditions were potentially windy, and a report later stated that a Los Alamos National Laboratory fire official told a Bandelier supervisor not to proceed with a prescribed burn at that time because fuels were very dry. The prescribed burn was ignited anyway, high winds developed, and the result was a 43,000 acre wildfire that destroyed 235 homes and displaced 400 families. Buildings at the Los Alamos National Laboratory were also burned. The US General Accounting Office estimated total damages at $1 billion.

– In late 2017, pile burns were implemented in the Gallinas Prescribed fire Project Area, not far from the location where the Las Dispensas prescribed burn was ignited. Fire began spreading away from the piles, but still within the project area. Then the fire crossed into an area where fire was "not desired" in December, and on December 29, suppression efforts commenced. The prescribed fire was converted to a wildfire designation on January 18, 2018. The scenario that started this wildfire was very similar to the scenario that started the Calf Canyon pile-burns ignited wildfire three years later, but it having occurred in January was clearly an advantage for containment. An FLA was completed, and yet another wildfire in the same area, that was orders of magnitude larger, occurred just 5 years later.

– On April 9, 2018, the Redondo Prescribed burn, set by the US Forest Service in the Zuni Mountains of the Cibola National Forest, escaped control and became the 9,338 acre Diener Canyon wildfire. A high winds event was a primary factor in the spread of the wildfire.

– On April 6, 2022, the Bureau of Land Management ignited a prescribed burn in Chavez County, 10 miles SE of Roswell, NM, which became the 1,900 acre Overflow Fire. Officials said the prescribed burn became a wildfire when "fire whirls" started within the prescribed burn.

– On April 6, 2022, the Forest Service ignited the Hermits Peak Fire due to attempting to implement a broadcast prescribed burn during a high wind pattern. The fire quickly took off in the dry vegetation. The need to catch up with the burn schedule was a causative factor.

– On April 19, 2022 high winds fanned up holdover burning in pile burns in the Cal Canyon area, igniting the Calf Canyon Fire. The piles had apparently been smoldering for months under the snow. However, the Forest Service was aware the piles were spreading fire, and was trying to suppress the fire, 10 days before the wildfire was declared.

– On April 22 , 2022, pile burns escaped in the Jemez, igniting the 45,605 acre Cerro Pelado Fire. Wind was again a factor.

Following are the conditions and factors that are common among the New Mexico wildfires caused by escaped prescribed burns that could cause another prescribed burn escape to to occur during the implementation of the EVLRP:

– All the escaped burns, including the Hermits Peak/Calf Canyon Fire and Cerro Pelado Fire occurred in the spring and in most cases winds were a factor, except the 2018 fire in the Gallinas Prescribed Fire Project Area, which occurred in January and was fairly quickly contained. Yet, the Forest Service does not consider in the PEA the time of year as a factor in designing and implementing prescribed burns. It is necessary to consider within an EIS whether it is safe to ignite prescribed burns in the spring in the EVLR Project area, and if so, under which conditions and parameters. It is necessary to consider a number of factors in implementing pile burns, such as the timing of pile burns, the size of piles, how many piles are burned at one time. It is critical to develop specific monitoring requirements listed in any final project decision.

– In their recent wildfire strategy document "Confronting The Wildfire Crisis," the Forest Service stated "Accordingly, the Forest Service has established a strategy for confronting the wildfire crisis by dramatically increasing fuels and forest health treatments by up to four times current treatment levels in the West. "Confronting The Wildfire Crisis, A Strategy for Protecting Communities and Improving Resilience in America's Forests" at 26.[35] The available windows for implementing prescribed burns are substantially decreasing due to climate warming. Because of this, and because the EVLRP Proposed Action shows that the Forest Service intends to greatly increase the amount and acreage of prescribed burns, it is inevitable that the risk of escaped burns will be much greater than before. In the National Prescribed Fire Program Review, the Forest Service states:

> "Given the current agency workforce and how it is used, Forest Service units lack the capacity to effectively conduct prescribed burning at the needed scale. In addition to looking at options for maximizing use of the existing workforce, the Forest Service is assessing additional capacity that will be needed for a successful prescribed burn

[35] See Ex. 21 - Confronting The Wildfire Crisis, A Strategy for Protecting Communities and Improving Resilience in America's Forests

> program at scale and how the additional capacity should be defined. Where applicable, an all-hands, all-lands approach to support an interorganizational workforce should be considered." National Prescribed Fire Program Review at 16.

The Forest Service states unequivocally here that it does not have the capacity to effectively conduct prescribed burning at the scale it deems necessary. In terms of increasing their capacity to do so, it states that it is merely assessing additional capacity, not that it has determined how to obtain additional capacity and is doing so, or has done so. Yet the EVLRP PEA is proposing a great increase in the implementation of prescribed burns in the project area now, without stating where sufficient capacity will come from to do so. The SFNF has had ongoing staffing shortages and a very high rate of turnover. There must be an evaluation within an EIS of current agency capacity to conduct prescribed burns so that they will not endanger communities, nor over-burn forests, and the amount of burning proposed must not exceed this capacity.

– As noted above, pile burns were ignited in several units located in the Gallinas Prescribed Fire Project area in October of 2017. Low snowfall levels contributed to conditions that caused prescribed fire to spread away from the piles. After December 29, the Pecos/Las Vegas Ranger District maintained a strategy of suppressing the spreading fire until January 19, 2018, when the escaping prescribed fire was converted into a wildfire due to "unwanted fire effects." Unpredictable weather is normal for the Santa Fe National Forest, and adequate snowfall that remains on the ground cannot be counted on.

– In several of the cases, the need to utilize marginal burn windows in order to maintain a faster pace of implementing prescribed burns was a factor in the prescribed burn escapes.

While USFS Chief Randy Moore states in the September 2022 National Prescribed Fire Program Review that 99.84% of prescribed burns "go according to plan," that percentage is nationwide. We do not either accept or reject that calculation, as we do not have sufficient information to understand how it was derived. However, given the amount of prescribed fire escapes in the SFNF in 2022, clearly that statistic does not apply to the SFNF.

A clear pattern of escaped prescribed burns exists in New Mexico, some with catastrophic consequences, and conditions are getting warmer and drier which increases the probability of escaped prescribed burns. In addition to considering the number of incidents, it's necessary to also consider the number of acres burned, the number of homes burned, and the extent to which livelihoods and communities have been impacted by escaped prescribed burns. It's also necessary to take into account the number of resulting human deaths.

In fact, the Forest Service failed to acknowledge or disclose any of the above. They did not seriously consider how direction from the Forest Service Chief, stemming from the National Prescribed Fire Program Review, would affect implementation of Alternative B in the EVLR Project area.

According to the Gallinas-Las Dispensas Prescribed Fire Declared Wildfire Review, the precipitating factors of the Hermits Peak Fire included a litany of human error, lack of agency capacity, lack of equipment, lack of updated climate models, lack of communication, the need to "catch up" on implementation of prescribed burns, and problems with agency culture. No evidence is provided in the PEA that these types of incapacity have been sufficiently addressed in the Coyote and Cuba Ranger Districts.

The SFNF made available to the public a list of new strategies they intend to employ going forward to implement prescribed burns.[36] None of the general strategies are specific to the EVLRP, or even to the SFNF. The page states: "In 2022, the Forest Service completed a comprehensive national prescribed fire program review that identifies immediate and longer-term actions for using prescribed fire to reduce wildfire risk to communities and restore ecosystems. Based on the review, the Forest Service has changed how it plans and implements prescribed fire."

The strategies listed are in some cases not appreciably different from existing strategies, and are in other cases mostly procedural, but also included are a few that are new, at least in some respects:

> – Drought monitoring. The Forest Service will be required to check the US Drought Monitor which is an extremely course-level screening for appropriate burn windows, and not likely to provide new or specific enough information for most prescribed burn decisions.
>
> – Burn Plan. The Forest Service must now make better use of available science, modeling and Go/No-Go drought monitoring. The EA must explain in what ways the agency is making better use of available science, and how it will be an improvement from the ways the agency previously made use of available science.
>
> – Infrared (IR) use. This may constitute an improvement in monitoring pile burns for heat, but the PEA provides no evidence that it significantly reduces pile burn escapes. This technology has the following limitations for ensuring that pile burns are extinguished. These limitations are not disclosed or considered in the PEA. The agency must do so.
>
> 1. Limited Depth Perception: Infrared devices can only measure surface temperatures. Subsurface heat pockets or embers buried deep within the pile may not be detected, leading to a false sense of security that the fire is completely extinguished when it's not.
> 2. Ambient Temperature Influence: The accuracy of infrared readings can be affected by ambient temperature, sunlight, and humidity. Extreme weather conditions can either mask hot spots or exaggerate cool areas, leading to inaccurate assessments.
> 3. Technical Limitations: The accuracy of hand-held infrared devices depends on their calibration and the emissivity settings used. Different materials in the pile burns might have different emissivities, complicating the interpretation of the readings.

[36] See Ex. 21.

Users need to understand these settings and adjust them appropriately, which requires training and experience.

4. Interpretation Required: The data provided by infrared devices need to be interpreted, which can introduce human error. Misinterpretation of the data could lead to premature conclusions that the fire is extinguished when it may still pose a risk.
5. Field of View Limitations: Hand-held devices have a limited field of view and range. Large pile burns may require extensive time to thoroughly scan, and inaccessible areas might be missed altogether.
6. Physical Risks: Using hand-held devices requires proximity to the pile burns, which can expose users to heat, smoke, and other hazards, especially if hot spots are undetected initially.
7. Cost and Accessibility: High-quality infrared cameras can be expensive, which might limit their availability to all teams or individuals responsible for managing pile burns. This limitation could lead to inconsistent monitoring practices.

It is incumbent upon the Forest Service to disclose and analyze the direct, indirect and cumulative impacts of an escaped prescribed burn as a result of the EVLRP, and to analyze the potential for an escaped prescribed burn. This was done in the 2005 Environmental Assessment for the Gallinas Municipal Watershed Wildland-Urban Interface Project. This project area is also within the SFNF and has similar landscapes. The potential for an escaped prescribed burn was identified as one of three "key issues" in the 2005 Gallinas Municipal Watershed WUI Project EA. Gallinas Municipal Watershed Wildland-Urban Interface Project EA at 9.[37]

The PEA states "Prescribed fire may be used as a stand-alone treatment if existing site-specific conditions are appropriate." EA at 37. In the 2005 Gallinas Municipal Watershed Wildland-Urban Interface Project environmental assessment, under the section titled "Potential for Escaped Fire" the Forest Service states, "The issue related to fire behavior is: Prescribed burns may escape control measures and threaten the water supply and resources in and around the Watershed. Burning unthinned stands may pose the highest risk of fire escape." The PEA Proposed Action is to implement prescribed burns on 74,600 acres and to cut a total of 33,902 acres, so that means that on up to 40,698 acres, the agency may burn unthinned stands.. However, since some areas have been previously thinned, the number would be less. That number should be disclosed in the PEA. To the extent that some part of the 40,698 acres is not previously thinned, by the agency's own definition of high risk prescribed burns, the Forest Service is proposing to expose both the project landscape and nearby communities to prescribed burns that have a high risk of escape. We are not at all condoning more thinning and logging, but instead pointing out that the Forest Service has not done sufficient analysis of the risks, nor disclosed the risks of the Proposed Action. The agency must disclose to communities near the project area that they are conducting prescribed burns that carry the "highest risk of fire escape."

[37] *See* Ex. 22 - SFNF. 2006. Environmental Assessment for the Gallinas Municipal Watershed Wildland-Urban Interface Project

The PEA also states "Prescribed fires are typically planned during or immediately following monsoon season, during winter, or at any other times of the year when fuels and soils have sufficient moisture to reduce damage to the residual trees, to meet resource objectives, and to confine the fire to the desired burn footprint." EA at 37. There is no analysis of what burn windows are optimal and less risky in the PEA. There is no consideration of the long dry season that can occur after monsoon season in which a wildfire caused by an escaped prescribed burn could burn for months until there is snowfall. There is also no consideration of which parts of winter are optimal. Burning in late winter could present the same issue as above, that a prescribed burn that does escape could burn as a wildfire for months, until the monsoon season arrives. Especially considering the SFNF's record for prescribed burn escapes in the SFNF, this must be considered in project analysis.

CEQ regulations regarding consideration of indirect and cumulative impacts in the NEPA Process state "The EIS must identify all the indirect effects that are known, and make a good faith effort to explain the effects that are not known but are "reasonably foreseeable." (40 CFR §1508.8(b)).

In addition to being highly probable that a prescribed burn escape will occur within the EVLR Project area during the duration of the project, it is also reasonably foreseeable. For the purpose of USFS project analysis, "reasonably foreseeable" actions are considered where there is a Proposed Action or existing decision (e.g., draft NEPA document, Record of Decision, or issued permit), a commitment of resources or funding, or a formal proposal (e.g., a permit request). It is very possible to foresee the possibility of events where there is not a Proposed Action, an existing decision, a commitment of resources or funding, or a formal proposal, and the possibility of impactful events outside of the Forest Service planning process must be considered. CEQ regulations regarding consideration of indirect and cumulative impacts in the NEPA process state "The EIS must identify all the indirect effects that are known, and make a good faith effort to explain the effects that are not known but are "reasonably foreseeable." (40 CFR §1508.8(b)). According to 40 CFR § 1502.21, "For the purposes of this section, "'reasonably foreseeable' includes impacts that have catastrophic consequences, even if their probability of occurrence is low, provided that the analysis of the impacts is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason."

The CFR definition of reasonably foreseeable is:

> Reasonably foreseeable future actions include federal and non-federal activities not yet undertaken, but sufficiently likely to occur, that a Responsible Official of ordinary prudence would take such activities into account in reaching a decision. These federal and non-federal activities that must be taken into account in the analysis of cumulative impact include, but are not limited to, activities for which there are existing decisions, funding, or proposals identified by the bureau. Reasonably foreseeable future actions do not include those actions that are highly speculative or indefinite.

43 CFR 46.30 It is reasonably foreseeable that a prescribed burn ignited during the implementation of the EVLRP could/would escape containment and convert to a wildfire, given the drying climate, decreasingly safe burn windows, and an agency lacking capacity and yet intending to greatly increase

the number of prescribed burns implemented. It is also reasonably foreseeable given the recent history of the three escaped prescribed burns that caused the Hermits Peak, the Calf Canyon Fire and the Cerro Pelado Fire. It is apparent that this is foreseeable and is not highly speculative, nor indefinite, given the past history of escaped prescribed burns in the SFNF, and in New Mexico. And certainly the consequences of a wildfire such as the Hermits Peak/Calf Canyon Fire are catastrophic.

The potential for escaped prescribed burns is a significant issue that requires an EIS, and meets the following criteria of significance.

A. Intensity – The Hermits Peak/Calf Canyon Fire demonstrated once again that a wildfire precipitated by an escaped prescribed burn can have catastrophic impacts over a large area, including the loss of human life, homes and livelihoods. Such effects, impacts which could potentially occur in another prescribed burn escape wildfire, are certainly effects on the human environment that are likely to be highly controversial. The effects of the Hermits Peak/Calf Canyon fire were highly controversial.
B. Duration and Frequency – The duration of the impacts of an escaped prescribed burn precipitated wildfire is very long. It can take many decades for forests that were burned at high severity to again become mature forests, and with the warming climate we have no reason to expect that the same type of landscape will regenerate. In some cases, forested landscape may type convert to shrubland.
C. Reversibility – The impacts of high severity fire on forested landscape may not be entirely reversible in the drying climate. It is unknown what type of vegetation may regenerate in high severity burn scars – vegetation type conversions could occur.
D. Public Health and Safety – An escaped prescribed burn precipitated wildfire clearly impacts public health and safety. The copious smoke from a nearby wildfire has many deleterious impacts on human health. See I.J. "Consider Impacts On Air Quality." An escaped prescribed burn wildfire creates risk of human injury or death.
E. Mitigation Measures: – The PEA contains no project-specific proposed scientifically based and analyzed mitigation measures to reduce the probability of escaped prescribed burns.

Given what the agency has proposed, and given the agency's lack of analysis and project-specific mitigations of the risks of escaped prescribed buns, residents of communities surrounding the EVLR Project area have every reason to be afraid in their own homes and on their own land. An EIS must be completed that includes comprehensive analysis of the potential for escaped prescribed burns based on a full range of the best available science. Project-specific risk mitigations that are scientifically based must also be provided, and receive public input and NEPA analysis.

The Forest Service should determine, utilizing assumptions that are based on a broad range of scientific research and are not scientifically controversial, what is the probability of a wildfire occurring within the EVLR Project area per year, and also determine what is the probability, specific to SFNF fire history, that the implementation of prescribed burns may result in a wildfire. That an escaped prescribed burn may develop into a catastrophic wildfire is both reasonably foreseeable and highly probable. When prescribed burns are implemented in the spring, with potential spring winds,

an escaped prescribed burn can turn into a fire with a large percentage of high intensity areas. The timing of prescribed burns should be evaluated and consideration given to not implementing prescribed burns in the spring, given the risks.

A risk/benefit analysis should be undertaken to determine if the benefits of prescribed burns outweigh the risks, impacts and costs. Such an analysis must determine, using non-controversial and best available scientific assumptions, how many acres are likely to be prevented from burning at high severity vs. how many acres are burned at high severity due to escaped prescribed burns, specific to the EVLR Project area. Without this fundamental analysis, there can be no justification for proceeding with the EVLR Project Proposed Action, in relation to prescribed burns. The Forest Service must determine that more benefit than harm is done, in accordance to the project purpose and need. That is not at all clear, and the adverse consequences of being wrong are unacceptably severe.

J. Consider Impacts To Air Quality

In section 1.3.10. "Air Quality and Climate," the agency states, "Poor air quality adversely affects humans, ecological resources, and other values (e.g., scenery) on NFS lands. The goal of air quality management is to meet regulatory standards that protect human health, the environment, and visibility, as well as address and respond to other air quality concerns, such as atmospheric deposition of pollutants in the forest." PEA at 26.

The agency also states, "All prescribed burns conducted on the SFNF must adhere to the New Mexico Air Quality Bureau and New Mexico Smoke Management Plan (SMP)." PEA at 37. The only PDFs and//or Mitigation Measure provided is "Prescribed burning will use emissions reduction techniques and will be coordinated with the State of New Mexico, in compliance with its smoke management plan, to minimize the effects on air quality. Monitoring will comply with New Mexico Environment Department direction." Encino Vista Landscape Restoration Project Design Features (PDFs) and Mitigation Measures at 2.

The EVLRP PEA Proposed Action includes applying prescribed fire to 74,600 acres of forest nearby Los Alamos and surrounding Jemez communities at the rate of approximately 8,000 acres per year. This smoke will also impact the residents of Santa Fe and surrounding communities. Smoke from significant burning in the Jemez tends to settle down into the Santa Fe basin, depending on wind direction and atmospheric conditions. This would greatly increase smoke pollution from prescribed burns in both the Los Alamos and Santa Fe areas. Although we understand there may be justification for some burning in targeted areas, the amount of burning proposed is many times too much given the severe health impacts current smoke levels are already having on many local area residents, despite prior burns having been presumably conducted in adherence to the New Mexico Air Quality Bureau and New Mexico Smoke Management Plan. Local residents have expressed they are suffering from these smoke impacts, and the Forest Service has so far not been willing to even acknowledge it, other than to refer to it as a nuisance. There was no acknowledgement in the PEA that smoke impacts from existing amounts of prescribed burn smoke have already been identified by

the public and by physicians to be seriously detrimental to the health of many members of the public.

It is not acceptable to simply rely on the Air Quality Index (AQI) to determine to what extent the health of Los Alamos and Santa Fe area residents are being impacted by prescribed 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.[38] 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.[39] The Forest Service also states in the Santa Fe Mountains Landscape Resiliency Project Final Environmental Assessment:

> "Smoke also contains a number of toxic air pollutants such as aldehydes (including formaldehyde and acrolein) and organic compounds such as polycyclic aromatic hydrocarbons and benzene. Acrolein and formaldehyde are potent eye and respiratory irritants. Benzene is a known carcinogen that can cause headaches, dizziness, and breathing difficulties." SFMLRP FEA at 3-85.

The public health impacts of none of these were considered in the PEA. In New Mexico, smoke from prescribed 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 prescribed burn smoke should be considered. Prescribed 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 prescribed burns, nor the possible risks of breathing these chemicals when volatilized into smoke have been

[38] *See* Ex. 23 - Human Health Effects Of Wildland Smoke by Ann McCampbell, MD October 25, 2021
[39] *See* https://www.epa.gov/burnwise/wood-smoke-and-your-health (last accessed, April 15, 2024).

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.[40] 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 prescribed burns must be considered.

It is not adequate to have "meeting regulatory requirements" for prescribed burn emissions as a goal when a substantial number of residents living near agency ignited prescribed burns have reported that smoke exposures from burns often make them ill, and some report being confined to their homes with air filters during prescribed burns, resulting in loss of income, loss of the ability to carry out activities related to basic responsibilities and needs, and loss of enjoyment of life. The Forest Service needs to consider the real-world effects of the Proposed Action on public health, especially on the vulnerable populations which comprises a large part of the population potentially affected by prescribed burns. These populations include those with asthma, bronchitis, chemical sensitivities, cancer, immune system disorders, cardiovascular diseases, the elderly, and children. Such populations also include low-income individuals, as they have less ability to proactively respond in order to avoid the health impacts of prescribed burns smoke.

Dr. Erica Elliot, a Santa Fe Environmental Medicine specialist sent a letter to the Santa Fe National Forest Supervisor dated February 21, 2021, describing the severe effects of prescribed burns on her patients.[41] She stated:

> "My name is Erica Elliott. I am board certified in both family practice and environmental medicine. I am writing on behalf of my patients, many of whom suffer from severe allergies, asthma, and chemical sensitivities.
>
> Each time the Forest Service carries out a prescribed burn, those sensitive patients suffer terribly. Most of them have nowhere to escape in order to get relief from the smoke. Some seal up their windows and doors with tape, but the smoke still manages to seep into their homes."

Many local area residents who are not patients of Dr. Elliot have equally severe effects from prescribed burns smoke. Many articles, op-eds and letters to the editor have been published in local papers describing the impacts prescribed burns have on local residents' health. Santa Fe area residents have testified to both the County Commission and the City Council about the serious impacts of frequent prescribed burn smoke on their health. Additionally, there are also many others who are not suffering quite as intense effects from the smoke, and do not report the effects, but for whom the smoke still has a substantial negative impact on their lives.

[40] *See* Ex. 24 - Residues Of Fire Accelerant Chemicals Risk Assessment
[41] *See* Ex. 25 - Elliot Ltr to Santa Fe National Forest Supervisor

The human health impacts of smoke are well documented, but in their analysis, the Forest Service pays virtually no attention to these impacts, and presents and considers no data demonstrating the detrimental effects of prescribed burn smoke on different segments of the local population with varying ages and health conditions. Not a single medical or other scientific source is cited in the PEA detailing the effects of smoke on the function of the human body. The PEA should include a well-documented, comprehensive, and scientific analysis of how prescribed burn smoke from the Proposed Action is likely to affect both the personnel and contractors who implement fuel treatments and the residents who live and work in affected communities. The PEA merely states, when considering the impacts of smoke on local populations, "Thus, while there may be temporary increase in smoke and particulate matter in the air during prescribed fire implementation, this health risk is expected to be lesser and shorter-term than the risk to health, safety, and quality of life that would result in the event of an uncharacteristic fire." PEA at 149. The Forest Service must explain how this calculation and expectation is derived, taking into account feedback from the public and their physicians..

As a publicly funded agency conducting and proposing a highly polluting fuel treatment, the Forest Service has an obligation to ensure that every resident and healthcare provider of Rio Arriba, Los Alamos, and Santa Fe Counties is directly provided with full disclosure of the health impacts of the smoke which would be emitted during implementation of the Proposed Action. Suggesting that vulnerable people stay inside behind closed doors and windows, with an air filter if needed, is far from sufficient protection for vulnerable populations. Finally, the Forest Service must recognize that many residents of impacted communities, particularly those who are most vulnerable to the health impacts of smoke, do not have the time, flexibility, and/or resources to evacuate to a different area before every prescribed burn, if that is necessary. The Forest Service must disclose in an EIS, therefore, that its Proposed Action will cause some vulnerable residents to have to stay in place, breathe the smoke from prescribed burns, and as a result suffer potentially dangerous health impacts.

Although the Forest Service states in the PEA Purpose and Need that the project is designed "to reduce the risk of uncharacteristic wildfire events to the surrounding communities of Cañones, Coyote, Gallina, and Youngsville in Rio Arriba County, New Mexico", they have not provided evidence that the project will do so. PEA at 9. The PEA also states, "If stands were to continue to grow without any fuels reduction treatments such as commercial thinning, pre-commercial thinning, and prescribed burning, there would be an increase in the threat of uncharacteristic large stand replacing fires." PEA at 42. They have also not provided sufficient evidence of this claim, nor have acknowledged that the vast majority of the stand replacing wildfire that has occurred in the Santa Fe National Forest in the past decade was precipitated by Forest Service escaped prescribed burns.

They have not acknowledged the significant possibility that the Proposed Action may increase the amount of stand replacing fire. The probability that any logging, thinning or prescribed burn treatment will be met by a wildfire, unless the agency has inadvertently ignited the wildfire themselves by an escaped prescribed burn, is low. (See above, "Consider Wildfire Burn Probability When Analyzing Climate Costs and Benefits"). The Forest Service's often repeated claim that

implementation of prescribed burns reduces the overall amount of fire on the landscape, and therefore reduces the overall amount of smoke pollution, or at least does not increase it, is not proven and unlikely to be valid. In fact, most prescribed burn smoke is likely to be in addition to wildfire smoke. To cause a deterioration of local air quality and to seriously impact human health with so little evidence that such treatments will reduce the incidence of high severity fire, and with no real-world consideration of the impacts of a lowered air quality on human health, is not reasonably acceptable. The agency's Proposed Action regarding prescribed burning would cause impacts on the human environment that is highly likely to be controversial, and is already controversial. The Proposed Action is related to other actions with cumulatively significant impacts. The smoke emitted during the implementation of the EVLRP will have a cumulative impact on public health with the smoke from the Santa Fe Mountains Landscape Resiliency Project and other SFNF projects that include prescribed burning.

We recommend that the Forest Service monitor health impacts from prescribed burn smoke on the public by systematically taking in prescribed burn smoke health impact reports. These could come from those affected, from their doctors, or from both. This would give the Forest Service feedback on when they are causing particularly excessive adverse impacts to the health of residents of the Los Alamos and Santa Fe areas. This real-world monitoring of human health impacts could at least be an adjunct to AQI and other air quality measurements that may not be sensitive or specific enough in predicting impacts on human health. The agency should also consider completing a prescribed burn smoke Health Impact Assessment.

The Forest Service must include, within an EIS, a thorough analysis of the impacts of the smoke emitted from the Proposed Action, and how human health may be impacted given the public health impacts that are already occurring from current levels of prescribed 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 prescribed fire on approximately 8,000 acres per year during implementation of the EVLRP. The agency must weigh realistic high severity fire mitigation and forest health benefits against the amount of human health impacts and suffering that are likely to occur. This consideration must take into account actual SFNF fire history, including the pattern of escaped prescribed 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 EVLRP. 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. Public Involvement Concerns Must be Addressed

The NEPA implementing regulations require that "Federal agencies shall to the fullest extent possible (e)ncourage and facilitate public involvement in decisions which affect the quality of the human environment." 40 C.F.R. 1500.2(d). This non-discretionary duty mandates the mobilization of all Forest Service resources to achieve a fundamental purpose of NEPA and remain consistent with the agency's Progressive Era aspirations. In addition, regulations governing public participation in land management planning state that the agency should be "proactive and use contemporary tools, such as the Internet, to engage the public, and should share information in an open way with interested parties." 36 CFR 219.4 (Mar. 20, 2024).

In this case, inadequate notification resulted in only 9 persons attending two informational meetings in small communities, on March 20, 2024 in Gallinas, NM and March 23, 2024 in Abiquiu, NM. Minimal public involvement has been the case since the SFNF first announced Encino Vista and a

corresponding public scoping meeting in November 2019 with a paper flier which was posted locally and mailed to area post office boxes. The agency also placed the scoping document with a cover letter on its site for the project, mailed those to 143 persons announcing the beginning of a 30 day public comment period. The SFNF issued no public news release, placed no legal notice in a newspaper for its scoping notice, and contacted no news source to announce the project. As a result, there has been little mention of the project in the media.

The SFNF received only 14 comments from the public during the 2019 comment period. In contrast, also in 2019, thousands of people submitted scoping comments about the agency's smaller but much better publicized cutting and intentional burning project – the Santa Fe Mountains Landscape Resiliency project. When the SFNF Supervisor went on public radio to discuss the SFMLR project, he did not so much as mention the much larger Encino Vista project which the agency also had in the offing that year.

On March 14, 2024 the Forest Service finally issued its first news release on the project, placed a legal notice about the project in the Albuquerque Journal, and posted on its online project page the scoping comments which it received from the public in 2019. The agency did not post the comments earlier even after releasing its responses to the comments in 2021. Despite these efforts, public knowledge and participation in the project has been minimal. As such, the Forest Service should reissue its public comment period to better ensure meaningful public participation as NEPA requires.

V. Demonstrate Compliance with Environmental Justice Executive Orders 12898 and 13985

In PEA section 3.13, "Socioeconomics and Environmental Justice," under Environmental Justice, the Forest Service states:

> In 1994, President Clinton issued Executive Order 12898. This order directs Federal agencies to consider the human health and environmental conditions in minority and low-income communities. The purpose of Executive Order 12898 is to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects on minority and low-income populations (Executive Office of the President 1994). The goal of environmental justice is for Federal agency decision-makers to meaningfully involve minority (typically 50% or more) and low-income populations in decision-making processes, and to identify impacts that are disproportionately high and adverse with respect to these populations and identify alternatives that would avoid or mitigate those impacts.
>
> In 2021, President Biden issued Executive Order 13985 titled Advancing Racial Equity and Support for Underserved Communities. Section 8, Engagement with Members of Underserved Communities, requires federal agencies to consult with members of communities that have been historically underrepresented in the Federal Government and underserved by, or subject to discrimination in, Federal policies and programs. Traditional communities including federally recognized Tribes and Spanish Land Grants pr- date the

> establishment of the United States government. The language barrier created by the transition from Spanish and Native languages to English resulted in difficulty by traditional communities to assimilate to the new government. Consequently, these communities have experienced a degree of historical underservice by the federal government. This executive order seeks to remedy past failures and promote more engagement by the Forest Service with these communities. The Forest Service recognizes their vital and time-honored connections to the project area's natural resources.

PEA at 146. The agency also states, "Rio Arriba County as a whole exhibits relatively high rates of poverty as well as large percentages of the population identifying themselves as Hispanic or Latino, American Indian, or "some other race" and so are appropriately considered under environmental justice." PEA at 146.

The Forest Service further states, "The primary risks for disproportionate adverse impacts to local minority or low-income communities with regards to this project is in the form of exposure risk from prescribed fire (e.g., health risks from smoke inhalation, safety due to proximity to prescribed burns) and the potential for temporary disruption of access to needed forest resources during project implementation." PEA at 149.

The PEA and the Forest Service public outreach for the EVLRP exemplifies three primary environmental justice failures. They include:

1. Failure to provide sufficient notice of the project to underserved communities, to include their concerns and needs, and to respectfully consider their values.
2. Failure to adequately consider the safety of low-income and minority communities due to the proximity of prescribed burns, and to consider the increased impacts a wildfire ignited by an escaped prescribed burn would have on such communities.
3. Failure to consider the health risks of smoke inhalation from emissions from prescribed fire and agency-ignited wildfires.

1. Failure to provide sufficient notice of the project to underserved communities, to include their concerns and needs, and to respectfully consider their values.

The agency states:

> Meaningful participation of minority and low-income populations was provided throughout project planning. Under the Proposed Action, Tribal Consultation has occurred during the project design phase with sixteen Pueblos and Tribal Nations consulted. Additionally, two public meetings were held for this project. The mailing list included land grants, Rio Arriba County, soil and water conservation districts, and livestock associations, all of whom typically represent minority, land-based communities to some extent.

PEA at 149. See Section 1.5 "Public Involvement." It is clear that sufficient efforts were not made by the agency to ensure meaningful participation by minority and low-income populations at any stage of project planning and analysis.

Many members of the traditional communities most affected by the EVLRP do not believe their community was provided sufficient notice, inclusion in project planning or were treated respectfully by the Forest Service. In a summary of a meeting with Forest Supervisor Debbie Cress in February of 2022, Melissa-Roxanne Velasquez, representative of the Juan Bautista Valdez Land Grant Advisory Group and member of the Cañones community wrote:

> The community was largely overlooked during the scoping phase of the NEPA process. No community organization received a scoping letter. Prior to the scoping phase, no Forest Service official ever attempted to make contact with any representatives of the community regarding the Project or implications of the Project. This is a primary concern because Cañones is the community most directly affected by the Project, as it lies right below the Project area. The community has since gotten on the mailing list for the Project and hopes to strengthen its relationship with the Forest Service. However, the community feels disrespected by the Forest Service's response to the scoping comments which states: "**As the Responsible Official, I have determined that no significant issues were raised during scoping**."
>
> The person making this declaration (signed on September 1, 2021) was neither present at the scoping meetings nor made any attempt to introduce himself or herself to the Cañones community as the leader of the Encino Vista Project.[42]

The community itself made the effort to get onto the USFS mailing list, but that does not represent efforts by the Forest Service themselves to genuinely include the residents and concerns of the Canones community.

The Forest Service only held two meetings about the EVLRP PEA, and they were just open houses; there were no presentations given or opportunities for community Q&A's. Despite the majority Spanish-speaking population in Rio Arriba County, there were no Spanish language presentations. The Forest Service did inform us, when asked, that they provided translators at the open houses. However, the agency never notified anyone that there would be or were translators available. Given that only 9 people attended over two meetings, it appears the community either did not know about the scarcely publicized meetings and/or did not feel comfortable attending.

The Forest Service stated in the October 2020 EVLRP Scoping Comment Content Analysis:

> The Forest intends to hold several public meetings in Cañones to better understand needs and concerns that the community may hold. The intent of the scoping document was to begin conversations and cast a wide net. This response is by no means the end, and hopefully community meetings and the later opportunity to read and comment upon the more detailed preliminary EA will help inform and shape any decision the Forest Service ultimately makes.

[42] *See* Ex. 26 - Velasquez et al. Ltr re: Encino_Vista_Meeting

EVLRP Scoping Comment Content Analysis at 21. The Forest Service had not proposed any meetings in Canones, and only on April 11, 2024, four days before the end of the PEA comment period, the agency responded to one of the numerous requests by the Cañones community to attend a meeting they put on at the Cañones Community Center. On April 12, 2024, a reporter from the Santa Fe New Mexican, Daniel Chacón, wrote in an article about the meeting:

> At the meeting, residents raised myriad concerns about the Forest Service's plans, including a failure to communicate with communities that will be affected by the large-scale vegetation management project, which Sanchez and Sando both acknowledged.
>
> While the Forest Service hosted two open houses earlier this year, only a handful of people attended each meeting, which residents said stemmed from poor advertising.
>
> "I think there's way more we could have done and that we should do when we're developing projects," Sanchez said in the interview. "We should develop projects collaboratively. We should be very, very proactive in our conversations, in our dialogue."

Santa Fe New Mexican, 4/12, 2024.[43] The EVLRP PEA was only available in English, although the majority of households in communities nearest the project area speak Spanish as their primary language and may not be able to read the PEA meaningfully in English. Only 36 percent of adults in Rio Arriba County speak only English at home. The Public Comment Notice sent out by the Forest Service for the EVLRP PEA stated "Only those who have submitted substantive formal comments will be eligible to file an objection." So citizens who may not even be able to read the PEA, nor are familiar with the format of formal comments, were expected to submit "substantive formal comments" in order to continue with the process and have their voices heard, if they do not agree with the PEA Proposed Action.

Certain members of local communities may benefit economically from the wood products obtained from either logging or pre-commercial cutting, and from temporary employment, but there is no consideration in the PEA of many community members' desire to preserve the forest that has supported and been the backdrop of their families for generations in a healthy and natural state. Many do not want to see the forest heavily cut and too-frequently burned with the resulting ecosystem damage and fire risk. The Forest Service appears to be incorrectly assuming that most of the local residents prefer short-term economic support over preserving the vitality and life of the forest nearby their communities for future generations.

2. Failure to adequately consider the safety of low-income and minority communities due to the proximity of prescribed burns, and to consider the increased impacts a wildfire ignited by an escaped prescribed burn would have on such communities.

[43] *See* Ex. 27 - Plans for prescribed burns to improve forest health, reduce wildfire risk spark concerns. https://www.santafenewmexican.com/news/local_news/plans-for-prescribed-burns-to-improve-forest-health-reduce-wildfire-risk-spark-concerns/article_2f122122-f81f-11ee-b66d-6f77e533725a.html

The agency states "Overall, the Proposed Action is not expected to create disproportionate adverse impacts to local minority or low-income communities." PEA at 149. Yet the agency provides no evidence that the Proposed Action will not, in fact, create such adverse impacts. There is reason to believe that the Proposed Action may in fact do so.

As discussed above in Section III.I "Consider the potential for escaped prescribed burns," the agency has not done due diligence in analyzing the potential for wildfire from escaped prescribed burns specific to the EVLRP and to the specific project location, climate and other conditions. The assumption that the Forest Service makes, that communities adjacent to the project area would be safer due to the proposed treatments, is countered by the reality of what has actually occurred in the SFNF in 2022.

The Hermits Peak/Calf Canyon Fire almost completely destroyed some similar land-based, low-income and minority communities in Mora and San Miguel Counties. Several hundred homes were destroyed, and two years later, the vast majority have not been compensated and are still living in extremely difficult situations. Acequias which provided water and irrigations of fields were damaged ,and the land that had helped to support them economically and spiritually was burned. Out of 3.95 billion dollars allocated to the victims of the Hermits Peak/Calf Canyon fire, as of early in 2024, almost two years later, only about 10% of the available funds had been distributed. This is largely due to the unique challenges in providing compensation to land-based and low-income communities, with homes that are often uninsured, with residents who do not possess deeds of ownership to family properties passed down through generations, and that often do not have power to their homes, which is a FEMA requirement to have FEMA trailers on their land. The logistical hurdles of the FEMA application process left many exhausted, demoralized and angry. All this has left many of the victims still displaced, with their lives upended. As Patrick Lohmann, reporter for Source NM who lived in Las Vegas, NM for a year talking those impacted by the Hermits Peak/Calf Canyon Fire, wrote in a recent article about the living conditions of fire victims:

> "And I worked the phones. After a bit of pestering, a county assessor marked down all the houses she knew had been lost in the fire. I called every property owner, often reaching people who were living far away until they could rebuild or were making do in RVs, friends' homes, and even, in one case, a tent. Many people were reluctant to talk; some said it was too painful to discuss what they had been through."[44]

Yet, the Forest Service does not even acknowledge the risk from wildfires ignited by escaped prescribed burn that those in traditional communities adjacent to the EVLR Project area face, nor does it analyze risk or provide PDFs and/or Mitigation Measures specific to the EVLR Project landscape and the local climate. This is a substantial disregard for the safety of the members of these communities, and also of the fear they would live with, knowing the Forest Service has not done due diligence to create a Proposed Action that is comprehensively analyzed and would be likely to keep their communities safe. They have every reason to fear the Forest Service actions, much more than their fear from the possibility of fires ignited by all other causes. The Forest Service does

[44] *See* Ex. 28 - Source New Mexico Lohmann, 2024 Op-Ed

not acknowledge in the PEA the need for members of communities adjacent to the Project area to feel safe in their homes during project activities.

The Forest Service provides examples of environmental justice issues regarding risk from wildfire in Rio Arriba County that are relevant to this project. They include:

- About 6 percent of households lack a vehicle, which could make fire evacuation difficult.
- Low-income households are less likely to have property insurance to help recover from any property damage done by a wildfire.
- Populated areas in Rio Arriba County have a greater wildfire risk to homes than 69% of counties in the State. Low-income households are less likely to be able to implement proactive wildfire mitigation measures to reduce their risk.

PEA at 146. Despite acknowledging increased risk from wildfire to many residents of the communities located near EVLR Project area, the agency has not adequately considered impacts that are disproportionately high and adverse in relation to fire risk with respect to these populations, and did not identify alternatives that would avoid or mitigate those impacts. To comply with EO 12898, the agency must identify alternatives which would avoid or mitigate the impacts.

The Forest Service must prepare an EIS for the EVLRP and implement an analysis process that complies fully with EOs 12898 and 13985, provides sufficient notice to low-income and minority communities, and is carried out in a genuinely inclusive and respectful manner.

3. Failure to consider the health risks of smoke inhalation from emissions from prescribed fire and agency-ignited wildfires

The Forest Service rightly acknowledges that the residents of Rio Arriba County are at risk for "disproportionate adverse impacts to local minority or low-income communities with regards to this project in the form of exposure risk from prescribed fire (e.g., health risks from smoke inhalation." Id. Therefore they must give additional consideration and analysis of the health impacts of the emissions from prescribed burns. That additional consideration and analysis was not provided in the PEA. The agency did not seriously consider that the health of local communities could be impacted by prescribed burn or agency-ignited wildfire smoke.

The Forest Service states that "The age of that population (of Rio Arriba County) has skewed older with a net increase of percent of the population over the age of 65 while all younger age brackets saw a decrease in population." PEA at 144. The elderly are a vulnerable population that is at increased risk for health impacts from smoke.

The agency also states, "A little over 22% of people in Rio Arriba County live in poverty with 12% living in deep poverty (defined as less than half of the federal poverty level).," and that Rio Arriba County has a "lower than the median household income in New Mexico and the United States as a whole." EA at 144. Therefore a significant portion of the local population may struggle to be able to afford to get medical care to treat the health impacts of smoke inhalation, and may have difficulty getting transportation to a doctor. Also, those living in poverty are less likely to be able to afford to

evacuate when necessary due to smoke events, as that involves transportation, paying for a place to stay, and the income lost from missing work. And those living in poverty are less likely to be able to stay inside with air filters during prescribed burns and agency-ignited wildfires, due to obligations to work, to take care of livestock, and to take care of children, etc.

The Forest Service states "Long-term, the Proposed Action would provide socioeconomic support to the rural and local communities surrounding the project area by improving ecosystem health over the long-term, and *it would reduce the risk for uncharacteristic wildfires that could disrupt commercial and subsistence activity, adversely impact community health and well-being*, and adversely impact traditional communities and their use of forest resources." PEA at 147. This statement is made without providing evidence, and in the face of strong evidence to the contrary, that prescribed burns ignited in New Mexico have been the causative factor of much of the wildfire that has occurred in New Mexico since 2000, and that in the past decade in the SFNF they have been the causative factor of the vast majority of the wildfire that has occurred. Instead, local communities should be receiving disclosures about the high level of risk to their health and well-being that will exist when the agency implements prescribed burns.

The only solution to these environmental justice failures is for the agency to complete an EIS and genuinely include affected communities. This means including issues and concerns that are not necessarily in alignment with the agency's overall perspective and plans. It means looking realistically at the agency's prescribed burn escape record, and to not expect members of affected communities to believe and assume that the agency has the failures and shortcomings of the SFNF prescribed burn program solved now, even while they did not mention the potential for escaped prescribed burns in the EVLRP PEA. It also means to genuinely reach out to these communities in ways that makes locals feel they can trust the Forest Service enough to engage, and certainly to provide more-than-minimal notice of meetings. The Forest Service must, by implementing a sincere and comprehensive EIS, "remedy past failures and promote more engagement by the Forest Service with these communities," and "meaningfully involve minority (typically 50% or more) and low-income populations in decision-making processes." *Id.*

VI. 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 New Mexico's antidegradation rules. We caution the agency against over-reliance on best management practices in complying with the CWA requirements as we explained above.

VII. The Forest Service must demonstrate compliance with the Roadless Rule

The U.S. Forest Service adopted the Roadless Area Conservation Rule (Roadless Rule) in 2001 "to protect and conserve inventoried roadless areas on National Forest System lands." Forest Service, Special Areas, Roadless Area Conservation, Final Rule, 66 Fed. Reg. 3244 (Jan. 12, 2001). The rule observed:

> Inventoried roadless areas provide clean drinking water and function as biological strongholds for populations of threatened and endangered species. They provide large, relatively undisturbed landscapes that are important to biological diversity and the long-term survival of many at risk species. Inventoried roadless areas provide opportunities for dispersed outdoor recreation, opportunities that diminish as open space and natural settings are developed elsewhere. They also serve as bulwarks against the spread of non-native invasive plant species and provide reference areas for study and research.

66 Fed. Reg. at 3245. The Rule "prohibits road construction, reconstruction, and timber harvest in inventoried roadless areas because they have the greatest likelihood of altering and fragmenting landscapes, resulting in immediate, long-term loss of roadless area values and characteristics." 66 Fed. Reg. at 3244.

The EVLRP encompasses three designated Inventoried Roadless Areas (IRA); Cañones Creek, Youngsville and Puebla Mesa IRAs that total 13,024 acres, of which approximately 3,070 acres are within the project area. PEA at 135, Table 38. We appreciate that under the proposed action "[t]here will no commercial or mechanical treatments with the IRAs. treatments will be limited to hand cutting/ piling and prescribed fire." *Id.* We agree this will have less of an impact on roadless characteristics than had the agency proposed commercial and/or mechanical treatments. However, the analysis fails to support the conclusion that expected impacts to high quality or undisturbed soil, water, or air resources will be short term, or that adverse impacts would be limited to small areas of the landscape or that project design features would be effective in preserving roadless characteristics. *Id.* at 135-36. Much of this concern stems from the fact that the agency must still access the IRAs in some manner to implement the proposed actions, yet the analysis lacks any discussion regarding this issue and simply offers the following: "Some areas of the IRAs are truly roadless and other portions may contain roads open to the public and shown on the SFNF MVUM." *Id.* at 139. Further, there is no discussion in the PEA regarding how the agency will implement the prescribed burns, specifically the size and location of any firelines, or how it will prevent unauthorized use of those lines or other

access routes while they persist on the landscape.

Further, the Forest Service fails to adequately describe or provide evidence for how the proposed action would maintain or improve one or more of the roadless area characteristics, as the regulations require. Given the undefined duration the agency seeks to authorize treatments, any claim that they would occur infrequently is arbitrary and a violation of the Roadless Rule. Further, we explain above that the Forest Service relies on erroneous assumptions regarding the need for and effectiveness of the proposed actions, and as such any assertions that the wildlife habitat improvement treatments would "improve threatened, endangered, proposed, or sensitive species habitat" are without merit. 36 C.F.R. § 294.13(b)(1). Certainly frequent treatments are not appropriate within IRAs. Moreso, any assertions by the Forest Service that the proposed treatments will "reduce the risk of uncharacteristic wildfire effects, within the range of variability that would be expected to occur under natural disturbance regimes of the current climatic period" are equally arbitrary, especially since the agency failed to incorporate current or projected climate conditions in its fire modeling. *Id.* Had it done so, it is likely that the natural disturbance regimes would not be as highly departed as the agency's models suggest. In addition, the agency fails to provide sufficient supporting analysis or evidence that its proposed treatments will effectively reduce wildfire effects under the current climatic period, especially since the Forest Service continues to rely on historic ranges of variability to determine its proposed actions. The agency must acknowledge that persistent drought, higher temperatures and windy conditions are the determining factors for wildfire severity, and no amount of fuel reduction is going to overcome extreme climate events. In other words, the agency cannot thin and burn its way out of the climate crisis. More effective strategies would be to create cooler micro-climates through road removal and reforestation, along with preserving and increasing mature, intact forests that serve as a natural climate change solution that we explain in these comments, particularly those pertaining to research from Moomaw 2019.

1. A Special Note on Roads

Under the Roadless Rule, "[a] road may not be constructed or reconstructed in inventoried roadless areas of the National Forest System" unless a narrow set of exceptions apply. 36 C.F.R. § 294.12(a). The Rule defines roads, and road "maintenance," which is generally permitted, and "road reconstruction" which is not:

> *Road:* A motor vehicle travelway over 50 inches wide, unless designated and managed as a trail. A road may be classified, unclassified, or temporary.
>
> *Road maintenance.* The ***ongoing*** upkeep of a road necessary to retain or restore the road to the approved road management objective.
>
> *Road reconstruction.* Activity that results in improvement or realignment of an existing classified road defined as follows:

> (1) *Road improvement.* Activity that results in an increase of an existing road's traffic service level, expansion of its capacity, or a change in its original design function.
>
> (2) *Road realignment.* Activity that results in a new location of an existing road or portions of an existing road, and treatment of the old roadway.

36 C.F.R. § 294.11, emphasis added. The above definitions may be misinterpreted by the Forest Service to mean that it may "maintain" unclassified roads (redefined as unauthorized roads in the 2005 Travel Management Rule, 70 FR 68287) inside IRAs. Such a misinterpretation would violate the Roadless Rule, especially since the agency fails to provide any analysis or direction regarding roads under the proposed action. To clarify, any action that would open overgrown closed roads, or bring unauthorized roads to even a low-standard would constitute road reconstruction thereby violating the Roadless Rule. This was underscored by a 2020 U.S. District Court decision from Montana holding that the Helena-Lewis and Clark National Forest violated the Roadless Rule by failing to ensure that existing routes used for timber harvest in IRAs would not be effectively "reconstructed" under the guise of "maintenance." *Helena Hunters & Anglers Ass'n v. Marten*, 470 F. Supp. 3d 1151, 1169-72 (D. Mont. 2020). That decision requires the Forest Service to provide detailed, on-the-ground information concerning road use and "maintenance" to ensure compliance with the Roadless Rule, including but not limited to: which routes will be used, what condition each route is in now, the precise nature of the equipment needed to perform the timber harvest, and what road clearance and width such equipment will require. The EVLRP contains none of this information.

Further, the Roadless Rule qualifies road maintenance to mean "ongoing upkeep," and for the Forest Service to invoke the road maintenance exemption, it will have to demonstrate that the road has been receiving "ongoing" maintenance as set forth in its Road Management Objectives. If the roads proposed for use have missed their scheduled maintenance, the agency cannot consider its road treatments as "ongoing upkeep." This is particularly true for Forest Service Roads 100D, 198A in the Youngsville IRA listed as closed (ML 1), and County Rds 196, 198 in the Pueblo Mesa IRA.

Again, the Roadless Rule also defines "improvement" to mean an increase of the ***existing*** road's traffic service level and expansion of route capacity. By opening closed roads, especially roads with an operational ML 1 classification, both the traffic service level and route capacity will increase. Similarly, treating unauthorized roads to provide access for high-clearance vehicles would also constitute road reconstruction that the Roadless Rule defines as applying to only classified roads (redefined as Forest Service System Roads in the 2005 Travel Management Rule, 70 FR 68288). As such, the Roadless Rule precludes the agency from using unauthorized roads, especially untreated or partially treated decommissioned roads, remnants of temporary roads, and those created through illegal use.

Given the fact that the Forest Service fails to explain how it will access the IRAs, it is arbitrary for the agency to assert there would be no significant effects, especially given the lack of analysis or

disclosure of the proposed action. Increasing motorized disturbance and potentially utilizing roads within and adjacent to IRAs will most certainly cause significant effects on the areas' roadless character.

VIII. Consider More Robust Protection of Goshawk and its Prey

In 1996 the Forest Service amended every forest plan in the Southwestern Region, including the Santa Fe National Forest Plan, to incorporate the Management Recommendations for the Northern Goshawk in the Southwestern United States (Reynolds et al. 1992 or MRNGs) arguing that these expert recommendations provide the best available scientific information (BASI) for managing the habitat of the northern goshawk, a species of conservation concern, and its prey species.

> The 1996 amendment explained that "[t]he best available scientific data and information on habitat needs for goshawk and Mexican spotted owl were used to develop and evaluate the proposed action and alternatives." In this connection, the Regional Forester noted that the (MRNG) contains the best known information on northern goshawk management in our Region." (emphasis added).[45]

The Forest Service also made clear in 2007 that it has no intention of rewriting the goshawk standards and guidelines so as to weaken them.

> The Forest Service is not, nor is it, planning to weaken the goshawk standards and guidelines. There is no effort or planning to rewrite them. (emphasis added)

Regional Forester's letter, August 22, 2007, p. 2. However, when the current Santa Fe National Forest Land Management Plan was approved in 2022 the Forest Service without explanation abandoned its long-held position that MRNG represent BASI for managing habitat of the northern goshawk and its prey species. Instead, the SFNF forest plan adopted a much more limited version of the MRNG which is being implemented here. The following key elements of the MRNG (not inclusive) were dispensed with:

> **Nest Area Management Recommendations:** Maintain overstory canopy cover (%) 50+ to 70+ in existing and replacement nest areas. Manage road densities at the lowest level possible to minimize disturbance in the nest area. Where timber harvesting has been prescribed to achieve desired forest condition, use small, permanent skid trails in lieu of roads. Wildlife and livestock utilization of grasses and forbs should average 20% by weight and not exceed 40% in any area, and shrub utilization should average 40% by weight and not exceed 60% in any area. These levels of utilization should maintain native food and cover for many of the prey species (Schmutz 1978, Wasser 1982).
>
> **Post-fledgling Family Area Management Recommendations:** A mosaic of vegetation structural stages (VSSs) interspersed throughout the PFA in small patches. The majority (60%) of the PFA should be in the three older VSSs (4, 5, 6), approximately 20% in each. Of the remaining

[45] See Ex. 29 - Forest Guardians vs. United State Forest Service, Supplemental Brief of Appellee Forest Service, No. CIV 05-0372 JB/DJS, p. 2

40%, 20% should be in young forest (VSS 3), and 10% in the seedling/sapling (VSS 2), and 10% in grass/forb/ shrub stages (VSS 1) . . . (t)he large-tree component throughout the PFA should include: snags, downed logs, and mature and old, live trees in clumps or stringers with interlocking crowns. A developed herbaceous and/or shrub understory throughout the PFA should emphasize native species, especially grasses. Woody debris: Present throughout the PFA. Soil conditions: develop intact forest soils with emphasis on organic surface layers (humus, litter and soil wood) within the natural turnover rates. These conditions should provide for the sustainability of mycorrhizae. Features of prey habitat in the PFA include:

1. large (>18 inches DBH) feeding and/or nesting trees for tree squirrels,
2. large (>18 inches DBH and >30 feet tall) snags and/or trees with exposed heartwood for nest cavity excavation by woodpeckers,
3. patches of mid-aged forests with high canopy cover (up to 70%) that provide mesic conditions for fungi (important foods for all the mammalian prey),
4. small (<2 acres) openings in the tree canopy to produce herbaceous and shrubby foods for the herbivorous prey, and
5. large (>12 inches in diameter and >8 feet long) downed logs and other woody debris that provide hiding, feeding, denning, and nesting sites used by goshawk prey.

Foraging Area: Approximately 5400 acres (not including nest areas and PFA acres). The majority (60%) of the foraging area should ultimately be in the three older VSSs (4, 5, 6), approximately 20% in each. Of the remaining 40%, 20% should be in young forest (VSS 3) and 10% in the seedling/sapling (VSS 2) and 10% in grass/forb/shrub (VSS 1). The large-tree component throughout the foraging area should include: snags, downed logs, and mature and old live trees in clumps or stringers with interlocking crowns. A developed herbaceous and/or shrub understory should emphasize native species, especially grasses, throughout the foraging area. Woody debris: present throughout the foraging area. Soil conditions: develop intact forest soils with emphasis on organic surface layers (humus, litter, and soil wood) within natural turnover rates. These conditions should provide for the sustainability of mycorrhizae.

MRNG (excerpts) pp. 21-30. We are concerned that the above elements, including lack of canopy cover requirements, forage utilization standards, snags, woody debris, road minimums and maintenance of mycorrhizal networks are not integrated into the project's purpose and need nor included in the Design Features, Best Management Practices or Mitigation Measures.

A key concern is the removal of protection for 7 goshawk prey species that attain high populations with 40-60% canopy cover. The most significant of these is the tassel-eared squirrel (*Sciurus aberti*) that attains high populations in closed canopy forests with younger age classes. This arboreal squirrel lives and nests in ponderosa trees, and their food consists almost exclusively of items produced by ponderosa pine and the mycorrhizal fungi symbiotic with it.

The tassel-eared squirrel's optimum habitat is mid-to-late-seral ponderosa pine forest, i.e., trees approximately 12-19 inches in diameter, intermixed with larger trees, with interlocking crowns. A study on the Carson National Forest determined that "Density of 12-16 DBH ponderosa pine was

the single best predictor of squirrel density" (Frey 2004). We are concerned because this project, together with massive tree clearing projects being planned by the 2-3-2 Cohesive Strategy Partnership in the larger San Juan, Chama and Rio Grande Watershed Landscapes, are proposing to log or burn thousands of these mature trees without apparently evaluating the impacts to the tassel-eared squirrel population which is a key goshawk prey species especially during the winter months when other prey are unavailable.

In addition to being an important goshawk prey species, the tassel-eared squirrel sustains the ponderosa pine ecosystem by consuming mycelium and fruiting bodies of hypogeous fungi (truffles) and epigeous fungi (mushrooms) and distributing spores in their fecal pellets (Dodd *at al.* 2003; States and Wettstein 1998; Stephenson 1975; Maser *et al.* 1978). This mycorrhizal network enhances seedling survival and forest regeneration and enables trees of different species to share water and nutrients and exchange information such as the presence of defoliating insects (Simard *et al.* 1997). The importance of the squirrels as a dispersal vector for the mycorrhizal fungi is such that they may indirectly influence the distribution and range of the ponderosa pine ecosystem in North America (Fogel and Trappe, 1978; Kotter and Farentinos, 1984).

There is a strong association between hypogeous fungi production, ponderosa pine canopy closure and squirrel abundance (States et al. 1988; States and Wettstein 1998; States 2004 Expert Declaration).[46] Clearing and burning mid-to late-seral ponderosa pine trees negatively impacts squirrel populations and mycorrhizal networks. Research conducted on the Coconino National Forest near Flagstaff, Arizona compared the removal of trees so that 1.5 to 3 trees remained for every pre-settlement tree on 40 acre plots. Controls were on adjacent sites that were not thinned or burned. The conclusions were:

- Truffle productivity was lower in thinned and burned sites than control sites.
- Reduced productivity on treated plots may be explained by a decrease in ectomycorrhizal root tip abundance but not by a decrease in ectomycorrhizal species richness.
- The number of truffles recovered by tassel-eared squirrels as evidenced by dig sites reflected the lower abundance of truffles on thinned and burned sites. Given that truffles are an important component of the diet of these squirrels, thinning and burning could significantly reduce habitat quality by reducing mycorrhizal colonization and thereby reducing truffle abundance. (emphasis added)

Beiler *et al.* 2004. This research reflects the widespread consensus in the scientific community that clearing and burning at the landscape scale, as proposed in this project, will diminish remaining high quality squirrel population source areas and exacerbate the effects of past logging unless squirrel habitat requirements are specifically taken into account in project planning.

The Dodd guidelines (Dodd *et al.* 2003) are acknowledged as the BASI for tassel-eared squirrel management. Named for Norris Dodd, a squirrel researcher employed by the Arizona Department of Game and Fish, they call for designation and maintenance of 20-36 hectare (50-90 acres)

[46] *See* Ex. 30 - Jack States 2004 Expert Declaration

"meso-reserves" throughout a landscape unit, such as this project area, that contain the best remnants of high quality squirrel habitat. This approach responds to the current understanding that squirrel survival requires maintenance of appropriate forest structure at the patch scale. Outside the designated meso-reserves, the Dodd guidelines call for leaving residual "refugia," or clumps of interlocking canopy trees.

Implementation of the Dodd guidelines requires that this project (1) conduct surveys for the optimal habitat characteristics as identified by Dodd and others; (2) designate meso-reserves containing the best quality habitat; and (3) limit tree cutting in designated areas that may adversely impact tassel-eared squirrels and the hypogeous fungi that provide a crucial dietary component.

The Dodd guidelines are consistent with Prather *et al.* 2006 recommendations ". . . that managers leave larger patches (160 ha) of habitat with moderate-to-high canopy cover (40%) as part of any treatment matrix. These untreated or lightly treated patches could serve as important sources for recolonization of treated areas." They are also consistent with Yarborough *et al.* 2015 that recommend "(w)inter core area forest patches for Abert's squirrels should have canopy closure ranging from 55% to 72% to maximize squirrel density and recruitment".

The maintenance of viable goshawk and tassel-eared squirrel populations (supported by robust mycorrhizal networks) is irrefutably consistent with the agency's obligation in the 2012 Planning Rule to "ensure that plans provide for the sustainability of ecosystems and resources; meet the need for forest restoration and conservation, watershed protection, and species diversity and conservation" (Federal Register Vol. 77, No. 68, Monday, April 9, 2012).

We are concerned that these goals may have been compromised in this case by the failure to utilize what the agency has long recognized as BASI for the maintenance of goshawk populations, their prey species and the ponderosa pine ecosystem. Please explain the scientific basis for removing critical elements of the MRNG in the proposed implementation of this project. 36 C.F.R § 219.3.

IX. Consider Robust Bird Habitat Protection

In less than a single human lifetime, 2.9 billion breeding adult birds have been lost from the United States and Canada, more than a quarter of our birdlife since 1970 (Rosenburg et al. 2019). This finding is based on 48 years of data from multiple independent sources, including the North American Breeding Bird Survey and the Christmas Bird Count. A comprehensive analysis of 11 years of data from 143 NEXRAD radar stations showed a similarly steep decline in the magnitude of migration.

Nearly 90% of these losses came from just 12 bird families, including sparrows, warblers, finches, and swallows, several of which occur in the project area. It includes familiar birds in the project area such as the Dark-eyed Junco which has lost 175 million individuals and the White-throated Sparrow which has lost 93 million. The disappearance of these common bird species indicates not only a shift in the ecosystems' ability to support basic birdlife but a broader biodiversity crisis.

A significant portion of this loss of birds is from temperate forests ecosystems — 1 billion birds since 1970. The biggest overall driver of bird declines in forest ecosystems is habitat degradation

caused by loss of canopy cover, habitat fragmentation and invasive plants. Climate disruption is expected to exacerbate these threats by, for example, shifting the timing of bird's peak food supplies.

Therefore, consider mandatory measures to reduce habitat degradation that the project will cause by: 1) extensive removal of the overstory canopy; 2) loss of ground cover caused by frequent burning; 3) Brown-headed Cowbird (*Molothrus ater*) parasitization resulting from excessive clearing and burning; 4) burning and clearing impacts to ground nesting birds during the breeding season; and 5) loss of oak habitat due to fuelwood gathering and livestock grazing.

Also, consider mandatory measures to reduce the cumulative impacts to the imperiled Pinyon Jay (*Gymnorhinus cyanocephalus*) population. The priority must be to identify and protect breeding sites and eliminate inappropriate clearing and burning of persistent Pinyon-Juniper woodlands. The Pinyon Jay was petitioned for federal listing under the U.S. Endangered Species Act in 2022 (Defenders of Wildlife 2022). Detailed conservation measures are suggested in this petition.

X. Consider Mandatory Standards to Protect All White Pine Trees

The PEA does not specify mandatory standards to preserve white pines while at the same time acknowledging that white pine genetic diversity is critically important to resist white pine blister rust *(Cronartium ribicola)* which has recently appeared on the SFNF.

> White pine blister rust poses a threat to southwestern white pine, causing severe mortality throughout its range. Some genetic resistance to this disease has been identified on selected individual white pines throughout the region and for this reason, it is critical that the full genetic diversity of southwestern white pine be maintained throughout its range (Conklin et al. 2009). (emphasis added)

PEA p. 15. Consider including mandatory standards in the Design Features, Best Management Practices and Mitigation Measures of Appendix C. These standards should require to the greatest extent possible the preservation of all white pine trees to conserve their diverse germplasm. In addition to disease resistance, preservation of genetic diversity would also aid white pines in confronting potential bark beetle outbreaks and, most significantly, adapting to a rapidly warming and drying climate.

Also necessary are mandatory standards to scale back management of created openings in white pine habitats. The creation of large and small openings should be avoided as it heightens the potential for blister rust damage (Schwandt et al. 1994; Fins et al. 2001). Increased sunlight reaching the forest floor often causes *Ribes sp.*, the main alternative host, to proliferate leading to increased opportunities for the spread of blister rust. Dense canopies limit not only *Ribes sp.* but also dispersal of rust spores. Forest Service pathologists in the Southwest recommend careful consideration of the potential hazard of clearing and burning projects that may increase long-term damage from blister rust (Conklin et al. 2009).

The SFNF's white pine population forms a unique hybrid zone that extends into southern Colorado (Benkman et al. 1984; Samano and Tomback 2003). Two species of five-needle white pines, limber pine (*Pinus flexilis*) and southwestern white pine (*Pinus strobiformis*) are at or near the limits of their

geographical ranges in northern New Mexico. These two closely related species interbreed to create hybrid populations unique to the SFNF. These hybrids may contain novel adaptive traits to not only create more effective resistance to blister rust infection but also increase climate adaptation by combining limber pine's greater cold tolerance with southwestern white pine's ability to better withstand drought (Menon et al. 2021).

Conserving this unique population is consistent with the agency's legal obligations under the National Forest Management Act (NFMA) to adopt standards for the management of national forests that "provide for diversity of plant and animal communities." Trees are singled out in NFMA which directs that "steps to be taken to preserve the diversity of tree species." 16 U.S.C. §1604(g)(3)(B). Tree diversity is also emphasized in the 2012 Planning Rule by requiring that plans maintain or restore "the diversity of native tree species similar to that existing in the plan area." 36 CFR 219.9(a)(2)(iii). The Planning Rule also requires the use of the best available scientific information to inform the planning process. 36 C.F.R. § 219.3.

In implementing NFMA's diversity mandate more generally, "genetic diversity within species in ecosystems" is given prominence as a key element in the adaptive capacity of ecosystems to respond to disturbances and stressors (Forest Service Land Management Planning Handbook 1909.12.05). The SFNF Land Management Plan includes standards for the Desired Conditions for All Vegetation Types (FW-VEG-DC) states: "Habitats and refugia for rare, endemic, and culturally important species, are resilient to stressors and support species' persistence or recovery." (SFNF LMP, p. 30). Conservation measures needed to meet the desired conditions of the forest plan are the obligation of site-specific projects such as this.

Recent research has identified high levels of resistance to blister rust in Southwestern white pines.. Trees grown from seed collected in the Lincoln, Cibola and Santa Fe National Forests were inoculated with blister rust spores. After 7.5 years three populations had a greater than 70% survival representing perhaps the highest level of resistance documented to date in a North American white pine species (Johnson and Sniezko 2021). These findings add urgency to the need to protect ALL wild genetically unique five-needle white pine populations on the SFNF.

Significantly, five-needle white pines have coevolved a mutualistic relationship with Clark's nutcrackers (*Nucifraga columbiana*) with the pines obligately dependent upon the bird for dispersal of its large, wingless seeds (Tomback 1982). In late summer and early fall, nutcrackers extract ripe seeds from cones, transporting them to open areas in a specialized sublingual pouch. The seeds are cached in the ground with the birds returning to feed on the seeds for up to a year (Tomback 1982). Unretrieved seeds are the primary source of tree regeneration (Hutchins and Lanner 1982; Tomback 1982, 2001). After high-severity fire nutcrackers will travel long distances to cache pine seeds in newly open terrain making them among the first trees to stabilize disturbed sites. Clark's nutcracker populations are declining in large parts of their northern range in part due to spreading blister rust infection (McKinney and Tomback. 2011). Preserving all disease resistant white pine germ plasm would help avoid a disruption of this key bird-pine mutualism in the project area.

In summary, we suggest to the greatest extent possible, protecting ALL native five-needle white pines trees with clearly stated mandatory standards to avoid significant loss of tree diversity. This approach is informed by the best available scientific information (Tomback et al. 2001b).

XI. Monitoring

There is no information in the EVLRP PEA regarding project-wide monitoring protocols. Nor is there information about funding for monitoring or about which organizations and/or agencies would be responsible for monitoring. Monitoring is a crucial element of adaptive management, and without monitoring there will be no understanding of why past projects in the SFNF have failed to meet the agency's purpose and need, and appear ecologically degraded. This means the agency may continue with strategies and actions that are causing ecological damage, and not even understand the extent of the damage.

GTR-310, "Restoring Composition and Structure in Southwestern Frequent-Fire Forests: A science-based framework for improving ecosystem resiliency," the document which is the Forest Service's framework for improving ecosystem resiliency in Southwestern forests, suggests that land managers should consider fuels treatment projects as "land experiments," meaning that they should evaluate the effects of each treatment so they can adjust future treatments accordingly. This is known as adaptive management. The document states that "Adaptive management requires feedback obtained from monitoring regarding the success or failure of treatments," and that "Adaptive management is the 'rigorous approach for learning through deliberately designing and applying management actions as experiments.'"

GTR-310 also states that there should be an "assessment of ecological, economic, and social benefits and costs (e.g., invasive species) of different restoration methodologies and implementation practices, such as methods for treating slash, tree marking approaches, spatial scales of treatment, and frequency of maintenance treatments." That is, there should be a cost/benefit assessment.

GTR 310 at 50-51. The Forest Service must include a monitoring protocol for the EVLRP within an EIS.

XII. The Forest Service Must Prepare an Environment Impact Statement

The Council for Environmental Quality's (CEQ) regulations (1978) define significance in terms of context and intensity, which includes inter alia the scope of beneficial and adverse impacts, unique characteristics of the geographic area, degree of controversy, degree of uncertainty, and degree to which an action may affect species listed or critical habitat designated under the Endangered Species Act. 40 C.F.R. § 1508.27 (defining "significantly"). The CEQ revised its regulations in 2020, but the Forest Service cannot apply the revised regulations because they were illegally adopted in violation of the Administrative Procedure Act (APA) NEPA, and the Endangered Species Act (ESA). The CEQ is currently revising the 2020 regulations, and published a proposed rule on July 31, 2023 to reinstate the 1978 regulations regarding the factors to consider when determining significance:

> CEQ proposes to redesignate 40 CFR 1501.3(b) as § 1501.3(d), title it "Significance determination—context and intensity," and address factors agencies must consider in determining significance by restoring with some modifications the consideration of "context" and "intensity" from the 1978 regulations, which appeared in the definition of "significantly." See 40 CFR 1508.27 (2019).

88 FR 49935. Given the state of flux and uncertainty regarding the 2020 regulations, the Forest Service continues to rely on the 1978 CEQ definition for "significance."[47] Here the Forest Service must"[f]or all alternatives, be sure to consider the environmental effects in terms of their context and intensity."[48]

> (a) Context. This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality.
> Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.
>
> (b) Intensity. This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following should be considered in evaluating intensity:
>
> > 1. Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.
> > 2. The degree to which the proposed action affects public health or safety.
> > 3. Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.
> > 4. The degree to which the effects on the quality of the human environment are likely to be highly controversial.
> > 5. The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.
> > 6. The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.
> > 7. Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.
> > 8. The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of

[47] *See* Forest Service Handbook (FSH) 1909.15 Ch. 10 at 40.
[48] *Id.*

> Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.
> 9. The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.
> 10. Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.[49]

The Forest Service appears poised to find that the proposed action will not have significant effects, and we caution the agency and specifically address each of the factors for intensity. In addition, as we detail in our comments, there is a high degree of uncertainty and scientific controversy regarding the efficacy of the proposed actions in meeting the project's purpose and need.

In enacting NEPA, Congress recognized the "profound impact" of human activities, including "resource exploitation," on the environment and declared a national policy "to create and maintain conditions under which man and nature can exist in productive harmony."[50] The statute has two fundamental two goals: "(1) to ensure that the agency will have detailed information on significant environmental impacts when it makes decisions; and (2) to guarantee that this information will be available to a larger audience."[51]

"NEPA promotes its sweeping commitment to 'prevent or eliminate damage to the environment and biosphere' by focusing Government and public attention on the environmental effects of proposed agency action."[52] Stated more directly, NEPA's '"action-forcing' procedures . . . require the [Forest Service] to take a 'hard look' at environmental consequences"[53] before the agency approves an action. "By so focusing agency attention, NEPA ensures that the agency will not act on incomplete information, only to regret its decision after it is too late to correct."[54] 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."[55] In *Natural Resources Defense Council v. U.S. Forest Service*, for example, the Court faulted the Forest Service for providing empty disclosures that lacked any analysis, explaining the agency "d[id] not disclose the effect" of continued logging on the Tongass National Forest and "d[id] not give detail on whether or how to lessen the cumulative impact" of the logging.[56] The Court explained that "general statements about possible effects and some risk do not

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[49] FSH 1909.15 Ch. 10 at 40 -42.
[50] 42 U.S.C. § 4331(a).
[51] *Envtl. Prot. Info. Ctr. v. Blackwell*, 389 F. Supp. 2d 1174, 1184 (N.D. Cal. 2004) (quoting *Neighbors of Cuddy Mt. v. Alexander,* 303 F.3d 1059, 1063 (9th Cir. 2002)); see also *Earth Island v. United States Forest Serv.*, 351 F.3d 1291, 1300 (9th Cir. 2003) ("NEPA requires that a federal agency 'consider every significant aspect of the environmental impact of a proposed
action ... [and] inform the public that it has indeed considered environmental concerns in its decision-making process.'").
[52] *Marsh v. Or. Natural Res. Council*, 490 U.S. 360, 371 (1989) (quoting 42 U.S.C. § 4321).
[53] *Metcalf v. Daley*, 214 F.3d 1135, 1141 (9th Cir. 2000) (quoting *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 348 (1989)).
[54] Marsh, 490 U.S. at 371 (citation omitted).
[55] *Biodiversity Cons. Alliance v. Jiron*, 762 F.3d 1036, 1086 (10th Cir. 2014) (internal citation omitted).
[56] *Natural Res. Def. Council v. U.S. Forest Serv.*, 421 F.3d 797, 812 (9th Cir. 2005).

constitute a hard look, absent a justification regarding why more definitive information could not be provided."[57] The court reasoned that the Forest Service also must provide the public "'the underlying environmental data' from which the Forest Service develop[ed] its opinions and arrive[d] at its decisions."[58] In the end, "vague and conclusory statements, without any supporting data, do not constitute a 'hard look' at the environmental consequences of the action as required by NEPA."[59] "The agency must explain the conclusions it has drawn from its chosen methodology, and the reasons it considered the underlying evidence to be reliable."[60]

At the project level, as compared to a programmatic decision, the required level of analysis is stringent.[61] At the "implementation stage," the NEPA review is more tailored and detailed because the Forest Service is confronting "individual site specific projects."[62] When the Forest Service fails to conduct that site-specific analysis, the agency "does not allow the public to 'play a role in both the decision-making process and the implementation of that decision.'"[63] "Although the agency does have discretion to define the scope of its actions, . . . such discretion does not allow the agency to determine the specificity required by NEPA."[64] In *State of Cal. v. Block*, for example, the decision concerned 62 million acres of National Forest land, and the Ninth Circuit still required an analysis of "[t]he site-specific impact of this decisive allocative decision."[65] In short, NEPA's procedural safeguards are designed to guarantee that the public receives accurate site-specific information regarding the impacts of an agency's project- level decision before the agency approves the decision.

Analyzing and disclosing site-specific impacts is critical because where (and when and how) activities occurring on a landscape strongly determine the nature of the impact. As the Tenth Circuit Court of Appeals has explained, the actual "location of development greatly influences the likelihood and extent of habitat preservation. Disturbances on the same total surface area may produce wildly different impacts on plants and wildlife depending on the amount of contiguous habitat between them."[66] The Court used the example of "building a dirt road along the edge of an ecosystem" and "building a four-lane highway straight down the middle" to explain how those activities may have similar types of impacts, but the extent of those impacts – in particular on habitat disturbance – is different.[67] Indeed, "location, not merely total surface disturbance, effects habitat

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[57] *Or. Natural Res. Council Fund v. Brong*, 492 F.3d 1120, 1134 (9th Cir. 2007) (citation omitted); see also *Or. Natural Res. Council Fund v. Goodman*, 505 F.3d 884, 892 (9th Cir. 2007) (holding the Forest Service's failure to discuss the importance of maintaining a biological corridor violated NEPA, explaining that "[m]erely disclosing the existence of a biological corridor is inadequate" and that the agency must "meaningfully substantiate [its] finding").
[58] *WildEarth Guardians v. Mont. Snowmobile Ass'n*, 790 F.3d 920, 925 (9th Cir. 2015).
[59] *Great Basin Mine Watch v. Hankins, 456 F.3d 955*, 973 (9th Cir. 2006).
[60] *N. Plains Res. Council, Inc. v. Surface Transp. Bd.*, 668 F.3d 1067, 1075 (9th Cir. 2011) (citation and internal quotation marks omitted).
[61] See, e.g., *Friends of Yosemite Valley v. Norton*, 348 F.3d 789, 800-01 (9th Cir. 2003).
[62] *Forest Ecology Ctr., Inc. v. U.S. Forest Serv.*, 192 F.3d 922, 923 n.2 (9th Cir. 1999).
[63] *Id.* at 928 (quoting *Methow Valley Citizens Council*, 490 U.S. at 349).
[64] *City of Tenakee Springs v. Block*, 778 F.2d 1402, 1407 (citing California v. Block, 690 F.2d 753, 765 (9th Cir. 1982)).
[65] *California v. Block*, 690 F.2d 753, 763 (9th Cir. 1982).
[66] *New Mexico ex rel. Richardson*, 565 F.3d at 706.
[67] *Id.* at 707.

fragmentation,"[68] and therefore location data is critical to the site-specific analysis NEPA requires. Merely disclosing the existence of particular geographic or biological features is inadequate—agencies must discuss their importance and substantiate their findings as to the impacts.[69]

Courts in the Ninth Circuit have taken a similar approach. For example, the U.S. District Court for the District of Alaska in 2019 issued a preliminary injunction in the case *Southeast Alaska Conservation Council v. U.S. Forest Service*, halting implementation of the Tongass National Forest's Prince of Wales Landscape Level Analysis Project.[70] The court did so because the Forest Service's condition-based management approach, which failed to disclose the site-specific impacts of that logging proposal, raised "serious questions" about whether that approach violated the National Environmental Policy Act (NEPA).

In sum, the Forest Service must comply with NEPA by taking a hard look at the potential environmental consequences of the proposed action, and demonstrate how those effects do not rise to the level of significance, addressing both the factors related to context and intensity. Information provided thus far by the agency fails to meet either requirement and issuing a final decision without performing this mandatory duty is a violation of NEPA.

Cordially,

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[68] *Id.*
[69] *Or. Natural Res. Council Fund v. Goodman*, 505 F.3d 884, 892 (9th Cir. 2007).
[70] *Southeast Alaska Conservation Council v. U.S. Forest Serv.*, 413 F. Supp. 3d 973 (D. Ak. 2019).

Exhibits

1. Declaration of Dr. Joseph Werne In Support Of Plaintiffs: Unite the Parks v. U.S. Forest Service, E.D. Cal (2021) Case 1:21-cv-00518-DAD-HBK.
2. Missoula Current. 2022. Part 1 & Part 2: Scientists, Missoula County shift wildfire focus to home ignition zone.; Missoulian. Aug. 2020. DAVE STROHMAIER and JACK COHEN Guest Column: Community destruction during extreme wildfires is a home ignition problem.
3. New Mexico Forest Health Conditions, 2023 Report.
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