January 23, 2023

Regional Forester
USDA Forest Service, Southwest Region
333 Broadway Blvd SE
Albuquerque, NM 87102
Submitted via email to: objections-southwestern-regional-office@usda.gov

Re: OBJECTIONS to Santa Fe Mountains Landscape Resiliency Project Environmental Assessment (Santa Fe National Forest) Pursuant to 36 C.F.R. § 218.8

To the Regional Forester:

The Center for Biological Diversity submits these objections to the U.S. Forest Service's draft Record of Decision ("Draft ROD"), Finding of No Significant Impact ("FONSI"), and Environmental Assessment ("EA") for the Santa Fe Mountains Landscape Resiliency Project ("SFMLRP") on the Santa Fe National Forest.

Project Objected To

Pursuant to 36 C.F.R. § 218.8(d)(4), Center for Biological Diversity *et al*. object to the following project:

> *Project*: Santa Fe Mountains Landscape Resiliency Project, Santa Fe National Forest
>
> *Responsible Official and Forest/Ranger District*: James Duran, Acting Forest Supervisor, Santa Fe National Forest

Timeliness

Notice of the Draft ROD and Final EA was published in the Albuquerque Journal (the newspaper of record) on December 9, 2022, making the deadline for filing January 23, 2023. These objections are therefore timely filed.

Lead Objector

Per 36 C.F.R. § 218.8(d)(3), the Objectors designate the "Lead Objector" as follows:

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Interests and Participation of the Objectors

The Center for Biological Diversity is a non-profit environmental organization with more than 1.7 million members and online activists who value wilderness, biodiversity, old growth forests, and the threatened and endangered species which occur on America's spectacular public lands and waters. Center members and supporters use and enjoy the Santa Fe National Forest and the lands proposed for logging within the Santa Fe Mountain Landscape Resiliency Project area for recreation, photography, nature study, and spiritual renewal.

The Center has advocated, since the mid-1990s, for a restoration approach that combined appropriate mechanical thinning, a right-scaled restoration industry, prescribed burning, and community protection while maintaining or enhancing large and old trees, key ecological process such as fire, and protecting sensitive and listed species.

The Center has been an active stakeholder throughout the project planning process. The Center submitted timely comments on scoping for the SFMLRP on July 10, 2019, and provided supplemental comments at the public meeting on November 10, 2022.

The EA productively addresses many of the key concerns we raised in our previous comments. We strongly support the inclusion of a universal 16-inch cap (diameter at breast height) for tree removal and a 12-inch cap (diameter at root collar) for the removal of juniper and pinyon trees. We support the EA's stated intention that thinning treatments will be based on site-specific conditions, and will not simply remove all trees below the cap. Similarly, we support the inclusion of a 9-inch diameter cap within Mexican spotted owl PACs, the prohibition on thinning within nest cores, and the EA's stated intention to minimize thinning treatments within and adjacent to PACs.

We strongly support the position stated in previous comments, and by community members and other stakeholders, that the Forest Service must develop an Environmental Impact Statement to adequately analyze and address the impacts of this project, to disclose the timing, specific location, and impacts of defined, site-specific proposed actions. A condition-based management approach does not absolve the Forest Service of the need to disclose site-specific impacts, and this NEPA document should be amended to make clear that it is a programmatic analysis that does not approve any activities implementing the project unless and until the Forest Service completes a subsequent, site-specific NEPA analysis informed by additional public comment.

The following objections focus on two specific, substantial weaknesses of the EA: the lack of a clear and practicable process for identifying areas for old growth recruitment, and the inadequacy of GTR-310 as a basis for determining the desired conditions for the project.

OBJECTIONS

I. THE EA FAILS TO IDENTIFY SPECIFIC AREAS FOR OLD GROWTH PROTECTION AND RECRUITMENT.

The EA acknowledges that there is a substantial deficit of old growth in the project area—and in the Santa Fe National Forest as a whole—and indicates the need to protect, recruit, and promote the development of old growth within the project.[1]

> *"The existing condition for all of the dominant forest types in the SFMLRP is deficient of late seral/large tree stages."* EA at 1-15.

The EA further states that areas with old growth characteristics or that are likely to develop old growth characteristics in the near future would be managed to retain those characteristics.

> *"Desired conditions in the 2022 Santa Fe National Forest Land Management Plan stresses the importance of retaining old growth and for managing vegetation in ways that support its development over time."* EA at 1-15.

However, the EA fails to identify any specific areas within the project area that meet these criteria. Furthermore, the EA fails to identify specific areas to be managed for old growth recruitment to address the old growth deficit, or to describe a process by which such areas will be identified and managed. Instead, the EA relies on the modeled development of seral stages in the various ecological response units (ERUs) to show that, in general, the project will result in compositions of late-open and late-closed seral stages closer to the desired condition, over the next twenty years.[2]

While the EA states correctly that the development of late seral stage forest stands is critical for the development of old growth, it is not correct in its implicit assumption that the development of late-open and late-closed seral stages, as defined in the EA, would necessarily represent old growth. In part, this is because the EA's definitions of late seral stages themselves are not equivalent to old growth. For the ponderosa pine forest type, for example, late seral stage is characterized as being dominated by trees greater than 10 inches diameter.[3] This is significantly smaller and less stringent than the definition of late seral in the 2022 Land Management Plan for the Santa Fe National Forest, which defines late seral ponderosa pine as "10-19.9 [inches dbh] and greater than 20 [inches dbh]."[4] In further contrast, the 1987 Forest Plan defined late seral ponderosa pine forest as at least 14 inches dbh in low-productivity sites and at least 18 inches dbh in high-productivity sites.[5]

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[1] "Large and mature trees are found throughout the project area. However, the development of future large, mature trees is limited in areas characterized by dense stands of small to medium sized trees. Existing old growth is also at risk for damage or loss due to high-severity wildfire, insects, and disease. The existing condition for all of the dominant forest types in the SFMLRP is deficient of late seral/large tree stages. This project does not propose to cut any trees over 16 inches in diameter in order to move the area toward the desired condition... Desired conditions in the 2022 Santa Fe National Forest Land Management Plan stresses the importance of retaining old growth and for managing vegetation in ways that support its development over time." EA at 1-15 (p. 27).

[2] EA section 3.2 Vegetation Communities, at 3-4 to 3-19 (p. 68 to 83).

[3] EA Table 3.3, Desired Conditions Ponderosa Pine Forests, at 3-7 (p. 71).

[4] Santa Fe National Forest Land Management Plan, 2022, at 44.

[5] Santa Fe National Forest Land Management Plan, 1987, at 70.

The EA states the intention to retain existing old growth characteristics and to manage for old growth recruitment in those areas with the potential to develop old growth characteristics in the near future.[6]

> *"Old growth characteristics within the landscape that currently meet or are likely to be able to meet desired conditions in the near future would be managed to retain those characteristics within the project area."* EA at 3-10.

However, the EA does not define the term "near future," leaving it unclear as to the criteria being applied. More importantly, the EA does not identify areas with existing old growth characteristics, it does not describe a process by which those areas will be identified and managed, and it does not provide specific criteria by which old growth characteristics will be identified. Without identifying specific areas as old growth recruitment and managing those stands for old growth characteristics, stands dominated by trees greater than 10" diameter alone are not going to develop the large trees, snags, down logs, group structure and size class diversity characteristic of old growth.

In addition, the EA relies on the assumption that areas managed for Mexican spotted owl and goshawk habitat will develop old growth characteristics.[7]

> *"Some areas managed for wildlife habitat, i.e., MSO nest/roost areas and replacement nest/roost areas as well as northern goshawk post-fledging areas (PFAs) and nest areas, provide opportunities to enhance old growth characteristics due to the desired structural and density characteristics of the habitat areas." EA at 3-10 (p. 74)*

While it is true that these habitat protections provide important opportunities for old growth development, the development of old growth characteristics cannot be taken for granted and can be affected by natural disturbance, prescribed fire, and future thinning projects. The EA acknowledges that prescribed fire can negatively affect old growth characteristics.[8] Sufficient areas must be identified for old growth recruitment across the project area to assure adequate old growth recruitment regardless of future disturbance within or outside of MSO and goshawk habitat.

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[6] "The 2022 Forest Plan describes old growth characters (e.g., large and old trees, coarse woody debris, and snags) as embedded in mid to late seral stages of all ERUs. In Figures 3.1, 3.2, 3.3, and 3.4 the models describe an increase in mid to late seral stages across treated ERUs. Old growth characteristics within the landscape that currently meet or are likely to be able to meet desired conditions in the near future would be managed to retain those characteristics within the project area." EA at 3-10 (p. 74)

[7] "Some areas managed for wildlife habitat, i.e., MSO nest/roost areas and replacement nest/roost areas as well as northern goshawk post-fledging areas (PFAs) and nest areas, provide opportunities to enhance old growth characteristics due to the desired structural and density characteristics of the habitat areas." EA at 3-10 (p. 74)

[8] "The Proposed Action is not anticipated to have a substantial effect upon old growth or large trees within the project area. The Proposed Action includes a "diameter cap" of 16 inches dbh for "forest species" and 12 inches drc for "woodland species." Given these limits, no large trees would be removed by thinning or mastication operations, unless safety warrants. However, there likely would be some impact from prescribed fire application. It is expected that these would be minor and any losses of large trees upon the landscape would likely be replaced by ingrowth from smaller trees over time." EA at 3-14 (p. 78)

The 1987 Forest Plan explicitly mandated the management for old growth development on no less than 20 percent of each forest type.[9] Unfortunately, the 2022 Forest Plan neglects to include such a clear directive, and instead relies on the assumption that managing for reduced fuel loadings and the reestablishment of fire, as well as an increased composition of late seral stage forest, will necessarily result in adequate retention and recruitment of old growth forest.[10]

> *"The Proposed Action has two essential objectives: the reduction of fuel loadings, including surface, ladder, and canopy fuels; and the reestablishment of fire upon the landscape as a naturally occurring and desirable ecological process. Other vegetation-based objectives, such as ecological resilience, forest health, catastrophic wildfire risk reduction, and old growth promotion and retention, are to be met through the achievement of these primary two objectives."* EA at 3-11. Emphasis added.

Nonetheless, the 2022 Forest Plan does require that the USFS "assure" sufficient recruitment of old growth characteristics.[11]

> *"Vegetation treatments should be designed such that structural stages and age classes that are under-represented in desired conditions become proportionally represented, and to assure continuous recruitment of old growth characteristics across the landscape over time." Guidelines for All Vegetation Types (FW-VEG-G).* Santa Fe National Forest, Land Management Plan at 32. Emphasis added.

Only by identifying specific areas for old growth development and tracking the development of those characteristics and their distribution at the landscape scale can the project assure that it is providing for sufficient old growth recruitment.

Identifying old growth characteristics within the project area for this EA is entirely consistent, both in substance and timing, with the current directive from Executive Order 14,072, which requires the Forest Service to inventory mature and old growth on the national forests by April 22, 2023.

> *"The Secretary of the Interior, with respect to public lands managed by the Bureau of Land Management, and the Secretary of Agriculture, with respect to National Forest*

[9] "Until the forest plan is revised, allocate no less than 20 percent of each forested ecosystem management area to old growth as depicted in the table defining the minimum criteria for old growth. In the long term, manage old growth in patterns that provide for a flow of functions and interactions at multiple scales across the landscape through time." Plan at 68.

[10] "Old growth characteristics for these ERUs are embedded in the late seral stages of stand development. These characteristics would include old or large trees, dead trees (snags), downed wood (coarse woody debris), and structural diversity. The location of old growth would shift on the landscape over time as a result of succession and disturbance. The desired conditions for frequent-fire ERUs include a high proportion of mid to late seral states." EA at 1-15 (p. 27).

[11] "Vegetation treatments should be designed such that structural stages and age classes that are under-represented in desired conditions become proportionally represented, and to assure continuous recruitment of old growth characteristics across the landscape over time." Guidelines for All Vegetation Types (FW-VEG-G), Plan at 32.

> *System lands, shall, within 1 year of the date of this order, define, identify, and complete an inventory of old-growth and mature forests on Federal lands, accounting for regional and ecological variations, as appropriate, and shall make such inventory publicly available."*[12]

The EA states correctly that the "diameter caps" limiting thinning operations to trees smaller than 16 inches diameter for ponderosa pine and other forest trees, and less than 12 inches for juniper and other woodland trees, will greatly reduce potential impacts to old growth and old growth recruitment.[13] We strongly support these diameter caps and agree that these limitations provide important assurances regarding the project's negative impacts. At the same time, we want the project to be forward-looking in how it retains, recruits, and develops old growth in the future.

Suggested remedy:

The project should include a geographically explicit identification of old growth characteristics within the project area and identify those areas to be managed for old growth, old growth recruitment, and the development of old growth characteristics in quantities sufficient to provide proportional representation at the landscape scale and to account for future disturbance. The NEPA document should include a map specifying these areas, in relation to roads, trails, Mexican spotted owl and northern goshawk habitats, vegetation type, and topography.

The project should include clear criteria for identifying old growth and old growth characteristics, and areas to be recruited for old growth development. The project should describe a clear process and timeline for evaluating these characteristics, and the specific management requirements for such areas.

II. THE EA RELIES ON FAULTY GENERALIZATIONS FOR DESIRED CONDITIONS, INSTEAD OF USING LOCALLY SPECIFIC REFERENCE CONDITIONS.

General Technical Report 310 (Reynolds et al. 2013[14]) is cited as a primary source for formulating desired conditions for the Santa Fe Mountains Landscape Resiliency Project. We have concerns with GTR-310 because it generalizes desired conditions for the entire Southwest

[12] Executive Order 14072 of April 22, 2022. Strengthening the Nation's Forests, Communities, and Local Economies, Sec 2 (b). Federal Register / Vol. 87, No. 81.

[13] "The Proposed Action is not anticipated to have a substantial effect upon old growth or large trees within the project area. The Proposed Action includes a "diameter cap" of 16 inches dbh for "forest species" and 12 inches drc for "woodland species." Given these limits, no large trees would be removed by thinning or mastication operations, unless safety warrants." EA at 3-14 (p. 78)

[14] Reynolds, R.T., A.J. Sánchez Meador, J.A. Youtz, T. Nicolet, M.S. Matonis, P.L. Jackson, D.G. DeLorenzo and A.D. Graves. 2013. *Restoring Composition and Structure in Southwestern Frequent-Fire Forests: A Science-Based Framework for Improving Ecosystem Resiliency*. USDA For. Serv. Rocky Mtn. Res. Sta. Gen. Tech. Rep. RMRS-GTR-310. Fort Collins, CO.

region based on reference site studies that were predominantly completed around Flagstaff, sites that are not applicable to the Santa Fe National Forest and the project area.

The authors of GTR-310 expressly indicate the need for developing site-specific guidance:

> "*Management informed by reference conditions and natural ranges of variability (the range of ecological and evolutionary conditions* ***appropriate for an area****) allow for the restoration of the characteristic composition, structure, spatial pattern, processes, and functions of ecosystems.*"[15]

Disturbance patterns are driven by spatial and temporal variation in climate, vegetation growth habitats, and management history. These are place-specific and cannot reliably be generalized over broad landscapes or timeframes.[16/17] Ecologists stress the need to define locally specific reference conditions to justify restoration goals and outcomes.[18/19/20]

We reviewed the 111 studies cited in GTR-310 as sources of information for reference conditions, disturbance histories, disturbance effects, stand structure and composition, and canopy openness. These studies are listed by location in a table and a map in appendices to this letter. **None of the reference studies cited in GTR-310 were from the Sangre de Cristo Mountains—the location of the SFMLRP project—and the two locations in the Jemez Mountains on the Santa Fe National Forest amount to approximately 12 acres of sampled forest.**

The SFMLRP is separated from the majority of the GTR-310 study sites by more than 200 miles, with no continuous forest connecting to them. Furthermore, the SFMLRP project area is different from the vast majority of the GTR-310 study sites in geology, elevation, weather, and site history. Nonetheless, the EA relies on GTR-310 for regionally generalized desired conditions for ponderosa pine and mixed conifer forest. The aggregation and averaging of sites predominantly surrounding Flagstaff is not applicable as a reference condition for the SFMLRP project area, in the southern Rocky Mountains.

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[15] Reynolds et al. 2013, at page 2 (emphasis added)

[16] Agee, J.K. 1996. The influence of forest structure on fire behavior. Pp. 52-68 in: J.W. Sherlock (chair). *Proc. 17th Forest Vegetation Management Conference.* 1996 Jan. 16-18: Redding, CA. Calif. Dept. Forestry and Fire Protection: Sacramento.

[17] DellaSala, D.A., J.E. Williams, C.D. Williams and J.F. Franklin. 2004. Beyond smoke and mirrors: a synthesis of fire policy and science. *Conservation Biology* 18: 976-86.

[18] Noss, R., P. Beier, W. W. Covington, R. E. Grumbine, D. B. Lindenmayer, J. W. Prather, F. Schmiegelow, T. D. Sisk, and D. J. Vosick. 2006. Recommendations for integrating restoration ecology and conservation biology in ponderosa pine forests of the Southwestern United States. *Restoration Ecology* 14: 4-10.

[19] Swetnam, T.W., C.D. Allen and J.L. Betancourt. 1999. Applied historical ecology: Using the past to manage the future. *Ecological Applications* 9(4):1189-1206.

[20] White, P.S. and J.L. Walker. 1997. Approximating nature's variation: selecting and using reference information in restoration ecology. *Restoration Ecology* 5: 338-349.

In GTR-310, Reynolds and others (p. 12) expressly indicate uncertainty in their recommendation of desired conditions for dry conifer forest resulting from a paucity of supporting information and geographic imbalance of accessible data:

> "*There is a clear need for additional reference condition data sets, including sites from a wider spectrum across environmental gradients (e.g., soils, moisture, elevations, slopes, aspects) occupied by frequent-fire forests in the Southwest, especially in dry mixed-conifer. While the quantity of reference data sets is increasing, existing data represent a largely unbalanced sampling across gradients (e.g., most data sets are from basaltic soils and on dry to typic plant associations), and there have been few studies quantitatively*."

In this statement, the authors of GTR-310 acknowledge their bias towards studies completed on basaltic soils in drier sites, conditions not representative of the SFMLRP project area.

GTR-310 seeks to overcome site-specific forest variation across a wide geographic area by generalizing desired conditions at broad landscapes with a generic "*pooled natural range of variability*"[21]:

> "*The natural range of variability can be estimated by pooling reference conditions across sites within a forest type. Reference conditions for a forest type typically vary from site to site due to differences in factors such as soil, elevation, slope, aspect, and micro-climate and manifests as differences in fire effects, tree densities, patterns of tree establishment and persistence, and numbers and dispersion of snags and logs. When pooled, these sources of variability comprise the natural range of variability of a site or forest type*."

Such pooling of reference conditions might be appropriate if there were an even geographic distribution of reference sites. However, the studies pooled in GTR-310 to develop the structural framework are disproportionately clustered in northern Arizona. In several cases, GTR-310 includes multiple studies from the same geographic location (Gus Pearson Natural Area and Fort Valley Experimental Forest). GTR-310 also places particular emphasis on the historic 1909 "Woolsey plots", which are not representative of the surrounding landscape.[22] As described in a 1933 review of the Woolsey Plots:

> "*So-called sample plots were established on logged over areas in order to ascertain how fast residual stands would grow, whether they could produce merchantable timber, and whether natural restocking would take place.*"[23]

[21] Reynolds et al. 2103: p. 11

[22] The reconstructions by ERI scientists on Woolsey plots have established a high bar for scientific integrity, but the plots were subjectively located by Woolsey and team as part of early silvicultural experiments, calling the usefulness of the results to be interpreted carefully and within a broader collection of multiple lines of evidence on representative sites.

[23] Pearson, G. A. 1933 at page 272. A twenty-year record of changes in Arizona pine forest. Ecology 4:272–285.

In a 2009 review, Bell and others[24] found that the Woolsey plots were not representative of forest conditions in the study area:

> *"The selection of [Woolsey] plot locations in the early 1900s followed a subjective nonrandom approach. [Our] results indicated that the Woolsey plots (1) were neither historically nor contemporarily representative of the entire study area because of environmental and current forest structural differences with respect to the FSFIA and AZCFI and (2) may be considered historically representative of their corresponding TEUs. Our study supports the use of TEUs for defining the applicability of information obtained from the Woolsey plots….Subjective plot selection, together with the small sample size of this rare dataset, raises questions about the inference space with regard to the larger, heterogeneous landscape of ponderosa pine forests in northern Arizona."*[25]

These findings indicate that the Woolsey plots are not representative of the conditions in the surrounding areas, let alone of the conditions in the Santa Fe National Forest, hundreds of miles away.

Furthermore, some important historical reference sites were notably excluded from GTR-310, such as the Long Valley Experimental Forest, which was established in 1936 as a comparison site to the much-studied Fort Valley unit. Long Valley "*contained some of the best stands of ponderosa pine on the Coconino and Sitgreaves National Forests"*[26] but this site does not appear in GTR-310.

The regional desired conditions document does mention the Long Valley site noting that:

> "*On the Long Valley Experimental Forest (sedimentary soils on the Mogollon Rim, central Arizona), the sampled trees per acre (1938) ranged up to 99 trees per acre, with an estimated 75 trees per acre being present prior to the cessation of frequent fire (circa 1880-1900, USDA Forest Service, unpublished data from Long Valley Experimental Forest).*"[27]

The pre-settlement trees-per-acre value (~75TPA) reported at Long Valley is substantially higher than the average range reported in GTR-310 for ponderosa pine sites, as are the values reported

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[24] Bell, D.M., P.F. Parysow, and M.M. Moore. 2009. Assessing the representativeness of the oldest permanent inventory plots in northern Arizona ponderosa pine forests. *Restoration Ecology* 17(3): 369-377.

[25] Bell et al. 2009 at page 369.

[26] "The Long Valley Experimental Forest (LVEF) encompasses two sections (1,280 ac) of Ponderosa Pine forests about 46 miles south of Flagstaff, Arizona. The LVEF was established in 1936 as a counterpart to the Fort Valley Experimental Forest because of its contrasting limestone/sandstone soils as opposed to basalt-derived clay loam of the Fort Valley Experimental Forest and because it contained some of the best stands of Ponderosa Pine on the Coconino and Sitgreaves National Forests. Today the LVEF comprises some of the last remaining continuous stands of un-harvested Ponderosa Pine forest in northern Arizona." USFS web page on Long Valley. https://www.fs.usda.gov/main/longvalley/home

[27] USFS Region 3, Southwest Region Desired Conditions, at 14.

for the Grand Canyon sites studied by Fule and colleagues[28] and the Malay Gap site studied by Cooper.[29]

GTR-310 does include Malay Gap, the site studied by Cooper in 1957. Cooper (p. 139) described the Malay Gap site as "*perhaps the closest approach to a truly primeval forest left in the Southwest*," and writes that a visitor "*is immediately struck by the open nature of the forest.*"[30] The figures in Appendix C to this letter, taken directly from Cooper (1960: p. 150), show a forest structure that does not support most contemporary notions of an "open" forest, and is far more dense than the reference conditions indicated by GTR-310. That is, GTR-310 fails to address the fact that some sites may have been far more dense than GTR-310 proposes as a reference condition, and fails to address the fact that conditions referred to as "open" in the literature at the time are considered too dense by the standards proposed in GTR-310.

If the Santa Fe Mountains Landscape Resiliency Project is to base its desired conditions on GTR-310, then the project is lacking some significant guidance provided by other neglected reference sites and local information. Additionally, in relying on GTR-310, the EA fails to distinguish differences in reference conditions between wet and dry mixed conifer forests common on the project landscape. Furthermore, GTR-310 is a poor source for reference conditions for spruce-fir forests, for which there has been little research on reference conditions.

NEPA requires agencies to explain opposing viewpoints and their rationale for choosing one viewpoint over another.[31] Federal courts have set aside NEPA analysis where the agency failed to respond to scientific analysis that calls into question the agency's assumptions or conclusions.[32]

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[28] Fulé, P.Z., W.W. Covington, M.M. Moore, T.A. Heinlein, and A.E.M. Waltz. 2002. Natural variability in forests of the Grand Canyon, USA. *Journal of Biogeography* 29:31-47.

[29] Cooper, C.F. 1960. Changes in vegetation, structure and growth of southwestern pine forests since white settlement. *Ecological Monographs* 30: 129-64.

[30] Interestingly, Reynolds et al. (2013) cite Malay Gap as a reference site, but ignore the results from the Maverick study location, which had a mean basal area of 102 ft^2/acre, to which Cooper (1960: p. 150) remarked: *"Although similar in basic composition and structure, the forests at Maverick and Malay Gap are quite different in appearance… The site at Malay Gap is clearly not as good as that at Maverick. The average height of mature dominants at Malay Gap is 95 ft, while those at Maverick average about 110 ft…The difference reflects inherent differences in site productivity*." The basal area of old growth at Maverick exceeds the range reported in Reynolds et al. (2013) and is outside of the basal area range given in Table 2 in the regional desired conditions document.

[31] 40 C.F.R. § 1502.9(b) (requiring agencies to disclose, discuss, and respond to "any responsible opposing view").

[32] *See Ctr. for Biological Diversity v. U.S. Forest Serv.*, 349 F.3d 1157, 1168 (9th Cir. 2003) (finding Forest Service's failure to disclose and respond to evidence and opinions challenging EIS's scientific assumptions violated NEPA); *Seattle Audubon Soc'y v. Moseley,* 798 F. Supp. 1473, 1482 (W.D. Wash. 1992) ("The agency's explanation is insufficient under NEPA – not because experts disagree, but because the FEIS lacks reasoned discussion of major scientific objections."), *aff'd sub nom. Seattle Audubon Soc'y v. Espy,* 998 F.2d 699, 704 (9th Cir. 1993) ("[i]t would not further NEPA's aims for environmental protection to allow the Forest Service to ignore reputable scientific criticisms that have surfaced"); *High Country Conservation Advocates v. Forest Service*, 52 F. Supp. 3d 1174, 1198 (D. Colo. 2014) (finding Forest Service violated NEPA by failing to mention or respond to expert report on climate impacts).

<u>Suggested remedy:</u>

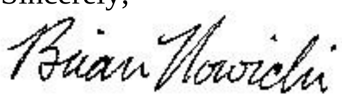
The NEPA document must base its desired conditions on reference conditions specific to the project area. If the EA is to rely on GTR-310, it must clarify which study sites and findings in that publication are applicable to the Sangre de Cristo Mountains, and how those findings are adapted for use in the project.

CONCLUSION

We appreciate your consideration of the information and concerns raised in our comments and highlighted in this objection.

We request a meeting to discuss potential resolution of issues raised in this objection, pursuant to 36 C.F.R. § 218.11(a). We hope that the Forest Service will use the objection process and such a meeting as opportunities to engage with stakeholders, including the objectors here, to develop a project that is legally and ecologically sound.

Sincerely,



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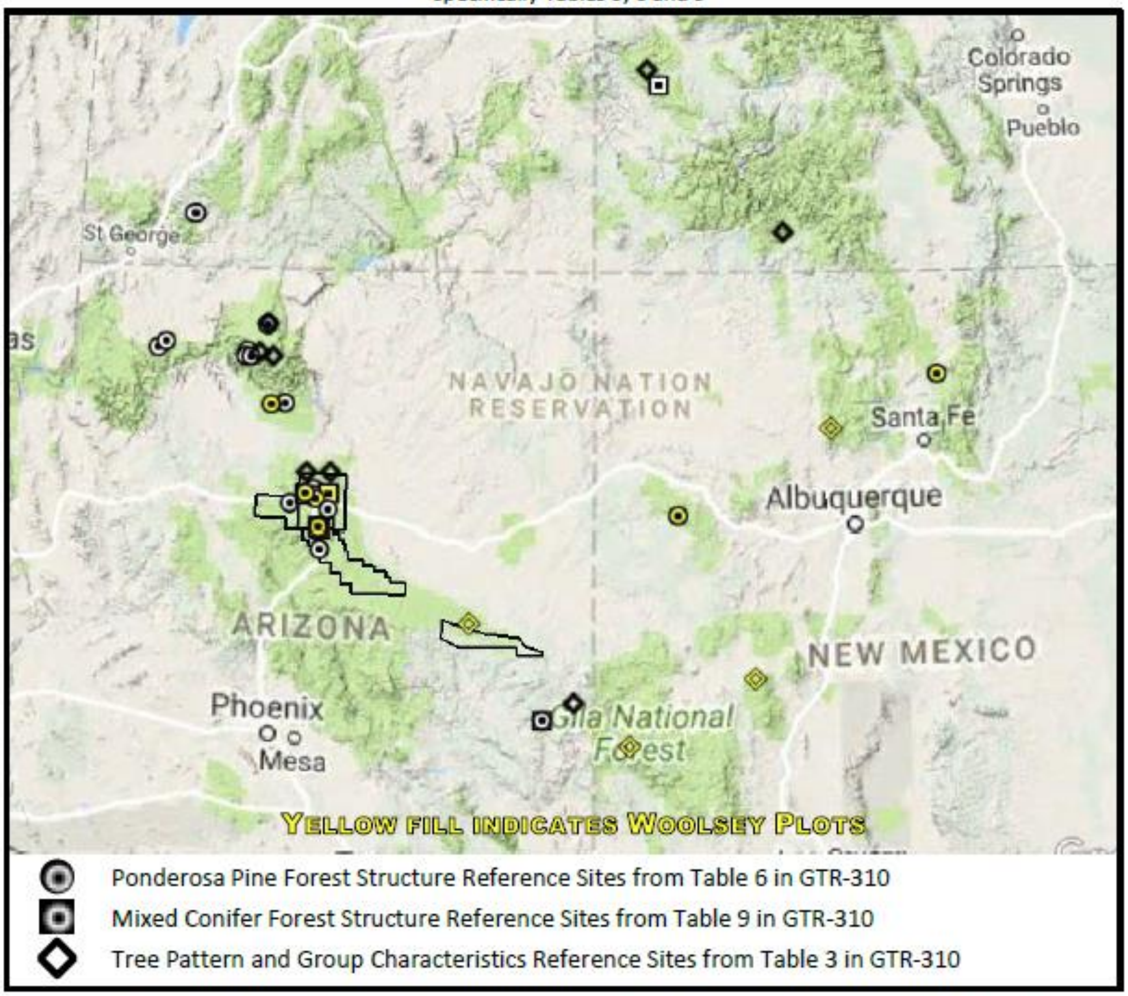
Appendix A. Locations of reference sites used in GTR-310.
Appendix B. Studies cited in GTR-310, and their locations.
Appendix C. Images from Cooper, 1960.

Appendix A. Locations of reference sites used in GTR-310.

FIGURE 1: LOCATIONS OF CERTAIN REFERENCE SITES* USED IN GTR-310 (REYNOLDS ET AL., 2013)

*Specifically Tables 3, 6 and 9



Sites referenced by Reynolds et al (2013) are biased towards conditions at the Grand Canyon and Mogollon Plateau around Flagstaff. All sites shown for New Mexico are limited to original inventory by Woolsey (1909-1913) and subsequent re-measures of those sites (Moore et al. 2004). Polygons represent work by Abella and Denton (2009; square around Flagstaff) and Williams and Baker (2012; two polygons along Mogollon Rim). None of the studies assessed in GTR-310 include sites with ponderosa pine-evergreen oak or ponderosa pine-shrub types.

"*The minimum diameters reported in Table 6 may also result in a source of error that can lead to small underestimates of historical tree densities reported in studies. Additional error may result from missing fully decomposed structures at time of measurement and reconstruction*" (Reynolds et al., 2013: p.17).

"*To date, only six studies report tree spatial reference conditions in the Southwestern ponderosa pine forests*" (Reynolds et al., 2013: p.17).

"*Management informed by reference conditions and natural ranges of variability (the range of ecological and evolutionary conditions* ***appropriate for an area****) allow for the restoration of the characteristic composition, structure, spatial pattern, processes, and functions of ecosystems*" (Reynolds et al., 2013: p.2, emphasis added).

"Some dry mixed-conifer forests and ponderosa pine-shrub communities experienced mixed-severity fires, which included combinations of surface and crown fires, sometimes resulting in larger patches of tree aggregation" (Reynolds et al., 2013: p.1).

Appendix B. Studies cited in GTR-310, and their locations.

Figure 2: Locations Of Studies Cited In Reynolds et el. (2013) *see GTR-310 for full citations	
General Location of Referenced Literature	**Literature cited for that location in GTR-310** **Bold** denotes measurements at historic Woolsey plots Underline denotes study specific to Gus Pearson Natural Area, Coconino NF
New Mexico	**Moore et al., 1994 (Gila & Zuni Mtns Woolsey remeasures); Woolsey, 1911 (Carson, Zuni, Gila, Alamo, Jemez sites);** Allen, 2007 (northern NM); Brown et al., 2001 (Sacramento Mountains); Conklin & Geils, 2008 (Jemez & Manzano Mountains); Kaye & Swetnam, 1999 (Sacramento Mountains); Negron, 1997 (Sacramento Mountains); Romme et al., 1999 (Carson & Santa Fe NF's); Swetnam & Dieterich, 1985 (Gila Wilderness); Touchan et al., 1996 (Jemez Mountains)
North Rim Grand Canyon/Kaibab Plateau/Uinkaret Plateau	Covington & Moore, 1994; Fule et al., 2002; Fule et al., 2003; Fule & Laughlin, 2007; Heinlein et al., 1999; Lang & Stewart, 1910; Rasmussen, 1941; Roccaforte et al., 2010; Waltz & Fule, 1998; White & Vankat, 1993
South Rim Grand Canyon	Fule et al., 2002; Harrington & Hawksworth, 1980; **Woolsey, 1911**
Mogollon Plateau (Flagstaff Area)	Abella & Denton, 2009; Abella et al., 2011; Biondi et al., 1994; Biondi, 1996; Cocke et al., 2005; Covington & Sacket, 1986; Covington & Moore, 1994a&b; Covington et al., 1997; Dieterich, 1980; Fule et al., 1997; Heinlein et al., 2005; Hoffman et al., 2007; Mast et al., 1999; Menzel & Covington, 1997; Pearson, 1950; White, 1985; **Sanchez Meador et al., 2011; Sanchez Meador & Moore, 2010; Woolsey, 1911;** Schneider, 2012; Williams & Baker, 2012
Mogollon Rim (Apache-Sitgreaves NF, White Mtn. Apache Reservation)	Cooper, 1960, 1961; Greenamyre, 1913; Lynch et al., 2010; Williams & Baker, 2012; **Woolsey, 1911**
Colorado	Binkley et al., 2008 (Uncompahgre Plateau); Boyden et al., 2005 (Front Range); Brown & Wu, 2005 (SW of Pagosa Springs); Ehle & Baker, 2003 (RMNP); Fornwalt et al., 2002 (Front Range); Fule et al., 2009 (San Juan Mountains); Grissino-Mayer et al., 2004 (San Juan Mountains); Korb et al., 2012 (San Juan Mountains); Mast et al., 1998 (Front Range); Mast & Veblen, 1999 (Front Range); Romme et al., 1999 (SW Colorado)
Southwestern Utah	Madany & West (Zion National Park)
Pacific and Inland Northwest/Northern Rocky Mountains/Black Hills (South Dakota)	Agee, 2003; Arno et al., 1995; DeLuca & Sala, 2006; Franklin et al., 2002 (incorrectly cited as 2012); Harrod et al., 1999; Hessberg et al., 1994, 2004, 2005; Lundquist, 1995; Nacify et al., 2010; Taylor, 2010; Taylor & Skinner, 2003; Von Schrenck, 1903; West, 1969; Wickman, 1963; Youngblood et al., 2004
Mexico/Baja California	Minnisch et al., 2000; Stephens et al., 2008
California	Fettig, 2012; Parsons & DeBenedetti, 1979 (Sequoia & Kings Canyon NP); Scholl & Taylor, 2010 (Yosemite NP)
Sky Islands Region	Barton, 2002; Grissino-Mayer et al., 1995
Illinois	Dhillon & Anderson, 1993
Macro-scale studies (west-wide/regional) * denotes utilization of Gila NF data	Bentz et al., 2010; Drummond, 1982; Littell et al., 2009; Maffei & Beatty, 1988; Moeck et al., 1981; Negron et al., 2009; Swetnam & Baison, 1996*; Savage & Mast, 2005*; Swetnam & Betancourt, 1990*; Wood, 1983
Review Reports, books, or general literature inappropriately cited as reference-site studies or original research	Abella, 2008; Abella, 2009; Castello et al., 1995; Edmunds et al., 2000; Ferry et al., 1995; Fitzgerald, 2005; Friederici, 2004; Goheen & Hansen, 1993; Hart et al., 2005; Hawksworth & Weins, 1996; Jenkins et al., 2008; Larson & Churchill, 2012; Miller & Keen, 1960; Miller, 2000; Rippy et al., 2005; Smith, 2006a,b,c; Stevens & Hawksworth, 1984; Tainter & Baker, 1996; Weaver, 1950

Appendix C. Images from Cooper, 1960.

PATTERN

A conspicuous feature of the ponderosa pine forest is the grouped arrangement of the trees. It is obvious that the forest is composed of distinct groups, each made up of several trees similar in size and apparent age (Fig. 17). This fact has long been recognized, but surprisingly little attention has been given to the structure of these groups or to their mode of origin.

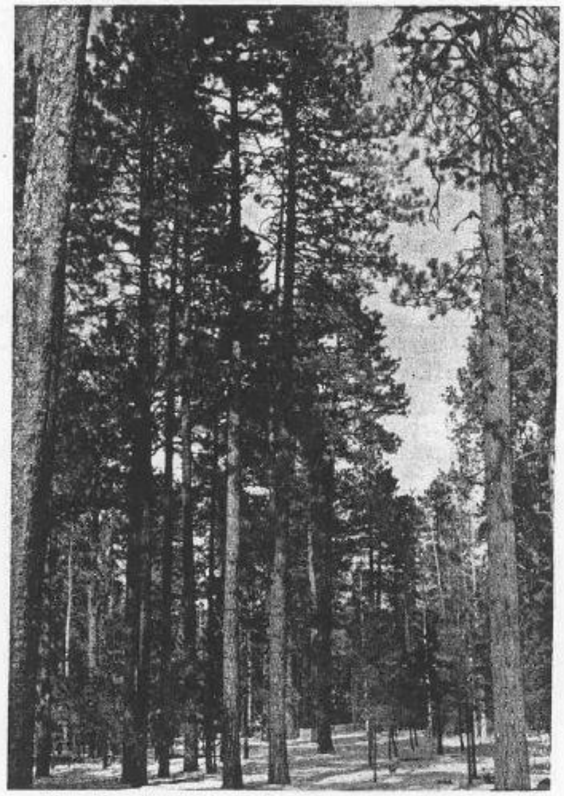


FIG. 17. Typical stand of mature ponderosa pine, showing grouped distribution of trees.

FOREST CONDITIONS AT MAVERICK AND AT MALAY GAP

Although similar in basic composition and structure, the forests at Maverick and at Malay Gap are quite different in appearance. A visitor to Malay Gap, conditioned by acquaintance with the over-dense thickets characteristic of most of the Southwestern pine region, is immediately struck by the open nature of the forest (Fig. 20). The forest floor is carpeted with a deep layer of grass, and small discrete patches of young trees are dispersed among groups of stately pines. The pure beauty of the Malay Gap region more than compensates for its difficulty of access.

FIG. 20. Typical view of the ponderosa pine forest in the primitive area at Malay Gap.