PO Box 824
Durango, CO 81302
March 21, 2020

Dolores Ranger District
San Juan National Forest
29211 Highway 184
Dolores, CO 81323

Dear Dolores Ranger District,

I am writing to comment on the Salter Vegetation Management Project Scoping Package (Salter VMPSP). I have several concerns at this scoping stage:

(1) The detailed differences between current conditions and desired conditions are not known at this point and yet the desired conditions are quite specific and detailed–exactly what are the differences? This requires detailed analysis and presentation of current vs. desired conditions for every variable in the description of desired conditions so the public can understand the situation.

(2) The main proposed vegetation treatments (Table 1 p 4 in the Salter VMPSP) of commercial and pre-commercial thinning and single-tree selection are not clearly the treatments that are needed to produce the desired conditions. Given the many details in the desired conditions, how does each treatment actually achieve each desired condition? Again, I suggest that tables, figures, and maps likely are needed to show how each desired condition will be achieved with each treatment tool, and how that tool will be applied to produce the desired condition.

(3) It is important to place treatments rationally within this large landscape and an important part of placement is the current condition of the forest. I suggest the past history of disturbances may be an important factor in what the condition of the forest is currently. A substantial part of the forest in this area was railroad logged, which has a distinctive legacy.

(4) This is a commercial timber area in the Forest Plan, but the desired condition could still likely be achieved with a certain amount, as opposed to a maximum commercial timber production in this entry, with the rest accomplished with more natural ecological processes. I would like to see analysis of an alternative, developed by the District after analyzing available data, that uses less timber production and more natural processes (e.g., fire), but still achieves the desired conditions.

(5) I would like to see added to the desired conditions a goal to achieve “heterogeneous stands in heterogeneous landscapes,” and specific attention to this concern under all alternatives.

(6) I would like to see an economic analysis, just from the standpoint of the forest’s costs and gains, for this project under all alternatives that are analyzed. I do not need the details of costs and benefits to the local timber industry.

(7) Please use the standard definition of WUI, which includes just “intermix” and “interface.”

(8) Please protect all extant large trees in the project area to increase resistance/resilience to fire.

The following provide the details of these seven scoping concerns:

1. Please present detailed scientific evidence about current and desired forest conditions in the project area and the differences between these

I would like to see scientific evidence made available to the public (downloadable on the project website) at the time of release of the Draft EA, and detailed evidence from analysis by your office presented in the Draft EA itself that together document that the following component of the stated need is correct and explains in detail the differences with the desired condition:

> "A comparison based on common stand exams and field observations between the current and desired condition of the ponderosa pine cover type found within the Salter Vegetation Management project area is different from the desired conditions associated with that vegetative cover type in the SJNF LRMP" (p. 3 Salter VMPSC).

<u>Please provide GIS data for public use at the time of release of the draft EA</u>

No evidence from common stand exam (CSE) data and no details about what the types of differences or magnitudes of differences are with desired conditions are presented in the Salter VMPSP itself. This information is essential to make available in detail in the draft EA.

Please provide a complete set of the CSE data and project data in ArcGIS shapefile or geodatabase format for the project area for download on the Project Website on the day of release of the draft EA, including but not limited to:

a. all available CSE data in GIS shapefiles/geodatabases with associated attribute data, including tree data (species, diameter, height, damage etc.), point data (location, elevation, site index etc.), and polygon data (groups of CSE points, if any).
b. a GIS shapefile/geodatabase showing boundaries for each treatment unit, along with the specific treatments proposed in the unit
c. a GIS shapefile/geodatabase showing the boundary of the project area
d. assuming there are different alternatives analyzed in the draft EA, then shapefiles/geodatabases showing where the treatments will occur and what the treatments will be under each alternative.
e. any other datasets needed to enable the public to independently verify that the CSE and project data support the analysis in the draft EA.

<u>Please analyze and present current forest conditions in the draft EA by treatment unit</u>

For analysis of current conditions, please present in the draft EA figures, tables, and maps showing tree density, basal area, tree species composition, diameter distributions by species by at least 2" size classes, and also present summary data for trees per acre above 16", 18", and 20" dbh, and presence of seedlings and saplings separately for each treatment unit across the project area and overall for the project area. These should be derived from analysis of the CSE data in the project area. You can average or find the median for each variable within a treatment unit or polygon and present it as a label on a GIS map showing each unit. You can show the variability in each variable (e.g., tree density) by presenting a table showing the standard deviation, coefficient of variation, and the quartiles of the distribution of each variable within each treatment unit and across the project area. See Baker (2020 Table 6 on p. 12) for examples of this kind of table showing variability.

However, where there is significant variability across a treatment unit because of variability in past logging, fires, beetle outbreaks, or other significant past disturbances, it would be better to break these up into separate treatment units, or at least present these same analyses for these distinct parts of treatment units.

The following components of desired conditions for Ponderosa Pine Forests presented on p. 2 of the Salter VMPSP are not apparently provided by CSE data. Please collect new data about variability in these across the project area and present these data in the draft EA:
1. Clumpiness (number of trees per clump, clump area) of ponderosa pine
2. Canopy layers of ponderosa pine
3. Area of openings and percent composition (shrubs, native grasses, native forbs, introduced grasses and forbs) of openings between the clumps. Native grasses should be identified and estimated by species, since the key indicator species are specified in the desired condition.
4. Diameter-class distribution of Gambel oak central stems within patches of shrubs and the area of patches of these shrubs
5. Variability in forest litter depth. I would add that variability in duff depth is also important.
6. Extent of invasive plant species
7. Abundance and size of snags and large wood on the forest floor

Please also present and analyze the recent fire rotation for low-intensity fire in the project area using MTBS (Monitoring Trends in Burned Area) and SJNF fire records. Fire rotation, which is the estimated time to burn once across a land area, is calculated as the time period of observation / (sum of area burned by all fires that burned at low intensity/project area). For example, if the period of observation is 1980-2020, the area burned at low intensity over this period was 7,000 acres and the project area is 35,000 acres, then the fire rotation is 40 years/(7,000/35,000) = 200 years. Further explanation, if needed, is in Baker (2009). This estimate of the current rate of burning is essential for comparison with desired conditions and planning future burning.

<u>To provide comparable analysis of desired conditions, please present identical details and scientific evidence for the same forest variables</u>
Please present estimated means, medians, and distributions etc. for desired conditions for all the elements of forest structure and composition described on p. 2 of the Salter VMPSP, which I have also listed in the previous section above.

Please substantiate the scientific basis for each detail of the desired condition by presenting the details from scientific sources already in the Forest Plan, but updated with all available detailed scientific evidence since the Forest Plan. Key scientific sources for the project area must include detailed use of Romme et al. (2009), Baker (2018), and Baker (2020), which are the major scientific sources with abundant ecological information about desired conditions in the project area. I would request that details be presented for each variable in figures, tables, and maps that are otherwise identical to those presented for the modern forest, as explained above.

2. Please show exactly how each proposed treatment will achieve each desired condition. For example, the pre-commercial thinning description in Table 1 says “thinning...to spacing specifications” whereas the desired conditions (p. 2) say “Tree clumps vary in density from widely spaced large trees to tightly spaced small trees.” Since the usual intention of commercial

timber operations is to thin to space trees widely so they grow timber faster, how could commercial thinning lead to the desired condition–it seems that it will instead destroy any variable spacing that exists. If the specification had been to use variable-density thinning to explicitly produce clumps containing a specific range of trees within a certain distance, combined with openings etc. then it would have been clear that the proposed treatments will produce the desired condition.

In the draft EA, I would like to see a list of each desired condition, each current condition, and a detailed specification for how a particular treatment will be used to achieve each desired condition. Please put this information in tables and/or figures, and use maps to show where specific treatments will be used.

3. Please incorporate the history of past disturbances explicitly into the placement and design of the project's treatment units, since different treatment prescriptions are likely needed to reach the desired conditions.

The rationale for the project's proposed treatment units is not provided in the Salter VMPSP, although treatment units are already defined on the Project Map (Figure 1 Salter VMPSP). However, it is not obvious how historical disturbances have shaped the treatment units. If they have, please explain that in detail in the draft EA. Yes, of course the plantations require a different treatment, and perhaps the other treatments have some relationship with past disturbance history. However, after a detailed analysis is completed of the CSE data, I would expect that the departures from desired conditions would generally correlate with the distinct histories of past logging and fires, and a reallocation of the treatment units is requested that is congruent with this history and its corresponding departure from desired conditions.

<u>Area subject to railroad logging and other high-grade logging</u>
A substantial part of the project area was railroad logged from about 1924-1948, as documented in several sources (e.g., Chappell 1971). Railroad logging tended to be high-grade logging in which larger, better quality, more merchantable trees were nearly all removed, leaving behind most numerous smaller trees and much fewer unharvested larger trees. The largest body of scientific evidence about the detailed effects of high-grade logging, including railroad logging, on the project-area's forests is in Romme et al. (2009 p. 42-47). Please review, present, and incorporate this best-available scientific evidence into the Draft EA in detail. Of course, there has been other high-grade logging in the project area since the 1924-1948 railroad logging. I do not have a GIS map of those later logging units. The upshot is that in these high-grade logging areas, there likely are few large trees and there is instead likely a preponderance of small to medium-sized logging survivors and post-logging trees, as shown in Romme et al. (2009).

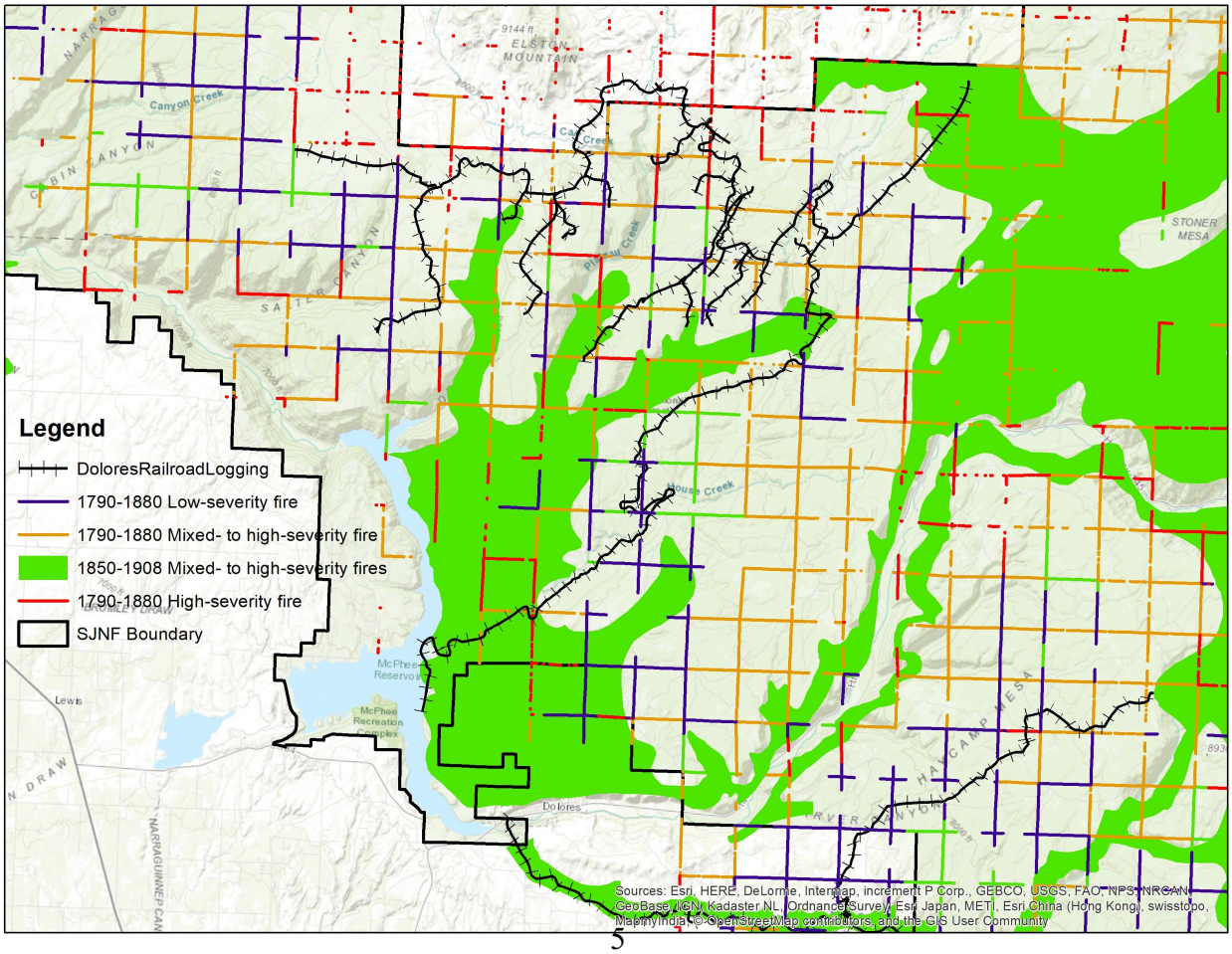
To meet the desired conditions in these areas, it is likely that larger trees must be retained by using a small enough diameter cap, since large yellow-barked trees needed for the desired condition are likely rare. The clumps needed for the desired condition can be created/maintained by retention of small to medium-size trees around these large trees, with harvesting of smaller trees used to recreate desired openings. It is logical for timber harvesting to be used to move these forests into the desired condition, followed by prescribed burning to restore and maintain low-intensity fires. Some mixed- to high-severity fires will likely occur in these areas in the

future, and can be managed for maintaining a heterogeneous forest structure.

Area recovering from historical moderate- to high-severity fires

Forests that burned in moderate- to high-severity fires in the period before the San Juan National Forest was established are, in contrast, likely still mostly recovering from those severe fires (Baker 2018, 2020). Moderate- to high-severity fires from 1850-1910, which were explicitly mapped as "woodlands" in the 1908 Montezuma Forest Atlas (Baker 2018), are shown as the green shaded polygons on the figure below. These woodlands were validated (Baker 2020) as mixed- to high-severity fires. Fire severity during the period from about 1790-1880 was also reconstructed from General Land Office survey data along section lines (Baker 2020), which are also shown on the figure below.

Note that the logging railroads crossed but otherwise generally avoided the large green polygon indicating 1850-1908 mixed- to high-severity fires, suggesting that merchantable timber was likely not sufficient in 1924-1948 for harvesting in these areas. In contrast, note that the gold lines indicating earlier 1790-1880 mixed- to high-severity fires were often likely harvested along the logging railroads, and there is evidence of this logging in remnant large stumps. However, the large expanses of gold lines in the northwestern part of the project area and on the southeastern plateau area likely had less merchantable timber and thus ended up far from the logging railroads and likely not harvested during this 1924-1948 period of high-grade logging. I have walked through several of these areas, and they often contain scattered large trees that are likely the survivors of these fires among a moderate to dense stand of small to medium-sized trees, along



with relatively few stumps, suggesting less past logging than in the railroad-logged areas, although some thinning has occurred. The larger trees in these areas are more likely these scattered surviving trees in a matrix of naturally recovering mid-sized post-fire trees; the smaller trees are more likely trees that have regenerated after fire suppression became effective following greatly increased aircraft use after World War II (Baker 2009).

To meet the desired conditions in these recovering-forest areas, the large trees that survived the 1790-1880 fires all warrant retention since yellow-barked trees are needed to meet desired conditions, and these are primarily the only ones available. These surviving trees plus sufficient medium-sized, naturally recovering trees can be the anchor points for clumps, around which can be retained enough trees of diverse sizes to create the clumpiness of the desired conditions. It is logical in these areas for clumping to be generated largely by retention of large trees and associated smaller trees, with most of the desired conditions produced by thinning from prescribed burning and managed fires for resource benefit.

Please update the fire component of desired conditions

Only a small part of the project area was historically subject to only low-intensity fires, which is one of the desired conditions. It is important to update the desired condition, given the new fire-history evidence in Baker (2018, 2020) to include previously known short-rotation low-intensity fires, but now it is known these were accompanied by long rotation, infrequent mixed- and high-severity fires. The idea for moving toward desired condition would still be the same, to restore low-intensity fires, so that mixed- to high-severity fires remain infrequent, which is likely all that is feasible. The infrequent mixed- and high-severity fires will likely still occur in the future during extreme fire weather, and will likely still help to produce and maintain heterogeneous landscapes, as long as these fires are not suppressed.

Available fire-history data in Baker (2018, 2020) should be cited and incorporated into the draft EA as the science-based source of the rates of low, mixed, and high-severity fires under desired conditions. These two publications include all available fire-history evidence and are updated to use the best measure of fire rates, which is the fire rotation. This is the only measure that should now be used and cited by any agency document, as earlier estimators (e.g., mean fire return interval) have now been discredited and are disappearing from further use.

The project area had a historically variable fire regime that led to substantial heterogeneity in forest structure across the landscape, and this landscape heterogeneity was a central source of historical resilience. It should certainly be part of desired conditions.

4. Please develop and analyze a feasible alternative that will just meet the minimum needs of Dolores-Montezuma-La Plata County local industry, so that more natural processes can be used to achieve the remainder of the desired ecological conditions. This could be called an Economy and Ecology alternative or something else that explains it briefly.

I would like to see answered in the draft EA what is the minimum commercial timber production necessary to achieve the desired conditions and provide for existing local industry, so that a large of amount of desired conditions could also be achieved using natural processes, particularly

prescribed fire and managed fire. I would to see an alternative developed and analyzed, after reviewing the CSE data and the disturbance history I presented above, that achieves desired conditions using just essential timber production and the rest using natural processes (e.g., fire).

I am an ecologist, so of course I am interested in using natural ecological processes wherever possible, but I am not opposed to some commercial timber harvesting either. One reason I would like to see this alternative presented and analyzed throughout the draft EA is that we already have lots of timber production occurring in the nearby Lone Pine project, and unless there is something I do not know, it seems that there is no specific need to maximize timber production on the Salter project to sustain the local industry at this time.

I suggest at the outset that prescribed fire and managed fire could be the primary natural processes used to thin forests in a way that promotes the clumping and variability in forest structure that are described in the desired condition. This makes the most sense since it is fire that historically created these desired conditions Managed fire is ecologically recognized as the best tool used to promote both stand- and landscape-scale heterogeneity in these forests and increase future forest resilience to impending disturbances. Of course, some timber harvesting/thinning and prescribed burning may first be needed in the vicinity of highly valued resources and assets.

I also suggest that a good starting point for the timber harvesting areas under this alternative would be the agreements that were achieved at the Lone Pine objection meetings, since it is known that those agreements were acceptable.

Another good starting point is that the large area of land that has a history of high-grade logging is a potentially sensible location for the commercial harvesting for wood production, whereas the large area that is recovering from past moderate- to high-severity fire is potentially a sensible location for primarily use of fire to achieve desired conditions.

5. Heterogeneous stands in heterogeneous landscapes needed to reduce beetles

The project description lists two of the needs: (1) "the need to improve resilience or maintain the resistance of forest ecosystems in an effort to increase protection against epidemic insect and disease outbreaks" and (2) "the need to increase the structural diversity of the ponderosa pine forest represented across the landscape" (p. 3), both of which are ecologically sensible.

It is well established that treating individual stands to reduce attack by beetles is ineffective, as explained in Graham et al. (2016), the most comprehensive study of beetle outbreaks in ponderosa pine in North America: "...treating a single stand to be resistant to MPBs would be insufficient to alter MPB dynamics and large areas or landscapes need to be in a resilient condition to keep MPB populations at endemic levels (Bentz et al. 2009; Fettig et al 2014)" (p. 155).

Thus, these authors conclude that: "...heterogeneous landscapes composed of stands with heterogeneous structures and containing densities in the neighborhood of 80 feet^2 of basal area are resistant to MPB infestations..." (P. 157). Please review and incorporate the findings of this

key study by Graham et al. into the proposed project.

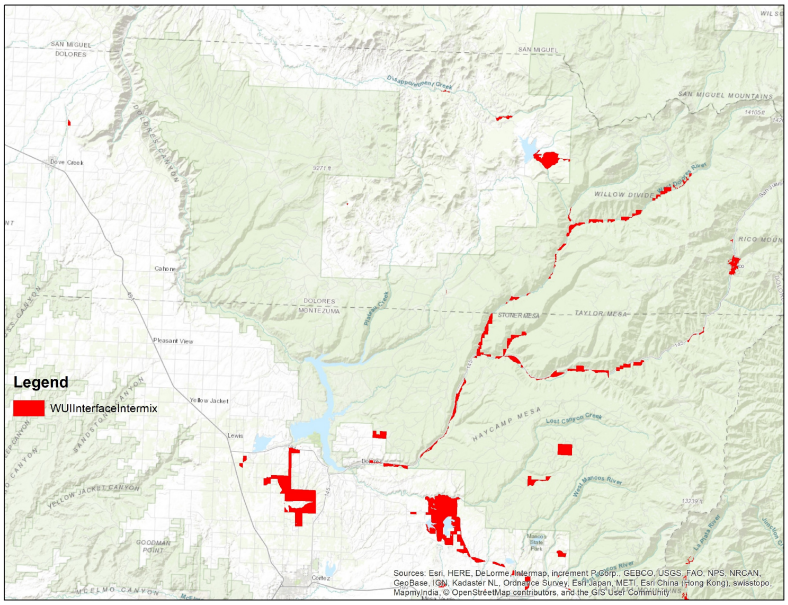
In particular, please plan the treatments to create heterogeneous stands and heterogeneity across the project area, then document in detail that this will be achieved by showing the variability in residual basal area and tree density, after treatments, expected across the project landscape. Show this as histograms for both basal area and tree density and also show these on a map, using either labels or colors for classes of residual basal area and tree density, also showing the before-harvesting basal area and tree density in each treatment unit.

In locations affected by the roundheaded pine beetle, please leave 50% of the dead and dying trees as mitigation for the documented adverse environmental effects of salvage harvesting (Lindenmayer et al. 2008), and please do not plant trees in these areas, as this will adversely affect the future resistance and resilience of the forests in this area.

6. Please provide an economic analysis for all alternatives.
The reason that I am requesting this is that I am very concerned about the cost, in public and private money provided to the Forest, of all alternatives, given the potential economic costs we are facing with Covid-19 and other threats to our local and national economy. Please show us what the estimated costs are for each component (e.g., specific treatments) of the project, and please also show us the details of where the funding comes from. We have long heard about below-cost timber sales; will this be one, or will it not?

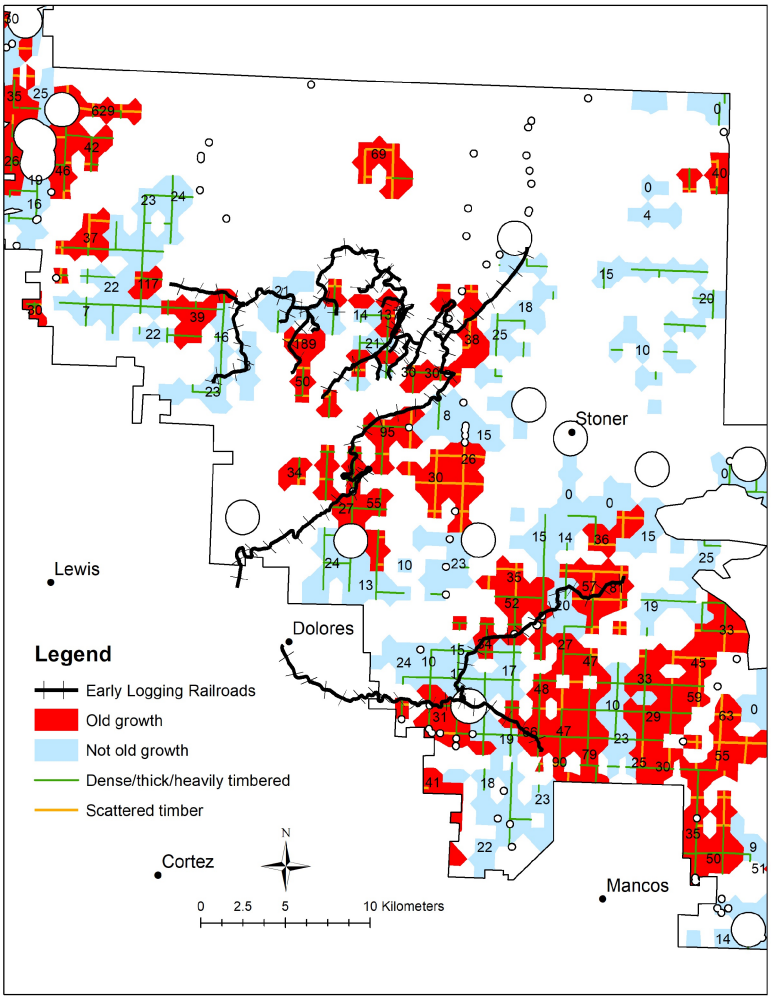
7. Please use the standard, science-based definition of WUI, which includes only intermix and interface. These show there is little to no WUI in the project area.
The Salter VMPSP says (p. 2) that "The Montezuma Community Wildfire Protection Plan identifies the entire project area as Wildland Urban Interface, as does the San Juan National Forest Land and Resource Management Plan (SJNF LRMP)."

These sources are not citing and using a science-based definition of the WUI. Please instead use Radeloff et al. (2005) for the definitions of the Wildland-Urban Interface in the United States. You can confirm on Wikipedia that intermix plus interface are the standard definition of WUI in the United States. Using the intermix and interface categories from the Radeloff et al. downloadable maps of WUI in the United States for 2010, there really is likely no or almost no WUI in the project area at all (See the Figure).



8. Please protect all extant large trees in the project area to increase resistance/resilience to fire.

Based on direct records by land surveyors in the late-1800s, approximately 47% of ponderosa pines were larger than about 16" dbh (40 cm), about 33% were larger than about 20" dbh (50 cm), and about 17% were larger than about 24" dbh (60 cm) in the ponderosa pine zone in the San Juan Mountain study area, which includes the project area–see Baker (2020 Table 9 p. 16). About 59% of ponderosa-pine forest area in the late-1800s would meet today's definitions for old-growth forests (Baker 2020 p. 21). There is no question that high-grade logging removed most of the large, old trees from the project area by about the 1950s although high-grade logging continued into the 1980s (Romme et al. 2009). See the adjacent Figure (Baker 2020 Figure 12 p. 24) showing the estimated historical extent of old growth in the project area in the late-1800s. The numbers are old-growth trees/ha, so divide by 2.47 to estimate old-growth trees/acre.



It is well documented that in ponderosa pine forests it is these large, old trees that provide the essential resistance and resilience to fire that is now particularly needed as fire is increasing with global warming. Large trees have the thickest bark, the highest crown base height, and have the greatest ability to survive substantial crown scorching and still resprout and survive (Baker 2009). Not only do large ponderosas have the greatest likelihood of surviving, thus provide the greatest resistance to fire, but large ponderosas also disproportionately provide the most seed for sexual regeneration after fires, thus they provide most of the essential resilience to fire.

It is thus essential for the draft EA, if the goal is to increase resistance and resilience to fire, to heed and remedy the serious deficiency in large trees as an essential part of the desired conditions for the project area. This requires explicit protection, using diameter caps small enough to ensure the protection of the necessary large trees. I suggest first an analysis of the CSE data showing the percentage of trees in the project area that exceed 16", 18" and 20" be presented before the necessary diameter cap is determined. Please present the science and the CSE results.

Thank you for your attention to these eight scoping concerns.

William L. Baker, PhD.

References Cited

Baker, W. L. 2009. Fire ecology in Rocky Mountain landscapes. Island Press, Washington, D.C.

Baker, W. L. 2018. Historical fire regimes in ponderosa pine and mixed-conifer landscapes of the San Juan Mountains, Colorado, USA, from multiple sources. Fire 1, 23. Online at: https://www.mdpi.com/2571-6255/1/2/23

Baker, W. L. 2020. Variable forest structure and fire reconstructed across historical ponderosa pine and mixed conifer landscapes of the San Juan Mountains, Colorado. Land 9, 3. Online at: https://www.mdpi.com/2073-445X/9/1/3/htm

Chappell, G. S. 1971. Logging along the Denver & Rio Grande: Narrow gauge logging railroads of southwestern Colorado and northern New Mexico. Colorado Railroad Museum, Golden, CO.

Graham, R. T., L. A. Asherin, M. A. Battaglia, T. B. Jain, and S. A. Mata. 2016. Mountain pine beetles: a century of knowledge, control attempts, and impacts central to the Black Hills. USDA Forest Serve General Technical Report GTR-353, Rocky Mountain Research Station, Fort Collins, Colorado. Online at: https://www.fs.fed.us/rm/pubs/rmrs_gtr353.pdf

Lindenmayer, D. B., P. J. Burton, and J. F. Franklin. 2008. Salvage logging and its ecological consequences. Island Press, Washington, D. C.

Radeloff, V. C., R. B. Hammer, S. I. Stewart, J. S. Fried, S. S. Holcomb, and J. F. McKeefry. The wildland-urban interface in the United States. Ecological Applications 15: 799-805. Online at: https://www.nrs.fs.fed.us/pubs/jrnl/2005/nc_2005_radeloff_001.pdf

Romme, W. H., M. L. Floyd, and D. Hanna. Historical range of variability and current landscape condition analysis: South central highlands section, southwestern Colorado & northwestern New Mexico. Colorado Forest Restoration Institute, Colorado State University, Fort Collins. On file at the San Juan National Forest Supervisor's Office, Durango.