31 May 2018

TO:   USFS

VIA: <https://cara.ecosystem-management.org/Public//CommentInput?Project=53520>

CC: [jschmidgall02@fs.fed.us](mailto:jschmidgall02@fs.fed.us)

**Subject: Calapooia Project - scoping comments**

Dear Forest Service:

Please accept the following scoping comments from Oregon Wild concerning the Calapooia Project, <https://www.fs.usda.gov/project/?project=53520>. Oregon Wild represents 20,000 members and supporters who share our mission to protect and restore Oregon’s wildlands, wildlife, and water as an enduring legacy. Our goal is to protect areas that remain intact while striving to restore areas that have been degraded. This can be accomplished by moving over-represented ecosystem elements (such as logged and roaded areas) toward characteristics that are currently under-represented (such as roadless areas and complex old forest).

The proposed action alternative involves:

* 1132 acres of thinning, DTR, skips and gaps
* Stands are 40-60 years old
* Matrix and riparian reserves
* 5 miles of road decommissioning
* 3 miles temporary road construction
* 45 miles road maintenance/reconstruction
* Creation of 1.5 mile long “day use only” corridor

Oregon Wild supports young stand thinning when it is carefully planned and implemented.

A few of our biggest concerns include:

* Making treatments spatially variable, including clumps of trees that are typical in old growth forests;
* Providing generous no cut buffers on streams, recognizing that commercial logging will cause a significant long-lasting reduction in wood recruitment and even small trees can provide pool-forming wood in small streams;
* Gaps should mimic natural disturbance by retaining some structure in the form of live and dead trees;
* Retain all legacy trees and snags.
* Focus thinning on Douglas fir. Retain underrepresented conifers (cedar, hemlock, pine, yew, etc) and hardwoods (maple, alder, etc); Post harvest fuel reduction efforts should be designed to avoid eliminating these elements of diversity.
* Focus treatments on places that are accessible form existing roads, so as to avoid the adverse effects of new road construction, and to move toward the HRV for watershed integrity and road density.

## Plantation thinning recommendations

Oregon Wild makes the following recommendations to enhance the restoration benefits of young stand thinning prescriptions:

1. When conducting commercial thinning projects take the opportunity to implement other critical aspects of watershed restoration especially pre-commercial thinning, restoring fish passage, reducing the impacts of the road system, and treating invasive weeds.
2. Use projects as an opportunity to learn by conducting monitoring and research on the effects of thinning. There are many information gaps that need filling. Every project should generate useful information to inform future projects.
3. Young stands do not exist in isolation, so be sure to consider the effects of thinning on adjacent mature & old-growth habitat which may provide habitat for spotted owls, marbled murrelets, and other species. Spotted owls may use young stands for dispersal, foraging, and security from predators. It may be helpful to create a “risk map” that identifies areas that are more or less suitable for thinning based on criteria such as: existing habitat characteristics, proximity to occupied habitat or activity centers, proximity to suitable habitat, and proximity to recently thinned areas, non-habitat, and roads. The agency should also consider adjusting both the location and timing of thinning to minimize the cumulative effects of widespread thinning on the sensitive and listed species.
4. Focus on treating the youngest stands that are most "plastic" and amenable to restoration.
5. Generally retain all the largest trees, and some of the smaller trees in all age-size classes. This can be accomplished in part by retaining untreated “skips” embedded within the stand.
6. Retain and protect under-represented conifer and non-conifer trees. Protect shrubs as much as possible, especially deciduous and tall shrubs, and those that produce insects, berries and mast. "Although usually classified as a shrub and not considered in discussions of forest composition or structure, *A. circinatum* [vine maple] dominated the angiosperm component, and although comprising only 0.9% of the basal area, it was the most abundant woody species in terms of stem count. This is important because *A. circinatum* makes a disproportionate contribution to biodiversity in this evergreen conifer forest, for example by providing food for folivore geometrid larvae that feed Neotropical migrant birds [26] and by providing substrate for epiphytic lichens and bryophytes [27]." Lutz JA, Larson AJ, Freund JA, Swanson ME, Bible KJ (2013) The Importance of Large-Diameter Trees to Forest Structural Heterogeneity. PLoS ONE 8(12): e82784. doi:10.1371/journal.pone.0082784. <http://ctfs.arnarb.harvard.edu/Public/pdfs/LutzEtAl_PLoS2013.pdf>
7. Strive for a variable density outcome. Be creative in establishing diversity and complexity both within and between stands. Use skips and gaps within units to help achieve diversity. Gaps should be small, while skips should be a little larger, but even small clumps and patches of trees are desirable. Gaps should not be clearcut but rather should retain some residual structure in the form of live or dead trees. Landings do not make good gaps because they are clearcut, highly compacted and disturbed, more likely subject to repeated disturbance, and directly associated with roads. Using “designation by description” results in a small amount of within stand variability, but it is a significant compromise compared to the amount of variability that is ecologically desired both within and between stands and that could reasonably be accomplished with a little more effort.



An example showing that old growth trees are not widely or evenly spaced, highlighting the need for variability and retaining clumps of trees.

1. The scale of patches in variable density thinning regimes is important. Ideally variability should be implemented at numerous scales ranging from small to large, including: the scale of tree fall events; pockets of variably contagious disturbance from insects, disease, and mixed-severity fire; soil-property heterogeneity; topographic discontinuities; the imprint of natural historical events; etc.
2. Retain abundant snags and course wood both distributed and in clumps so that thinning mimics natural disturbance. Retention of dead wood should generally be proportional to the intensity of the thinning, e.g., heavy thinning should leave behind more snags not less. Retain wildlife trees such as hollows, forked tops, broken tops, leaning trees, etc.
3. Thinning does not always accelerate development of late successional forests, in particular commercial thinning has an adverse effect on snags and dead wood that are defining characteristics of late successional habitat. Thinning might produce the first large trees, but those trees would be vigorous and less likely to experience mortality, so developing large snags is not direct and immediate result of growing large trees. Thinning also dramatically reduces the pool from which future mortality can be recruited so thinning actually retards development of some attributes of late successional forest and spotted owl habitat including snags and down wood. NEPA analyses often assert that "As a result of thinning, growth of retained live trees would be accelerated, so larger trees would be available sooner for recruitment as snags and CWD than without thinning." This is only half the story and it is very misleading. The agency is not being fully honest about the effects of logging unless statements like this are followed by a loud and clear acknowledgement that accelerating development of a few larger *live trees* (that *might* become snags if a few of them happen to die) *comes at the cost* of a significant reduction in the number of medium and large snags over time. From an ecological perspective, the net result of commercial logging is undeniably adverse to snag habitat. The agency cannot present logging as a benefit to snag habitat when it is really a cost that needs to be mitigated.
4. Continuous recruitment of snags is critical to development of old growth forest habitat. We urge the agency to adopt a process-based approach to snag habitat. Instead of focusing on how many snags there are now and immediately after logging, it is better to focus on (i) whether the project will retain an adequate pool of green trees from which to recruit snags and (ii) whether the project will retain the ecological processes that cause mortality, including density dependent mortality and other mechanisms. Commercial logging will significantly harm both of these snag recruitment factors, so mitigation measures are needed. Green tree retention, including generous unthinned “skips” where density dependent mortality will play out, is necessary to support this process. This is especially critical in previously logged uplands that are already short of snags and in riparian areas where recruitment of large wood is important to stream structure. It is often asserted that thinning grows big trees faster and therefore results in more rapid recruitment of large snags, but FVS and other tools show this NOT to be true. In fact, thinning both reduces and delays recruitment of snags, first by removing trees that would otherwise suffer suppression mortality, and second by increasing stand vigor and postponing overall mortality. See this online slideshow which shows the modeled effects of thinning on dead wood habitat. Heiken, D. 2010. Dead Wood Response to Thinning: Some Examples from Modeling Work. <https://www.dropbox.com/s/m4671mhsstg61ss/dead_wood_slides_2.pdf?dl=0>. The implications are that heavy thinning should be used sparingly and generous unthinned patches should be retained WITHIN thinned stands in order to continue the snag recruitment process and mitigate for captured mortality. To inform the decision, please conduct a stand simulation model to fully disclose the adverse effects of logging on dead wood, especially large snags >20” dbh, and then mitigate for these adverse effects by identifying areas within treated stands and across the landscape that will remain permanently untreated so they can recruit adequate large snags and dead wood to meet DecAID 50-80% tolerance levels as soon as possible and over the long-term.
5. Artificial snag creation is often proposed as mitigation for the loss of snags during logging, but snags fall down and dead wood decays, so a one-time snag creation effort provides very short-term benefits. Since logging has long-term adverse effects on snag recruitment, it is necessary to adopt mitigation with long-term effects, such as retaining generous untreated “skips” embedded within treatments areas where natural mortality processes can flourish.
6. Recognize that dead wood values are sacrificed in thinned areas due to the effect of “captured mortality,” while other late successional values, such as rapid development of large trees and understory diversity may be delayed in unthinned areas, so an important step in the restoration process is to identify the most optimal mix of treated (thinned) and untreated (unthinned) areas. We think this should be a conscious and well-documented part of the NEPA analysis, not just an accidental byproduct of what’s economically thinnable. Tools like DecAID might be used to identify goals for large and small snags that need to be met over time and at the geographic scale of home-ranges of focal species. This can help identify the scale and distribution of untreated “skips.”
7. Thin heavy enough to stimulate development of understory vegetation, but don’t thin too heavy. Recognize that thinning captures mortality and that plantation stands are already lacking critical values from dead wood due to the unnatural stand history of all clearcut and planted stands. Tom Spies made some useful observations in the Northwest Forest Plan Monitoring Synthesis Report: “Certainly, the growth of trees into larger diameter classes will increase as stand density declines (Tappeiner and others 1997). At some point, however, the effect of thinning on tree diameter growth levels off and, if thinning is too heavy, the density of large trees later in succession may be eventually be lower than what is observed in current old-growth stands. In some cases, opening the stand up too much can also create a dense layer of regeneration that could become a relatively homogeneous and dominating stratum in the stand. Furthermore, if residual densities are too low, the production of dead trees may be reduced (Garman and others 2003). Thinning should allow for future mortality in the canopy trees.” <http://web.archive.org/web/20070808101639/http://www.reo.gov/monitoring/10yr-report/documents/synthesis-reports/index.html>.
8. If using techniques such as whole-tree yarding or yarding with tops attached to control fuels, the agency should top a portion of the trees and leave the greens in the forest in order to retain nutrients on site. Achat, Deleuze, et al 2015. Quantifying consequences of removing harvesting residues on forest soils and tree growth – A meta-analysis. Forest Ecology and Management Volume 348, 15 July 2015, Pages 124–141. <http://www.sciencedirect.com/science/article/pii/S0378112715001814> (“Our study showed that, compared with conventional stem-only harvest, removing the stem plus the harvesting residues generally increases nutrient outputs thereby leading to reduced amounts of total and available nutrients in soils and soil acidification, particularly when foliage is harvested along with the branches. … Soil fertility losses were shown to have consequences for the subsequent forest ecosystem: tree growth was reduced by 3-7% in the short or medium term (up to 33 years after harvest) in the most intensive harvests (e.g. when branches are exported with foliage). Combining all the results showed that, overall, whole-tree harvesting has negative impacts on soil properties and trees that may have an impact on the functioning of forest ecosystems.”)
9. Thinning creates activity fuels that can be treated (or not treated) in a variety of ways. Strive to treat fuels in ways that provide public benefits such as wildlife habitat (e.g., complex woody structure) and charcoal production (e.g., enhanced soil carbon storage), and reduce detrimental soil impacts from machine piling and hot burn piles. Deborah S. Page-Dumroese et al. 2017. Methods to Reduce Forest Residue Volume after Timber Harvesting and Produce Black Carbon. Scientifica. Volume 2017 (2017), Article ID 2745764, <https://doi.org/10.1155/2017/2745764>; <https://www.hindawi.com/journals/scientifica/2017/2745764/>
10. Recognize and mitigate adverse effects of thinning on spotted owl prey such as flying squirrels, red tree voles, and chipmunks. Avoid impacts to raptor nests and enhance habitat for diverse prey species. Train marking crews and cutting crews to look up and avoid cutting trees with nests of any sort and retain trees with defects such as forks, broken tops, etc...
11. Take proactive steps to avoid the spread of weeds. Use canopy cover to suppress weeds. Avoid soil disturbance and road construction. Scarifying landings and tempera roads and planting with native seeds is a good idea but please take steps to ensure that it is effective.
12. Buffer streams from the effects of heavy equipment and loss of bank trees and trees that shade streams. Mitigate for the loss of LWD input by retaining extra snags and wood (and green trees for recruitment) in riparian areas. Recognize that thinning “captures mortality” and results in a long-term reduction in recruitment of functional down wood, and that effect is not mitigated by future growth.
13. Avoid road construction. Building new roads will cause degradation that typically erases any alleged benefit of treatments. Roads have a variety of long-lasting adverse impacts on soil, water, and wildlife. Focus treatments on areas accessible from existing roads. Inaccessible areas can be treated non-commercially or become part of the landscape mosaic that is untreated and serve important ecological values such as dense forest cover, carbon storage, and natural rates of snag recruitment.
14. Where road building is necessary, ensure that the realized restoration benefits far outweigh the adverse impacts of the road. Carefully consider the effects of roads on connectivity, especially at road/stream crossings, across ridge tops, and midslope hydrological processes (such as large wood delivery routes). The NEPA analysis should rank new road segments according to their relative costs (e.g. length, slope position, soil type, ease of rehabilitation, weed risk, native vegetation impacts, etc.) and benefits (e.g. acres of restoration facilitated), then use that ranking to consider dropping the roads with the lowest ratio of benefits to costs. Avoid log hauling during the wet season. Once the relative acres accessed per mile of road is determined, take the analysis one step further and determine the “effective road density” of each segment. In other words, extrapolate as if that much road were required to reach each acre of the planning area, then compare the resulting road density to standards for big game, cumulative hydrological impact, etc? For example, if a new spur road accesses thinning opportunities at a rate of 200 acres of forest per mile of road, then divide 640 acres per section by 200 acres per mile to determine the effective road density of 3.2 mi/mi2.
15. If this project involves biomass utilization, the impacts need to be clearly disclosed. How will the biomass be moved from the remote corners of the treatment areas to the landings? Will there be extra passes made by heavy equipment? Will the landings be enlarged to make room for grinders, chip vans, and other equipment? Can the local forest roads accommodate chip vans? Will the roads be modified to make them passable by chip vans? What are the impacts of that? What are the direct, indirect, and cumulative impacts on soil, water, wildlife, and weeds?
16. Adopt a purpose and need to maintain and increase carbon storage in forest ecosystems. Develop an alternative that addresses carbon and climate by (a) deferring harvest of older forests to store carbon and provide biodiversity and connectivity and (b) thin younger stands to increase forest resilience and diversity and connectivity. Recognize that there is a carbon cost associated with thinning. As stands develop from young to mature to old, they recruit large amounts of material from the live tree pool to the dead wood pool and this pool continues to accumulate large amounts of carbon for centuries. Logging, even thinning, can dramatically affect the accumulation of carbon in the dead wood pool by capturing mortality, diverting it from the forest, and accelerating the transfer of carbon to the atmosphere. Carbon stays out of the atmosphere much longer if it remains in the forest as live and/or dead trees, instead of being converted to wood products and industrial and consumer waste.
17. If the stands to be thinned are younger than 80 years, the agency may rely on the Pechman exemption and not complete surveys for rare and uncommon species. However, this exemption is intended to apply to even-aged stands. If there are distinguishable legacy trees (more than 2 per acre) those areas are not part of the younger stand, and not eligible for the Pechman exemption, therefore the agency must survey for red tree voles and other survey and manage species.
18. Descriptions of the effect of NOT thinning dense young stands should incorporate the information presented in Lutz. J.A. 2005. The Contribution of Mortality to Early Coniferous Forest Development. MS Thesis. University of Washington. <http://faculty.washington.edu/chalpern/Lutz_2005.pdf>. This MS Thesis looked at long-term transect data from young forests in Western Oregon and found that non-competitive mortality and gap forming processes are very much in operation in dense young planted stands. This indicates that in young stands the homogenizing influence of stand growth and competitive mortality is significantly counter-balanced by non-competitive mortality that tends toward heterogeneity and structural diversification. This means that if young stand management is to effectively mimic natural patterns and processes, that variable density treatments must be the rule, and the scale of the mosaic must be very fine scale. Note: The study sites were located in the HJ Andrews Experimental Forest and were not naturally regenerated, so it is likely that in young stands that are naturally regenerating after disturbance such as fire, the heterogeneity and gap-forming processes would be even more pronounced. See also Lutz & Halpern 2006. Tree Mortality During Early Forest Development: A Long-Term Study Of Rates, Causes, And Consequences. Ecological Monographs, 76(2), 2006, pp. 257–275. <http://cfr501.jamesalutz.com/Lutz_Halpern_Mortality_EM_2006.pdf> and Franklin, J. F., T. A. Spies, R. Van Pelt, A. B. Carey, D. A. Thornburgh, D. R. Berg, D. B. Lindenmayer, M. E. Harmon, W. S. Keeton, D. S. Shaw, K. Bible, and J. Chen. 2002. Disturbances and structural development of natural forest ecosystems with silvicultural implications, using Douglas-fir as an example. Forest Ecology and Management 155:399-423. <http://www.fs.fed.us/pnw/pubs/journals/pnw_2002_franklin001.pdf>
19. Focus the analysis on “trade-offs” related to logging. All logging, including thinning stands of any age, include some adverse impacts and trade-offs. Some impacts of logging are unavoidable, so there is no such thing as a logging operation that is 100% beneficial. Depending on how thinning is done, it can have adverse impacts such as soil disturbance; habitat disturbance; damage to the shrub layer; carbon removal; spreading weeds; reduced populations of prey for carnivorous species; reduced recruitment of snags; road-related impacts on soil, water, site productivity, and habitat; moving fuels from the canopy to the ground, hotter-drier-windier microclimate that is favorable to greater flame lengths and rate of fire spread, etc. Some of these negative effects are fundamentally unavoidable, therefore all thinning has negative effects that must be compensated by beneficial effects such as reducing competition between trees so that some can grow larger faster, increased resistance drought stress and insects, possible increasing species and structural diversity, possible fire hazard reduction, etc. It is generally accepted that when thinning very young stands, the benefits outweigh the adverse impacts and net benefits are likely. It is also widely understood that thinning older stands tends to have greater impacts on soil, water, weeds, carbon, dead wood recruitment so the impacts very often outweigh the benefits, resulting in net negative outcome on the balance sheet. Thus, as we move from young forest to older forests, the net benefits turn into net negative impacts. See Klaus J. Puettmann, Adrian Ares, and Erich Dodson. 2011. Over- and understory vegetation responses to thinning treatments: Can we accelerate late successional stand structures? Symposium: Density Management In The 21st Century: West Side Story. <http://oregonstate.edu/conferences/event/densitymanagement2011/agenda.pdf> (“growth of large trees was less responsive to thinning and low mortality rates for larger trees resulted in little recruitment of large snags or coarse woody debris (down wood). In general, thinning increased abundance and diversity of early-seral understory species, with little effect on late-seral species. On sites where shrub cover was already high harvesting initially reduced the cover, but shrubs recovered over time. Exotic species slightly increased in response to treatment …”); and Erich K. Dodson, Adrian Ares, and Klaus J. Puettmann. 2011. Thinning effects on tree mortality and snag recruitment. Symposium: Density Management In The 21st Century: West Side Story. <http://oregonstate.edu/conferences/event/densitymanagement2011/agenda.pdf> (“…thinning did little to accelerate the development of large snags and coarse downed wood that provide critical wildlife habitat…”) These are some of the trade-offs that must be disclosed and weighed in the NEPA document.
20. Provide clear and detailed descriptions of silvicultural prescriptions and marking guides in the NEPA document.
21. Make the NEPA analysis thorough, explicit, and transparent on all these issues.

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Sincerely,



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