Comments on McDonald-Dunn Management Plan, as well as external critiques of the plan

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McDonald-Dunn Forest Management Plan

Overall, I appreciate the massive effort the team has undertaken to produce this plan and engage with the public. The main components are in place for a good management plan. I appreciate the balance between wood, revenue and other objectives that you've attempted to balance. Nevertheless, I think there are several elements that could be substantially improved to make this a world-class forest management plan that I'd be proud to discuss with the public, my colleagues and friends. I've described both major and minor points below. The major ones are: (#1) the need for more rigorous monitoring, (#3) how will you use the responses (like this one) in making adjustments to the plan? (#5) formalized flexibility within "management strategies" to allow adaptive management and explore alternative silvicultural options (including testing "ecological forestry"), (#8) additional recruitment of old growth forest, (#14) full transparency when it comes to wood yields, AAC projections, projected habitat change, habitat relationships used in the linear programming model. These should be basic elements of any forest management plan.

I have also included my response to some widely circulating critiques of the plan (below). I did not look at these before developing my own review below.

1. **<u>Monitoring.</u>** Monitoring is a key component of forest management and biodiversity conservation in that it enables "adaptive management" (the capacity to learn whether forest management strategies are working, and adjust accordingly if they are not). Although monitoring is mentioned in the plan (to be conducted by "consultants" and via "participatory science") there are no details on sampling intensity, sampling design or spatial extent. As such, it is difficult to evaluate whether adaptive management will be possible at all. A next step needs to be the **development of a formal monitoring plan**. Ideally, this would not be conducted by consultants but could be included in the OSU Forest Curriculum and /or OSU research labs are given the opportunity to develop sampling designs. Monitoring should be considered a key component of the overall plan and should be **paid for by harvest revenues**. It is remarkable (looking at Table 2) that there are very few (any?) forest-wide monitoring efforts, but only very study specific, spatially restricted research. No end dates are provided in Table 2 so it is impossible to determine the length of past/current studies.
2. Perhaps semantics: I'm surprised that one of the goals does not include biodiversity conservation (mentioned in the Mission, but not in specific goals)
3. **<u>Response to public input.</u>** Figure 1 shows the process of plan development but gives no indication of how public comment will be incorporated in to plan revisions. The next step is simply "Draft to dean and forest exec committee". Will revisions be made following public comment?
4. **<u>Historical forest composition and structure.</u>** I suspect that Fig. 8 greatly oversimplifies the historical distributions of "forest", "oak savannah" and "prairie". It would be a useful

and interesting exercise to do some dendro work to determine the distributions of large stumps, and date them to determine what this historical range of variation might have been. This is particularly important given the stated priority of restoration. An additional test would be to look at the logging history of the forest to estimate how many board feet (and of what species) have been harvested over time. Under the hypothesis that the land was primarily oaks and that Douglas fir colonization was very recent, most harvest in early years should presumably have been oak.

5. **Categorical management strategies.** I am curious about why five categories of "management strategies" are being presented rather than offering the opportunity to examine gradients among these strategies to <u>test</u> how best to balance stand-level yield with other important outcomes like climate adaptability, biodiversity and public acceptance. Binning management into these categories runs the risk of severely limiting creativity when it comes to silvicultural approaches. Since this is a research forest, there should be a formal plan on how variation within these categories plays out in terms of yields, biodiversity, carbon, microclimate etc.

    (a) Why, for instance, does the short-rotation strategy only aim for 6% cover of hardwood trees rather than deliberately exploring variation in this amount to see if yield is compromised?

    (b) Why adhere only to the minimum Oregon Forest Practices of 2 trees & snags/acre rather than examining a range of retention, even in this short-rotation strategy?

    (c) Why not conduct formal research on various approaches to controlling competing vegetation rather than doing-business-as-usual herbicide application? What are the economic and wood costs of different approaches to controlling competing vegetation?

    (d) Why not test the effects of varying degrees of retention in the long-rotation harvest stands (on yields, wildlife habitat, carbon etc.)? Is there a "sweet spot" between two trees per hectare and multi-aged silviculture that could provide habitat/carbon and still generate revenue?

6. **Testing Ecological Forestry.** Relating to (d) above, I would like to have seen a higher proportion of management and research focused on ecological forestry approaches. Given that so little is known about yields from these methods, wildlife responses etc., along with poor public opinion about management of the McDonald-Dunn, it seems prudent to do more experimentation on various non-traditional approaches to management, even if it ends up coming at some cost to yields (by the way, which we can't even quantify because so little has been done along these lines).

7. **Forest Fragmentation.** To what extent will attention be paid to limiting forest fragmentation effects (enhancing connectivity, reducing edge etc.). Looking at the map in Fig. 22 it *does* look as though attempts have been made to put multi-aged treatments beside old-forest (which is good from a limiting edge perspective). Was this ever quantified formally? What will be the timing of spatial layout to minimize fragmentation effects?

8. **Old-growth recruitment**: I don't see the term "stand establishment" as being compatible with multi-aged management. When is the stand established given that there will be no stand-initiating disturbance? Why is the oldest age of trees in the multi-aged stands 120? Why not let some forest age past that? It is likely the case that the historical range of variation in this forest did tend toward oak woodland, but clearly some significant

patches of old growth exist (and have been cut quite extensively in the past). Given that old growth is in such short supply in the Coast Range as a whole (see Spies et al. 2007 – *Ecol Apps*), and that old growth has microclimate buffering effects (Frey et al. 2016 – *Science Advances*, Kim et al. 2022 – *Global Change Biology*) **it makes sense to plan for increasing this development stage over time in the McDonald-Dunn.**

9. **Fire as a restoration tool in old growth.** I would like to see the evidence that fire was a regular occurrence in existing old-growth stands. Is this published? Also, is there evidence that reductions in "surface fuel loading" reduces fire risk/severity on the west side? My understanding is that that practice is highly controversial. Dead wood in the understory and multi-canopy stands are likely to be the mechanisms behind old-growth microclimate buffering (Frey et al. 2016 *Science Advances*). Removing these materials/trees could therefore increase temperatures in the understory, elevate VPD and enhance fire risk and spread.

10. **Forest inventory and yields.** How reliable are the inventories and yields used to build the linear programming model? These models are clearly highly sensitive to parameterizations. For instance, to my knowledge, yields for multi-aged forest management are non-existent. From where did you generate yields for short and long-rotation management? Importantly, how will you determine whether or not various treatments are responding (in terms of yield) following harvest? (How frequently and at what sampling intensity will post-harvest inventories be conducted; I see there is some mention of this later in the plan, but details are lacking). The plan should include (at least in the appendix): (a) yield curves, (b) inventory data, (c) species habitat relationships, (d) trajectories of habitat, yield, and growing stock over time.

11. I appreciate the use of coarse and fine-filter approaches. For the indicator species, was an effort made to (a) estimate their habitat requirements, (b) model future habitat for these species over time? These should also be reported in the plan for full transparency. Again, what rigorous long-term monitoring will be conducted to test whether projections are indeed correct?

12. **Hardwoods.** For the 6% hardwood threshold that you cite from Ellis and Betts (2012) this is for the abundance of all birds. A more conservative threshold from the same paper is ~16% (for leaf-gleaning birds that are your indicator species). However, an alternative explanation is just "the more hardwoods the better": "Quantification of a threshold at 15.89% (SE = 5.71) cover for all leaf gleaners was ambiguous, with slightly greater support for the linear model". I do think the 6% threshold is incautious. I appreciate that you have the target at 10% for long-rotation forestry, but I suggest that even this should be higher.

13. **Dead wood conservation.** After quite a nice review on the importance of dead wood, the plan then goes on to state that the bare forest practices minimums will be used in various harvests. If the objective is to demonstrate sound forestry, these levels of downed wood and snags should be increased. Again, adaptive management should be used to hone the targets that are initially established.

14. **Transparent projections about future forest conditions. I've mentioned this above, but it is important to emphasize that forest management plans should show projections for all of the elements considered in those plans under various scenarios (I thought that a consulting company did these for you?)** Included in those projections should be estimates of uncertainty. Where are the projections for annual cut over the next

100 years? Wildlife habitat? Growing stock? I think some of the existing critiques of the plan might have less impact if it were shown quantitatively that total above-ground carbon in the McDonald-Dunn will be accumulating (I expect it will given the relatively conservative harvest rate estimates – if the inventory is correct). If I missed, these, my apologies! Showing forest inventory and wildlife habitat projections are critical if the public (and CoF employees) are going to effectively evaluate the efficacy of the plan.

My response to some external critiques of the plan (I only focused on critiques that are within my area of expertise).

Critique	Response
• allows clearcuts of **40 to 80 acres** ("long-rotation" vs. "short-rotation") compared to the 2005 plan (which limited the size of cuts in the southern portion of the McDonald Forest to **four acres in size**)	Smaller cuts are not necessarily better in that they tend to fragment the forest even more (e.g., create more edge, result in smaller future patches of mature forest). Rather, cuts should consider natural terrain boundaries, have considerable retention (dispersed and aggregated). Notably, a later critique also focuses on increased fragmentation in the plan, but limiting cut size would amplify fragmentation.
• relies on continued, widespread use of poisonous herbicides at the discretion of forest managers	Agreed that it should not be default to use herbicides. Formal research should be done on herbicide alternatives, as well as minimum amounts of herbicide to achieve regeneration objectives.
• relies heavily upon ("Woodstock") forest modeling which is widely regarded as promoting wood fiber production over ecological values	Woodstock is just a tool that can be used for any sort of forest management planning. We have used this model to primarily examine ecological values in relation to wood yields
• relies on the relatively low standards of the **Oregon Forest Practices Act (OFPA)** as the primary constraint for forestry activities	Agreed. I don't understand why we're just adhering to the minimums rather than test of flexible alternatives (see above)
• promotes polluting, ecologically-destructive biomass energy as a "renewable source of energy	I didn't see this in the plan?
• promotes a skewed biodiversity metric which relies on a limited number of taxa, rendering the conclusions arbitrary	I'm not sure what is being referred to here. Yes, a wider range of indicator species could be used, but the approach used was quite ambitious even compared to some Forest Stewardship Council certified forests that I've visited. The alternative to indicator species is to monitor all biodiversity (1000s of species) which is intractable.
• uses modeling that falsely concluded OSU's continued reliance on even-aged, monoculture tree plantations will *increase the resilience of the forests*	What is the evidence that forest management will result in monocultures? I didn't see that part (I do argue above that the hardwood component could be increased based on best available science).
• changes the old-growth reserves to allow logging for a variety of reasons, including	I assume that any activity in old growth stands would be extremely light touch. I do agree with this point that very little should be done in

"public safety" and to create/maintain, "structural and compositional diversity"	reserves (especially not fuels reduction or understory burning) – see my point above that there isn't much science to support this (to my knowledge).