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Comments on the Late Mungers Sale and the Integrated Vegetation Management Plan

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Given the adverse publicity that has been directed at the BLM for management activities employing the Integrated Vegetation Management Plan, particularly those regarding logging old growth forests, a delegation of the SOCAN Forest and Fire Project Team (Gary Clarida and Alan Journet, accompanied by Rich Fairbanks) visited units in the Penn Butte section of the Late Mungers Sale on May 7th to assess what is happening on the ground.

McCarthy (2019) identifies succinctly the problem with the definition of old growth:

> "In the 1970s, researchers started using the term "old growth" to describe complex, biodiverse forests at least 150 years old. Environmentalists prefer using the term to describe forests with large, old trees undisturbed by human impact. Under the environmentalist's characterization, much more forest would qualify as old growth. The tension between these two definitions remains unresolved."

Meanwhile, FSG (2019) states that old growth forests are "Forests dominated by large, old trees, both live and dead, standing and fallen, that usually contain many other smaller trees." They continue the explanation with the caveat that: "Tree size alone is not a marker of old growth. High productivity stands may have large, relatively young trees. Like all forests, old growth forests are affected by disturbances." More recently, Barnett *et al.* (2023) argue that mature and old growth forests are: "characterized by a relatively long period of development since catastrophic disturbance…"

These examples of definitions and characterizations indicate how subjective is the definition of old growth forest.

From a climate change perspective, our interest in the Late Mungers controversy stems from our understanding regarding the capacity of mature forests both to store carbon and to continue sequestration into old age. As Law *et al.* (2022) report, "Forests account for 92% of all terrestrial biomass globally, storing approximately 400 gigatons carbon." Meanwhile, DellaSala *et al.* (2022) report: "At the stand level, old-growth forests store 35 to 70% more carbon, including in the soils, compared to logged stands." There is no doubt that mature and old growth forests store substantial amounts of carbon.

Of particular interest is the carbon capture trend of individual trees as they age. In a study of "673,046 trees belonging to 403 tropical, subtropical and temperate tree species" Stephenson *et al.* (2014) reported: "For all continents, aboveground tree mass growth rates (and, hence, rates of carbon gain) for most species increased continuously with tree mass (size)."

Penn Butte section of Late Mungers Sale. Yellow tags indicate non-removal. Note smaller trees marked to stay. Photo by Alan Journet.

In addition, Gilhen Baker *et al.* (2022) report: "Until recently, it was believed that they [old-growth forests] no longer pulled carbon out of the air but current findings have shown that to be untrue….." and "On top of continuing to pull carbon from our atmosphere and accounting for at least 10% of the worlds carbon sequestration capabilities … disturbing these great stands of trees releases the considerable carbon stores that they would otherwise hold fast both in their bodies and in the soil beneath them." In terms of aging forest ecosystem carbon flux, Luyssaert *et al.* (2008) reported on an assessment of literature and data sets of forests between 15 and 800 years of age. They reported a positive accumulation of carbon is usually the case among the 519 data sets from temperate and boreal forests assessed. While some forests exhibited negative carbon balance, carbon neutrality instances were negligible.

Old-growth forests are critical components of our forested landscape not only for their stored carbon, but also both because, if left standing, they continue to sequester carbon, and, if removed, this ongoing sequestration is thwarted. In a world such as we currently occupy, where promoting carbon sequestration in our forests should be a top priority, there is *prima facie* a reason to protect old-growth forest.

Penn Butte section of Late Mungers Sale. Yellow tags indicate non-removal. Note mixture of ages in trees marked to stay. Photo by Alan Journet.

In late April and early May we visited the following units 18-1 (a 50-year-old plantation), 19-1, 25-1, 25-3, 26-1, to assess what the impact of the BLM Late Mungers plan might be.

Based on the units we visited, and recognizing fully that other units may be marked differently, we concluded that the BLM marking of the trees for retention indicated a desire to manage for a mixed age forest. This conclusion is based on the evidence that tress designated for retention

did not compromise only older / larger trees but included many that are much smaller in diameter. In addition, some large trees were designated for removal. This seems to suggest a program based on the premise that a healthy forest will contain trees in the full range of age classes, not just older/larger trees. From the perspective of managing for a future healthy and age-diverse forests, we judged the tactics applied in these units appropriate. However, given the carbon storage and future sequestration capacity of old-growth trees, we might have designated more large trees for retention than was evident in these units.

Based on conversations with other interested parties, we have learned that the sector that we explored may be atypical of other sectors and so are continuing to explore how this overall project is being undertaken. We will develop a broader assessment when that exploration is completed.

It is not evident to what extent decisions regarding trees to leave or remove are based on their likely future viability, but considering this future offers some valuable insights.

Assuming climatically, we follow the current trajectory of warming, the following maps (Crookston and Radke 2022) represent the likely climatically appropriate distribution for various tree species encountered in SW Oregon. In these images, purple represents high viability location green/yellow sub-optimal conditions while grey represents inappropriate conditions. The blue lines delineate currently appropriate conditions.

Figure 1 Dougal fir now (left) and 2090 (right)

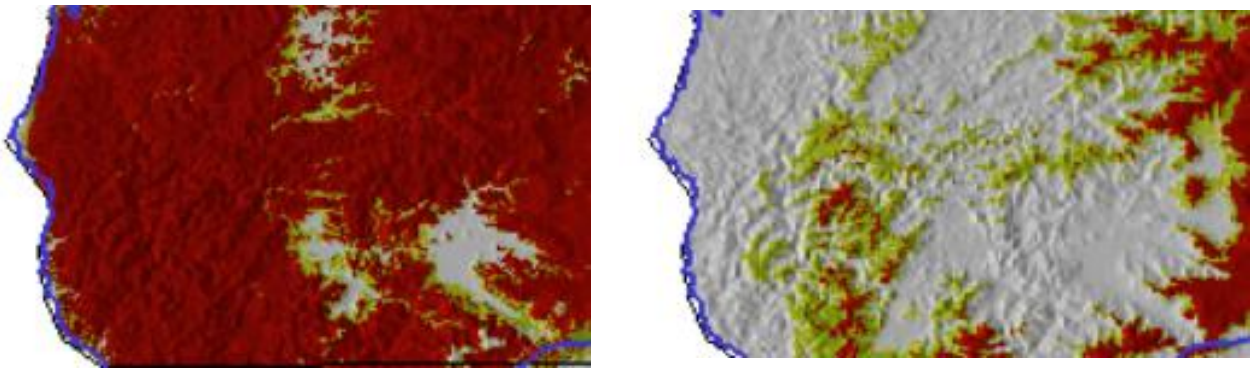


Figure 2 Ponderosa pine now (left) and 2090 (right)

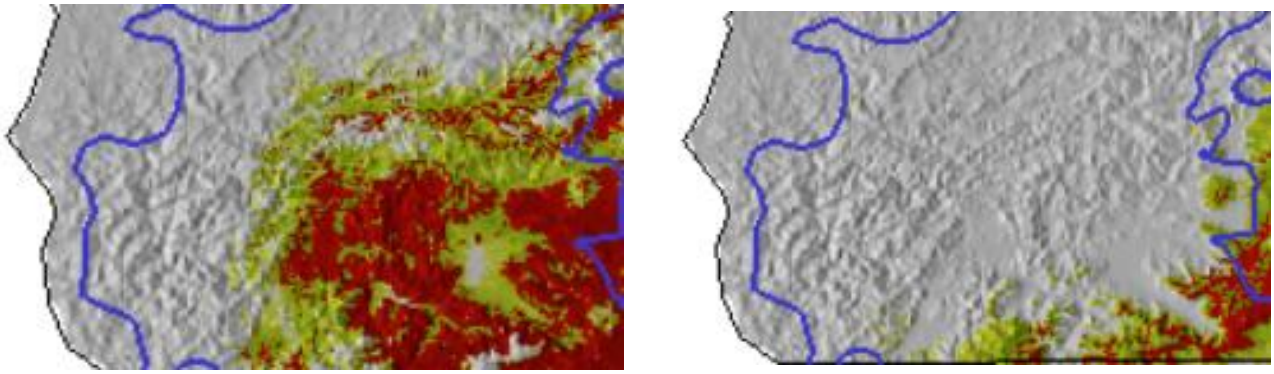


Figure 3 Sugar pine now (left) and 2090 (right)

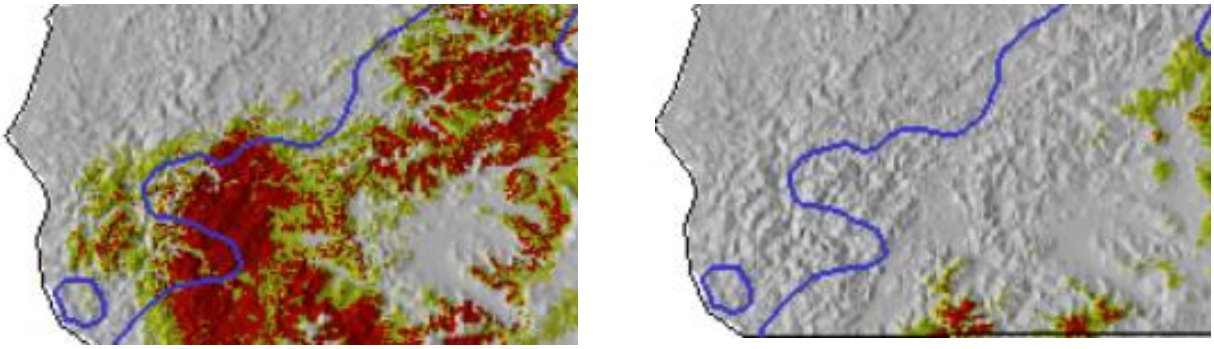


Figure 4 Pacific madrone now (left) and 2090 (right)

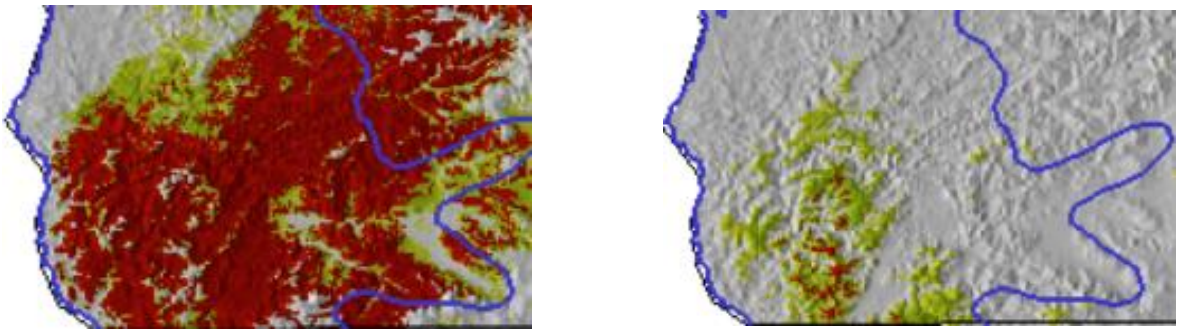
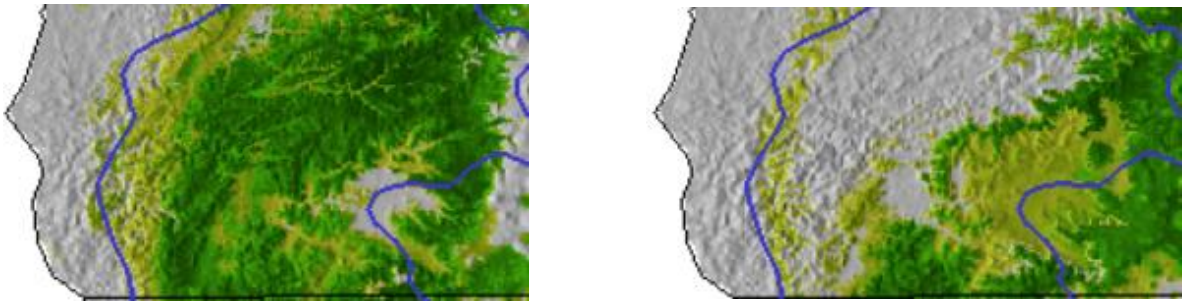


Figure 5 Incense cedar. now (left) and 2060 (right). The future assessment only extends to 2060



It is clearly impossible to know exactly what trajectory the regional climate will take, but these climate envelope projections certainly raise questions about the efficacy of retaining smaller specimens of sugar pine, Pacific madrone, and maybe Douglas fir.

The uncertainty of future conditions raised the specter of applying Climate Smart management principles (SOCS undated, Sydoriak 2022, Stein *et al.* 2014) to the project area rather than some pre-determined strategy and tactics. Climate Smart management comprises a management approach that acknowledged unknown future conditions and incorporates monitoring, reviewing, and revising both goals and tactics.

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