Monitoring Summary

Pre-treatment, Bradfield Unit – Lone Pine Vegetation Management

Prepared by Mike Remke, PhD; Mountain Studies Institute

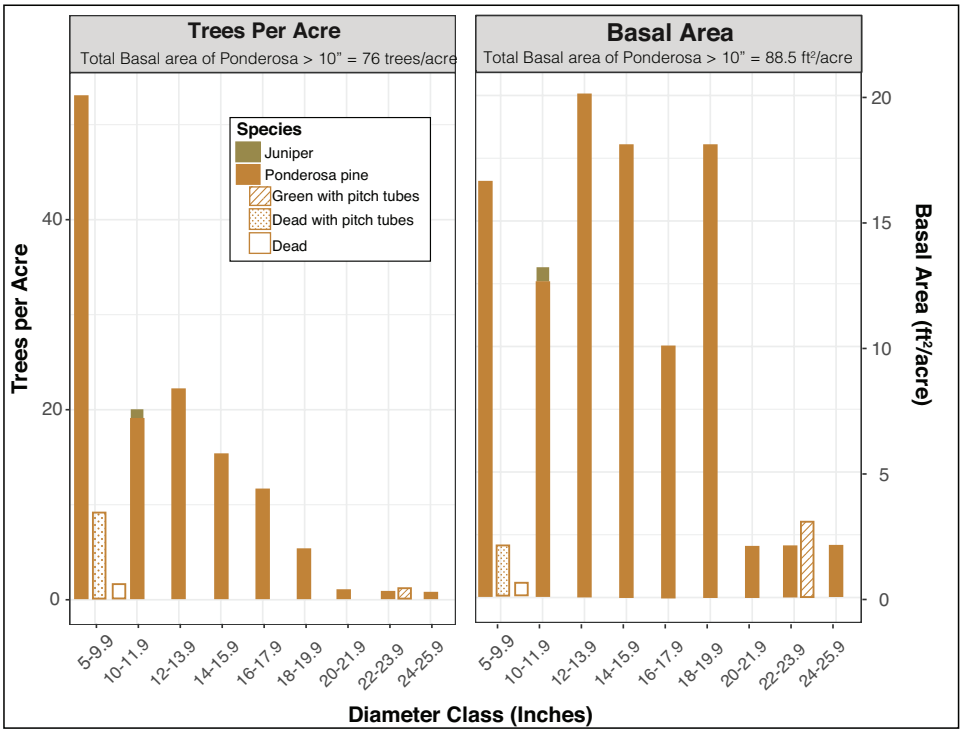
Increasing Forest Resilience: The Bradfield unit of the Lone Pine Vegetation Management Analysis area is adjacent to geographies where significant ponderosa pine tree mortality has been observed. Primary species composition of the unit is ponderosa pine with sparse pinon pine and juniper. The understory is dominated by Gambel oak with some serviceberry. The primary agent of tree mortality is round-headed beetle, however, mountain pine beetle, pine engravers, drought stress, and overly dense stands are all factors that may contribute to tree mortality. Additionally, tree densities and abundant fuels puts this geography at risk of uncharacteristic wildfire, especially during moderate-extreme fire weather conditions. The primary objectives of management are to increase forest resilience to beetle, fire and drought by reducing stand density. The project also aims to increase regeneration to maintain or improve age class diversity. The Bradfield Unit has increased emphasis on improving forest resiliency to round-headed bark beetle attack.

Pre-treatment highlights: Pre-treatment data was collected in the Fall of 2019 when most vegetation had senesced, thus estimates of shrub cover and plant functional groups are not included in this report. We demonstrate that trees with observed pitch tubes within the Bradfield Unit are relatively uncommon but do exist (figure 1). Data captured shows numerous ponderosa pine seedlings, few ponderosa pine saplings and numerous ponderosa pine trees less than 10 inches diameter at breast height (DBH).

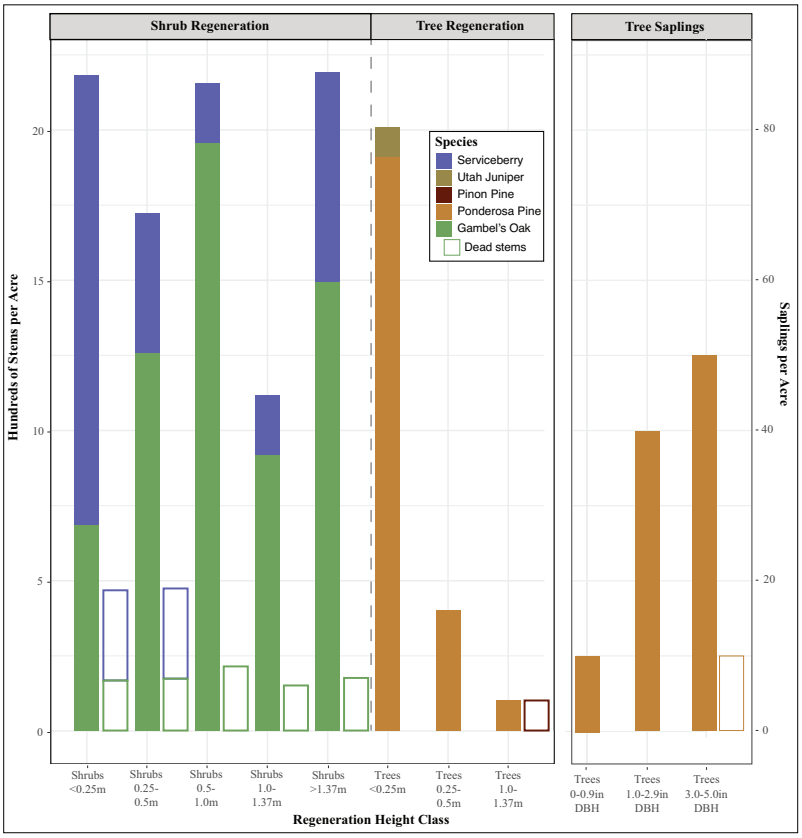
Project Information

Implementation Agency	San Juan National Forest – Dolores District
Operator	
Funding	
Location	North of Bradfield Bridge
Year Completed	FY 2020
Monitoring Plots	20
Forest Type	Ponderosa Pine
Implementation Method	

Forest Overstory and Understory Conditions

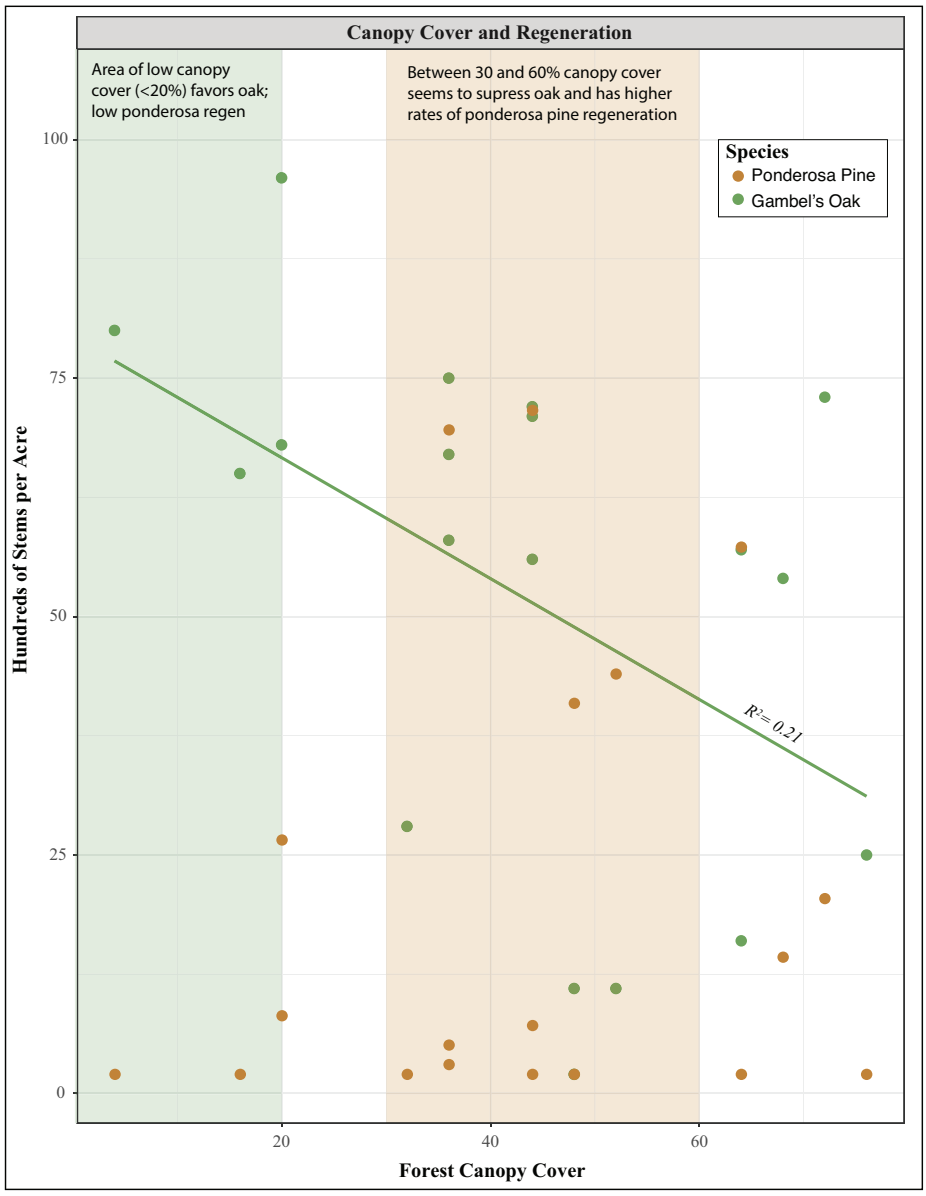


Overstory trees in the Bradfield unit shows trees in the 5-9.8in DBH contribute the most to tree density, however, trees in the 12-13.9in DBH size class contribute to the majority of the basal area. Large trees do exist on the landscape at low densities and with low contributions to the basal area. Trees had an **average crown base height of 27 ± 12 feet** and thus are likely not problematic as ladder fuels**.** Additionally, dead trees are uncommon and were all less than 10 inches DBH. Trees with pitch tubes were either small (<10in DBH) or large (22-23.9in DBH). Tree densities in this unit are relatively high, however, and important consideration is the size class distribution of tree sizes. Basal are of trees greater 10" DBH is 88.5ft^2/acre which exceeds Negron et al (2009)'s suggested value of a basal area greater 26 yielding a 55% probability of infestation by mountain pine beetle in ponderosa pine stands. Reduction of basal area of trees larger than 10" can significantly decrease the probability of the stand being infested by mountain pine beetle.



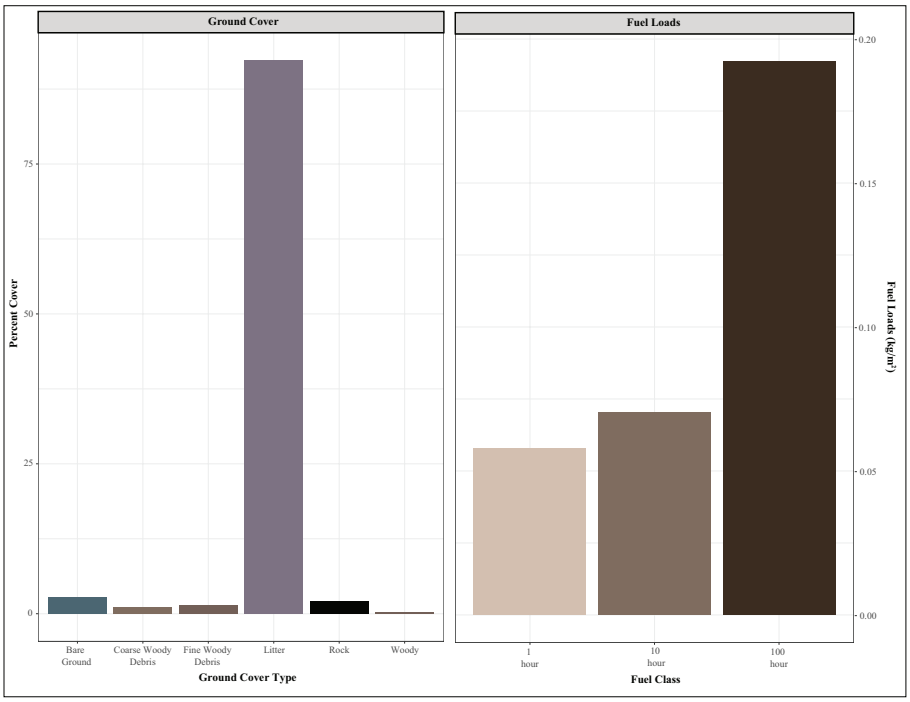
Shrub regeneration dominated by Gambel oak is abundant within the Bradfield Landscape. Shrub sizes varied from less than 0.25m to shrubs that are well over breast height (1.37m). Shrubs on this landscape are likely to behave as ladder fuels under extreme fire weather

conditions, however, under desirable conditions for prescribed or managed fire these fuel types are less likely to contribute significantly to erratic fire behavior and repeated fire may be effective in limiting growth of Gambel oak (Harrington 1989).



Tree regeneration Ponderosa pine regeneration was also abundant, with most trees less than 0.25m in height. While no dead ponderosa pine seedlings were observed, these is no guarantee these seedlings will survive given prolonged dry conditions or should a fire occur. Numerous healthy and only a few dead saplings exist in the Bradfield unit. Additionally, there is a negative linear relationship between forest canopy cover and Gambel oak regeneration ($p = 0.04$, $r^2=0.21$). This finding pre-treatment is an important to consider that at the stand level oak persistence on the landscape is at least in part driven by canopy cover and a significant reduction of canopy cover could result in the release of oak. While this is certainly not enough to draw any conclusion about factors driving oak cover or for projecting future oak cover and tree regeneration, it is important to consider that oak tends to release in high light environments (van Auken et al. 2016). Additionally, historical pine recruitment and survival in the San Juans has been shown to correspond with episodic wet periods with few fires (Wu & Brown 2005). Thus, it is important to consider that weather conditions during and following implementation are likely to contribute strongly to years of pine recruitment and just because favorable abiotic microsites exist does not mean favorable regeneration will occur. Furthermore, an overabundance of ponderosa pine regeneration could contribute to high tree densities in the future. It is imperative to some, but not all ponderosa pine regeneration is maintained on the landscape.

Forest floor conditions were covered in close to 100% litter with minimal bare soil. These conditions may limit ponderosa pine recruitment however a surface fire could consume the majority of litter cover and create more favorable microsites. Implementation may also alter forest floor conditions.



Fuel loads on the forest floor consisted of fuel loads that is the historical range of variation for southwestern ponderosa pine forests, however, 100-hour fuels were on the high end and could contribute to undesirable smoldering lengths or flame lengths in moderate to extreme fire weather. A surface fire under the right conditions could help consume these fuels loads and care should be taken during implementation that fuels are distributed across the landscape and not concentrated under residual trees or their crowns in the event of an unplanned ignition.

Works Cited

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For more information or questions contact:
Michael Remke, PhD; Mountain Studies Institute. mremke@mountainstudies.org