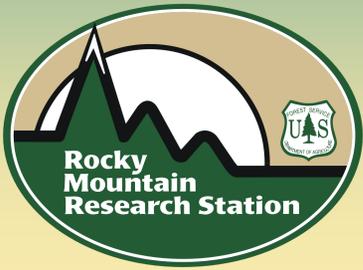


Surface fuel loadings in mulching treatments in Colorado coniferous forests (JFSP 06-3-2-26)



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Background

- Mastication or mulching treatments are being implemented in various ecosystems across the Western United States in order to decrease crown fire risk

- Mulching treatments shred, chop, or chip unmerchantable material and deposit the biomass on site



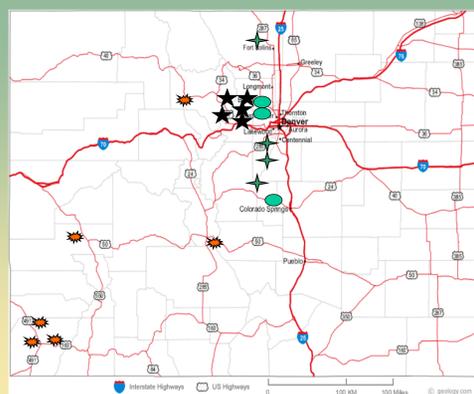
- Woody fuel generated from mulching treatments result in distinct changes in ground cover, fuel loadings, and fuel size distribution



Research Question

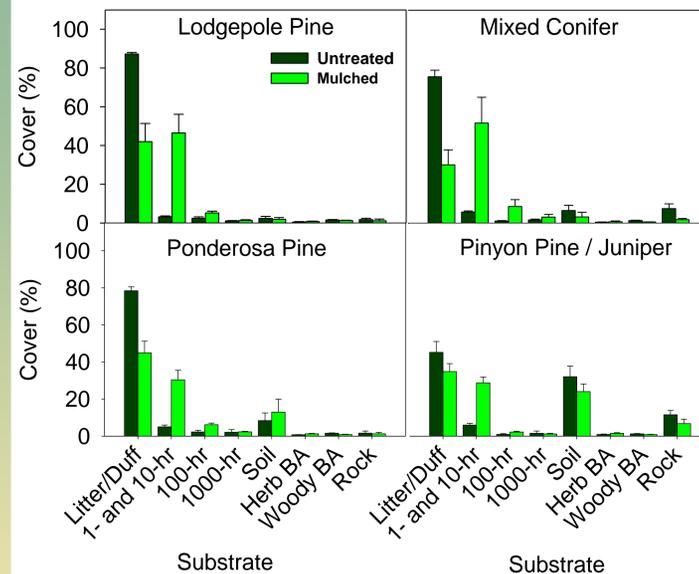
How do mulching treatments alter the distribution of woody biomass?

Study areas



- ★ Pinyon-Juniper
- ◆ Ponderosa pine
- Mixed conifer
- ★ Lodgepole pine

Ground Cover

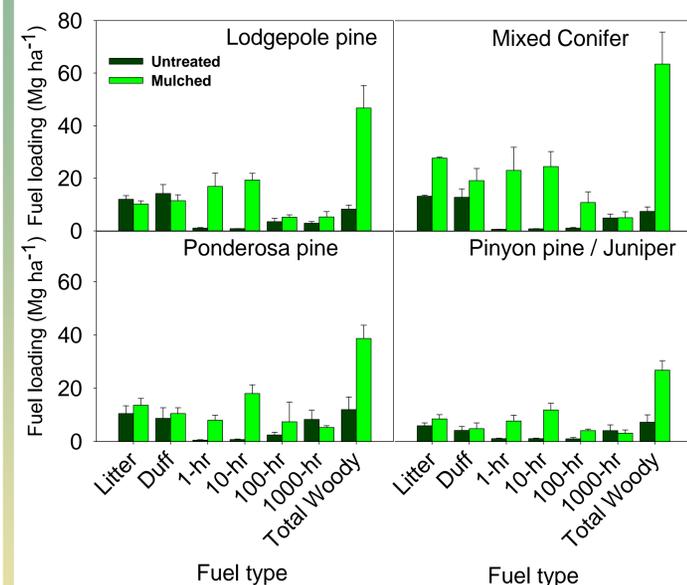


- Litter/Duff cover decreased with a concurrent increase in 1-hr and 10-hr woody fuels

- In the Pinyon pine / Juniper ecosystem, there was also a decrease in bare mineral soil

- No change in the cover of 1000-hr fuels

Surface fuel loads

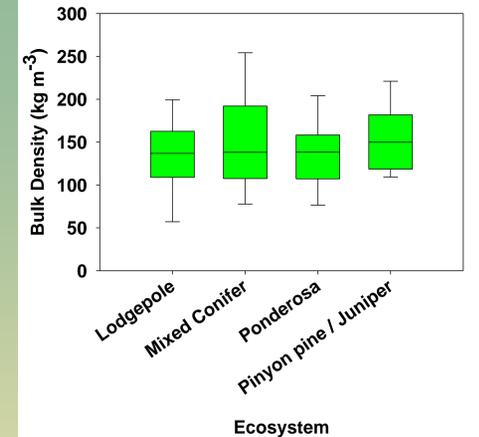


- Surface fuel loadings increased substantially (up to 4 times more fuel) in the mulched treatments for each ecosystem

- 1000-hr fuels represent 35 to 69% of total woody fuels in untreated areas, but only 8 to 14% in mulched treatments

- 1-hr and 10-hr fuels represent 67 to 78% of total woody fuels in mulched treatments

Fuel bed bulk density



- Mulching treatments create compact fuel beds



- Shift in fuel beds from a needle fuel bed to a needle/woody mix

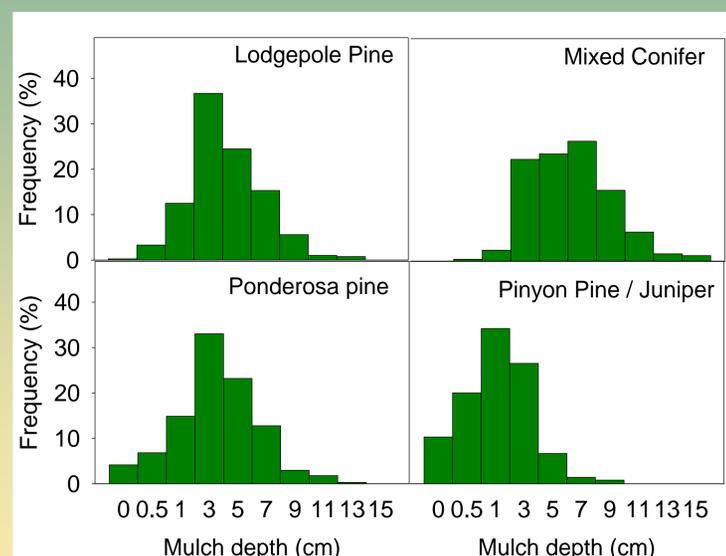
- Shift in fuel beds will likely alter surface fire behavior and fire effects

Mulch depth distribution

- Median mulch depth
 - Lodgepole: 3.8 cm
 - MC: 6 cm
 - Ponderosa: 3.3 cm
 - PJ: 1.4 cm

- Mulch deposition not homogeneous

- Variability in mulch depth in stands create different microsites



More research is needed

- The change in fuel bed characteristics will make it difficult to use existing fire behavior fuel models to estimate potential surface fire behavior

- Development of new fuel models and validation of these new models are needed

- The ecological response to mulching will likely vary with ecosystem, mulch quantity, mulch arrangement, and time since treatment

- Associated study has found that in the short-term:

- Mulch alters the soil microclimate in a way that favors microbial activity, decomposition, and nutrient turnover

- Impact to soil nitrogen is mulch depth-dependent and differs among ecosystems

- Herbaceous plant cover and non-native plant cover increases in some ecosystems