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The exclusion of fire from forests that historically burned on a frequent basis has affected stand structure and forest health conditions at the landscape scale. Many land managers are uncertain of the effects of prescribed fire on the overall health of forests due to primary mortality directly attributed to fire and especially secondary mortality caused by bark beetles and other insects. The objectives of this study are to evaluate primary and secondary impacts of prescribed fire as it pertains to tree injury and mortality in a fire dependent ecosystem in the Intermountain Region.
To achieve these objectives we have:
Established 800 single-tree plots comprised of ten, two-inch size classes from seven to twenty-five inches dbh of Douglas-fir and ponderosa pine.

Measured coarse woody debris, vegetation, litter, and duff on each plot to assess the fuel load that may affect each individual plot tree.

Fuel consumption will be related to fire intensity and severity, tree injury, primary mortality, and secondary insect related mortality.
Study Sites
The Danskin/Gallagher project is located within the Payette River Basin in southwest Idaho. The project area encompasses 8,126 acres located approximately 12 miles east of Garden Valley on the Emmett Ranger District, Boise National Forest, Boise County, Idaho.
Site characteristics for sample trees

1. Habitat type
2. Aspect in degrees
3. Slope in percent
4. Basal area using a relascope
5. Elevation
6. Stand structure
7. Tree position or crown class
8. Fuel model
9. Slope position
10. Slope horizontal shape

Sample plot radius is correlated with tree dbh, varying from 11.3 ft. to 17.6 ft.

Experimental Design

To assess the impacts of prescribed fire, 800 randomly selected single-tree plots within 4 treatment areas are being burned. Each area contains 100 Douglas fir and 100 ponderosa pine trees portioned into ten two-inch size classes.

Treatment areas 1 & 2 were established in 2001 and burned in 2002. Since the burns occur in a mosaic pattern, unburned plots will be used as control plots.

Herbs

Record as a group (graminoids and forbs):
1. Ocular estimate of canopy coverage (percent) by class, in the sample plot.
2. Percent of estimated canopy coverage that is dead.
3. Average height to the nearest 3 inches.

Shrubs

Record:
1. Ocularly estimated canopy coverage (percent) by species and class.
2. Percent of estimated canopy coverage that is dead.
3. Average height to the nearest 3 inches.

Conifers

Record conifers less than 6 inches dbh, by species, in the following size classes:

- <0 inches (that is, less than 4.5 feet tall);
- 4.5 feet tall and greater-1.9 inches;
- 2.0-3.9 inches;
- 4.0-5.9 inches;
- Canopy coverage (percent) by class live/dead, in the sample plot.
Landscape staples were used to determine duff consumption.
Plot trees were well-marked and identified with individual tree tags.
The fire treatment was applied aerially during the spring of 2002.
Sixty-one Douglas-fir and 129 ponderosa pine trees were treated with prescribed fire.
Postfire data was collected in 2002 to assess fuel reduction and fire impacts.
An average of 10 tons/acre or 47% of the duff layer beneath Douglas-fir trees was consumed by prescribed burning.
An average of 2.4 tons/acre or 56% of the litter layer beneath Douglas-fir trees was consumed by prescribed burning.
An average of 0.24 tons/ac or 60% of the 10HR fuels beneath Douglas-fir trees was consumed by prescribed burning.
An average of 0.80 tons/ac or 30% of the 100HR fuels beneath Douglas-fir trees was consumed by prescribed burning.
An average of 1.4 tons/ac or 32% of the 1000HR fuels beneath Douglas-fir trees was consumed by prescribed burning.
An average of 14.1 tons/ac or 64% of the duff layer beneath ponderosa pine trees was consumed by prescribed burning.
An average of 4.1 tons/acre or 75% of the litter layer beneath ponderosa pine trees was consumed by prescribed burning.
An average of 0.15 tons/acre or 45% of the 10HR fuels beneath ponderosa pine trees was consumed by prescribed burning.
An average of 0.50 tons/acre or 50% of the 100HR fuels beneath ponderosa pine trees was consumed by prescribed burning.
An average of 1.0 tons/acre or 64% of the 1000HR fuels beneath ponderosa pine trees was consumed by prescribed burning.
Percent crown volume scorched for burned trees in treatment areas 1 and 2 by DBH class.
Percent basal girdling estimated from four cambium samples for burned trees by DBH class.
Only 19 of the 400 trees in our study have not survived the 2002 prescribed burn. We are currently analyzing the fire severity data from the first burn. We are planning on applying prescribed fire to a second group of 400 trees in the spring of 2006.