Current Vegetation and Recent Mortality on the Umatilla National Forest

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Objectives

Vegetation inventory data has been collected on the Umatilla National Forest of Oregon and Washington over two occasions, the first in the early 1990s and the latest approximately 10 years later. An inventory has not been compiled since the early 1980s, and Forest users have recognized many vegetation changes since then. Major change agents include western spruce budworm (80% of the Umatilla NF had detectable defoliation between 1981 and 1992) and large wildfires (13,898 acres burned in 1986; 15,293 acres burned in 1987; and 72,517 acres burned in 1996). These disturbance processes changed the composition and structure of forest vegetation. Working jointly with the Umatilla NF staff, the Forest Inventory and Analysis (FIA) program of the Pacific Northwest Research Station and Region 6 Forest Health Protection compiled the latest inventory information and produced current estimates of vegetation cover type and standing timber volume of trees. In addition, issues related specifically to forest health include an analysis of recent mortality (trees that died between first and second measurements) and a summary for major insect and disease agents.

Background & Methods

The Umatilla National Forest, located in the northern Blue Mountains of northeastern Oregon and southeastern Washington, encompasses approximately 1.4 million acres. Over 20% of the Forest area has been designated as Wilderness. Forests are dominated primarily by conifer trees, ranging from warm and dry ponderosa pine forests to cool and moist subalpine fir forests at high elevations.

The two most recent inventories were conducted using the Region 6 inventory and monitoring system: Current Vegetation Survey (CVS). The plot design is a cluster of five subplots within a 2.5 acre circle. Plots are spaced on a 1.7 mile grid outside designated wilderness or with a 3.4 mile spacing for wilderness areas.

The 640 plots measured on the first occasion have been compiled using PNW-FIA's integrated database (IDB) for analysis. The 490 second occasion plots have also been loaded into IDB. These 490 remeasured plots are used to characterize current forest conditions and to analyze vegetation change between measurement occasions.

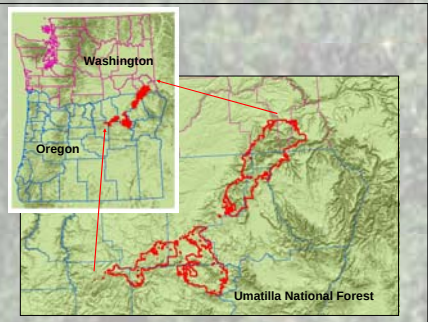

Figure 1 – The Umatilla National Forest is located in northeastern Oregon and southeastern Washington.

Results

Compilation of second occasion measurements reveal that of the 1.2 million acres of forest land, approximately two-thirds is comprised of 3 forest types: grand fir, interior Douglas-fir and ponderosa pine (*fig. 2*). No significant change in forest type occurred since the first occasion measurement. 13% of forest land is capable of supporting tree cover but is currently non-stocked.

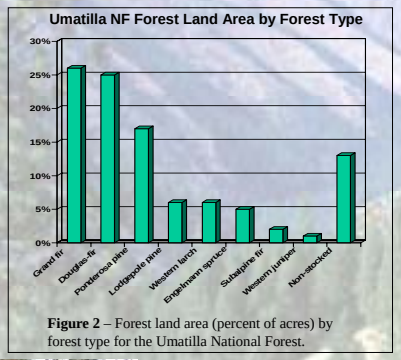

Figure 2 – Forest land area (percent of acres) by forest type for the Umatilla National Forest.

Young grand fir growing up through a western larch (dark stems) forest type.

Standing, live-tree volume shows that, like forest type, the majority of forest land volume currently comes from three main species: grand fir, interior Douglas-fir and ponderosa pine (*fig. 3*). Grand fir currently has 34% of the total standing volume. Since the grand fir and interior Douglas-fir forest types occupy about the same proportion of forest land (25% each), it appears that grand fir frequently occurs in forest types other than its own. Little difference was found between first and second occasion estimates of timber volume by tree species.

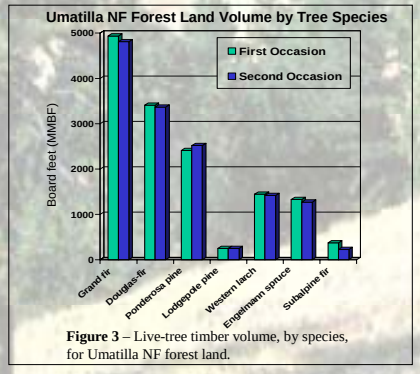

Figure 3 – Live-tree timber volume, by species, for Umatilla NF forest land.

There was approximately 490 million cubic feet of mortality volume between the first and second occasion measurements. Total mortality volume is predominately grand fir (39%) and interior Douglas-fir (23%), roughly proportional to the contribution made by these species to total live volume (*figs. 3,4*). Although ponderosa pine has 18% of the live volume, it accounted for only 8% of the mortality volume.

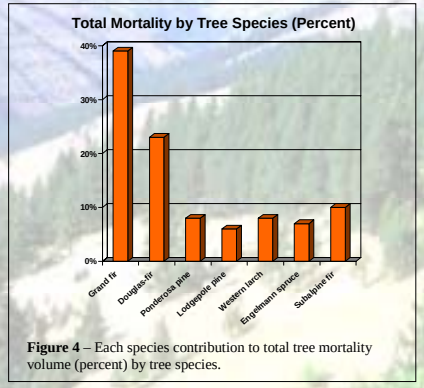

Figure 4 – Each species contribution to total tree mortality volume (percent) by tree species.

When trees died between the first and second occasion measurement periods, inventory crews attempted to determine the cause of tree death. The most commonly recorded cause of death was bark beetle attack, with over half of the mortality volume attributed to bark beetles (*fig. 5*). Slightly more than ¼ of the mortality volume was attributed to trees that fell over or had been physically damaged. This mortality group probably includes trees killed by insects or diseases but the inventory crews were unable to determine an exact cause of death at the time of remeasurement.

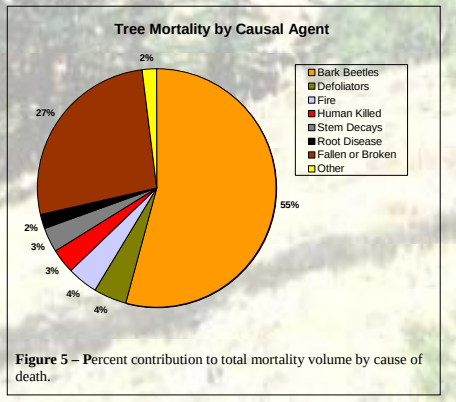

Figure 5 – Percent contribution to total mortality volume by cause of death.

Photographs of remeasured plots showing fire-caused tree mortality and post-fire regeneration on the Umatilla NF.

Is there a relationship between root disease and bark beetles? Figure 6 shows the percentage of tree mortality from bark beetles, both with and without root disease. Root disease was found on 9% of forest land and it caused 2% of the tree mortality volume. In grand fir, beetle-caused mortality was almost twice as great when root disease was present. In other species, the difference was minor.

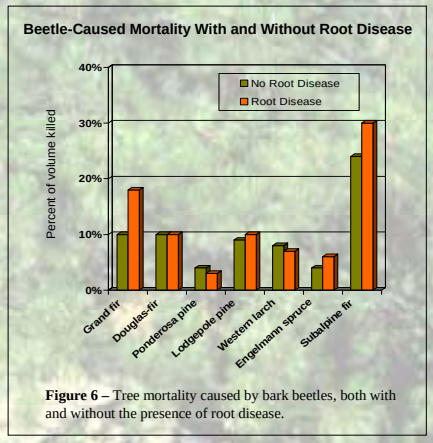

Figure 6 – Tree mortality caused by bark beetles, both with and without the presence of root disease.

Conclusion

We plan to further investigate how insects, disease and fire are affecting forest conditions. How these results compare with previous inventories for the Umatilla National Forest will also be examined. This poster presents initial findings from a cooperative project between FIA, Forest Health Protection and the Umatilla NF. The objective of this project is to examine vegetation conditions and forest health for one national forest. The final report will include additional information about biomass (standing and down), forest structure, wildfire risk assessment and distribution of tree sizes. This analysis provides information to help forest managers and the public understand current forest health conditions for the Umatilla NF.

For Further Information

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