Predicting Heartwood Decay in Apparently Sound Western Larch for Snag Retention and Management

Angela Daenzer, Department of Wildlife Biology, University of Montana, Missoula, MT 59812

Jack Ward Thomas, Emeritus- Boone and Crocket Professor of Wildlife Conservation, University \ of Montana, Missoula, MT 59812

Marcus Jackson, Plant Pathologist, USDA Forest Service-Northern Region Forest Health Protection, P.O. Box 7669, Missoula, MT 59807

Since many cavity-excavating birds require heart rot, managers routinely emphasize decayed trees in their snag retention prescriptions. Where too few trees are present with obvious indicators of decay, apparently sound trees are left to meet retention objectives. These trees may also contain decay, and may offer advantages in longevity and protection over more extensively decayed trees. Better information regarding conditions and heartwood decay-causing fungi important to heart rot in apparently sound trees would aid in retention decisions. We combined data from the 2003 Westside Reservoir and Roberts Fire burns with data from the USDA Forest Service Forest Health Protection's 10-year western larch (*Larix occidentalis*) merchantability study on the 2001 Moose Fire burn, all collected on the Flathead National Forest. We used dissection data from 284 apparently defect-free fire-killed western larch to predict the probability of heart rot related to tree age, diameter at breast height (dbh), elevation, aspect, habitat type, and heartwood-to-sapwood ratio. Fungi were isolated from trees with heart rot and identified through DNA analysis. We isolated *Stereum sanguinolentum, Echinodontium tinctorium, Sistotrema brinkmannii, Antrodia serialis, Phellinus chrysoloma*, and *Fomitopsis cajanderi* from trees in the three burn areas. All variables tested were significantly associated with probability of heart rot ($\mu = 0.05$), with age and dbh showing the highest predictive power through CART analysis. These preliminary findings support tree diameter as a critical characteristic in retaining trees most useable to wildlife, as well as retaining heart rot-causing fungi, which have undergone marked declines in other parts of the world.