

Sawing Operations in Stands Effected by Mountain Pine Beetle

Introduction:

The Northern Rockies is in an epidemic stage of mountain Pine Beetle attack. Large areas of forests are being converted to snag patches. This presents many new challenges for any types of timber falling operations on agency land. These large stands of even aged snags will present more and more of a falling hazard as time goes on until the epidemic has run its course and most of the snags have fallen. Employees may need to be trained on how to evaluate risks for felling operations not only at the tree level, but at the stand level.

Sizing up Beetle-Killed Trees:

- The first thing to look for when sizing up a tree in beetle kill is the condition of the stand that the tree is in. What proportion of trees in the stand have been affected by Mountain Pine Beetles, and how long ago was the attack?
 - Look for pitch tubes on the bole of the trees and frass(boring dust) coming from the holes and around the base of the tree.
 - Also look at the canopies. Trees under first year of attack will still be green to yellow.
 - The first two years after attack trees canopies will be red and will still be holding most of their needles.
 - Three years since attack and beyond, trees will appear grey and will lose more and more of their canopies from this point on. Observing a tree in the grey phase should be a clue that it may be decaying and unstable. Many studies have shown that the half-life (time it takes for half of the snags in a stand to fall) of beetle-killed trees lies somewhere between 6 and 9 years (Lewis and Hartley; Farris and Zach).
 - Look for hazards in the lay of the tree to be felled. The rotten tops and limbs of beetle-killed snags may snap readily with contact from other trees as they fall.
- Look for visual clues on the tree to be felled for signs of poor structural integrity.
 - Look at the condition of the canopy. As the snag ages, its branches will lose their needles, then the smaller “branchlets” will fall off of the larger branches, and finally, the larger branches will begin to drop.
 - Look for wood-pecker activity. Wood-pecker foraging and nesting can be tied closely to the level of insect infestation and wood decay in trees. At first, wood-peckers will “flake” the bark to find beetles in the outer cambium layer. As more “secondary” boring beetles infest the tree, drill

holes may appear as wood-peckers dig deeper to get at these insects. After about 5 years, nest cavities may begin to appear. Studies have shown that most species of wood-peckers require significant decay in trees to excavate nests(Farris et. al. 2002).

- Look for any other visual indicators such as conks, sloughing bark, broken tops, or any other clues to the extent of decay in the tree.
- Consider the species of trees in the stand, and the local environmental factors affecting the stand.
 - Ponderosa snags hold moisture much longer than lodgepole snags due to the thickness of their bark. Decay fungi cannot survive in wood with less than 20% moisture content(Lowell et.al.). This means that while a ponderosa snag may have extensive rot 2/3 of the way up the bole, under the same environmental conditions, the rot in a lodgepole snag may be confined to within a few feet of the ground. Because of this, lodgepole almost always break at ground level while Ponderosa have more of a tendency to break off incrementally down the bole(Everett et.al.). This is very important when considering the “safety circle” around ponderosa snags. Because ponderosa tend to decay further up the tree, they will have more of a tendency to have the tops break out or limbs break out while working under the tree. It is imperative for sawyers to maintain control of the felling area in these stands not only because of the instability of the tree being felled, but also because of the possibility of starting a domino effect to the other trees in the stand if something goes wrong.
 - The environment that the snags are in also plays a large role in the rate of decay. Decay propagates much more quickly in warmer, wetter conditions. When evaluating the condition of a stand, take into account elevation, aspect, position on slope, soil moisture, and overall average moisture in the area. All of these factors will contribute to how quickly the trees will decay.
- Physically examine the tree. Hit it with an axe, listen to hear how solid the tree sounds, and watch for any wobble in the top. Chip away the bark and look at the bole. Bore the tree to check for areas of structural decomposition.
- Watch the weather: **winds are the main mechanism causing the actual fall of decayed trees!** If moderate to high winds are observed or expected then it may not be safe to operate in the stand at all. Alternative methods such as blasting or mechanical felling may need to be considered if the stand is in advanced stages of decay and risk cannot be mitigated.