



Rehabilitation of Mountain Pine Beetle Impacted Stands: Thinking Critically

THE REHABILITATION OF MOUNTAIN PINE BEETLE (MPB) impacted stands is essential to mitigating the economic, environmental and social impacts of the MPB epidemic. Over 17.5 million hectares of forest are damaged or dead. What will happen to these dead stands if they are left untreated? What can and should be done to rehabilitate these stands? These are complex, important questions which need our attention.

To date, the primary response to the MPB infestation has been to accelerate the harvest of dead merchantable stands. Logging and reforestation done under existing tenures has rehabilitated a significant portion of the impacted area. However, due to the magnitude of the infestation, there is expected to be a large area of dead stands that will not be harvested. These stands will exist on the timber harvesting land base and within areas set aside for non-timber values and will consist of mature and immature stands. As the uplift harvest declines there needs to be greater focus on what might happen to remaining stands which are not expected to be harvested, and what can be done to minimize future risks and maximize future benefits.

MPB-impacted stands often have varying degrees of living trees in both the overstory and understory. Residual overstory trees typically consist of non-pine species and smaller diameter pine (relative to the size of the dead trees). Of this sub-population, priorities for rehabilitation would be the stands not expected to have enough residual overstory volume to be merchantable in the near future.

These stands also have varying degrees of stocking of understory trees. There is a wide range of densities, distribution, species composition and health among these trees. Stands that have low stocking of understory trees and limited prospects for future ingress of naturals are potential candidates for rehabilitation. Decision-making in stands that have abundant understory stocking is more difficult.

Left untreated, the risk factors to residual stocking in MPB-impacted stands include:

- damage to the residual overstory and

understory from the breakup of the dead overstory;

- losses to the residual overstory and understory due to windthrow and snow press;
- long-term resiliency and quality of understory stocking dominated by moderate to low densities of lodgepole pine (these stands are susceptible to many forest health agents and damage from animals);
- long-term risk of widespread losses due to catastrophic fire resulting from the build-up of surface fuels and the related increase in fire severity; and
- concerns for the long-term productivity and resiliency of understory advanced regeneration dominated by shade tolerant species in ecosystems where the natural fire regimes are more frequent and lodgepole pine naturally dominates.

Given the scale and complexity associated with decision-making in MPB-impacted stands, it should not be expected that the existing free growing system developed for reforestation of harvested areas will provide an adequate framework. As forest professionals, we need to understand that good decisions cannot be based on only what exists now but need to consider what is expected to happen over the long-term. Also, the complexity of addressing these risks increases in the face of uncertainty about what is going to happen without intervention. A long-term analytical approach at the stand and forest level, utilizing risk-based techniques and considering both timber and non-timber values is required. This approach must consider the health, resiliency, and quality of future managed forests (both MPB impacted and non-impacted).

For example, while it may seem that the most cost effective strategy for MPB rehabilitation is simple replanting of the dead stands, there are many risks to this strategy. In addition to the previously listed risks, underplanted seedlings face competition from brush and damage or mortality from various animals. Even with conservative estimates for losses to these

factors, the preferred decision quickly changes to more costly regimes which typically involve removing most to all of the dead overstory. This emphasizes the need to further integrate rehabilitation efforts through trying to utilize as much of the dead material as possible.

While overstory removal can be used to mitigate many risk factors, some risks, such as fire, must also be addressed at the landscape level. Creation of fire breaks and concentration of treatment regimes which involve fuel mitigation can be used to reduce the overall landscape scale fire risk. If investments are considered in isolation of major disturbances like fire, we risk losing years of investment in a single event that will have compounding impacts on the mid-term timber supply. Policies such as retention of secondary structure, while well-intended, may create more hazardous fuels in the long-term and may support conditions for the spread of existing forest health agents.

At the stand level, even though trees are green, there may be significant losses in wood quality, value, and associated merchantability if the risks of ubiquitous disease vectors are ignored when considering silviculture investments. While the path of least resistance may seem the most cost effective in rehabilitating MPB impacted stands, experience and observation tells us that future disturbance events may be as damaging as the mountain pine beetle and again undermine our best laid plans.

It is clear that existing silvicultural techniques cannot address all of the issues that we are facing in the effort to address reforestation of these complex sites. Our approach will evolve over the coming years as we learn the most effective ways to ensure a resilient future for MPB-impacted stands. 🌱

Bruce Blackwell, RPF, is the principal of B.A. Blackwell & Associates Ltd., a forestry consulting company located in North Vancouver.

Jeff McWilliams, RPF, is a senior associate with B.A. Blackwell & Associates Ltd. specializing in strategic forestry planning and practices.