



March 2018

Beyond Beetle

Natural and Facilitated Lodgepole Pine Regeneration after Mountain Pine Beetle Outbreaks in Alberta

Alberta is facing a future in which large tracks of lodgepole pine forest have died as a result of attack by Mountain Pine Beetle (MPB). Not all stands attacked by MPB will be salvage harvested; thus we need to understand whether and which tree species will regenerate in untreated post-attack stands and how this varies with ecosite and level of MPB mortality. Further, we need to understand the health of post-MPB stands. Together, this information will provide a clearer picture of the future successional development of stands. In addition, we need to explore operational treatments to facilitate regeneration in these stands and to understand the potential for undesirable side-effects of such treatments, such as impacts on fire risk.

Objectives

- Assess the potential for lodgepole pine regeneration post-MPB attack across a range of lodgepole pine ecosite types in west-Central Alberta for stands that have experienced varying levels of MPB-caused mortality.
- Assess health of residual live lodgepole pine and regenerating seedlings across a range of lodgepole pine ecosite types in west-Central Alberta for stands that have experienced varying levels of MPB-caused mortality.
- Develop operational-scale harvesting and site preparation treatments to rehabilitate pure lodgepole pine stands that have been partially killed by MPB.
- Assess the fire risk of forests receiving partial harvesting and mechanical site preparation treatments designed to facilitate tree regeneration.

Methods

Surveys of untreated post-MPB stands will be conducted in west-central Alberta to assess the extent of seedling regeneration and the factors contributing to this. Sowing experiments will be used to further clarify the conditions under which natural regeneration





is possible in these stands. Health of regenerating seedlings and residual live trees will be assessed in order to understand the probability of their future survival. Experimental trials of partial harvesting and site preparation will be established and monitored for natural regeneration and the survival of residual live trees, natural regeneration and planted seedlings. Fire risk associated with these treatments will be assessed using fuels assessments and modeling.

Outcomes

This research will provide critical information on the potential for natural regeneration in lodgepole pine forests that have been attacked by MPB, in turn informing a science-based approach to their future management. It will assist us to develop innovative silvicultural approaches for these forests. Further, it will provide the foundational knowledge upon which to build a decision support system that can be used to prioritize stands for different management approaches—whether that be salvaging, alternative silviculture, or “leave for natural.”



The Beyond Beetle project runs from March 2014 through March 2018. It is led by Ellen Macdonald, Professor of Forest Ecology; Victor Lieffers, Professor of Silviculture; Mike Flannigan, Professor of Fire Science; Nadir Erbilgin Professor of Forest Health and Entomology, Department of Renewable Resources; University of Alberta.