



FIA–FSP Forest Science Corner

Monitoring ecological changes in MPB-impacted stands

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Understanding the implications of mountain pine beetle-caused lodgepole pine mortality on stand structure and vegetation is critical in helping land managers develop strategies that will

mitigate the drop in mid-term timber supply and the loss of key natural forest habitats.

Fifty permanent research plots were recently established in lodgepole pine-dominated stands that have been heavily impacted by mountain pine beetle (MPB) within the Vanderhoof Forest District (Figure 1).

Plots are distributed throughout unsalvaged MPB stands on three different sites: 1) average sites in three common biogeoclimatic units within the Sub-Boreal Spruce Zone (30 plots); 2) dry sites (10 plots); and 3) stands that burned following MPB attack (10 plots). All plots are associated with a 2 to 5 ha reserve that will remain unharvested.

Within these plots, researchers will monitor changes in stand structure (e.g., snag and log recruitment), vegetation (e.g., species recruitment and loss, and species cover changes), functional wildlife habitat, and tree mortality and growth. The main purpose of this project is to monitor MPB-caused ecosystem changes over time, allowing researchers to examine the ecological and economic benefits and trade-offs of three potential management options: no interference, the use of prescribed burning, and conventional timber harvesting.

Initial results indicate there is:

- almost complete mortality (98%) of lodgepole pine above 22 cm diameter at breast height,

but variable mortality (21–98%) of smaller lodgepole pine;

- a wide variation in the density (125–7,175 stems per hectare) and basal area (0.7–23.2 m²/ha) of live non-pine tree species within the stands; and
- close to a 200% increase in height growth increment for understorey white and black spruce, and 175% for subalpine fir, two years following death of the lodgepole pine canopy.

The results of this project will assist researchers and managers to:

- improve growth and yield estimates for surviving naturally established trees in MPB-impacted stands and to determine their contribution to mid-term timber supply;
- determine changes in important wildlife habitat attributes (e.g., large snags, coarse woody debris [CWD], and berry-producing shrubs) over time;
- improve estimates of tree fall-down rates and CWD decay for input into recently developed models that track deadwood habitat supply; and
- improve estimates of changes in abundance and productivity of non-timber forest products due to increased understorey light conditions associated with MPB mortality.

The project was designed to be able to accommodate future studies in the established reserves, allowing for significant cost and time efficiencies. The plots have been randomly selected, include a substantial amount of supporting data, and the 2 to 5 ha reserves allow for both non-destructive and destructive sampling. We encourage other researchers to contact us for more information about the utility of the reserves for their research. 🌲

Acknowledgements

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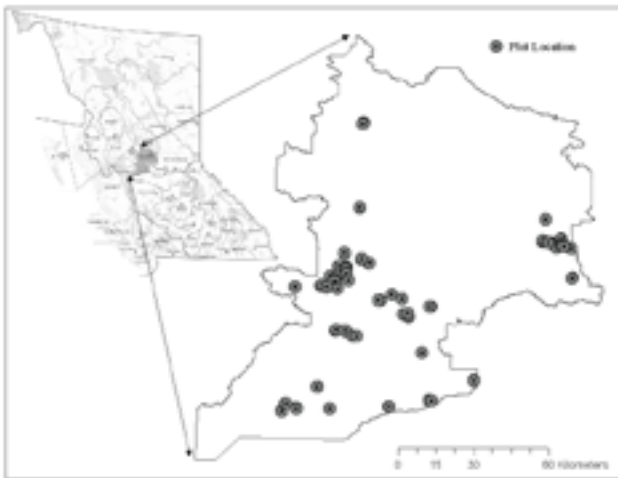


Figure 1. Fifty permanent plots were recently established in lodgepole pine-dominated stands.

More information

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