

ARE FREE-GROWING STANDS MEETING TIMBER PRODUCTIVITY EXPECTATIONS IN THE LAKES TIMBER SUPPLY AREA

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EXECUTIVE SUMMARY

The current administrative milestone for ensuring effective reforestation is the free-growing declaration. When the free-growing milestone is achieved, it is assumed that the young managed stand is on a trajectory that will result in a productive mature stand. Currently, no monitoring procedures are in place to determine if free-growing stands are meeting these expectations. This study examines whether the reliance that has been placed on this policy is supported by stand performance from a timber yield perspective.

Sixty randomly sampled free-growing stands were evaluated in the Lakes Timber Supply Area (TSA) in central British Columbia. Sample stands were grouped into two classes based on the number of years since free-growing declaration: half were declared between 1987 and 1994 (early), and the other half were declared between 1995 and 2001 (late). All sampled stands were greater than 15 ha in size, and were surveyed using fifteen 3.99 m radius survey plots.

We used the silvicultural planning model TIPSy to estimate projected volume at a rotation age of 80 years. The mean projected volumes at rotation based on free-growing declaration values were not significantly different from volume projections based on 2005 stand attributes for either the early or late groups. Based on declaration



attributes, the mean projected volumes for the early and late groups were 327 and 316 m³/ha, respectively. Using 2005 stand attributes, projected volume for the early and late groups were 324 and 314 m³/ha, respectively. These projected values closely match the projected values from the most recent timber supply data package for the Lakes TSA. The mean density of both well-spaced and free-growing stems has remained relatively stable since declaration with both the early and late groups at or close to 1000 well-spaced stems per hectare.

The only significant difference for the late group was the marked increase in forest pest incidence, which was also found in the early group. Over 27% of all declared free-growing, pine-leading stands had greater than 20% hard pine rust incidence, with pine-leading stands representing 90% of the sampled managed stands. The increase in pest incidence is probably due to a combination of increased recognition, as well as real increases in forest pests. The

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vast majority (84%) of pest-affected trees in stands that no longer pass the minimum stocking level (i.e., 700 free-growing stems per hectare based on the lower confidence limit test) are in the 4 m+ height class. In 2005, one of the stands in the early group was identified as being attacked by mountain pine beetle, with 70–75% of the trees infested. As of November 2007, mountain pine beetle had attacked an additional 10 stands in the early-declared group. The incidence of red-attack in these stands ranged from approximately 1% to close to 20%.

CONCLUSIONS

Our analyses suggest that free-growing declarations may occur too early in the life of stands to provide an accurate projection of future stand productivity. The likelihood of making overly optimistic projections of stand productivity increases the earlier stands are declared free-growing, as the influence of forest health factors is not yet realized. Our study involved an intensive examination of stand conditions on the ground and demonstrates the importance of more intensive monitoring of free-growing stands. A mid-rotation assessment of stand productivity and forest health would provide more confidence particularly in light of climate change. A program to survey post-free growing managed stands should be developed. We intend to conduct similar assessments in other timber supply areas.

RECOMMENDATIONS

Management of forest and range resources is a complex process that often involves the balancing of ecological, social, and economic considerations. Many FREP monitoring reports represent a single facet of this process. Based on monitoring data and analysis, we offer the following recommendations for consideration to those who develop and implement forest and range management policy, plans, and practices.

1. Although the majority of free-growing stands in the Lakes TSA are currently meeting timber productivity expectations, those that are not are dominated by lodgepole pine and have low initial densities, which are further compromised by forest health agents. In areas where species options are limited to lodgepole pine, increasing initial planting densities should be considered¹. In areas where species options are not limited, we recommend increased species diversity.
2. Silviculture survey training and accreditation should include a mandatory update of forest health agent field identification training to ensure that free-growing

1 In lodgepole pine dominated stands where hard pine rust incidence is high, initial planting densities of 1600 sph too often lead to insufficiently stocked stands post free-growing. Based on local experience the Regional Pathologist recommends 2500 sph.

surveys accurately capture the incidence of forest pests. We also recommend closer field inspections of contract survey work to ensure forest health agents are properly identified.

3. Mid-rotation field assessments of stand productivity and comparison of current volume with TASS/TIPSY projections would improve the level of confidence in timber supply projections and help refine the TASS/TIPSY models. Methods specifically designed to accomplish this need to be developed. This would include developing a field protocol for the collection of data suitable for input into TASS/TIPSY as well as possible modifications to TASS/TIPSY to facilitate these assessments.
4. For a stand to be declared free-growing, the 90% lower confidence limit (LCL) associated with the estimate of the mean should be greater than the minimum acceptable stocking level. Using the LCL decision rule would significantly reduce the liability of the Crown when accepting understocked stands as free-growing.
5. TSA performance measures could include a requirement for an acceptable minimum proportion of stands to remain free-growing. To accomplish this, a minimum stocking threshold for post-free-growing stands should be established that better represents stands at this stage of development (i.e., a minimum of 700 free-growing stems per hectare may not be appropriate for a 35-year-old stand).
6. Our analyses suggest that free-growing declarations occur too early in the life of stands to provide an accurate projection of future stand productivity. A mid-rotation assessment of stand productivity and forest health would provide more confidence. A program to survey post-free growing stands should be developed. Survey results should populate a new inventory of managed stands in the province.
7. Policy-makers should consider how well free-growing policy will continue to uphold the B.C. Ministry of Forest and Range's stewardship mandate, given the uncertainty associated with the direct and indirect effects of climate change. A free-growing designation presupposes that young trees will continue to grow and thrive in a relatively stable environment.

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