Modelling Natural Regeneration in Mountain Pine Beetle Affected Stands: A Hybrid Model Approach

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Introduction
A large portion of the BC’s long-term timber supply will come from stands that have gone unsalvaged following Mountain Pine Beetle (MPB) attack. Estimating regeneration levels in these stands is challenging as stand structure is highly variable.

Stand Dynamics Following MPB attack:
1. Highly variable snag fall rates
2. Understory release of Spruce and Douglas Fir
3. Dynamic light conditions, particularly at the regeneration layer.

High Variability in Regeneration Levels = Difficult to Model

Approach
Candidate Models to Model Natural Regeneration and Provide Mid to Long-term Growth Estimates:
1. SORTIE-ND
2. PrognosisBC

Models were evaluated for use in BC’s southern interior

Hybrid Model Approach

Hybrid Model Approach:
Integrate Advantages of SORTIE-ND and PrognosisBC

Advantages of Hybrid Model Approach:
1. Uses process-based behaviours from SORTIE-ND to estimate regeneration rather than trying to explicitly model highly variable regeneration level using empirical data.
2. Uses reliable empirical relationships in PrognosisBC to grow trees and obtain estimates of yield.
3. Uses existing models – avoids need to develop new model

Main Outstanding Question:
1. How to define ‘hand-off’ point between SORTIE-ND and PrognosisBC?

Next Steps
1. Adjust Crown Allometry in SORTIE
2. Adjust Height / Diameter Allometry in SORTIE

Crown Allometry

Outstanding Issues

1. How to determine hand-off point between SORTIE-ND and PrognosisBC?
2. Does the Hybrid Model improve upon MSN results?
3. Does the Hybrid Model improve upon SORTIE alone, Prognosis alone?
4. How to test this?

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