

# CENTRE FOR ENHANCED FOREST MANAGEMENT



## ADVANCES IN FORESTRY RESEARCH

DEPARTMENT OF RENEWABLE RESOURCES

EFM RESEARCH NOTE 06/2007

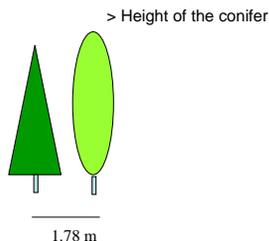


### Free-to-grow standards are poorly linked to growth of spruce in boreal mixedwoods

VICTOR J. LIEFFERS, KEN J. STADT AND ZHILI FENG

Free-to-grow (FTG) standards were instituted to ensure that conifer trees in juvenile surveys would not grow under excessive competition. The Alberta conifer FTG standard requires that a crop tree have no overtopping hardwood or shrub within a 1.78m radius. Achieving enough FTG trees across a cutblock requires at least one tending treatment with a significant cost. To our knowledge no one has tested the efficacy of the FTG standards for prediction of growth.

Fig. 1 This tree fails the conifer FTG Standard



We used the Stand Dynamics System permanent sample plots from Alberta SRD to make this test. We used a measurement at age 13 or 14 and then another two measurements at or after year 18. We used the spatially-mapped positions of the trees and their height and diameter measurements. This allowed us to determine if the planted spruce in the plots that were FTG at year 13-14 and determine if trees that reached FTG status actually grew faster than non-FTG trees. We also assessed if height attained at year 14 was a good predictor of growth.

**Findings:** Neither height growth (Fig. 2) nor diameter growth after year 18 (data not shown) were affected by whether or not trees were classed as FTG. The height attained at year 13, however, was a useful predictor of future growth. Tall trees at year 13 tended to be faster growing later.

**Implications:** The poor prediction of growth by FTG may be related to several factors:

- 1) The mil-hectare plot is too small to address the competitive environment around the conifer tree.
- 2) FTG criteria and other competition indices that include the size of the subject tree relative to its

neighbours may overestimate the competitive effect of neighbours as they do not distinguish competition from the genetic, microsite or other factors affecting growth.

3) Shade tolerant spruce may be more tolerant of competition by hardwoods than has been previously thought.

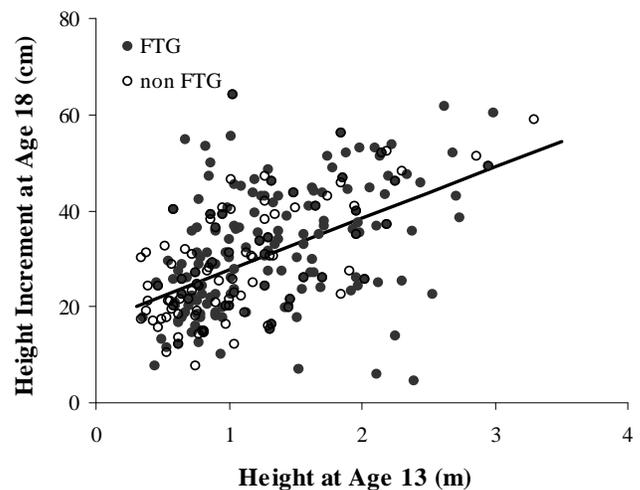


Fig. 2. Height increment vs. height at age 13 for white spruce crop trees. Note that there was no difference in growth due to FTG status.

Since height attained at year 13 is a good predictor of growth after year 18, and our earlier studies show stands near year 18 have as much hardwood competition as they ever will, height assessment is a much more useful survey measure than free-to-grow.

**Funding** was provided by the Mixedwood Management Association, NSERC, West Fraser and Weyerhaeuser. Alberta SRD provided the SDS data set.

#### Further Information:

Lieffers, V.J., Stadt, K.J. and Feng, Z. 2007. Free-to-grow standards are poorly linked to growth of spruce in boreal mixedwoods. *For. Chron.* December Issue.

Lieffers, V.J., Pinno, B.D. and Stadt, K.J. 2002 Light dynamics and free-to-grow standards in aspen-dominated mixedwood forests. *For. Chron.* 78: 137-145.

<http://www.cefm.rr.ualberta.ca/>

Centre for Enhanced Forest Management, Dept. of Renewable Resources, U. of A., Edmonton, AB T6G 2H1

[Victor.lieffers@ualberta.ca](mailto:Victor.lieffers@ualberta.ca)