

# CENTRE FOR ENHANCED FOREST MANAGEMENT



## ADVANCES IN FORESTRY RESEARCH

DEPARTMENT OF RENEWABLE RESOURCES

EFM RESEARCH NOTE 03/2010



### Regeneration of hardwoods in variable retention harvest systems – the EMEND experience

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Variable retention, i.e., leaving residual trees in cutover areas, has become standard practice as a way to maintain forest biodiversity after logging. There has been less research, however, on understanding how variable retention influences forest regeneration in particular hardwood regeneration. The EMEND experiment is a replicated experiment where boreal mixedwoods of different composition (Deciduous, Mixedwood and Coniferous) were cut leaving different levels of residual trees (0, 10, 20, 50, 75 and 100% residuals).



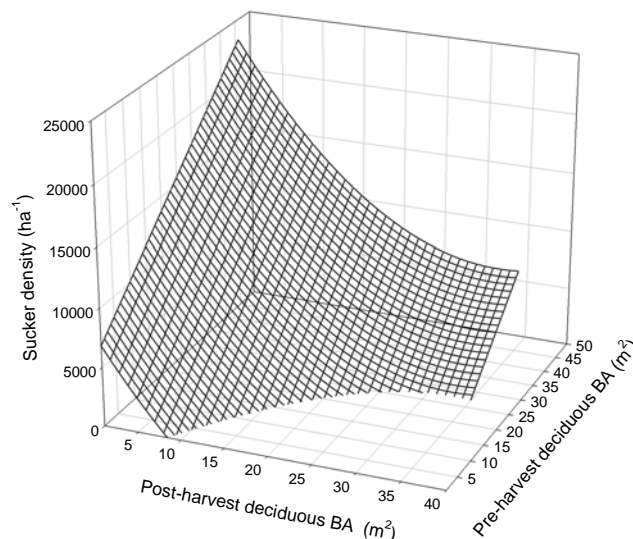
The EMEND experiment covers nearly 1000 Ha and ~100 cutting units of about 10 Ha.

**Methods:** Nine year after harvest, the regeneration of aspen and balsam poplar was evaluated at the stand level for the three stand composition and six residual density treatment combinations.

**Results:** While stands with higher hardwood basal area (BA) prior to logging produced more hardwood regeneration after logging, higher levels of hardwood tree retention resulted in decreased sucker regeneration. With as little as 20% of the original basal area retained, sucker regeneration density declined by 50%.

Retaining mature spruce trees in the stand had little influence on the number of suckers but did affect their growth and total volume per hectare.

Models for the prediction of hardwood regeneration based on pre and post harvest hardwood and softwood BA were developed.



Hardwood sucker density in relation to the amount of mature hardwoods in the stand before and after logging.

**Implications:** The hardwood regeneration density and subsequent growth performance can be predicted by knowing the amount of hardwood basal area prior to logging and by varying levels of retention of basal area of hardwoods and softwoods after harvest; thus hardwood regeneration can be manipulated to fit the needs of mixedwood forest management.

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#### Further Information:

Gradowski, T. Lieffers, V.J., Landhäusser, S.M., Sidders, D., Volney J. and Spence, J.R. 2010. Regeneration of aspen nine years after variable retention harvest in boreal mixedwood forest. *Forest Ecology and Management*. 259: 383-389.

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

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

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