

## Effects of Early Herbaceous and Woody Vegetation Control on Eastern White Pine

D.G. Pitt<sup>1</sup>, W.C. Parker<sup>2</sup>, A. Morneau<sup>3</sup>, L. Lanteigne<sup>4</sup>, A. Stinson<sup>5</sup>, F.W. Bell<sup>2</sup>

<sup>1</sup>Canadian Forest Service, Great Lakes Forestry Centre, 1219 Queen St. E., Sault Ste. Marie, ON P6A 2E5

<sup>2</sup>Ontario Forest Research Institute, 1235 Queen St. E., Sault Ste. Marie, ON P6A 2E5

<sup>3</sup>Ontario Ministry of Natural Resources, 3301 Trout Lake Rd., North Bay, ON P1A 4L7

<sup>4</sup>Canadian Forest Service, Atlantic Forestry Centre, P.O. Box 4000, Fredericton, NB E3B 5P7

<sup>5</sup>Tembec, Canadian Ecology Centre, Box 430, #6905 Hwy 17 W, Mattawa, ON P0H 1V0

Eastern white pine (*Pinus strobus* L.) is one of North America's most valuable softwood species. Historically, it thrived in regions characterized by frequent, low-intensity fires that created favourable regeneration conditions. Declining frequency of such fires, coupled with competition, insect, and disease problems, has seriously impeded white pine regeneration efforts. A greater understanding of the vegetation conditions favouring white pine survival, growth, and stem quality would enable more effective management of early stand conditions in the absence of fire.

In 2000, an experiment with 3 installations was initiated to quantify the temporal and spatial effects of woody and herbaceous vegetation on white pine seedlings. A response surface design is being used to combine and test different durations of herbaceous vegetation suppression (0, 2, and 4 years) with various timings of woody vegetation release (time of planting, after second growing season, after fifth growing season, and never). Four different hardwood densities are being studied: 0, 5000, 10000, and 15000 stems per ha. The research sites, situated near North Bay, Ontario, and Doaktown,

New Brunswick, address the clearcut and 2 gradients of the shelterwood regeneration systems. After 4 growing seasons, white pine subjected to woody competition control had 1.2 to 1.4 times the stem volume of trees left untended, the earlier release providing the larger gains. In contrast, pine receiving 2 growing seasons of herbaceous competition control averaged 4.3-fold gains in stem volume over untreated trees. Two seasons of herbaceous control, coupled with woody vegetation control, after the 2nd growing season or at the time of planting, increased these gains in volume to 6.0- and 7.7-fold, respectively. These responses to early vegetation control challenge the current operational strategy of planting, waiting 2 growing seasons, and then broadcast releasing with glyphosate (i.e., providing both woody and herbaceous control after the second growing season), which provided 3.0-fold volume gains over untended pine. White pine height growth and weevil avoidance were greatest with either an aspen or a mature pine (shelterwood) overstory, suggesting that early herbaceous competition control and maintenance of a moderate overhead canopy may maximize white pine stem growth and quality.