



# Project Impacts

NSRC-FUNDED RESEARCH FINAL REPORT

## *Soil-Site Influences on Northern White-Cedar Stem Quality and Growth*

PROJECT AWARD YEAR AND TITLE:

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*Soil-Site Influences on Northern White-Cedar (Thuja occidentalis) Stem Quality and Growth*

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Photo courtesy of U.S. Forest Service

Northern white-cedar is a valuable tree species in the northern United States and adjacent Canada. Recent U.S. Forest Service Forest Inventory and Analysis (FIA) data for Maine indicate that cedar growth rate is the lowest of all commercially valuable softwood species, and the volume of cedar has declined since 1995. Forest products industries in this region are concerned about reduced regeneration, growth rate, stem quality, and overall sustainability of the northern white-cedar resource.

To better understand factors controlling growth rate and degree of stem decay of northern white-cedar, a previous study of sites in Maine was conducted that defined growth and health characteristics of cedar and related those factors to a widely used site evaluation index (Briggs site classes), largely based on soil drainage properties. However, soil drainage factors were not well correlated to northern white-cedar growth and health. To better understand factors governing northern white-cedar growth and health, NSRC researchers analyzed soil chemical properties at 10 of the original sites to see if soil chemical factors would improve predictions of cedar site quality.

Results show that better cedar growth rates and health appear to be associated with higher soil calcium concentrations and lower soil acidity. This is consistent with the known effects of soil acid-base balance on plant growth in many ecosystems. Results also suggested that site classes should consider the organic matter content of the soil. The findings further the understanding of this species, but additional research is essential to determine the factors limiting northern white-cedar regeneration, health, and growth and to develop sustainable management guidelines.