Assisted Migration

Assisted Migration Adaptation Trial (AMAT)

Background

Approximately 300 million tree seedlings are planted in the western USA, British Columbia (BC) and Yukon each year. Many climatologists predict that the climate could be 3-4°C warmer when those trees are harvested 60-80 years after planting. These changes to climate will expose trees to increased stress and health risks, compromising the many goods and services we receive from our forests. Consequently, BC Forest Service researchers, with the assistance of the USDA Forest Service and industry, have initiated a large, long-term climate change research study - the Assisted Migration Adaptation Trial (AMAT) - to better understand tree species climate tolerances.

Objective

The AMAT seeks to better understand the growth and health of reforestation seed sources from BC and north western United States when planted across a range of climates and latitudes. This information will be used to identify species and seed sources best adapted to future climates of planting sites, in order to maintain healthy productive plantations.

Experimental materials and test sites

Forty-eight seed sources from 15 tree species originating from BC and the north-west states are being tested at 48 field test locations between southern Yukon and northern California.



Fifteen tree species being tested in the AMAT. (photo Dr. Ward Strong)

Abies amabilis - Amabilis fir Abies grandis - Grand fir Abies lasiocarpa - Sub-alpine fir Betula papyrifera - Paper Birch Callitropsis nootkatensis - Yellow cypress Larix occidentalis - Western larch Picea glauca × P. engelmannii - Interior spruce Picea sitchensis - Sitka spruce Pinus contorta - Lodgepole pine Pinus monticola - Western white pine Pinus ponderosa - Ponderosa pine Populus tremuloides - Trembling aspen Pseudotsuga menziesii - Douglas-fir Thuja plicata - Western redcedar Tsuga heterophylla - Western hemlock



Tree Improvement Branch Ministry of Forests, Lands and Natural Resource Operations



FGC MMA Forest Genetics Council of British Columbia

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Design

Thirty-two seed sources were planted at each test site in a Randomized Complete Block Design containing four blocks. Within each block, each seed source is represented by 25 trees planted in a 5 × 5-tree square plot at a spacing of 2.5 m. Stakes identify the centre tree of each plot, and labels on the stakes identify the seedlot.

Methods

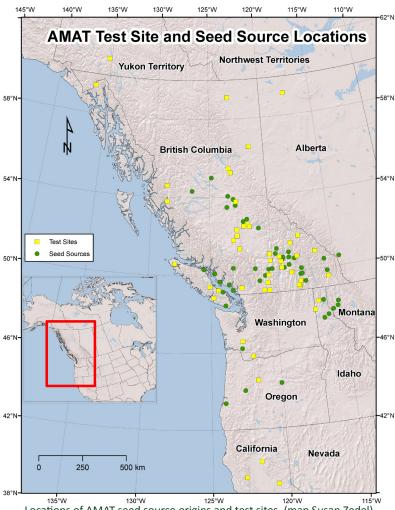
Twelve test sites were established each year for four years, beginning in 2009. Growth and health of each seed source at each site will be assessed every five years. Response functions will be developed relating growth and health to the climate and latitude of the sites in which each seed source is tested. These relationships will facilitate identification of the best adapted seed sources for any location in a changing climate, helping to ensure that future plantations are healthy and productive.

Funding and technical assistance

- BC Ministry of Forests, Lands and Natural Resource Operations
- **BC** Forest Genetics Council

AMAT Collaborators

Alberta Forest Service Ardew Wood Products **ATCO Wood Products** Brinkman Forest Ltd. **Coast Tsimshian Resources Gorman Brothers GRO TRZ** Inland Empire Paper Company Inland Empire Tree Improvement Cooperative **Island Timberlands** Landmark Solutions Louisiana Pacific Canada **MFLNRO** - Tree Improvement Branch **MFLNRO - BC Timber Sales** MFLNRO - Fort Nelson, Kamloops, Rocky Mountain **Revelstoke Community Forest Corporation**



Locations of AMAT seed source origins and test sites. (map Susan Zedel)

Sierra-Pacific Industries State of Alaska, DNR, Department of Forestry Stella-Jones Inc. Tembec Inc. **Tolko Industries UBC Alex Fraser Research Forest UBC Malcolm Knapp Research Forest USDA FS - Deschutes National Forest** USDA FS - Gifford Pinchot Nat Forest/PNW Res Stn **USDA FS - Mendocino National Forest** USDA FS - Priest River Exp Forest/RM Res Stn **USDA FS - Tahoe National Forest** West Fraser Timber Company Western Forest Products Weyerhaeuser Canada and USA

Yukon Department of Energy, Mines and Resources

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For more information, including a list of seedlots, test sites, publications and media reports, see: http://www.for.gov.bc.ca/hre/forgen/interior/AMAT.htm