

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

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

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/for/gen/interior/AMAT.htm>

