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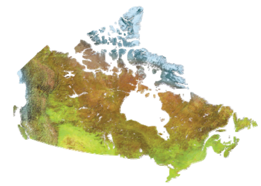
The Great Lakes Forestry Centre (GLFC)



Petawawa Research Forest

Overview

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The Petawawa Research Forest (PRF) was established in 1918 as a result of the efforts of R.H. Campbell, Director of the Federal Government's Forestry Branch. Campbell lobbied for and received $6,000 to begin forestry research with the idea that systematic investigation, periodically observed, was the only way to develop sound estimates for growth and yield and to calculate the results of silviculture treatments for Canada’s forests.It was decided to begin with a forest experiment station modeled after the successful agricultural experimental stations.The Petawawa site had been cut over for pine and was an ideal site to study this important species. From a small tent camp on the shores of Corry Lake was born what would become one of Canada’s most intensively measured and monitored forests.

Eighty-nine years later Petawawa contains a legacy of research spread over 10,000 ha, which is conservatively valued at $125 million. The research assets include:growth and yield permanent sample plots (500 PSPs), various silviculture studies (100+),research plantations (125), intensive forest management plots (1100), genetics trials (300), forest fire research sites (100), ecological reserves (13), and remote sensing (30 sites). Additional data sets include >25,000 photos, air photos back to 1930s, more than 700 unpublished internal reports, and 300 project files.

For further information:

http://cfs.nrcan.gc.ca/pages/270?lang=en_CA

Investing in seed stock: How CFS is helping China become green again

Overview

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Canada

Beginning in the 1970s, Liaoning Province in Northeast China implemented an ecological construction program to reforest the province's depleted forest areas. However, several of the native species did not perform very well. Liaoning called upon Canada, and an international partnership was formed to undertake species introduction with the goal of restoring Liaoning's forest cover and increasing the environmental and economic benefits a forest provides.

Ben Wang, now a Scientist Emeritus at the Petawawa Research Forest, carefully considered the climate, soils and geographic location of the areas to be planted in China and matched these characteristics with sources of tree seed from Canada. The project started with 17 tree species from 130 seed sources with the idea of starting genetically broad then narrowing down into a land race.

Twenty-year results indicate that jack and white pine from the Upper Ottawa Valley outperform the native pines because they are tolerant of a wide range of conditions. In fact, the project has gone so well that Liaoning has ordered more than 50 million pine seeds from Ontario to assist with their five-year planting goals.

The next stage is to establish seed orchards and seed production areas within Liaoning to allow them to grow their own seedlings and to test silvicultural options. Ultimately, the program should develop local or regional land races that can produce seeds in Liaoning's own orchards. This successful cooperative project is a worldwide model for species introduction, which has proven to be economically and environmentally beneficial in many regions around the world.

For further information:

Wang, B.S.P.; D'Eon S.P.; Dong J. 2006. Introduction of Canadian tree species to the Northeast of China.The Forestry Chronicle 82: 219-225.

Long-term silvicultural studies

Overview

Forest management is based on knowledge of the dynamic responses of forests to disturbance, treatments, and natural progressions over long periods of time.

Forest management is based on knowledge of the dynamic responses of forests to disturbance, treatments, and natural progressions over long periods of time. Much of this knowledge comes from long-term silvicultural or ecological studies. Sometimes the later results from these long-term studies confound earlier expectations, leading to new ways to manage forests.

White pine is one of the dominant species in the research forest. It is prized for its lumber as well as its ecological values. Rotation ages for pine stands were originally planned to be 100 years in the 1940s. This was modified to age 80 or 110 in the 1960 management plan. The 1990 management plan returned to 100 year rotation age. Changes in rotation age have an impact on many aspects of forest management including allowable harvest levels.

In 1948 a stand of 115-year-old white pine with intolerant hardwoods near Race Horse Road in the Petawawa Research Forest was set aside and measured as an ecological reserve to observe the natural succession as this overmature white pine rapidly died out and the hardwoods took over. At the time these ecological reserves generated little scientific interest as no manipulative treatments could be tested. Nature took its course and the stand was remeasured in 1971, 1981, and 1998 with the surprising result that the white pine did not die out but instead kept on growing at decent rates even at age 150+ (3.2 m^3/ha/year). Individual trees tower over 40 m with diameters near 100 cm. With this new information in mind, extended rotations from 140 to 160 years are planned for selected sites in the research forest. What started out as a scientifically unpopular monitoring plot has demonstrated unique information that is now being used in our management regimes.

Provenance tests and climate change

Overview

Trees are unique because they cannot move if conditions where they are growing become unfavourable.

Trees are unique because they cannot move if conditions where they are growing become unfavourable. They must adapt or migrate by spreading their seed to new locations where conditions are more favourable. Thus over a tree species' range there are differences in genetics as these adaptations to local conditions manifest themselves.

A provenance test involves taking seeds of the same species but from different geographic origins and planting them at the same site. The original intent of these tests was to find the best growth and survival and to quantify genetic variation. Several series of provenance tests were established across the range of commercial conifer species with about 25 planted at Petawawa. Now these tests are being used to simulate the effects of climate change by studying northern seed that is moved to warmer southern environments and grown for 40 years.

Given that the climate is changing, should foresters today plant seed sources adapted for the climate of tomorrow? Since trees need to survive over long periods should we plant sources adapted for the predicted climate of 2020? 2050? 2080? Working with partners from Lakehead University and the Université du Québec en Abitibi-Témiscamingue, Petawawa Research Forest's long-term provenance tests are contributing to detailed analysis to answer these types of questions by identifying and selecting genetic adaptations within species that will survive and adapt to predicted future climates.

Upcoming events

Complex Stand Structures and Associated Dynamics: measurement indices and modeling approaches (An IUFRO-sponsored scientific conference)
July 29 - Aug. 2, 2007, Sault Ste. Marie, Ontario
http://iufrosault.org

National Forest Week: September 23 to 29, 2007

National Science and Technology Week: October 12 to 21, 2007

Forest Pest Management Forum: December 4-6, 2007
http://cfs.nrcan.gc.ca/pages/267

GLFC recent publications

If you would like to order any of the publications listed below, please contact Publications at the following e-mail address: glfc.publications@nrcan.gc.ca

de Groot, P., Biggs, W.D., Lyons, D.B., Scarr, T.; Czerwinski, E., Evans, H.J., Ingram, W., Marchant, K. 2006. A visual guide to detecting emerald ash borer damage. Natural Resources Canada, Canadian Forest Service, Great Lakes Forestry Centre, Sault Ste. Marie, Ont. 16 p.

Lyons, D.B., Caister, C., De Groot, P., Hamilton, B., Marchant, K., Scarr, T.A., Turgeon, J.J. 2007. Survey guide for detection of emerald ash borer. Natural Resources Canada, Great Lakes Forestry Centre, Sault St. Marie, Ontario, Canadian Food Inspection Agency. 52 p.

Ric, J., De Groot, P., Gasman, B., Orr, M., Doyle, J., Smith, M.T., Dumouchel, L., Scarr, T.A., Turgeon, J.J. 2007. Detecting signs and symptoms of Asian longhorned beetle injury: Training guide. Natural Resources Canada, Great Lakes Forestry Centre, Sault St. Marie, Ontario, Canadian Food Inspection Agency. 118 p.

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