

Our National Research Forests: Continuing to Answer Important Forestry Questions

Katalijn Kooper

Canada's two oldest national research forests, Petawawa and Acadia, are celebrating their 90th and 75th anniversaries respectively this year, marking many years of renowned and remarkable research.

Over the years, both Petawawa and Acadia have been front-runners in answering many different forestry questions. The research conducted at these forests is very diverse ranging from tree breeding and tree seed to fire research, forest ecology, forest ecosystem and remote sensing. Results derived from this research form the basis of real-life management plans and regeneration models, along with several growth and yield models.

In fact, Gary Warren, an NRCan forest pathologist from Newfoundland, is currently tackling the mysteries of a hidden enemy — root and butt rot in balsam fir — and the effect this important disease has on this species. Although there are differing opinions on what types of forestry practices can manage this disease, his recent research at Acadia indicates that pre-commercial thinning in balsam fir has increased the incidence of rot in mature trees. This research shows that it is fundamental for forest managers to account for this in their harvesting options and wood supply calculations.

Similarly, at Petawawa, university researchers from Toronto, Laval and Montreal are setting up studies in 40 to 60 year old white spruce plantations to learn about the effects of root rot on crown size and wood quality. We look forward to the results this interesting study will produce.

The Petawawa Research Forest was the first place in Canada where systematic research was conducted on how to establish and grow stands of trees. Numerous species were planted at a variety of spacings and on many different sites. This allowed researchers to measure trees at regular intervals and track and analyze the growth, development and performance of the plantations.

A prime example is a red pine spacing and thinning trial established in 1953 at Petawawa by Will Stiell. He examined a variety of different planting distances ranging from 1.2 to 6.1 m, along with different thinning treatments. Recently, these plots have been examined by NRCan researchers and scientists from FPInnovations. After more than 50 years, it has recently been determined that the most promising red pine spacing option is 1.8 to 2.4 m with periodic thinning and a rotation of about 60 years. A narrower spacing had higher establishment costs and lower growth, while wider spacings had lower revenue due to lower fibre quality. These results have been incorporated into the latest growth and yield predictive models.

Petawawa was the first place in North America where research was done on logging damage in conifers. Outcomes of these studies allowed loggers and other forest workers to use different methods in order to minimize damage and forest managers were allowed to better predict the expected logging damage. This research at Acadia

continues today. NRCan forester Ed Swift recently completed commercial thinning studies using mechanized harvesters on balsam fir stands.

“Supporting forester operator training and motivation is important,” says Ed. In fact, motivated, well-trained operators had significantly lower damage on residual balsam fir trees than had been previously reported in the literature (5–10% damage compared to 30–60%).

Fire research at Petawawa is also well recognized. For example, results of research on prescribed understorey burning in white pine stands have been included in training and operational understorey burns in Ontario and Quebec. Ontario’s understorey prescribed burn expert system for white pine management (UPBX), a large rule-based/neural network expert system that guides managers in their decisions as to the appropriateness of a specific site, incorporates the research and experience with the types of burns conducted at Petawawa.

Fire research at Petawawa also formed the basis for the development of a Fire Weather Index System, which is used worldwide to help predict fire hazards. As well, Charlie van Wagner’s research on fire behaviour is widely used in explaining and calculating fire cycles for forest planning across Canada.

The Petawawa area, situated in the Great Lakes–St. Lawrence Forest Region, is well known for its red and white pine, and some impressive research was done on these species at Petawawa, both in plantations and natural stands. Results from two major experiments on regeneration of these species, Cartier Lake Silviculture Area and Meridian Road Silviculture Area, have been used in the current silvicultural guide of the Ontario Ministry of Natural Resources.

For over 90 years, the Acadia and Petawawa national research forests have played an important role in helping the forest industry tackle some of its major issues. By working together with industry and academia, these national forests will continue to provide answers to the many pertinent forestry questions that are challenging our industry today.

To learn more about the forests visit: www.cfs.nrcan.gc.ca/subsite/researchforests or contact Dean Toole, National Research Forests Program Manager dtoole@nrcan.gc.ca