Branching out

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Fire: an ally for the regeneration of eastern white pine stands

Forest harvesting and fire suppression are the main factors contributing to white pine regeneration problems in eastern Canada. Researchers with the Canadian Forest Service (CFS) of Natural Resources Canada, in collaboration with Parks Canada and Université Laval, have carried out studies to assess the effects of prescribed burning on white pine regeneration and balsam fir mortality.

Eastern white pine was once abundant in the forests of eastern Canada. Intensive logging of the species in the 19th century and the early 20th century caused a drastic decrease in the number of seed trees, enabling other more competitive species such as balsam fir to take hold. Forest fire suppression has also had an adverse effect on eastern white pine. This species' thick bark and the high position of its lower branches, which often escape the flames, provide protection against fire. In contrast with white pine, balsam fir has little resistance to surface fires. Systematic fire suppression favours the establishment of balsam fir seedlings and the survival of fir saplings, which create low light conditions detrimental to white pine regeneration.

Prescribed burning operation.
Photo: Parks Canada

White pine regeneration.
Photo: Parks Canada

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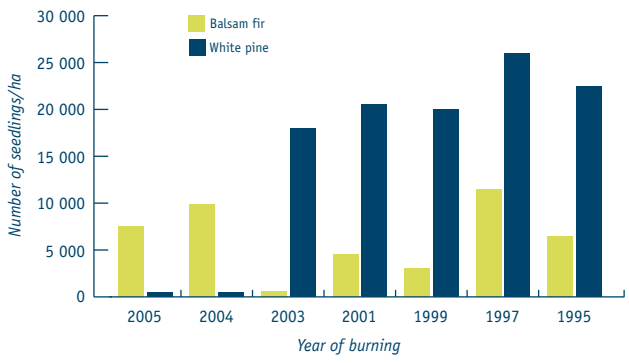
Since 1991, La Mauricie National Park of Canada has been carrying out prescribed burning to restore the natural conditions that sustained eastern white pine stands in the past. The re-establishment of these forests will enable Parks Canada to advance toward its goal of maintaining the integrity of the ecosystems under its responsibility. Prescribed understory burning is carried out in 100-year-old white pine forests, eliminating more than two thirds of the young balsam firs and more than one third of the mature firs. This reduces competition for light and favours the establishment of white pine seedlings, which require at least 20% to 25% of full sunlight to become established and thrive. Fire also reduces the amount of humus in the soil, promoting the survival of white pine seedlings.

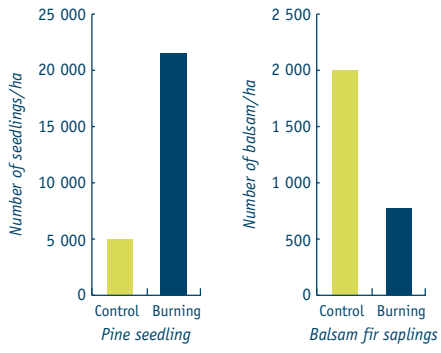
Prescribed burning.
Photo: Parks Canada

Observations made by researchers in 2006 helped to confirm the beneficial effects of fire. Sites that had undergone burning three or more years earlier had a very large number of eastern white pine seedlings compared with the unburned (control) sites. Stands in which burning had been carried out only a year or two earlier did not show this abundant regrowth because they did not benefit from a good seed crop (good seed crops occur every three to five years in white pine). Furthermore, these stands had an abundance of balsam fir seedlings, which tend to impede the establishment and growth of white pine seedlings, particularly on such sites. Over the coming years, the growth of the white pine regeneration in the burned stands will be monitored to ensure that the white pines are able to out-compete other tree species. The ultimate goal is to promote the renewal and long-term sustainability of the eastern white pine forests.

White pines dominating the landscape.
Photo: Natural Resources Canada

White pine seedling.
Photo: Parks Canada





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