

Canon Envirothon 2011 – NB Resources

Forestry Canada - Key facts

Society

- Most of Canada's forest land (93%) is publicly owned—77% under provincial or territorial jurisdiction and 16% under federal purview.
- The rest is on private property belonging to more than 450 000 private landowners.
- The provinces and territories have legislative authority over the conservation and management of the forest resources on provincial/territorial Crown lands.
- The federal government is responsible for matters related to the national economy, trade and international relations, and federal lands and parks, and has constitutional, treaty, political and legal responsibilities for Aboriginal peoples.
- In 2008, direct employment in the Canadian forest industry fell by 6.9% compared with 2007.
- For about 300 communities, the forest sector makes up at least 50% of the economic base.
- About 80% of Aboriginal communities are in forested areas.
- Public participation is an important aspect of forest management planning in Canada.
- There were 13.1 million person-visits to Canada's national parks in 2008.

Economy

- Canada is the world's largest exporter of forest products.
- The forest industry's contribution to Canada's gross domestic product is about 1.9%.
- The United States is by far the largest buyer of Canadian forest products.

Environment

- Canada has 402.1 million hectares of forest and other wooded land, representing 10% of the world's forest cover and 30% of the world's boreal forest.
- About 8% of Canada's forest area is protected by legislation. About 40% of the total forest landbase is subject to varying degrees of protection such as integrated land-use planning or defined management areas such as certified forests.
- Annually, less than 1% of Canada's forests are harvested.
- By law, all forests harvested on Canada's public land must be successfully regenerated.
- About 50% of harvested areas on Crown land are regenerated naturally, while the remainder is regenerated through tree planting and direct seeding.
- By June 2009, almost 146 million hectares of Canada's forests were certified as being sustainably managed by one or more of three globally recognized certification standards.
- Bioenergy now constitutes more than 55% of the total energy used by the forest

Principle Insects and diseases that Affect New Brunswick Forests

Balsam twig aphid *Mindarus abietinus* Koch

Main host(s):	Balsam fir
Diet and feeding behaviour:	Sap-feeding; Piercing-sucking
Micro-habitat(s):	Needle
Distribution:	Canada

Damage, symptoms and biology

Balsam twig aphids cause curling of the needles and distortion of the shoots, resulting in a gall-like swelling. The aphids secrete copious amounts of honeydew on the shoots, which allows the growth of a fungus, the sooty mold, further reducing the aesthetic appearance of the infested shoots.

The severity of balsam twig aphid infestations varies from year to year and from tree to tree. During heavy infestations in plantations, the height growth of trees and elongation of annual shoots can be reduced by 10 to 30%.

The balsam twig aphid is a secondary pest in natural stands since it does not cause tree mortality. Outbreaks are generally of short duration and affect specifically ornamental trees and edge trees or nursery and plantation trees. In Christmas tree plantations, balsam twig aphids can have a major economic impact because they reduce the aesthetic appearance of the trees.

Balsam woolly adelgid *Adelges piceae* (Ratzeburg)

Main host(s):	Balsam fir
Diet and feeding behavior:	Sap-feeding; gall-forming Piercing-sucking
Micro-habitat(s):	Branch, Root collar, Trunk, Twig
Distribution:	British Columbia, New Brunswick, Newfoundland, Nova Scotia, Ontario, Prince Edward Island, Quebec

Damage, symptoms and biology

The balsam woolly adelgid causes two types of damage. Affected trunks can be recognized by the presence of the insect covered in white woolly material in bark fissures, causing swelling of the affected areas and an increase in stem diameter. The needles soon start dropping, the crown turns a brick red colour and the insect's feeding activity results in the formation of dense compression wood, reducing the quality of the wood fibre which is used in pulp and paper manufacturing.

The second type of damage results from the insects attacking the shoots. This causes swelling and distortion of the twigs, a syndrome commonly called "gout". Prolonged attack will hinder bud growth and height growth, and may ultimately lead to tree death, starting from the crown.

The balsam woolly adelgid, a species introduced from Europe, was first reported in Canada in 1910, in southern Nova Scotia. After this discovery, the species was found to be gradually dispersing to the other Atlantic provinces. For the most part, the outbreaks observed during the 20th century were sufficiently intensive and persistent to lead to fir mortality in some areas.

Beech bark disease

Main host(s): American beech

Diet and feeding behavior: Sap-feeding: Piercing-sucking

Micro-habitat(s): Branch, Trunk

Distribution: New Brunswick, Nova Scotia, Ontario, Prince Edward Island, Quebec

Beech bark disease causes significant mortality and defect in American beech, *Fagus grandifolia* (Ehrh.). The disease results when bark, attacked and altered by the beech scale, *Cryptococcus fagisuga* Lind., is invaded and killed by fungi, primarily *Nectria coccinea* var. *faginata* Lohman, Watson, and Ayers, and sometimes *N. galligena* Bres.

Around 1890, the scale was accidentally brought to Nova Scotia. By 1932, the scale and an associated nectria fungus were killing trees throughout the mature beech areas of the Maritime Provinces and in localized areas of eastern and south central Maine. In addition, isolated infestations of scale were occurring in southwestern Maine and eastern Massachusetts. The scale insect has continued to spread to the north into Quebec and to the west and south throughout New England, New York, New Jersey, and northern and eastern Pennsylvania. In 1981, a 70,000-acre area was found infested in northeastern West Virginia.

Forest Insect & Disease Leaflet 75 U.S. Department of Agriculture Forest Service

White pine blister rust *Cronartium ribicola* J.C. Fisch.

Main host(s) Eastern white pine, gooseberry & currant bush, limber pine, western white pine, whitebark pine

Micro-habitat(s): Branch, Trunk

Distribution: Canada

Damage, symptoms and biology

Blister rust is a very important exotic disease that kills white pine of all ages. The fungus first attacks the needles in the fall and many tiny yellow dots appear on the needles the following spring. Over the next year or two, the fungus spreads toward the branches and trunk. In mid-summer, orange pustules develop on the bole and exude a liquid containing a first type of spores. The following spring, these spores cause white blisters to form on the bark. The white fruiting bodies give rise to a canker that keeps growing. The foliage above the canker yellows and then turns reddish brown. The mortality of the infected upper part causes the branch or stem to break, thus providing a point of entry for the decay fungus. The white fruiting bodies in turn produce orange spores that will be disseminated by the wind and infect plants in the family *Ribes* (red currant, gooseberry and black currant). Many generations of spores successively live on the undersurface of the leaves of plants in this family, thereby promoting the rapid spread of the disease over considerable distances. Finally, in late summer or early fall, some filamentous fruiting bodies develop on the leaves of the family *Ribes*. A last type of spores is produced and serves to transmit the disease to other white pines.

White pine blister rust is a disease that was introduced from Europe at the turn of the 20th century. Economically, it is one of the most important forest diseases in North America. It brought about a decrease in reforestation of white pine in Quebec, despite the species' considerable commercial value.

<http://imfc.cfl.scf.rncan.gc.ca/maladie-disease-eng.asp?geID=24>

Dutch elm disease *Ophiostoma ulmi* (Buisman) Nannf.

Main host(s): White elm

Micro-habitat(s): Branch, Leaf, Trunk

Distribution: Eastern Canada

Damage, symptoms and biology

Dutch elm disease was introduced into Canada around 1940. The fungus causes a vascular wilt that results in browning of the foliage and kills affected trees. Because their sap supply is cut off and fungal toxins poison them, the affected parts of the tree wilt and eventually die; this process can take a few days or a few years. The fungus develops in the sap-conducting tissues of elm trees, under the bark. The first symptoms of the disease generally appear between mid-June and mid-July. The leaves of affected branches wilt, curl up and dry out, while turning yellowish or brownish, but they usually remain on the tree. If the infection occurs later in the season, premature leaf drop usually follows the wilting. When an infected branch is cut, a ring-shaped brownish vascular discoloration can be seen. The exposed wood beneath the bark has numerous brown streaks. The disease is transmitted by bark beetles. These insects dig galleries beneath the bark of weakened trees where they can reproduce. Once spring arrives, the bark beetles, which have in the meantime become covered by spores from the causal fungus, migrate toward healthy trees and begin feeding. The beetles thus contaminate new hosts and spread the disease.

<http://imfc.cfl.scf.rncan.gc.ca/maladie-disease-eng.asp?geID=10&ind=D>

Forest tent caterpillar *Malacosoma disstria* Hubner

Main host(s): American beech, apple trees, basswood, cherries, gray birch, mountain-ash, red oak, sugar maple, trembling aspen, white ash, white birch, white elm, willow

Diet and feeding behaviour: Phyllophagous; Free-living defoliator

Micro-habitat(s): Leaf

Distribution: Canada

Damage, symptoms and biology

Defoliation is caused by the caterpillar, which begin to feed on the new leaves as soon as they appear in May. Given this insect's voracious appetite and gregarious behaviour throughout most of its development, its presence can be quickly detected. Older larvae devour entire leaves and, when the tree is completely defoliated, migrate in search of other sources of food. Larvae can also be observed in colonies on tree trunks sheltered from the sun's rays.

During massive invasions, trees can be completely defoliated over large areas. Even when severely defoliated, trees withstand infestations relatively well. Infestations generally last no more than three consecutive years. However, on trembling aspen, radial growth loss and twig dieback occur. Denuded trees will produce another crop of leaves during the season.

In the fall, the presence of egg bands, which resemble spongy, brownish masses, can be easily detected on small branches and twigs. In late June, the female deposits between 150 and 350 eggs in masses that encircle the twigs. The embryo develops over the course of the season and overwintering takes place as a fully developed embryo within the eggshell.

<http://imfc.cfl.scf.rncan.gc.ca/insecte-insect-eng.asp?geID=9374&ind=F>

Gypsy moth: *Lymantria dispar* (Linnaeus)

Main host(s): American beech, apple trees, ash, balsam fir, cherries, eastern hemlock, gray birch, hickories, larch, pines, poplar/aspens, red maple, red oak, spruce, sugar maple, trembling aspen, white birch, white elm, willow

Diet and feeding behavior: Phyllophagous; Free-living defoliator

Micro-habitat(s): Leaf, Needle

Distribution: Eastern Canada

Damage, symptoms and biology

Gypsy moth damage is caused exclusively by the caterpillars, which feed on developing leaves in May. Newly hatched larvae are hairy and black and feed by chewing small holes in the surface of the leaves. Older larvae devour entire leaves. The body of the larvae are dark-coloured and hairy, with red and blue spots on the back. Full-grown larvae can be up to 65 mm long.

Another sign of gypsy moths is the presence, in late July, of spongy egg masses covered with tan or buff-colored hairs from the female's abdomen on the trunks and branches of trees or in forest debris near defoliated trees.

The gypsy moth was first detected in Canada in 1912 in British Columbia, where egg masses had been accidentally introduced on young cedars from Japan. However, the first infestation in Canada occurred in 1924 in southwestern Quebec, near the U.S. border, followed by a second infestation in 1936 in New Brunswick. In both cases, the insect was eradicated through intensive egg mass removal campaigns. The insect was again reported in Quebec in 1955 and since then, has become established in southern Ontario, New Brunswick, Nova Scotia and British Columbia. Populations vary annually, depending on the region.

<http://imfc.cfl.scf.rncan.gc.ca/insecte-insect-eng.asp?geID=9506&ind=G>

Hemlock looper *Lambdina fiscellaria* (Guenee)

Main host(s): Balsam fir, black spruce, eastern hemlock, sugar maple, white birch, white spruce

Diet and feeding behavior: Phyllophagous; Free-living defoliator

Micro-habitat(s): Leaf, Needle

Distribution: Canada

Damage, symptoms and biology

Hemlock looper damage is visible on conifers during epidemics in late July and early August. The trees turn a reddish colour, which is very characteristic of hemlock looper outbreaks. Needles damaged by feeding larvae dry out, turn red and drop in the fall.

Hemlock looper outbreaks develop and subside very suddenly. They spread quickly and can cause the death of balsam firs in the first year that damage is detected.

The wasteful feeding of this species and its rapid population growth make it a serious defoliator.

Native to North America, the hemlock looper is considered a serious defoliator in Canada. It occurs from the Atlantic coast west to Alberta. It has destroyed several million hectares of conifer forests in eastern Canada over the years. The other subspecies, *Lambdina fiscellaria lugubrosa* (Hulst.) is found in British Columbia. The main hosts of this insect are balsam fir in eastern Canada and hemlock in western Canada.

<http://imfc.cfl.scf.rncan.gc.ca/insecte-insect-eng.asp?geID=8846&ind=H>

Larch sawfly *Pristiphora erichsonii* (Hartig)

Main host(s): European larch, subalpine larch, tamarack, western larch

Diet and feeding behavior: Phyllophagous; Free-living defoliator

Micro-habitat(s): Needle

Distribution: Canada, Yukon

Damage, symptoms and biology

The larch sawfly can be detected by looking for the slits on new shoots in which females have deposited their eggs or checking for groups of larvae crawling on the branches.

Egg-laying in young shoots causes them to dry out and curl, which stops them from growing, reduces the number of buds and eventually results in crown deformation. The main damage is caused by feeding groups of larvae, which defoliate the tree. Moderate defoliation reduces growth and weakens the tree. Larch is deciduous and can withstand defoliation better than most conifers. However, repeated severe infestation over many years may result in a reduction in growth, tip dieback, branch mortality and tree mortality.

The larch sawfly is considered the most damaging pest of larch in North America. The species was first described in Europe in 1837 but was not reported in Canada until 1882, in Quebec and 1930 in British Columbia. Its origin remains uncertain.

<http://imfc.cfl.scf.rncan.gc.ca/insecte-insect-eng.asp?geID=7907&ind=L>

Spruce bud moth *Zeiraphera canadensis* Mutuura and Freeman

Main host(s): Black spruce, white spruce

Diet and feeding behaviour: Phyllophagous; Webworm

Micro-habitat(s): Annual shoot, Needle

Distribution: Canada

Damage, symptoms and biology

Scouting for the spruce budmoth can be done by observing two different signs:

1. the prolonged presence of the bud cap, held by silk threads at the tip of the annual shoot;
2. the presence of multiple leaders and branches with many branchlets in the upper crown.

Needles chewed along their margins, or cut off at the base, gradually take on a reddish colour. Although the caterpillars primarily attack apical shoots without any serious consequences during their early development, older caterpillars cause more damage since they are especially fond of the tender bark of twigs, and this leads to shoot breakage during rainfall or heavy winds.

A native species in North America, the spruce bud moth was first reported in 1938, in Eastern Canada. Associated with the spruce budworm during the drastic outbreak of 1939 to 1958, the spruce bud moth's presence is very noticeable. The damage it causes is often confused with that wreaked by the spruce budworm. However, *Zeiraphera canadensis* differs from the spruce budworm in that it prefers to feed on open-growing spruce rather than spruce in forests.

<http://imfc.cfl.scf.rncan.gc.ca/insecte-insect-eng.asp?geID=11208&ind=S>

Spruce budworm *Choristoneura fumiferana* (Clemens)

Main host(s): Balsam fir, black spruce, eastern hemlock, jack pine, Norway spruce, red spruce, tamarack, white spruce

Micro-habitat(s): Bud, Cone, Male flower, Needle

Distribution: Canada

Damage, symptoms and biology

Spruce budworm damage appears in May. Evidence of a spruce budworm infestation includes the destruction of buds, abnormal spreading of new twigs, defoliation of current-year shoots and, if an affected branch is disturbed, the presence of large numbers of larvae suspended from strands of silk.

Defoliation begins at the top of the tree and quickly progresses to the periphery of the crown from the top downwards. Current-year needles are partially or completely consumed and, if large numbers of larvae are present, previous-year needles may also be affected. Spruce budworm larvae also feed on staminate (male) flowers and cones. During epidemics, the larvae may destroy all of the cones.

Severely affected stands turn a rust colour due to the presence of dried out needles held by strands of silk spun by the larvae. In the fall, most dead needles are dispersed by the wind and defoliated stands take on a greyish appearance. A single year of defoliation generally has little impact on the tree. However, it does cause weakening of the tree, making it more susceptible to attacks by other insects. Defoliation over a few consecutive years causes tree growth loss. However, if defoliation of current- and previous-year shoots continues uninterrupted over several years, some trees will die, while others will continue to gradually decline for several years, even after the end of the infestation. This is the case with fir, the species most vulnerable to spruce budworm attacks, which dies after four consecutive years of severe defoliation.

A native species, the spruce budworm is considered the most serious pest of fir and spruce forests in North America. Its range coincides with that of fir.

<http://imfc.cfl.scf.nrcan.gc.ca/insecte-insect-eng.asp?geID=12018&ind=S>

Butternut canker

Butternut canker is a disease caused by a fungus, *Sirococcus clavigignenti-juglandacearum* Nair, Kostichka & Kuntz. It is mostly found on butternut (*Juglans cinerea* L.) trees, although other members of the walnut family (*Juglandaceae*) show some susceptibility to infection. The disease is a serious threat to butternut populations in North America and has killed up to 90% of the butternut population in some areas of the United States. Damage from the *Sirococcus* fungus was first noted in Wisconsin in 1967, but it was not until 1979 that the fungus itself was described. Scientists believe that the disease was introduced to North America much earlier than the first report. First reports in Canada occurred in 1990 in Quebec, 1991 in Ontario, and 1997 in New Brunswick.

Infection usually occurs first in the lower crown of trees, and then spreads downward as fungal spores from the cankers are washed by rain along the branches and down the main stem. As the disease intensifies, multiple cankers will form on the branches, stem, and roots, and the infected tree will stop producing nuts. As the cankers grow and join together, affected branches will die, and if the stem is girdled by cankers, the tree will die. Cankers also serve as entry points for other decay organisms.

<http://cfs.nrcan.gc.ca/news/457>

White pine weevil *Pissodes strobi* (Peck)

Main host(s): Eastern white pine, jack pine, Norway spruce, scots pine, white spruce

Diet and feeding behaviour: Phloeophagus Borer

Micro-habitat(s): Terminal shoot

Distribution: Canada

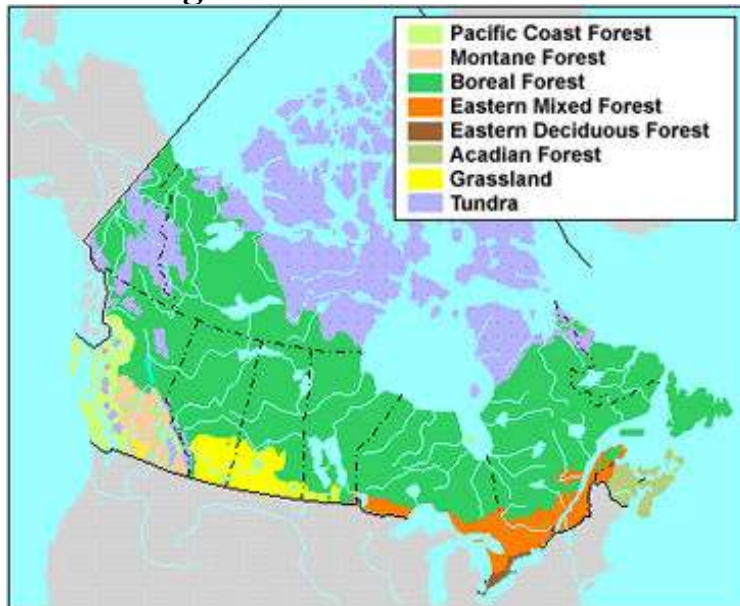
Damage, symptoms and biology

Damage is caused mainly by the larvae, which feed under the bark of the tree's terminal leader. Feeding punctures made by the adult weevils can also damage the leader. The presence of the insect is easily detected by the drooping, wilted appearance of the current year's leader, which resembles a shepherd's crook. The leader is eventually killed. Symptoms are usually noticeable by late June.

Tree mortality due to the white pine weevil is rare, however. During outbreaks, the combined damage caused by adults and larvae results in reduced growth and usually in the total loss of the previous and current years' terminal shoots. In white pine with recurring annual damage, wood quality is affected, reducing merchantable timber volume by sometimes up to 60%. Studies have shown, however, that in Norway spruce, the impact on volume productivity can be negligible when the trees reach commercial size. Infected ornamental specimens lose their aesthetic value.

Native to North America, the white pine weevil occurs throughout the range of white pine in eastern Canada. Although it occurs naturally in our forests, in eastern Canada, it is considered to be the most serious pest of white pine, jack pine and Norway spruce plantations. The white pine weevil may significantly hinder the growth of young trees.

Forest Regions of Canada



<http://www.thecanadianencyclopedia.com/index.cfm?PgNm=TCE&Params=A1SEC8650...> 08/01/2009

Acadian Forest Region

Closely related to the Great Lakes-St Lawrence Forest Region, this region is confined to Nova Scotia, Prince Edward Island and a large portion of New Brunswick. Red spruce, balsam fir, yellow birch and sugar maple are commonly found. Black spruce, white and grey birch, red oak, white elm, black ash, beech, red maple, trembling aspen and balsam poplar are also widely distributed.

<http://www.thecanadianencyclopedia.com/index.cfm?PgNm=TCE&Params=A1SEC8650...> 08/01/2009

The Acadian Forest Region stretches primarily from New York through New Hampshire, Vermont, and Maine and includes all the provinces of New Brunswick, Nova Scotia and Prince Edward Island. Closely related to the Great Lakes-St. Lawrence and Boreal regions it is a transition forest that contains a diverse collection of trees, shrubs and other plants. The Acadian Forest Region is characterized by the presence of red spruce and other trees like yellow birch, balsam fir and sugar maple. Other associated tree species include red pine, eastern white pine, eastern hemlock and beech. These trees live an average of 150 years with shade tolerant old growth living as old as 400 years.

Typical herbaceous plants of the Acadian Forest are showy lady's slipper and the round-leaved orchid. Common species include bunchberry, mayflower and low bush blueberry.

It is interesting to note that undisturbed Acadian Forest may be the rarest forest type in North America. Settled in by Europeans in the 1600's, much of the forest was harvested to support the new inhabitants. Tall straight pines were cut for ship masts and forests were cleared to make way for agriculture and urban development. As western North America was being discovered the Acadian Forest Region was already drastically changed. <http://botanicalgardens.acadiau.ca/acadianForest.html>

Boreal Forest Region

Approximately 80% of Canada's forested land is in the immense boreal forest region, which swings in an arc south from the Mackenzie River Delta and Alaskan border to northeast British Columbia, across northern Alberta and Saskatchewan, through Manitoba, Ontario and Québec, terminating in northern Newfoundland on the shores of the Labrador Sea. The northern boreal region consists of open forest with trees growing farther apart and smaller in size as the forest stretches towards the tundra, where only dwarf specimens persist.

The southern boreal region presents a denser, closed forest which, at its southwest boundary in the Prairie provinces, gives way to a transitional zone dominated by poplar. Known as the aspen grove, this part of the forest thins out into open, almost treeless prairie. White and black spruce are the principal species of the predominantly coniferous boreal forest, but other conifers (eg, balsam fir, jack pine and tamarack) also have a wide distribution. There is a general mixture of broad-leaved trees in the region, including white birch, balsam poplar and the wide-ranging trembling aspen.

<http://www.thecanadianencyclopedia.com/index.cfm?PgNm=TCE&Params=A1SEC8650...> 08/01/2009

Coast Forest Region

This region covers the lower seaward slopes of British Columbia's Coast Mountains and extends to the coastal islands. Characteristic species are western hemlock, Douglas fir, eastern red cedar and Sitka spruce, all renowned for their value as timber-producing trees. By comparison, the region's broad-leaved trees (eg, black cottonwood, red alder, big-leaf maple) have a limited distribution and are of minor economic importance.

<http://www.thecanadianencyclopedia.com/index.cfm?PgNm=TCE&Params=A1SEC8650...> 08/01/2009

Columbia Forest Region

This region lies in southeast British Columbia between the Rockies and the central plateau and fingers its way through the subalpine region along river valleys and lakes. The forest of this interior wet belt strongly resembles that of the coast region, although fewer species occur in the interior. Characteristic trees are western red cedar and western hemlock. The blue Douglas fir is widely distributed, and in southern parts western white pine, western larch, grand fir and western yew are found. Engelmann spruce is found in the upper Fraser Valley and occasionally at higher elevations in the region.

<http://www.thecanadianencyclopedia.com/index.cfm?PgNm=TCE&Params=A1SEC8650...> 08/01/2009

Deciduous Forest Region

Canada's smallest forest region, this area borders the southeast shore of Lake Huron and the northern shores of Lakes Erie and Ontario. Despite its small size, this region contains the largest number of native tree species of any region. Along with the broad-leaved trees common to the Great Lakes-St Lawrence Forest Region are found the cucumber tree, tulip tree, black gum, blue ash, sassafras, Walnut and others which are at the northern limits of their range. Conifers occur only as a scattering of eastern white pine, tamarack, eastern red cedar and eastern hemlock.

<http://www.thecanadianencyclopedia.com/index.cfm?PgNm=TCE&Params=A1SEC8650...> 08/01/2009

Great Lakes-St Lawrence Forest Region

Although it is less than one-tenth the size of the boreal forest, the Great Lakes-St Lawrence is Canada's second largest forest region. With the exception of a 322 km gap where the boreal region touches the north shore of Lake Superior, this forest stretches from southeastern Manitoba to the Gaspé Peninsula. It is bordered to the south by the deciduous forest region, and is a transitional forest between the coniferous and broad-leaved regions. Characteristic species are eastern white pine, red pine, eastern hemlock and yellow birch. Sugar and red maples, beech, red oak, basswood and white elm are also found, as are many boreal species.

<http://www.thecanadianencyclopedia.com/index.cfm?PgNm=TCE&Params=A1SEC8650...> 08/01/2009

Montane Forest Region

This region includes British Columbia's central plateau and several valley pockets adjacent to the Alberta boundary, areas which share a prevailing dry climate. The characteristic tree of this region is the blue Douglas fir, a smaller variety of the coast-region type. Lodgepole pine and trembling aspen are generally present and white spruce is found in cooler, shaded valley locations. In southern parts of the region's more open forest, ponderosa pine is common. Engelmann spruce and alpine fir from the subalpine region, together with western white birch, are important species of this region's northern limits.

<http://www.thecanadianencyclopedia.com/index.cfm?PgNm=TCE&Params=A1SEC8650...> 08/01/2009

Subalpine Forest Region

Composed of coniferous forests, this region is situated on the mountain uplands of British Columbia and western Alberta. Characteristic trees are Engelmann spruce, alpine fir and lodgepole pine; occasional species include western larch, whitebark pine and limber pine, together with yellow cypress and mountain hemlock on the more westerly ranges. The subalpine region makes an impressive contribution to the scenic splendour of the Canadian Cordillera and offers unique features of watershed protection and stream control in high-mountain source areas. The trees at lower elevations are harvested for timber.

<http://www.thecanadianencyclopedia.com/index.cfm?PgNm=TCE&Params=A1SEC8650...>

08/01/2009

Forest Certification in Canada

Certification

Third-party certification signals buyers that the forest products they purchase come from sustainably managed forests. It helps demonstrate the rigor of Canada's forest management laws and the sustainability of its forest management practices.

Context

Canada has the largest area of third-party independently certified forest in the world. While only 10% of the world's forests are certified, about 40% of this amount is in Canada.

Three internationally recognized certification systems are used in Canada

- _ [Canadian Standards Association \(CSA\)](#)
- _ [Forest Stewardship Council \(FSC\)](#)
- _ [Sustainable Forestry Initiative \(SFI\)](#)

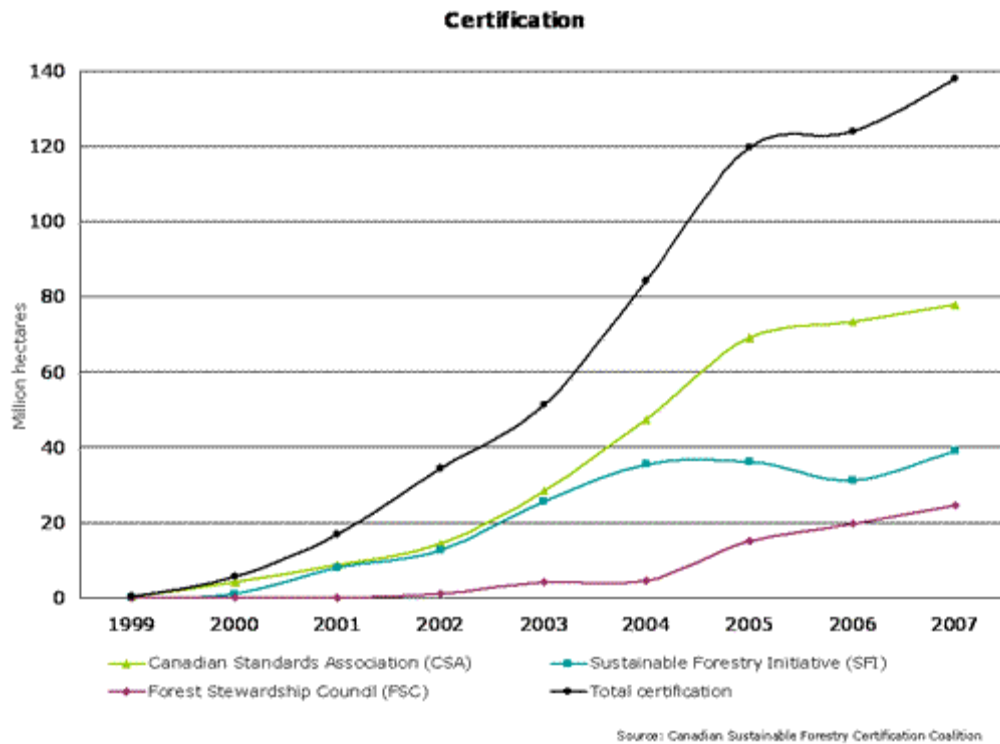
The CSA and SFI have been endorsed by the [Programme for the Endorsement of Forest Certification Schemes \(PEFC\)](#). The Programme for the Endorsement of Forest Certification Schemes is a non-profit, non-governmental organization that supports sustainable forest management globally. It was formed in 1999 for the assessment and mutual recognition of national forest certification schemes based on a comprehensive review of the rigorous and critical elements of the entire certification program being reviewed.

Canada accounts for more than ½ of the PEFC-endorsed and 1/4 of the FSC-endorsed certifications worldwide.

Governments in Canada support forest certification as a tool for improving performance and demonstrating the country's sustainable forest management record; they do not endorse one system over another.

Status

As of January 2008, Canada had 138 million hectares of forest certified to one of the certification systems, up from 123.8 million hectares in 2006.



Influencing factors

A key factor for Canada's forest certification success was the achievement of the Forest Products Association of Canada's (FPAC) 2002 commitment that all of its members be third-party certified by the end of 2006. Together, FPAC members manage 75% of the country's working forests. FPAC now requires that companies be third-party certified in order to become a member—a world first.

Increasingly public and private environmental procurement policies are stating requirements around sustainable management and the sustainable use of natural resources.

Outlook

Given that a large percentage of Canada's working forest area has been certified, the rate of increase of certified land will slow.

http://canadaforests.nrcan.gc.ca/articletrend/top_suj/22_08/01/2009

Forest History in New Brunswick

The profound relationship between New Brunswickers and their forest heritage began many centuries ago. Early aboriginal inhabitants relied on the forest for food, clothing and shelter. They developed spiritual traditions based on trees, and gathered woodland plants for medicine. European settlers used wood to make everything from barrels and furniture to buckets and sewer pipes. Trees were burned for fuelwood, charcoal and fertilizer production. Forestry is the largest industry in New Brunswick today. It has been our economic mainstay since the early 1800s.

In 1806 - during the Napoleonic Wars - Emperor Bonaparte began a lengthy blockade that cut Britain from its traditional Baltic wood suppliers. Forced to seek timber elsewhere, Britain turned to its North American colonies, especially New Brunswick. The British government imposed protective tariffs to encourage a steady flow of provincial timber, and the forest industry came of age.

New Brunswick's extensive river system gave loggers easy access to the interior with its rich stands of pine, spruce and hemlock. Sawmills churned out square-cut timber for domestic and overseas consumption. At mid-century, forest products accounted for more than 80 per cent of the province's total exports. Britain absorbed much of the output, but New Brunswick shipbuilders also consumed their share. Shipyards along the coasts and major rivers launched vessels to carry masts and other wood cargo around the world. After 1870, the expanding railroad system opened more of the province to logging.

Yet despite the improved infrastructure and apparently unlimited forest resources, New Brunswick's timber trade began to falter. After 1880, foreign tariffs, world recessions, competition from Pacific Coast logging, and the demise of wooden shipbuilding took their toll. The province also experienced a growing shortage of large and accessible trees, caused by years of wasteful cutting practices.

Meanwhile, a new type of forest operation appeared on the scene: wood pulp mills. They opened first in the late 1800s at Penobsquis in Kings County and Miramichi, and grew more numerous after 1900. By 1930, the pulp and paper industry achieved enough vigor to economically surpass the lumber industry - a position it still holds today.

The 1930s to 1950s brought other challenges to the forest industry, including major insect infestations. At mid-century, timber consumption began to escalate rapidly. Wood harvest tripled in just three decades. By the mid-1970s, it became apparent that - if harvest levels continued to increase - New Brunswick could experience severe timber shortages. Government reports such as the 1974 Forest Resources Study recommended a more sustainable approach to forest management.

The Province responded with a series of moves that culminated in 1982 with the landmark Crown Lands and Forests Act. That Act has served us well. Today New Brunswick's forest management standards rank with the best in North America.

<http://www.gnb.ca/0079/Forest/history-e.asp> 08/01/2009

History (continued)

Since pre-colonial times the forest has played a major role in the lives of the inhabitants of New Brunswick. The Native inhabitants of this region used wood to construct shelters, tools and means of transportation. The forest was also home to the many different animals they hunted for nourishment.

The first settlers relied heavily on the forest since their principal source of economy was the fur trade. At this time, wood was exported only on a small scale; it mainly served local needs in shipbuilding, the construction of homes and heating.

The early part of the 19th century saw the decline of the fur trade and the beginning of a more intensive exploitation of the forest. Great Britain had been at war with France since 1793 and needed wood to rebuild their merchant marine and navy so they turned to the forests of the North American colonies. For more than half a century, woodsmen entered the forests of New Brunswick in search of pine and oak. In two decades the annual wood production climbed from 5,000 tons to more than 400,000 tons. In response to this increase of wood production, lumber mills opened throughout the province.

At the end of the nineteenth century, technical progress introduced new materials such as brick, iron and steel into competition with sawtimber. This caused demand for lumber on the international market to diminish, fortunately, the market for pulp and paper increased during the same period. With the increase in demand for pulpwood, the economic value of private woodlots gained recognition in the early 1900's.

Woodlots in New Brunswick

The forest plays a crucial role in the lives of many New Brunswickers. The forest industry is one of the major employers of our province with about 15,000 people working directly in the industry as employees or contractors and 13,000 more people working in jobs related to this field. There are 14 New Brunswick communities that depend entirely on the forest industry for their economic survival and close to 40 others who rely heavily on forest-related business.

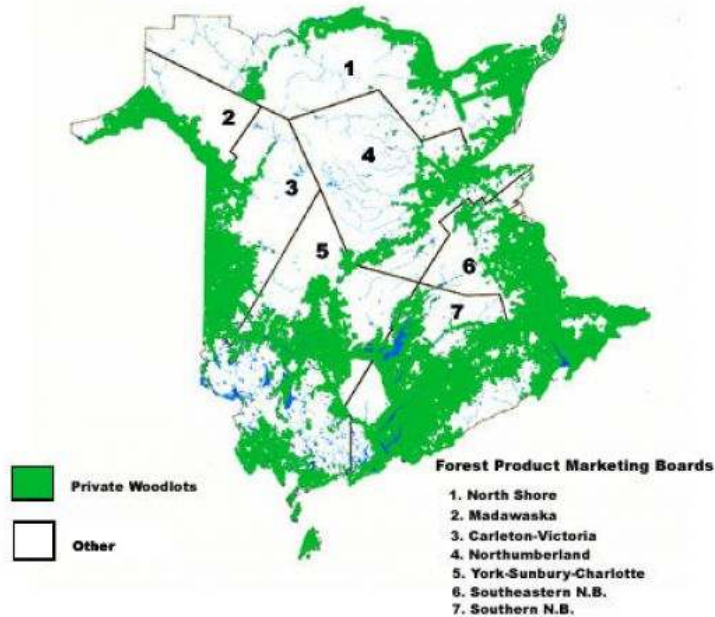
New Brunswick has a landmass of 73 500 km² (over 18 million acres), 85 percent of which is forested. These lands are divided in four major categories; crown land (51%), federal land (2%), industrial freehold (18%) and private woodlots (29%).

In New Brunswick, there are approximately 40,000 private woodlot owners who own 1,857,884 hectares (4.59 million acres) of the province's total forested area. From this land-base, private owners generate over 90 million dollars worth of economic activity.

New Brunswick's woodlot owners are a varied group, encompassing people of all ages and occupations. The objectives of ownership are extremely varied, depending on the values of the owner in question. These values include, but are not limited to, recreation, spiritual, timber/income, firewood and wildlife.

NB Federation of Woodlot Owners and Marketing Boards

Over the past four decades, New Brunswick woodlot owners have established regional organizations, marketing boards, and a provincial body, the New Brunswick Federation of Woodlot Owners, to represent their interests to government and buyers.



The initial establishment of marketing boards was prompted by a market situation where supply and demand was dominated by a small number of large players. Marketing boards strive to insure that woodlot owners of all sizes achieve a fair share in the available markets. These organizations were first started in 1961 in the Madawaska region and by the end of the 70's seven marketing boards were in place covering the entire province.

Today, a majority of wood originating from private woodlots in New Brunswick is sold through the marketing boards. These organizations negotiate prices, contracts, and market access on behalf of private woodlot owners who are marketing primary forest products. The boards collect a certain percentage of levies from the sale of any primary forest products. The money collected through levies is mostly used to cover the marketing boards administration costs. The remainder of the money is then invested in various programs offered by the boards.

In 1965 the existing marketing boards came together to create the New Brunswick Federation of Woodlot Owners. The federation was created to represent the concerns of woodlot owners to government and to improve the level of communication between woodlot owner organizations around the province. From the beginning, the Federation's purpose has been to do all that is necessary to promote the economic and social interests of woodlot owners.

History of the Acadian Forest

What would the Acadian Forest have looked like before and early on in the arrival of Europeans?

This article provides a great insight into how New Brunswick's forests would have looked before the arrival of Europeans and how our forests have changed since. Below is a timeline which describes some of the major changes and events that have shaped our forests today.

"Sir James Alexander, an English traveler and surveyor in the 1840's wrote: Perley (1847) wrote that red pine obtained a height of 70 or 80 feet and a diameter of 2 feet and greater. He said that white pine sometimes attained heights of 160 feet and a diameter of 5 feet, 3 feet off the ground. Some hardwood species attained great size as well. Perley (1863) reported that butternut was abundant on rich alluvial river banks and grew to 80 feet in height, with circumferences of 6 to 8 feet."

Chronology of Events of New Brunswick Forest Industry

1696: As of this date it is known that mature pine and spruce trees are being removed, marking the advent of what would be called logging in New Brunswick

1700: France begins to remove the great pine from the shores of the St. John River for use as ship masts.

1764 – 1776: Last recorded incidents of wolverines in New Brunswick. Eight pelts were sold at St. John during this time.

1769: Commercial shipbuilding begins and continues through the 1800's.

1780: Fewer than 4000 European Settlers in North America .

1800: Approximately 25 000 European Settlers in North America

1803: Up until this point, New Brunswick is supplying most of the pine masts for the entire British Navy. Up to 200,000 mature white pine removed in a single year.

1805: Napoleon cuts off British timber supply from Baltic regions. Intensive commercial logging begins in New Brunswick to fill British demands. New Brunswick exports of timber multiply by twenty times from 1805 to 1812.

1811: Lower St. John River Valley said to be "denuded of great pine".

1824: Thomas Ballie is appointed surveyor general and adopts a 'public auction' approach to the sale of Crown lands. This helps accumulate large tracts of land in the hands of large timber interests as there is no limit to how much one individual can own.

1825: Great Miramichi fire burns up to 20 700 square kilometers after several land-clearing fires joined together.

1830's: Logging begins in remote areas of the province. Steam sawmills were introduced and other wood products including laths, deals, and planks start to be exported. "Boom/Bust" cycles of the lumber industry favours "Lumber Barons" who at this point are accumulating vast tracts of land, large sawmills and can ride out economic low periods. Strong alliances are built between lumber barons and politicians of the day.

1835: White Pine still being harvested but begins to decline after this period. Spruce begins to become more marketable.

1850: By this time 640 000 acres of land has been cleared in New Brunswick for agriculture.

- Most of the tall white pine within 5 km of a stream large enough to float timber had been felled.

1860's: Timber wolf is extirpated from New Brunswick.

1890: Introduction of Beech Bark insect-disease in Halifax.

Early 1900's: Constricting markets cause the collapse of the lumber supply. The provincial government, desperate to avoid imminent fiscal crisis, promoted the development of the pulp and paper industry.

1913: Crown land is divided into two forms of license – sawmill license and pulp license. Pulp mill license could be extended for 15 years, sawmill license for 10 years.

1911 - 1919: Spruce budworm devastation documented in New Brunswick and Nova Scotia by Arthur Gibson.

1921: Last recorded Grey Wolf in New Brunswick is killed. Grey Wolf is extirpated.

1930's: Extirpation of the Woodland Caribou from New Brunswick forests. This is due to loss of mature forest habitat, and brain worm introduced from growing population of white tailed deer.

1937: New Brunswick became the first province to impose specific management responsibilities on licensees; Ontario and British Columbia followed over the course of the next decade.

1937 – 1947: Period of dieback experienced by white and yellow birch and maple go through period of decline.

Mid 1900's: Much of the fertile lands of the St. John River Valley are converted to agricultural land. Dams – resulting in a 99% reduction in the original rich tolerant hardwood forests of the Upper St. John River Valley.

1950's: Coyotes begin to enter New Brunswick.

Local entrepreneurs, community leaders and labour increasingly criticized the major pulp and paper companies for not managing the forest in the interests of the people.

1954: Pesticide 2,4,5-T is used for the first time to control unwanted growth on cutover lands.

1957: Dutch Elm Disease reported in New Brunswick. Soon kills most of the mature Elm trees in the province.

1960s: The amount of wood harvested begins its steady increase to present times (2 million cubic meters in 1965, to 5 million cubic meters in 1995). Logging employment begins its steady decline to present times (4500 workers in 1965 to 2500 workers in 1995).

1982: The Crown Lands and Forest Act combines 84 licenses into 10 license controlled by firms that who processing plants. The 10 corporate licenses are given management responsibility over Crown land. The Department of Natural Resources was given responsibility to be the regulator of corporate plans.

2002: New Brunswick implements Protected Natural Area Act, increasing protected areas in New Brunswick from 1.2% of the Province to approximately 4% of the Province.

2004: Eight percent of the Acadian Forest converted to softwood plantations.
- Herbicides have been sprayed on 8.5% of the Crown landbase.

What is the Acadian Forest?

New Brunswick's forest is part of the Acadian forest Region. The Acadian forest region encompasses all three Maritime Provinces, northern New England and some southern parts of Quebec. The Acadian forest is a unique, diverse ecosystem that is only found in eastern North America.

The Acadian forest is a meeting place where the northern boreal forest blends with southern hardwood forests creating a remarkable variety of forest ecosystems and opportunity. There are 32 species of trees that are found in New Brunswick's Acadian forests.

<http://www.acadianforest.ca/discover.htm>

Sustainable Forest Management

Sustainable forest management involves meeting society's need for forest products and other benefits, while respecting the values people attach to forests and preserving forest health and diversity.

Canada believes that innovative approaches, technologies and tools are necessary to the sustainable development of forests and the economic well-being of forest communities. The country's forest policies and management practices are designed to adjust over time to changing societal values, circumstances and knowledge.

Most of Canada's forest (93%) is publicly owned—77% under provincial or territorial jurisdiction and 16% under federal purview. As a result, governments, on behalf of the Canadian people, have set legislation and regulations—based on the latest knowledge about sustainable forest management—for nearly all of the country's forest. Governments also monitor progress toward sustainability.

Canada is committed to sustainable forest management and is a world leader in several respects. One of the most notable is that, as of 2006, Canada has the largest area of independently certified forest in the world.

Forest policies in Canada are based on the concept of sustainable forest management. Their underlying goal is to maintain and enhance the forest for the social, cultural, environmental and economic well-being of all Canadians, now and in the future.

Companies that harvest Canada's public forests consider and plan for multiple uses and values. They also ensure that all harvested areas are reforested (mainly through natural regeneration), that water bodies are protected and that biodiversity is maintained.

Foresters can choose from various options to ensure that there is adequate regeneration after harvesting. Variations on clearcutting silvicultural systems are commonly used in countries like Canada, where most of the forests are even-aged.

Criteria and indicators serve as a framework for describing and measuring the state of Canada's forests, management practices, values and progress toward sustainability.

Independent third-party certification of forest land is a useful tool for assessing progress toward sustainability. Certification assures consumers that the paper and wood products they buy and use come from forests that are well managed and legally harvested.

http://canadaforests.nrcan.gc.ca/articletopic/top_suj/4

Forestry by Numbers (New Brunswick)

Economic Facts

Employment

- 23,400 direct and indirect jobs
- \$1.1 billion wages and salaries
- 1 in 11 New Brunswick jobs
- Higher than average earnings
- Significant in rural communities

Communities

- 40 communities highly dependent on some aspect of the industry for their existence
- 14 communities are completely dependent on the industry

Provincial Economy (2005)

- \$2.1 billion into NB Economy
- 11.2 % of Provincial GDP
- 40% of value of exports
- \$264 million in NB tax revenues
- \$3.7 billion in shipments

Production Costs (2005)

- Royalties \$57 million
- Wood purchase \$600 million
- Electricity consumption \$260 million
- Property Tax (2002) \$21.3 million
- Capital Investment (last 10yrs) \$3.4 billion

"Forestry is one of the top five sectors to adopt and integrate high tech equipment. Advanced technology purchases are greater than automotive, metal, transport and Chemical sectors combined!" Statistics Canada

Forestry revenues currently pay for the equivalent of:

- approximately 250 full-time nurses
- 200 hospital beds
- 20 schools and 400 teachers

"The forest industry is a cornerstone of the NB economy..." APEC, 2004

Forest Species Group

Softwood 46%
Hardwood 27%
Mixedwood 27%

Productive Forest Ownership

Provincial or Crown Land 51%

Federal 2%

Private woodlot owners 29%

Industrial Freehold 18%

Resource Base

Total Area 7.2 million hectares

Forest Land 6.1 million hectares

Productive Forest 5.9 million hectares

Species Mix

Softwood spruce 31%, balsam fir 19%, pine 4%, cedar 7%, other softwoods 2%

Hardwood red maple 8%, sugar maple 78%, yellow birch 5%, white birch 5%, aspen 7%, beech 3%, other hardwoods 1%

Annual Allowable Cut (2004-2005)

	Softwood (m3)	Hardwood (m3)	Total (m3)
Crown Land	3,494,000	1,870,00	5,364,000

Annual Silviculture (2005)

	Planting (# of seedlings)	Pre-commercial Thinning (hectares)	Herbicide (hectares)
Crown Land	31,197,000	26,654	12,807

Annual Harvest (2004-2005)

	Softwood (m3)	Hardwood (m3)	Total (m3)
Crown Land	3,290,000	1,530,000	4,820,000

Special Management Areas

	Protected Natural Areas	# DWAs (ha)	DWAs (ha)	Old Forest Habitat	Water Course Buffers (ha)
Crown Land	150,000	800 +	280,000	450,375	400,000

Over 30% of Crown land is under special management.

<http://nbforestry.com/?section=13&subsection=60&PHPSESSID=f9676dbf079ce3f17a75>

...

Forestry in New Brunswick

Coastal waters teeming with fish first brought Europeans to the Maritimes, but it was the wealth of the forest that attracted permanent settlement to New Brunswick. The rise of the timber trade after 1783 led to the settlement of the upper Saint John Valley and to the opening of the eastern coastal areas around the mouths of rivers, where settlers found seemingly endless forests. During the late 1700s and early 1800s, the United Kingdom got much of its timber, especially white pine for ship masts, from eastern Canada. After 1809 Britain sought more general timber supplies. Great fleets of timber ships stopped to pick up cargo at Saint John. By 1870, when wood shipbuilding was in decline and New Brunswick faced rising competition from other timber exporters, the province's forests had been heavily cut.

Despite the early exploitation of timber in the province, forest cover gradually returned to large tracts of cleared land. Today, 87 percent of New Brunswick is forested. Private ownership accounts for 30 percent of this timberland, while public land accounts for 50 percent. The remainder of the timberland is controlled by industrial freehold. The annual allowable cut is more than 11 million cubic meters (388 million cubic feet). Eastern New Brunswick, which contains both coniferous and mixed forests, is an important base of the pulp and paper industry. Chatham and Newcastle are sawmill centers; pulp, plywood, and pressed wood are manufactured in the area. The central and northern parts of New Brunswick have a greater wealth of timber and a more developed lumber industry. Other centers are Bathurst for paper, Dalhousie for newsprint, Saint John for paper products, and Edmundston for pulp manufacturing. Spruce is the principal species cut for pulping.

http://encarta.msn.com/encyclopedia_761570176_3/New_Brunswick.html

NEW BRUNSWICK SOFTWOODS

Balsam fir *Abies balsamea* (L.)

Mature Height: 21m

Life Expectancy: 70-150 yrs

Shade Tolerance: High to moderate

Moisture Preference: Moderate

Description: Balsam fir is best identified by its flat, soft, fragrant needles with unique cones which stand upright and smooth grey bark with raised resin blisters.

Habitat: Balsam fir grows on a wide variety of sites throughout the region, preferring moist bottom lowlands. Balsam fir is the favored food of the spruce budworm.

Wildlife: Balsam fir is a favorite winter food of the ruffed grouse and various other birds and small mammals. Moose also graze on the trees during winter.

Uses and Lore: Due to its fragrance and soft needles it is well suited for Christmas trees and wreaths. Various oils are extracted from the needles for their medicinal properties for soothing remedies for sore throats and coughs. The Balsam fir is the provincial tree of New Brunswick.

Mill.<http://cfs.nrcan.gc.ca/subsite/maritimetrees/maritimetrees>

Tamarack *Larix laricina* (Du Roi) K.Koch

Mature Height: 23m

Life Expectancy: 100-180 yrs

Shade Tolerance: Low

Moisture Preference: High

Description: Tamarack is best identified by its light green, needle like foliage found in clusters of 10 to 20. It is the only softwood that drops all its needles each fall.

Habitat: Tamarack prefers to grow in cool, moist areas such as bogs and swamps, but will grow on well drained sites.

Wildlife: The buds, needles and seeds are eaten by spruce and ruffed grouse. Seeds are also a favorite food of the purple finch, red crossbill and white-winged crossbill. Porcupines also eat the bark of tamarack.

Uses and Lore: Tamarack wood is very durable and used for boatbuilding. The lower part of the trunks and large right angled roots that were naturally curved were in great demand. These curved pieces or "knees" were utilized for ribs and keels in dories and schooners. Mill.<http://cfs.nrcan.gc.ca/subsite/maritimetrees/maritimetrees>

White spruce *Picea glauca* (Moench) Voss

Mature Height: 24 m

Life Expectancy: 100-200 yrs

Shade Tolerance: Moderate

Moisture Preference: Moderate to high

Description: White spruce is best identified by its dense growth and blue-green needles with strong smell when crushed. The common names cat spruce and skunk spruce refer to this odor.

Habitat: White spruce prefers to grow on moist, sandy loams and is commonly found throughout the Maritimes. This hardy spruce tolerates extreme situations, from windy saltwater islands to barren old fields.

Wildlife: White Spruce provides excellent nesting sites, cover and food for birds. The seed is a choice winter food of the white-winged crossbill and other finches. The new unfolding needles are a favourite food of the spruce budworm.

Uses and Lore: The native people used the long, pliable and strong roots of the White spruce for sewing baskets, birch bark onto canoe frames and their shelters.

Mill. <http://cfs.nrcan.gc.ca/subsite/maritimetrees/maritimetrees>

Black spruce *Picea mariana* (Mill.) B.S.P.

Mature Height: 17 m

Life Expectancy: 150-250 yrs

Shade Tolerance: High to moderate

Moisture Preference: High

Description: Black spruce is best identified by its dark colored small cones, twigs, and scaly bark. Black and red spruce naturally hybridize, making exact identification often difficult.

Habitat: Black spruce usually grows on very moist, acidic bogs, swamps, and other wet areas. However, it is also found on many other soil types and locations.

Wildlife: The seeds are eaten by many different birds and small mammals. The needles are a preferred food of the spruce grouse. Old trees provide nesting cavities for woodpeckers, and chickadees.

Uses and Lore: Spruce beer is made by steeping the young shoots and adding molasses, maple syrup, or honey which is then fermented with yeast. This beverage was the drink of the working class and consumed extensively to prevent scurvy for over a century.

Mill. <http://cfs.nrcan.gc.ca/subsite/maritimetrees/maritimetrees>

Red spruce *Picea rubens* Sarg

Mature Height: 26m

Life Expectancy: 250-350 yrs

Shade Tolerance: Very high

Moisture Preference: High

Description: Red spruce is best identified by its large broad crown, with right-angled branches, curving upward at the ends. The bark and twigs tend to be lighter than Black spruce.

Habitat: Red spruce is a characteristic tree of the Acadian Forest Region. It is a tree that prefers rich moist sites in mixed conditions and will dominate in a mature forest.

Wildlife: Similar to the other spruces, it provides cover, food, and nesting sites for birds; bark, seeds, and needles for snowshoe hares, porcupines, and small mammals; and food for white-tail deer.

Uses and Lore: Red spruce is the preferred tree for collecting and making spruce gum. Try this woodland novelty by collecting the sap, boiling it until completely dissolved, and pouring it on to a greased cookie sheet. Red spruce is the provincial tree of Nova Scotia.

Mill.<http://cfs.nrcan.gc.ca/subsite/maritimetreestrees/maritimetreestrees>

Jack Pine *Pinus banksiana* Lamb.

Mature Height: 19 m

Life Expectancy: 80-130 yrs

Shade Tolerance: Low

Moisture Preference: Moderate to low

Description: Jack pine is a medium-sized tree, with short, spreading, yellowish green needles found in bundles of two. The unopened cones are narrow and typically curved and persistent on the tree.

Habitat: Jack pine grows on poor or disturbed areas after fire or clearcut logging. The cones require heat from the sun or a fire to release the seeds, which grow in pure or mixed forests.

Wildlife: These trees provide good cover, nesting sites, and food for birds. White-tail deer and snowshoe hare browse young trees, and porcupine feed on the bark and needles.

Uses and Lore: Early settlers found this tree growing on poor soils, incorrectly blaming the tree for poisoning the ground. To rid areas of these pines, fire was considered the best treatment, until to their surprise, it spread the tree even more.

Mill.<http://cfs.nrcan.gc.ca/subsite/maritimetreestrees/maritimetreestrees>

Red Pine *Pinus resinosa* Ait.

Mature Height: 26m

Life Expectancy: 150-200 yrs

Shade Tolerance: Low

Moisture Preference: Low

Description: Red pine is easily identified by its reddish, flaky bark and long needles in bundles of two, that snap easily when bent.

Habitat: Red pine is commonly found on sandy, well-drained soils. After fire or logging, Red pine establishes itself in pure stands or mixed forests.

Wildlife: Red pine is an important tree for food, shelter and homes for wildlife. The seed is a favorite food of the pine siskin, chickadees, and nuthatches, and is also eaten by squirrels, chipmunks, and mice.

Uses and Lore: The long needles can be braided into rope-like chains. The cones are attractive and used in many crafts including Christmas wreaths. The long poles of red pine is also used for log house construction.

Mill. <http://cfs.nrcan.gc.ca/subsite/maritimetrees/maritimetrees>

White pine *Pinus strobus* L.

Mature Height: 35 m

Life Expectancy: 200-400 yrs

Shade Tolerance: Moderate

Moisture Preference: Moderate

Description: Tallest tree of the Maritimes, with long green needles in bundles of five. Large, hanging cones often covered with sap.

Habitat: White pine prefers moist, well drained sandy loams but can tolerate rocky outcrops and edges of wet areas. The qualities of this tree allow it to grow into an old mature forest, continuously regenerating itself.

Wildlife: There are over two dozen birds, and several mammals that eat the seeds and nest in the cover of the large branches and cavities.

Uses and Lore: Over a century ago, the largest White pine were reserved for shipbuilding, specifically masts for the British navy. Surveyors of the Kings Woods reserved the trees by marking them with a broad arrow, three gashes that resembled a crow's foot or track.

Mill. <http://cfs.nrcan.gc.ca/subsite/maritimetrees/maritimetrees>

Eastern white cedar *Thuja occidentalis* L.

Mature Height: 15m

Life Expectancy: 150-350 yrs

Shade Tolerance: High to Moderate

Moisture Preference: High

Description: White cedar is best identified by its scale-like needles and its stringy light brown bark. This is the only tree member of the Cypress family in the Maritimes.

Habitat: White cedar grows on moist, alkaline to neutral soils on rocky banks along streams or low, swampy areas.

Wildlife: White cedar provides a very important winter cover and food for white-tail deer, small mammals and birds. The seed is a preferred food of the pine siskin.

Uses and Lore: The bark of the cedar was used by native people as a source of fibre to make mats, cordage and as a kindling to start a fire by the bow and drill method. Traditionally, early French settlers tied together the fragrant twigs and branches to make brooms to sweep and freshen their homes.

Mill. <http://cfs.nrcan.gc.ca/subsite/maritimetreestrees/maritimetreestrees>

Eastern hemlock *Tsuga canadensis* (L.) Carr.

Mature Height: 21m

Life Expectancy: 300-400 yrs

Shade Tolerance: Very High

Moisture Preference: High

Description: Hemlock has a graceful and dense crown with drooping branch tips. The short, dark green needles are flat with white undersides.

Habitat: Hemlock grows in cool moist valleys, ravines, rocky ridges and other protected areas. This tree is very tolerant of shade and needs some protection for best growth.

Wildlife: Older trees provide nesting places and cavities for many birds and small mammals. The small, winged seeds are an important food for finches and chickadees. Snowshoe hare and white-tail deer browse the twigs and foliage in winter.

Uses and Lore: The young needles are steeped in water to make a stimulating and medicinal tea which is high in Vitamin C. The pleasant tea was widely brewed by the native people and in lumber camps.

Mill. <http://cfs.nrcan.gc.ca/subsite/maritimetreestrees/maritimetreestrees>

NEW BRUNSWICK HARDWOODS

Sugar maple *Acer saccharum* Marsh.

Mature Height: 28m

Life Expectancy: 150-250 yrs

Shade Tolerance: Very high

Moisture Preference: Moderate

Description: Sugar or rock maple is best identified by the five-lobed leaf, with a smooth edge. The buds are brown and pointed.

Habitat: Sugar maple prefers rich, moist, well-drained soils along river valleys and upland forests.

Wildlife: Seeds of the sugar maple are eaten by small mammals and a variety of birds, including cardinals and evening grosbeaks. Large, old trees provide nest cavities.

Uses and Lore: This strong hardwood is well recognized for its straight grain, "bird's-eye" or "curly" patterns. Maple syrup was traditionally made by the eastern woodland Indians, who boiled or froze the sap, leaving behind the delicious syrup and sugar.

Mill. <http://cfs.nrcan.gc.ca/subsite/maritimetrees/maritimetrees>

Yellow birch *Betula alleghaniensis* Britton

Mature Height: 25m

Life Expectancy: 150-250 yrs

Shade Tolerance: Moderate

Moisture Preference: High

Description: Yellow birch is best identified by its yellowish to grey, papery bark and the wintergreen scent in the sap of the buds and twigs.

Habitat: Yellow birch grows on rich, moist, well-drained soils in mixed forests along streams, rivers and upland slopes.

Wildlife: Buds and seeds are commonly eaten by many birds and small mammals. The twigs and bark are browsed upon by moose, white-tail deer, and porcupine.

Uses and Lore: Yellow birch is an aromatic tree, with a strong smell and taste of wintergreen from the buds and twigs. Year round, the twigs can be steeped to make a delightful tea. In spring, this birch can be tapped and the sap boiled down to make a wintergreen syrup.

Mill. <http://cfs.nrcan.gc.ca/subsite/maritimetrees/maritimetrees>

Red maple *Acer rubrum* L.

Mature Height: 22m

Life Expectancy: 80-130 yrs

Shade Tolerance : Moderate

Moisture Preference : Moderate

Description: Red maple can be easily identified throughout the year by its red twigs and buds, and the uneven saw-toothed margins of the leaf. The seeds have wings and fall in early summer, germinating immediately.

Habitat: Red maple grows in mixed forests, over a wide range of Maritimes conditions. While it tolerates many situations, it prefers moist, well-drained, sandy loams.

Wildlife: Red maple attracts a variety of birds and small animals that feed on the seeds, twigs, buds and flowers. Some birds use the leaves and twigs in nest building, while white-tail deer and moose browse on the twigs and foliage.

Uses and Lore: Pioneers discovered and utilized dyes that were extracted from the bark of red maple. By using elements such as iron sulphate or alum, a variety of shades could be made ranging in color from cinnamon to purple, and even black.

Mill. <http://cfs.nrcan.gc.ca/subsite/maritimetrees/maritimetrees>

Silver maple *Acer saccharinum*

Mature Height: 27m

Life Expectancy: 80-130 yrs

Shade Tolerance: Moderate

Moisture Preference: High

Description: Silver maple is best identified by the deeply lobed leaves with a white or silvery undersurface. On larger trees, the bark peels in long strips that curls at the ends, giving it a unique shaggy appearance.

Habitat: Silver maple grows in moist bottomlands along the shores of rivers, streams, islands and lakes.

Wildlife: In old trees, the large branches are hollowed out by fungus and rot, creating dens for raccoons and squirrels. The nest cavities are used by the wood duck and many other birds.

Uses and Lore: The Silver maple is not widely planted as a street or shade tree. Due to its brittle nature, many twigs and branches are broken off during storms. The roots search out sources of water, creating problems for foundations, water and sewage lines.

Mill. <http://cfs.nrcan.gc.ca/subsite/maritimetrees/maritimetrees>

White birch *Betula papyrifera* Marsh

Mature Height: 24m

Life Expectancy: 80-130 yrs

Shade Tolerance: Low

Moisture Preference: Moderate

Description: White or paper birch is best identified by its white papery bark which peels off in curls, and fine, white symmetrical branching.

Habitat: White birch typically grows on a wide variety of locations, particularly in pure stands after disturbances. Best growth is found on deep, moist, fertile lowland and upland sites.

Wildlife: The White birch provides food, cover, and nesting cavities for the yellow-bellied sapsucker, downy woodpecker, and black-capped chickadee. At least ten other bird species eat the seed as part of their diet.

Uses and Lore: The native people of the Maritime Provinces and Maine made over two dozen products from the versatile bark, which included their shelter, transportation, containers, bedding, toys and art work.

Mill. <http://cfs.nrcan.gc.ca/subsite/maritimetrees/maritimetrees>

Grey birch *Betula populifolia* Marsh

Mature Height: 11m

Life Expectancy: 80-130 yrs

Shade Tolerance: Low

Moisture Preference: Moderate to low

Description: Grey or wire birch is easily identified by its fine, wiry black-colored branches, with triangular leaves and grey-white non-peeling, thin bark.

Habitat: Grey birch grows on a wide variety of locations, after a disturbance such as fire or clearcut. It regenerates quickly on poor, depleted areas where other trees cannot survive.

Wildlife: Grey birch provides cover for small birds, rodents and grouse which also eat the flowers, seeds, and buds. White-tail deer and moose browse the branches.

Uses and Lore: In the past, it was used for barrel hoops, spoolwood and fuel. As a sapling it is very pliable and used to make attractive lawn furniture.

Mill. <http://cfs.nrcan.gc.ca/subsite/maritimetrees/maritimetrees>

Beech *Fagus grandifolia* Ehrh.

Mature Height: 24m

Life Expectancy: 100-200 yrs

Shade Tolerance: Very high

Moisture Preference: Moderate

Description: Beech is best identified by its long pointed, alternate buds and strongly veined, waxy leaves, which often remain on the tree over winter.

Habitat: Moist river valleys to upland hardwoods sites in pure or mixed stands. It suffers greatly from the non-native scale insect and a fungus canker disease.

Wildlife: Beech nuts are a favorite food for wildlife, from mice to squirrels, raccoons, bears, and various birds. It was a preferred food for the now extinct passenger pigeon.

Uses and Lore: One of the tastiest nuts of the northern woods, it was once ground into flour, pressed to make a cooking oil or used to make a coffee-like beverage. The leaves were once used as a filler for mattresses as they didn't mildew or crumble like hay.

Mill. <http://cfs.nrcan.gc.ca/subsite/maritimetreestrees/maritimetreestrees>

White ash *Fraxinus americana* L.

Mature Height: 23m

Life Expectancy: 100-20 yrs

Shade Tolerance: Moderate to low

Moisture Preference: Moderate

Description: White ash is best identified by its compound leaves with seven stalked leaflets. Its two uppermost side buds are tight against the terminal bud.

Habitat: White ash likes to grow in rich, moist, well-drained soils on riverbanks and lower slopes.

Wildlife: White ash is an important food for birds, such as finches and grosbeaks, and small mammals, such as mice and squirrels. Deer browse the winter twigs.

Uses and Lore: Bark of the white ash produces a colorfast dye of beautiful yellows and tans. It is made by bringing dried or green bark to a boil and letting it simmer. The wood is strong and pliable, making it ideal for snowshoes, hockey sticks, baseball bats, and tool handles.

Mill. <http://cfs.nrcan.gc.ca/subsite/maritimetreestrees/maritimetreestrees>

Black ash *Fraxinus nigra* Marsh.

Mature Height: 18m

Life Expectancy: 80-130

Shade Tolerance: Moderate to low

Moisture Preference: High

Description: Black ash is best identified by stout twigs and dark buds with a space between the terminal and side buds. Also the compound leaf has nine to eleven leaflets.

Habitat: Black ash is found growing in organic or sandy soils along banks of streams, lakes and other wet areas, such as bordering swamps and bogs.

Wildlife: The fruit is an important food for the wood duck, many songbirds, and small mammals. Moose and yrs white-tail deer browse the twigs and young leaves.

Uses and Lore: Native people prized black ash for making baskets, backpacks, and chair bottoms. The light brownish wood has unique features that enable it to be pounded and peeled into thin sheets or strips.

Mill.<http://cfs.nrcan.gc.ca/subsite/maritimetrees/maritimetrees>

Red ash *Fraxinus pennsylvanica* Marsh.

Mature Height: 18m

Life Expectancy: 80-130 yrs

Shade Tolerance: Moderate to low

Moisture Preference: High

Description: Red ash is easy to identify by the downy or light hairs on the twigs, veins, and undersurface of leaves. The bark on young trees and branches is a light reddish brown.

Habitat: Red ash is found on wet bottomlands, near rivers, streams and lakes. It grows scattered in mixed forests and is sometimes found on moist upland locations.

Wildlife: Red ash produces a regular seed crop eaten by birds like the wood duck and evening grosbeak. The young buds and twigs are browsed upon by moose, deer, and beaver.

Uses and Lore: Our native red ash has hairy twigs and leaves, while the commercial "green ash" variety has hairless twigs and leaves.

Mill.<http://cfs.nrcan.gc.ca/subsite/maritimetrees/maritimetrees>

Butternut *Juglans cinerea* L.

Mature Height: 21m

Life Expectancy: 60-80 yrs

Shade Tolerance: Low

Moisture Preference: Moderate

Description: Butternut is best identified by its large compound leaf with 11 to 17 leaflets. The trees crown is broad with many wide-spreading branches.

Habitat: Butternut thrives in fertile, moist, well-drained soil along streams and rivers. Occasionally, they are found on dry, rocky ridges where the soil is rich in lime.

Wildlife: The nuts are one of the favorite foods of squirrels and chipmunks, with over a dozen different kinds of birds feeding on the remaining crumbs.

Uses and Lore: Native people roasted, crushed and boiled the butternuts in water, removing the oil on the surface, which cooled to a butter-like consistency. The trees can be tapped in spring to make a sweet syrup.

Mill.<http://cfs.nrcan.gc.ca/subsite/maritimetrees/maritimetrees>

Note: Butternut was designated as Endangered in New Brunswick in November 2003.

http://www.cosewic.gc.ca/eng/sct4/result_e.cfm?SSGBox=3&StartRow=11&Page=2

Hophornbeam *Ostrya virginiana* (Mill) K.Koch

Mature Height: 12m

Life Expectancy: 50-100 yrs

Shade Tolerance: High

Moisture Preference: Low to moderate

Description: Hophornbeam or ironwood is a small tree, best identified by its greyish brown bark that forms narrow, vertically rectangular plates when young, later shredding into long strips with curled ends.

Habitat: Hophornbeam grows best on well-drained slopes and ridges. Due to its high shade tolerance, it is normally found in the understory of mixed to pure hardwood forests.

Wildlife: In late winter, the buds and catkins provide an important food for the ruffed grouse, with the nutlets as a supplement in the fall. Other birds such as the downy woodpecker, purple finch, and rose-breasted grosbeak also eat the fruit.

Uses and Lore: The name hop comes from the distinctive fruit, that resembles hops. Hophornbeam or ironwood, refers to the quality of the wood, which is one of the hardest in North America. **Mill.**<http://cfs.nrcan.gc.ca/subsite/maritimetrees/maritimetrees>

Balsam poplar *Populus balsamifera* L.

Mature Height: 24m

Life Expectancy: 80-150 yrs

Shade Tolerance: Low

Moisture Preference: High

Description: Balsam poplar is best identified by the large, sticky, fragrant buds, and distinctive brownish green leaves with resin spots.

Habitat: Balsam poplar grows in moist soils of river banks, wet fields, and ridges.

Wildlife: Many mammals and birds eat the bark, twigs, buds, and seeds. Like other poplars, it is preferred by beaver.

Uses and Lore: The large buds possess medicinal qualities. In early spring, the buds can be boiled in lard to make a salve for sprains, swellings, and pulled muscles.

Mill. <http://cfs.nrcan.gc.ca/subsite/maritimetrees/maritimetrees>

Largetooth aspen *Populus grandidentata* Michx.

Mature Height: 22m

Life Expectancy: 60-100 yrs

Shade Tolerance: Low

Moisture Preference: Moderate to low

Description: Largetooth aspen or Poplar is best identified by the large teeth on the margins of the leaves. The winter buds are hairy with silvery white leaves unfolding in early spring.

Habitat: Largetooth aspen is a fast-growing, short-lived tree that requires full sun to re-establish itself quickly after fire or logging.

Wildlife: The buds and catkins are a favorite food of the ruffed grouse and older trees provide nesting cavities for sapsuckers and woodpeckers. The bark, leaves, twigs, and branches are a preferred food of the beaver.

Uses and Lore: Logs can be used to cultivate a delicious, mushroom *Pleurotus*. Fresh logs are inoculated with the fungus. Within 1 or 2 years, edible oyster mushrooms are produced.

Mill. <http://cfs.nrcan.gc.ca/subsite/maritimetrees/maritimetrees>

Trembling aspen *Populus tremuloides* Michx.

Mature Height: 18m

Life Expectancy: 60-100yrs

Shade Tolerance: Low

Moisture Preference: Moderate

Description: Trembling aspen or poplar is best identified by its smaller, rounded leaf with a finely toothed margin. The long, flat stem is at a right angles to the leaf, causing it to "tremble" with the slightest breeze.

Habitat: Trembling aspen is commonly found throughout the Maritimes, growing on a wide variety of soils. It regenerates abundantly from seed, or sprouts from its root system.

Wildlife: Aspen provides habitat, food, and even building materials to a wide variety of birds and animals. It is a favorite tree of the beaver, who use it for food and building materials for their lodges and dams.

Uses and Lore: This poplar is the most widely distributed tree in North America, growing from Cape Breton Island west to Alaska and south through the western states to Mexico.

Mill.<http://cfs.nrcan.gc.ca/subsite/maritimetreestrees/maritimetreestrees>

Black cherry *Prunus serotina* Ehrh.

Mature Height: 21m

Life Expectancy: 100-200 yrs

Shade Tolerance: Low

Moisture Preference: Moderate

Description: Black cherry is easily identified by its leaves which are deep green and shiny above, with brown hairs along the central vein beneath. The smooth reddish-brown bark on young trees and branches matures to dark, scale-like plates.

Habitat: Black cherry grows in groups, but is more often found scattered in mixed forests. It is tolerant of many situations, with best growth on moist and fertile areas.

Wildlife: The fruit and seeds are a very important food for small mammals and many birds, including the northern oriole, rose-breasted grosbeak, and cedar waxwing.

Uses and Lore: The purple-black fruit is juicy and slightly bitter; it makes great jelly, wine, syrup, or in pies and muffins.

WARNING: The bark, leaves, and seeds are toxic and should be avoided.

Mill.<http://cfs.nrcan.gc.ca/subsite/maritimetreestrees/maritimetreestrees>

Bur oak *Quercus macrocarpa* Michx.

Mature Height: 18m

Life Expectancy: 200-300 yrs

Shade Tolerance: Moderate to low

Moisture Preference: High

Description: Bur oak is best identified by its large leaf with irregular, rounded lobes, and acorns with fringed caps that cover most of the nut.

Habitat: Bur oak is rare in the Maritimes region, growing only along the lower St. John River and adjacent lakes and streams. It prefers deep, moist, rich bottomland soils.

Wildlife: The slightly sweet nuts are very valuable for many small mammals, deer, and birds. The large branches and crown provide cover and nesting cavities.

Uses and Lore: The latin species name for this tree is *macrocarpa*, meaning large fruit or acorn. Native people collected the edible nuts in the fall, and dried and ground them into a rich, nutritious flour.

Mill.<http://cfs.nrcan.gc.ca/subsite/maritimetreestrees/maritimetreestrees>

Red oak *Quercus rubra* L.

Mature Height: 24m

Life Expectancy: 200-250

Shade Tolerance: Moderate to low

Moisture Preference: Medium

Description: Red oak is best identified by the small capped acorns and lobed leaves with pointed tips. This tree is the more common of the two native oaks found in the Maritime Provinces.

Habitat: Red oaks grow on river bottomland, gravelly areas, and rocky outcrops. They prefer a well-drained site for their tap and deep spreading roots.

Wildlife: White-tail deer, black bears, raccoons, squirrels, blue jays, and small rodents all eat acorns. Large trees with cavities make good habitat for birds and mammals.

Uses and Lore: Traditionally, many rural people planted oaks to attract lightning away from their homes. A beautiful yellow dye can be made from the bark of the red oak. The red oak is the provincial tree of Prince Edward Island.

Mill.<http://cfs.nrcan.gc.ca/subsite/maritimetreestrees/maritimetreestrees>

Basswood *Tilia americana* L.

Mature Height: 22m

Life Expectancy: 60-100

Shade Tolerance: High

Moisture Preference: High

Description: Basswood or American linden is best identified by its large-heart shaped leaf and nutlike fruits with a distinctive, leaflike wing.

Habitat: Basswood prefers moist areas near rivers, streams, and lakes within the St. John River watershed and southwestern parts of New Brunswick.

Wildlife: In early summer, the abundant flowers of this tree have a delightful fragrance making it very popular with honey bees, butterflies, and many other insects. Several animals eat the seeds or browse upon the twigs and foliage.

Uses and Lore: Native people used the fibrous inner bark of basswood for making high quality twine and rope. The fibers are long and tough, making a strong rope, less likely to kink and softer on the hands. They also used these fibers to weave rough cloth, mats and nets. Mill.<http://cfs.nrcan.gc.ca/subsite/maritimetrees/maritimetrees>

White elm *Ulmus americana* L.

Mature Height: 27m

Life Expectancy: 60-100 yrs

Shade Tolerance: Moderate

Moisture Preference: Moderate

Description: Mature white elm is best identified by its characteristic vase-shaped crown, large main trunk and spreading, over hanging branches.

Habitat: White elm prefers moist, deep, bottomland soils along rivers and islands. It was commonly found in mixed forests, but an introduced fungus, Dutch elm disease, has devastated the white elm in its natural range.

Wildlife: Woodpeckers, such as the common flicker, downy and hairy woodpeckers, use tree cavities as nesting sites. The evening grosbeak, purple finch, and American goldfinch feed upon the seeds and buds of the white elm.

Uses and Lore: Early settlers used white elm wood extensively for building cultivators, chopping blocks, wheel hubs, and chair bottoms. Its qualities of extreme toughness, pliability, and resistance to splitting made it popular in a wide variety of domestic uses.

Mill.<http://cfs.nrcan.gc.ca/subsite/maritimetrees/maritimetrees>

Definitions

Pre commercial thinning

- a thinning that does not yield trees of commercial value, usually designed to improve crop spacing.
www.unbf.ca/forestry/centers/cwru/soe/gloss.htm
- a silvicultural treatment to reduce tree density in young stands, carried out before the stems reach merchantable size. ...
www.srd.gov.ab.ca/forests/enforcementcompliance/glossary.aspx

Commercial thinning

- A silviculture treatment that "thins" out an overstocked stand by removing trees that are large enough to be sold as poles or fence posts. It is carried out to improve the health and growth rate of the remaining crop trees.
csfs.colostate.edu/pages/pub-glossary-index.html
- Removing trees from a developing young stand, so that remaining trees will have more growing space; dead and dying trees will be salvaged; and the operation will make a net profit.
cfs.nrcan.gc.ca/subsite/glfc-tree-planting/glossary

Shelterwood

A method of regenerating a forest whereby a portion of the stand is harvested and the rest of the stand, evenly distributed over the area, is left to protect the site and provide seed to reseed the area. After the new stand is well established, the residual trees are harvested. The method is used to regenerate species not tolerant of shading.

www.iowadnr.gov/forestry/definitions.html

Sanitation cut

- the harvest of dead, damaged, and susceptible trees to prevent the spread of pests and disease within a stand.
www.sfrc.ufl.edu/Extension/ssfor11.htm

Crop tree release

Natural stands of trees start out with thousands of trees per acre. Planted stands may contain 500 to 1500 trees per acre. At maturity, due to constraints of space, nutrient availability and the increased size of individual trees, there can be only 50 to 70 trees per acre. Crop tree release is the practice of selecting the individual trees that are to remain in the stand until maturity and then removing the trees competing with them.

www.iowadnr.gov/forestry/definitions.html

Clearcut

A method of regenerating a forest in which all trees on a given area are cut. Clearcutting results in conditions which allow the greatest amount of sunlight to reach the forest floor, a desirable condition for the regrowth of certain valuable tree species which need a lot of sunlight to grow, such as oaks and walnut. Clearcutting also confers certain benefits for many wildlife species. www.iowadnr.gov/forestry/definitions.html

Site preparation

- Preparing an area of land for planting, direct seeding or natural reproduction by clearing, chemical vegetation control, burning, disking, bedding, windrowing or raking.
texaspinestraw.tamu.edu/glossary.html
- A forest activity to remove unwanted vegetation and other material to cultivate or prepare the soil for reforestation.
www.in.gov/dnr/forestry/4703.htm

Planting (reforestation)

Establishing a forest by setting out seedlings, transplants, or cuttings in an area.
Silvicultural Terms in Canada

- The act or process of replanting a forest, especially after clear-cutting
en.wiktionary.org/wiki/reforestation
- Reestablishing a forest by planting or seeding an area from which forest vegetation has been removed.
www.ncforestry.org/docs/Glossary/term.htm

Pruning

The practice of removing tree limbs so that a straight, bole, free of limbs, will develop. Several years after pruning, the resulting wound will have grown over and the wood that grows over the site of the former branch will be clear, that is, knot free. Pruning is a component of T.S.I. www.iowadnr.gov/forestry/definitions.html