

Forestry in Ontario



Wildlands League

a chapter of the Canadian Parks and Wilderness Society

This series of fact sheets has been produced to increase public understanding of forestry in Ontario and to present innovative ideas on how it can be improved. Forestry is the single largest use of public lands in Ontario and forestry activities can have a major impact on ecosystems. The Wildlands League is committed to improving forestry practices and reducing the ecological impact of logging by working directly with government and industry and by improving public awareness and involvement in forestry issues.

Eastern White Pine Forests *Ecology, Threats and Survival*

INTRODUCTION

Eastern white pine (*Pinus strobus L.*) is the provincial tree of Ontario. Its sweeping silhouette has become a symbol of the province's wilderness. Before European settlers arrived white pine trees covered much of the southern and central Ontario landscape. Today, white pine forests are increasingly rare, an ecological monument to the wild past.

It is clear that these natural ecosystems need to be carefully protected and conserved to ensure their long-term survival. The Wildlands League has produced this fact sheet to help you understand the role of white pine in



White pines provide key nest sites for osprey and eagles in shoreline forests. Above: Halcrow Lake in the Algoma Highlands.

Ontario's forest ecosystems. It describes the basic ecology of white pine, explores some of the threats to its survival, and lets you know what can be done to help the species prosper.

HISTORICAL AND CULTURAL SIGNIFICANCE

From Newfoundland to the southeast corner of Manitoba and from as far south as present-day Georgia to the shores of Lake Nipigon in northern Ontario, seemingly endless pine forests shaded ridges and valleys at the end of the 18th century. A recent study estimated the cover of old growth white pine forest in the pre-settlement landscape

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Often the largest tree in the forest, white pine often survive for more than 300 years. Above: a pine in the Algoma Highlands.

of the southern boreal forest region at 30%, and 50% for the pre-settlement old-growth cover in the Great Lakes-St. Lawrence forest region (Quinby, 1993a).

From the late 1800s to the 1950s, the number of Ontario tall pines was greatly reduced by logging and land clearing. As early as 1810, agents of the British Crown were marking the tallest and straightest pines for use as masts, booms and spars on British ships. In the mid-1800s, the emphasis shifted to domestic uses of white pine for lumber. As a result, few of our original old-growth white pine forests now remain.

WHITE PINE ECOLOGY

The Basics

Eastern white pine is a conifer that keeps its needles year-round. It is a member of a worldwide group of five needled pines in the genus *Pinus*. White pine and its relatives belong to a group known as the soft or white pines as compared to the two and three needled species that are classed as hard or pitch pines.

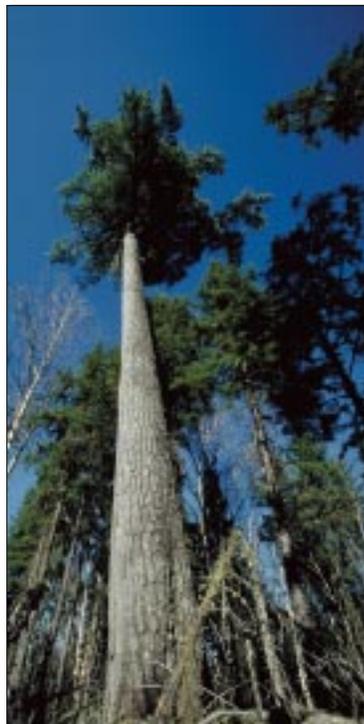
White pine has a distinctive bark. It is smooth and greyish-green on saplings and young trees, and matures to a deeply

ridged, black-brown in adults. White pine is one of Ontario's largest trees, reaching heights of 150-200 feet and trunk diameters of two to four feet (Leverett, 1992). White pine is relatively long lived, with upper limits ranging from 380 to 426, and even 634 years (Stearns, 1992).

The broad geographic range of white pine demonstrates its adaptability. It occurs on soils varying from young, relatively acid soils with coarse texture to much older soils which are often fine textured with well developed profiles (Stearns, 1992).

The root system of white pine normally consists of 3-5 large roots which branch out forming a wide-spread system of support. Root grafting is frequent among white pine, and often several trees are interconnected (Bormann, 1966). In older stands, more vigorous trees may support suppressed ones by transfer of nutrients, water and sugars.

White pine is usually described as intermediate in its tolerance to being shaded although this changes with age (Stearns, 1992). Young seedlings may survive with as little as 20% of full sunlight. This partial shade tolerance enables white pine to enter and survive in aspen and birch stands and to gradually dominate stands as these shorter lived



Old-growth white pine forests around the northern Great Lakes are some of the largest remaining in the world. Left: Algoma giant; Right: White Otter Lake forest.

species disappear. The ability of white pine to grow in partial shade decreases with age.

Reproduction and Disturbance Patterns

White pine produces cones in which its seeds are found. The cones mature over a two year period. During the first year they are green and ripen to a dull gray in their second summer. Good seed crops are produced on an average of 3 to 5 years (Steams, 1992). Seed production increases with age and dominant trees are the best producers.

White pines grow in pure and mixed stands with other conifers and hardwoods. This means that many different forest types with various disturbance regimes (such as small scale gaps or holes in the forest canopy to large-area catastrophic fire), have historically contained white pine. White pine-dominated forests, as well as scattered groups and individuals, are still found within the southern boreal forest, the Great Lakes-St. Lawrence and deciduous forest regions.

Pine photos: Lori Labatt

Fire

White pine is not dependent on fire for regeneration. Its cones open and drop seed without being burned (as contrasted with jack pine which requires high temperatures for seed dispersal). Yet fire has helped white pine to persist.

Fire exposes the mineral soil under the organic needle layer, allowing pine seed to germinate, and eliminates the dense under-growth of brush and small trees, such as hazel, mountain maple and alder which compete with white pine seedlings. Mature white pines often survive sub-canopy fire

due to their thick bark and height, which places their crowns out of the reach of flames.

WHAT ARE OLD-GROWTH PINE FORESTS?

Old-growth forests are not just composed of old trees. They are ecosystems largely unaffected by industrial disturbance, and have several unique characteristics. They contain a great number of snags (dead standing trees), and have large numbers of logs on the forest floor. Because old-

growth forests have varied structural diversity, they often contain more varied habitat and demonstrate greater species diversity than younger forests.

Ontario's old-growth white pine represents more than 95% of what remains of this ancient forest type in Canada and 60% of what remains worldwide (Quinby, 1993b). This makes Ontario the last place in Canada where it is possible to conserve and enhance this once widespread ecosystem.

WHITE PINE AND WILDLIFE

Studies have shown that old-growth white pine forests support a diversity of wildlife. Species partially dependent on mature and old-growth white pine forests include white-winged crossbills and pileated woodpeckers. In addition, lynx, pine marten, three-toed woodpecker and bald eagles prefer to live in these forests.

Northeastern subspecies of the red crossbill occur throughout the northern hemisphere and are adapted to white pine. The bill for crossbills is specialized for prying open conifer cones for their seeds. These subspecies are separated on the basis of bill size and shape that are adaptations to differ-



Top left: Young white pine seedling; top right: fire destroys trees but maintains the forest; bottom: rapid growth after fire.

ent species of conifers (Green, 1992). Using a series of museum specimens collected over the last 100 years, it has been speculated that the population of crossbill subspecies was drastically reduced at the beginning of the century as the extensive white-pine forests were logged.



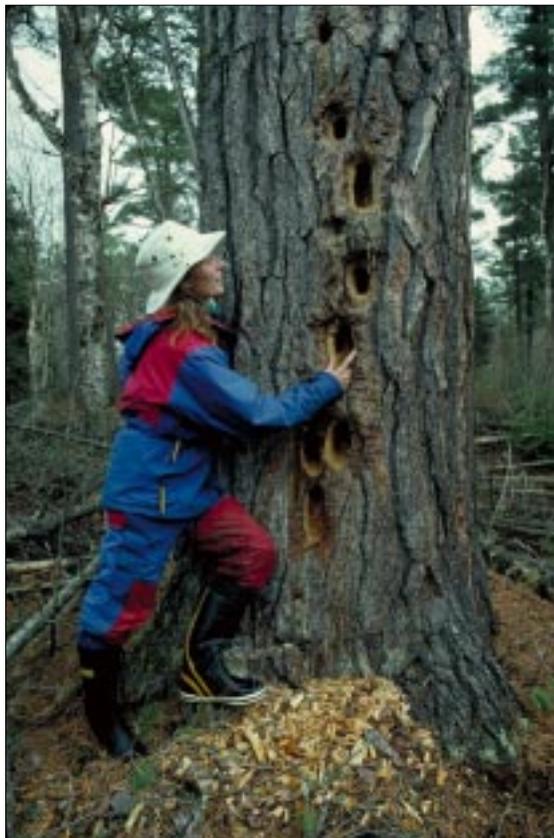
Large pines are preferred nest sites for bald eagles, an endangered species. The structure of fallen trees in pine forests provide important travelways for marten.

The brown creeper, a bark foraging bird species, favours mature stands of white pine. Older white pine bark are a good foraging surface for its fine, slightly decurved bill (Green, 1992).

Old-growth white pine stands contain snags and live trees with heart rot that provide excellent sites for cavity nesting species. Long-lived, hollow, old white pine provide the room needed by large-bodied species. For example, black bears use fallen pines extensively as lodgings, squeezing into their interiors for rest or a winter's hibernation (Wilkins, 1994). The pileated woodpecker, hairy woodpecker and northern flicker are the main excavators and the holes are used by several other species of birds (Green, 1992). Logging plans that try to leave diverse habitat often call for the retention of snags, but it may be that live trees with heart rot are better habitat (Green, 1992).

Supercanopy White Pine and Wildlife

Scattered white pines that tower above the rest of the forest (supercanopy trees), perform a



Pileated woodpeckers can convert old pines to den trees for many wildlife species.

different wildlife function than do pure white pine stands. Besides adding structural diversity to the forest, they provide nesting and foraging opportunities that would otherwise not be available. For example, female black bears like to leave their cubs within a few metres of an old white pine. The tree's ridged bark allows the cubs to climb easily to safety should predators appear (Rogers and Lindquist, 1992).

Ospreys and bald eagles prefer white pine for their nests. For example, 77% of the osprey in Michigan's Superior National Forest build their nests in the crowns of old white pines, which comprise a mere half-percent of the forest's larger trees. More than 80% of bald eagles use the trees for the same purpose (Wilkins, 1994). Supercanopy white pine snags also show higher woodpecker use than do other northern forest snag species.

Research is scarce regarding the importance of specific tree types to most wildlife species (Rogers and Lindquist, 1992). Thus, it is important to protect undisturbed forests for future study. Furthermore, such protection is essential as we attempt to maintain managed forests in as 'natural' a state as possible - including varied ages of white pine in all ecosystems where it naturally occurs.

THREATS TO WHITE PINE SURVIVAL

Several scientific reports suggest that white pine has not done well under human management because of various combinations of the following: blister rust (an invasive alien fungus), removal of trees, and therefore seed sources, over large areas, substitution of logging for fire as the major type of disturbance, poor seedbed conditions for pine in second growth forests, ability of hardwoods to revegetate forest rapidly by sprouts under short-rotation harvest, and deer browsing (Frelich, 1992).

Loss of Genetic Diversity

White pine has been heavily over-harvested. As a result the seed source has been reduced causing difficulties for regeneration of the species.

Ongoing logging, even partial logging (i.e. shelterwood cutting), of old-growth white pine forests is may be having severe negative impacts on their genetic diversity. Recent research by an ecological geneticist working for the Ontario Forest Research Institute revealed that these pristine forests are losing 25% of their genetic variability after being partially logged. According to this data, repeated logging in the future will result in continued genetic loss (Buchert, 1994). This means that the continued logging of old-growth white pine may be threatening its ability to adapt to changes in climate, resist diseases, or take advantage of new habitat.

The loss of parent trees due to logging is causing forms of genes to disappear because the parent trees don't have the opportunity to pass on their genes to their offspring. In a natural unlogged white pine forest ecosystem, fire usually would often leave the large fire-resistant parents alive and prepare the forest floor for the germination of new

seedlings. The surviving parents would then be able to pass on the total variety of their genes to the next generation before dying of old age.

Insects and Disease

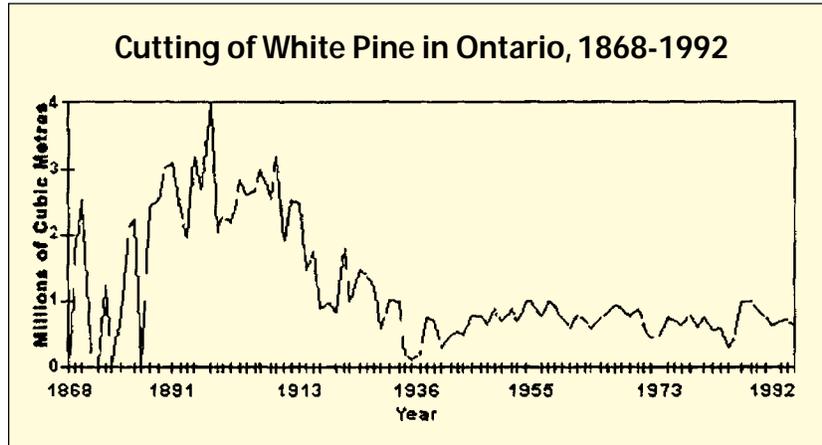
White pine is susceptible to several diseases. White pine blister rust is a fungus that was introduced to North America during the early 1900s. Its spores attack the needle clusters of pine saplings, spread along the branches to the trunk and choke off the sapwood, killing the tree.

White pine seedlings and saplings are also prey to the white pine weevil, an insect whose larvae deform

young trees by killing their tender central leader. Mature trees are relatively immune because their branches are above the height to which the blister rust spores can rise as well as the flying capabilities of the adult weevil.

SOLUTIONS

Our remaining old-growth areas are significant natural laboratories. They provide the opportunity to research natural processes over time. White pine trees can live 350 to 400 years, thus long-term



Gary McGuffin

Most foresters now recognize that special care is necessary if white pine is to survive in logged forests.



White pine cone crops occur once every three to five years. White pine is still a valuable tree for lumber.

Growth Forest Advisory Committee (of which Wildlands League was a member) and a legal order under the *Environmental Assessment Act* by producing *A Conservation Strategy for Red and White Pine Forest Ecosystems in Ontario*.

study is imperative to understand the species growth and regeneration patterns.

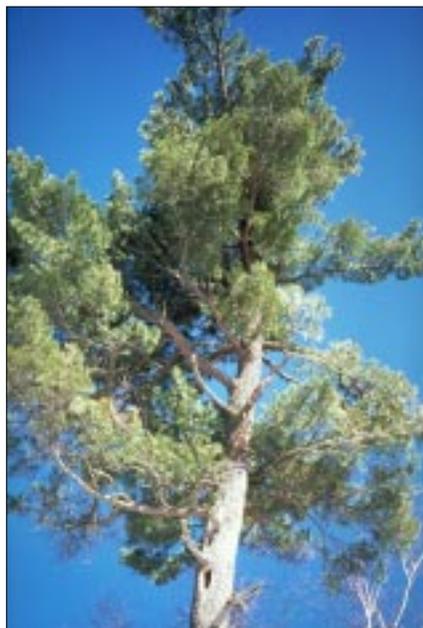
The continued loss of the remaining old-growth white pine in Ontario is of natural, cultural, and ecological concern on a provincial, national and worldwide scale.

Protecting Important White Pine Forests

During the 1990s many remaining old growth white pine forests found on public lands were protected in Provincial Parks and Conservation Reserves. In 1999, through the work of the Wildlands League and our conservation partners, the province's protected areas system greatly increased with the establishment of over 370 new sites, many of which in the southern portions of the province contained pine forests. Notable examples include the Algoma Highlands, Lower Spanish Forest, and Kawartha Highlands. The Forest Accord, also signed in 1999, commits the Ontario government, the forest industry and the environmental community to completing the parks and conservation reserves system in places where important features (like old growth pine) remain unprotected.

Conserving Genes and Habitat

In 1995 the Ontario government responded to the Old



A large cavity in an old white pine.

The goal of the Conservation Strategy is

“To ensure that red and white pine forest ecosystems; including old growth stands; are present on the landscape of Ontario now and into the future, while permitting a sustainable harvest of red and white pine”.

Making this goal operational is a requirement for forest companies and MNR staff operating on public lands (no mandatory rules for logging are in place for private land in Ontario). Directives to Forest Managers include:

- i) *“As a minimum, red and white pine in forest management units will not be reduced to an area less than the current levels. Forest management plans will establish specific targets for restoring red and white pine on the landscape using historical records as a guide and focusing on sites that previously supported pine. Over the long-term, at least one old growth red and white pine ecosystem will be protected within each site district”*
- ii) *The age class distribution of red and white pine forests at the forest management unit will include old growth red and white pine forests. The rationale for establishing the desired age class distribution must be explained in the forest management plan.*
- iii) *Silvicultural prescriptions will be based in specific stand and site conditions and should be used to achieve the*

objectives outlined in the forest management plans. Pre-harvest silvicultural prescriptions will be developed which retain old growth structural characteristics.

iv) Where stand and site conditions permit, silvicultural techniques that promote the natural regeneration of red and white pine will be the preferred option. Artificial regeneration techniques may be used to restore red and white pine to sites that they once grew on.

Protecting Pine Forests on Private Land

Many of the best examples of white and red pine forests in southern and central Ontario are now found on private lands. Agencies such as Ontario Parks, The Nature Conservancy and the Federation of Ontario Naturalists have participated in direct acquisitions of key properties, creation of conservation easements and establishment of regional land trusts.

WHAT WE NEED TO DO

► Finish a provincial network of ecologically representative protected areas including areas of old-growth white pine. In many areas this means all remaining white pine forests should be permanently protected from development.

► In lands that are logged, white pine trees must be maintained. Public lands must be managed to meet the goals and objectives of the Conservation Strategy and private land logging should also conserve the white pine component, especially big old trees.

HOW YOU CAN GET INVOLVED

► Participate in the development of the local forest management plan in your area if you reside in Central or Northern Ontario. Ensure that the forest company is following white pine protection rules outlined in the Conservation Strategy. If you submit comments and letters during the planning process your input must be considered and a reply must be received. To find out more about forest plans in your area visit the Ministry of Natural Resources web site or visit your local office.

► Ask your lumber dealer where they get their white pine boards from and if they don't know ask if they know that wood that comes from well-managed forests is available under the Forest Stewardship Council banner. For more information on the FSC visit the Wildlands League web site at www.wildlandsleague.org/certify.html.

► If you own land with white pine forest on it please contact the Nature

Conservancy of Canada, or the Ontario Nature Trust Alliance to learn more about how you can protect your property for future generations. In addition, your local office of the Ministry of Natural Resources can explain how you can save significantly on your property tax bill if you agree to manage your forest carefully.



White pine are important cultural identifiers of Canadian wilderness.

RESOURCES

Ontario Nature Trust Alliance
355 Lesmill Road
Toronto, Ontario
M3B 2W8
web site: www.ontarionature.org/enviroandcons/onta.html

Nature Conservancy of Canada
110 Eglinton Avenue West, Suite 400
Toronto, Ontario M4R 1A3
Tel.: (416) 932-3202
Fax: (416) 932-3208
Toll-free: 1-800-465-0029
Email: nature@natureconservancy.ca
web site: www.natureconservancy.ca

Ontario Ministry of Natural Resources web site:
www.mnr.gov.on.ca

*Fact sheet written by Sara Wilson and Tim Gray,
revised August 2001.*



WILDLANDS LEAGUE
a chapter of the Canadian Parks and Wilderness Society

The Wildlands League was founded in 1968 to protect wilderness in Ontario and is a chapter of the Canadian Parks and Wilderness Society (CPAWS). We are solutions oriented and we get results. We are respected for our science-based campaigns to establish new protected areas, our efforts to ensure that nature comes first in the management of protected areas, and success at addressing issues of resource management and community development.

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Other fact sheet topics in this series

- Forest Certification
- Intensive Forest Management
- Control of Public Forests
- Protecting Shoreline Forests
- Maintaining the Ecological Integrity of the Boreal Forest

Deborah Freeman