

Pinus strobus

White Pine



White Pine, BWCAW
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Flora, fauna, earth, and sky...
The natural history of the northwoods

Name:

- *Pinus*, from the Greek, **pitus** (*pityis*), "pine or fir tree"
- *strobus*, from the Latin for a tree from Carmania with a smelly gum, hence, "gum yielding"
- Common Name, from ??
- Other common names include: Eastern White Pine, Northern White Pine, Northern Pine, Soft Pine, Weymouth Pine, *pin blanc* (Qué), *Weymounhtall* (Swe), *Weymouths Kiefer* (Ger)

Taxonomy:

- Kingdom *Plantae*, the Plants
 - Division *Coniferophyta*, the Conifers
 - Class *Pinopsida*
 - Order *Pinales*
 - Family *Pinaceae*, the Pines, Spruce, and Firs
 - Genus *Pinus*, the Pines
- Taxonomic Serial Number: 183385
- Also known as *Strobus strobus* (Linnaeus)

Description:

- **Bark** darkening and thickening as tree ages, smooth and gray on young growth, becoming gray-brown, deeply furrowed with broad ridges of irregularly rectangular, purple-tinged scaly plates.
- **Branches** whorled, few and spreading, with slightly upturned tips. In closed stands, trunks are free of branches over 2/3 of their length.
- **Twigs** slender, flexible, pale red-brown, with rusty hairs when young; aging gray and smooth.
- **Needles** soft, flexible, blue-green; 2"-4" long, 3-sided, in bundles of five. Evergreen.
- **Buds** heavily resinous and sticky, aromatic.
- **Cones** slender and thornless, 3"-10" long and tapering; each scale usually bears two winged seeds as do all native pines.
- **Roots** widespreading and moderately deep, without a distinct taproot
- **Ages** exceeding 400 years are possible; commonly reaches 200 years of age and may exceed 450.
- **Height** of mature trees in nature 80'-110'; largest eastern conifer.
- **Spread:** 20'-40'

Identification:

- The only five-needle pine native to eastern North America
- Distinguished by its commonly "windblown" or asymmetrical look; its large, long cones; and its five needles per cluster.

Distribution:

- Northern North America, south in mountains.

Habitat:

- Prefers well-drained soils and a cool, humid climate.
- **Disease:** White Pine Blister Rust (*Cronartium ribicola*), an introduced fungal disease, has decimated formerly extensive stands.
- **Occurs** on a variety of sites from wet bogs and moist streambottoms to dry sand plains and rocky ridges; common on the east shore of lakes where blowdowns create openings for regeneration.
- **Soils:** grows on nearly all soil types within its range. Most competitive on fairly infertile sandy soils. On clay or poorly drained soils, occurs only as individuals or in small groups. Grows on fine sandy loams and silty loams on disturbed sites with little hardwood competition.
- **Shade tolerance** intermediate. In the BWCA it begins to be replaced by more shade-tolerant Balsam Fir (*Abies balsamea*), Paper Birch (*Betula papyrifera*), White Spruce (*Picea glauca*), and White Cedar (*Thuja occidentalis*) about 360 years after fire.
- Sometimes a component of climax forests on sites such as steep slopes and ridge tops where windfall provides regeneration opportunities.
- Frequently dominates or codominates dryer northern pine forests. In mixed hardwood forests, it often occurs as a scattered superdominant tree towering above the surrounding hardwoods
- Lower soil pH limit of 4.0.
- Seedlings tolerate limited shade from herbaceous ground cover better than other pines.
- Germination and emergence not greatly affected by soil acidity caused by acid rain.

Fire:

- Moderately fire resistant; mature trees survive most surface fires due to thick bark, branch-free trunks, and a moderately deep rooting habit. (Younger trees are not as fire resistant.) Needles have relatively low resin content so are not highly flammable.
- The natural fire regime of White Pine/Red Pine forests is nonlethal surface fires at 5-50 year intervals, punctuated by severe stand-replacing fires at longer intervals. In the BWCA low-severity fire intervals average 36 years, and severe fire intervals average 160 years. Forests growing on moister sites with a substantial shade-tolerant component probably undergo only one fire every 150-350 years. Some large individuals survive or escape severe fires and serve as seed sources for a new stand. Severe fire creates large open areas with ash or mineral seedbeds and reduces competition, good conditions for White Pine regeneration.
- The typical fuel under White and Red Pine stands is an organic layer 2"-4" deep, a continuous needle layer, a moderate forb and shrub layer, and a moderately dense understory. Ground fires spread slowly in this fuel. Dry, windy conditions are required for fires to crown and have a high rate of spread.
- Once White Pine reaches 60' in height and develops rough bark on the lower trunk, it tolerates low-severity fire. Large individuals usually survive moderate-severity fires. Fires of more than moderate severity during the first 50 years may destroy the entire stand. Total scorching of foliage usually kills

the tree.

- Colonizes burns if a seed source is nearby.
- A thick organic layer is an unfavorable seedbed because roots of new seedlings dry out before reaching mineral soil. The higher the fire severity, the more organic material is removed. Establishment is highest when mineral soil is exposed.
- **Trees:** Bigtooth Aspen ([Populus grandidentata](#)), Quaking Aspen ([Populus tremuloides](#)), Black Cherry ([Prunus serotina](#))
- **Shrubs:**
 - On dry sites, Sweetfern ([Comptonia peregrina](#)), Low Bush Honeysuckle ([Diervilla lonicera](#)), Wintergreen ([Gaultheria procumbens](#)), Blueberries ([Vaccinium angustifolium](#), [Vaccinium myrtilloides](#)),
 - On moist, rich sites associates include Partridgeberry ([Mitchella repens](#))
 - Other associates include Bunchberry ([Cornus canadensis](#))
- **Herbs:** Wild Sarsaparilla ([Aralia nudicaulis](#)), Jack-in-the-Pulpit ([Arisaema triphyllum](#)), Large Leaf Aster ([Aster macrophyllus](#)), Hay Scented Fern ([Dennstaedtia punctilobula](#)), Canada Mayflower ([Maianthemum canadense](#)), Woodsorrel ([Oxalis montana](#)), Bracken Fern ([Pteridium aquilinum](#))
- **Ground Covers:** Clubmosses ([Lycopodium spp](#)),
- **Mammals:** Squirrels, chipmunks and mice feed on the seeds and soft needles. Inner bark is a preferred winter food of porcupine and deer browse the twigs. Rabbits may eat the bark of young trees. The seeds are eaten by red squirrels and such birds as crossbills and pine siskins. Pocket gophers graze the roots of seedlings and young trees. Snowshoe hares, white-tailed deer, and cottontails browse the foliage; the bark is eaten by various mammals. Young black bear cubs use large White Pine to climb to safety.
- **Birds:** Songbirds eat seeds. Bald eagles build nests in living White Pine, usually at a main branch located below the crown top. White Pine, especially those with broken tops, provide valuable habitat for cavity-nesting wildlife.

History:

- Pushed south and east during the last Ice Age by the southward expanding White Spruce forest, which was to extend as far south as northern North Carolina and eastward out onto the Continental Shelf, White Pine was to weather the Ice Age at the extreme eastern edge of the Continental Shelf and perhaps in some as yet undiscovered pockets in the southern foothills of the Appalachians.
- With the melting of the continental ice sheets and the slow rise of sea levels, White Pine moved westward, off the Continental Shelf, arriving in the Shenandoah Valley of Virginia about 12,700 years ago. Because it had to migrate north around the Appalachians and south around the Great Lakes, it would be some 3500 years after the arrival of Jack and Red Pines in Minnesota that they would be joined by White Pine. The western movement of White Pine was still ongoing in Minnesota when the first Europeans arrived.
- Native Americans were said to have used the inner bark as an emergency food source. The whitish resin which seeps out of the wounds of this tree was mixed with beeswax by the Iroquois and used to seal the seams of their canoes.
- New England forests were a valued source of 18th Century naval stores; large tracts were once reserved for exploitation by the Royal Navy. Heavy logging for building materials and furniture followed the westward course of settlement throughout the 18th and 19th centuries. Regeneration was poor because of the lack of seed trees and the destruction of remaining seedlings and saplings by fire (such as the great Hinkley Fire). Few uncut stands remain.
- The provincial tree of Ontario and the state tree of Maine and Michigan.

Uses:

- Wood light, straight-grained and easily worked but not strong. Softwood with a soft to medium density. Color varies from creamy white to pale straw, with occasional contrasting orangish growth rings.
- Used in cabinetmaking, furniture, interior finishes, woodenware, matches and lumber. The white pine produces the most valuable softwood lumber in eastern North America and is used extensively for interior trim, window sashes, door frames and for intricate carpentry. Excellent carving material. Lightweight, soft, even-textured, and easily worked, Eastern White Pine is probably the least resinous of all pines. It does not swell or shrink greatly with moisture content changes and displays remarkable durability as shown by the large number of houses built of Eastern White Pine in New England 200 and more years ago. Because of these desirable characteristics, Eastern White Pine uses include millwork, knotty pine paneling, siding and boards for boxes, crates, coffins, boats, woodenware, and novelties.
- Grown extensively as Christmas trees.

Reproduction:

- Sexually by seed
- Cone production begins when 5-10 years old, but good seed production does not occur until trees are at least 20-30 years old. Good seed years every 3-5 years, with some seed produced in intervening years.
- Seed dispersal primarily by wind. Seeds travel 200' within a stand and more than 700' in the open. Animals also disperse seeds. White-footed mice and red-backed voles bury caches containing seed beneath the litter but on top of the mineral soil. Caches that escape revisitation and decimation produce seedlings.
- Favorable seedbeds include moist mineral soil, mosses (*Polytrichum spp.*), and short grass cover of light to medium density. Dry mineral soil, pine litter, lichen, and very thin or very thick grass covers are poor seedbeds in full light but adequate in shade. Very limited delayed emergence the second year after seed fall, and none after 3 years.
- Colonizes disturbed sites, but a nurse crop of aspen (*Populus spp.*), birch (*Betula spp.*), or other pioneer species promotes best regeneration.
- Seedlings require at least 20% full light for survival. They achieve maximum height growth in 45% of full light. Early growth is slow, but between 10 and 20 years of age, the average annual height growth is about 16" per year
- The pollen-bearing flowers are clustered in small cones at the base of the new growth. The bright red seed-producing flowers occur on other twigs. The cones take two years to mature. Male strobili open and shed pollen in April through June, depending on latitude. Fertilization occurs 13 months after pollination. Cones ripen and seeds are dispersed August through September, about 2 years after cone initiation. Seeds germinate in the spring. Terminal shoot growth is usually completed by the end of June.
- Seeds require cold stratification to break dormancy;

Propagation:

- By seed, following cold stratification.

Cultivation:

- Hardy to USDA Zone 2 (average minimum annual temperature -50°F)
- Cultural Requirements
 - Full sun to partial shade
 - Well-drained to poorly drained, sandy or clay soils, pH 4.5 - 6.5
 - Moist to dry
- Size 50'-80'W x 100'H
- Cultivars and species available by mail order from specialty suppliers or at local nurseries
- In northern areas, a dwarf form can be found. Both normal and dwarf varieties are sold by nurseries.
- Subject to the white pine blister rust, a serious fungal disease. The fungus spends part of its life-cycle on gooseberry and currant bushes. To avoid infection, keep the tree at least 1/4 mile from gooseberry or currant.
- Does not tolerate air pollution, heat, drought, or salt; therefore, not a good plant for city conditions or along roads.
- **Care:** Prune in the spring to increase plant density. Pinch off one-half of the new growth tip. Do not shear for a hedge. Test soil and adjust pH according to test results if needles look yellowish.
- **Problems:** Iron chlorosis may be a problem in high pH soils and causes needles to become

yellowish. White Pine Weevil kills the young top of the tree which may result in a crooked trunk. Breakage due to ice storm can be a problem.

- **Cultivars** of *Pinus strobus*:
 - *Fastigiata* (Pyramidal White Pine), a narrow upright form 20' wide - 60' tall with narrow crotch (branch) angles.
 - *Pendula* (Weeping White Pine), drooping branches; slow growth.
 - *Nana* (Dwarf White Pine), dwarf, globe shaped form.
 - *Compacta* - (Nana) Dwarf, 5' tall
- A soft wooded pine that will form pure stands in the wild. White pines do not withstand the city pollutants well, but they do fine in adverse native environments. They are useful in parks and large areas. Wind and ice can cause limb breakage to the point of complete destruction. Overall, a fast growing, handsome tree that is easy to transplant and has proven to be quite useful in most any landscapes.
- Two of the more damaging pests are the White Pine Weevil (*Pissodes strobi*) and White Pine Blister Rust (*Cronartium ribicola*).

Links:

- [Fire Effects Information System \(FEIS\)](#)

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Last updated on 4 March, 2006