



*River Trail
Guide*

CONTENTS

- 1 - Fields
- 2 - White Pine Stand
- 3 - Balsam Fir
- 4 - Stone Culvert
- 5 - Red Pine, Norway Pine
- 6 - Stone Walls
- 7 - Eastern White Pine
- 8 - American Beech
- 9 - Beech Bark Disease
- 10 - Paper Birch
- 11 - Northern Red Oak
- 12 - Red Spruce
- 13 - Big-Tooth Aspen
- 14 - Pileated Woodpecker Damage
- 15 - White Ash
- 16 - Red Maple, Swamp Maple, White Maple
- 17 - Yellow Birch
- 18 - Sugar Maple
- 19 - Hemlock Stand
- 20 - Eastern Hemlock
- 21 - Fish Habitat and Riparian Zones
- 22 - A Burl
- 23 - Hemlock Witness Tree
- 24 - Hemlock Cavity Tree
- 25 - Water Bars Control Erosion
- 26 - Small Forest Openings
- 27 - Striped Maple Clump
- 28 - Logging Damage
- 29 - Bear Claw Marks
- 30 - Pin Cherry
- 31 - Staghorn Sumac
- 32 - Gravel Pit
- 33 - Log Landing
- 34 - Old Logging Brow
- 35 - A Mature White Pine"

1

Fields

New Hampshire's area is approximately 5.94 million acres, an acre being about the size of a football field—minus the last ten yards. Forests cover 4.74 million acres or 80% of the state. We are the second most heavily forested state. (Maine is the most.) Still, between 1997 and 2010 New Hampshire lost about 95,040 acres to development.

There are 1.2 million acres of non-forested land in New Hampshire. When the early colonists arrived and began settling, they made a tremendous effort to clear the land. What was once 93% forested, by around 1851 was 50% cleared land. The gold rush, the civil war, and emigration to the Midwest, where it was much easier to farm, led to the abandonment of cleared land and its reversion back to forest.

The field west of the wall in front of you is 4.4 acres. It is mown annually to keep it open, otherwise within a few years thousands of seedlings would occupy the field and it would most likely largely revert to pure white pine. Presently, there is a semi-carpet of low bush blueberries. The soil is very acid, a key requirement for blueberry dominance. One of our goals is to convert this field to a carpet of blueberries. Burning the field, for example, will encourage their spread. This could become an excellent site for townspeople to pick a bountiful supply of this delicious fruit.



View to Teacup Lake

2

White Pine Stand

This stand of white pine is approximately 70 years old. A white pine averages about one foot of growth per year, so to estimate the height of a white pine is to estimate its age. This area was formerly a field and when mowing was discontinued, it seeded into pure white pine. Notice the difference in the diameters of the trees: some are large, some are medium, and some are small. Yet the trees are all the same age and about the same height. Some are dying. The weaker, small-crowned trees are being crowded by the dominant ones and will die. The forest is being thinned naturally

If we were to manage this stand and thin it properly, we would focus on the removal of the smaller diameter, small-crowned suppressed trees, leaving the larger better developed trees with space around each crown so as to reach their full potential. Some say that to thin a forest you should take out most of the big trees and leave the smaller ones to grow. The opposite should be done, as we just outlined, since the smaller trees will not recover from the years of suppression.

The hardwood competition that persistently tries to establish itself in the understory of the forest has been mowed to maintain the pure pine stand and the open, see-through appearance. On this rich, moisture-retentive, loamy soil, a hardwood forest is the natural succession to the present, white pine forest.

Maintaining white pine on this site requires intensive management. This begins with thinning the stand on bare ground during natural, white pine seed years, about every 3-5 years. The seeds released in September land on the disturbed forest floor and have an excellent chance of germinating to new, tiny seedlings the following spring. These will develop into the next pine forest, if given enough light and periodic release from the large dominant trees over-topping them.



White Pine Stand (source: pixgood.com)

3

Balsam Fir

(*Abies balsamea*)

Distinguishing Characteristics:

- ▶ Needles: dark green, 1/2 to 1 inch long, flattened, one row on each side of the branch, and marked on the underside by two silvery-white bands.
- ▶ Cone: cylindrical, erect, and dark rich purple in color.
- ▶ Bark: on old trees is thick, rich brown and separated into scaly plates; on young trees often has resin blisters.
- ▶ Tree: has a symmetrical, slender, pyramidal crown that is quite dense, grows to 60 feet with a trunk diameter of up to two feet, has an average life span of 40-60 years, and is mature at 50 to 60 years.
- ▶ Wood: light, weak, soft, and coarse-grained.
- ▶ Application: construction lumber, pulpwood, and Christmas trees.



Balsam Fir (source: Wikimedia Commons)

4

Stone Culvert

You are standing atop a stone culvert probably constructed around the turn of the nineteenth century somewhat over one hundred years ago. Then, prior to the manufacture of cement, galvanized, or plastic culverts, landowners often constructed them from stone that they removed from their cleared field or simply discovered in the woods. A ditch across the road was dug (by hand) and the proper size stone placed vertically along the sides of the ditch. Then large flat stones to cover the ditch were located. The materials were free, but a lot of physical labor and animal power was needed to build this drainage path. This culvert has performed its function well for over a century.



Stone Culvert

5

Red Pine, Norway Pine

(Pinus resinosa)

Distinguishing Characteristics:

- ▶ Needles: dark green, long slender 5-6 inches in length with two needles per cluster.
- ▶ Cones: symmetrical, 2-2 1/2 inches in length, light brown without spines on the scales.
- ▶ Bark: divided into flat ridges, covered with reddish-brown scales.
- ▶ Tree: single stemmed, symmetrical crown, small branches, grows to 70-100 feet, average life span is 80-100 years, mature at 90-100 years.
- ▶ Wood: hard, close grained, and very resinous, and so classified as a hard pine, strong.
- ▶ Application: construction lumber, timbers, flooring, treated utility poles, paper.



Red Pine (source: Wikimedia Commons)

6

Stone Walls

Stone walls are present throughout New England. One rough estimate suggests the total length of the stone walls in New England as sufficient to extend from the earth to the moon, a distance of about 238 thousand miles. No one really knows.

Stone walls provide a glimpse into the use of the land immediately adjacent to both sides of the wall being studied. If you look at the wall at this station you see that in addition to large rocks, many additional smaller rocks create a substantial wall through what is now forest. The fact that there are so many smaller rocks indicates that the land adjacent to the wall was cultivated intensively, probably from the late 1800s through the early 1900s. Each year frost heaved more rocks up close to the surface. When the farmer plowed in the Spring, these rocks were brought to the surface. To remove and dispose of them the landowner carted them over to the wall.

In contrast, if a wall appears to be constructed of a single row of substantially large rocks, then it is likely served as a pasture or a boundary wall (or both).



Well-kept Stone Wall (source: NH Garden Solutions)



Abandoned Stone Wall, Wentworth Trail, Mt. Israel

7

Eastern White Pine

(Pinus Strobus)

White pine is the most productive and prevalent pine in the state. It produces the most volume per acre and generally the most value. In a white pine forest fully stocked with mature trees (i.e., about 100 years old) there can be over 50,000 board feet of lumber per acre.

The white pine is subject to white pine weevil injury which kills the terminal shoot and often results in crooks or multiple tops in the tree. White pine blister rust is another serious disease affecting this species. The rust alternately attacks ribes (currant and gooseberry bushes) and white pine. The rust enters the needles on a live white pine branch and travels down the limb attacking the trunk of the tree, causing deformation. The stem can even be girdled by the rust, killing the tree.

Distinguishing Characteristics:

- ▶ Needles: soft bluish green, flexible, 3-5 inches in length, five needles per cluster.
- ▶ Cones: 4-8 inches in length, curved with scales. It takes two years for a cone to mature and produce seed.
- ▶ Bark: on young pines is thin, smooth and dark green, on older trees it is deeply divided into broad ridges.
- ▶ Tree: attains a height of over 100 feet, 3-4 feet in diameter, pyramidal crown, average life span 90 - 130 years, mature at 130 years.
- ▶ Wood: light colored, straight grained, but not strong.
- ▶ Application: interior trim, cabinets, timbers, furniture, paper.



White Pine (source: Wikimedia Commons)

8

American Beech

(Fagus grandifolia)

This species is a very shade tolerant hardwood that regenerates three ways: by seed, by root sprouts and by stump sprouts. It is also a climax species meaning it perpetuates itself on site. The nut crop is a favored food for wildlife including black bear. Bears will climb the tree leaving distinct claw marks in the bark.

Distinguishing Characteristics:

- ▶ Leaves: oblong, oval shaped, pointed leaves 2-6" long. Leaf margins have large teeth which turn yellow in autumn, then tan to bronze and often stay on the tree until spring.
- ▶ Nuts: edible, triangular in shape, 3/4" long borne in prickly husks.
- ▶ Bark: light gray and smooth, unless infected with the beech bark disease.
- ▶ Tree: grows to 60-80 feet and 2-3 feet in diameter. The crown is broad and rounded; the trunk usually short; the average life span is 80-120 years; and the tree is mature at 100 years.
- ▶ Wood: strong, light colored, heavy.
- ▶ Application: lumber, furniture, flooring, handles, millwork, pulpwood, and firewood.



Beech (source: Missouri Botanical Garden)

9

Beech Bark Disease

This beech is heavily infected with beech bark disease. It starts when the beech tree is attacked by the beech scale insect. A wool-like, white, waxy substance appears at the site infested with the scale insect. The infestation is followed by an infection by the parasitic bark fungus that causes the bark disease. Infected trees appear to have acne and develop deep cracks on the surface of their bark.

This disease has the effect of girdling the tree. At some point, the tree is sufficiently weakened so that it is often snapped off in a high wind. It takes decades, though, for the disease to kill the tree. Heavy infested trees are downgraded in value to pulpwood, firewood or pallet quality sawlogs, impacting the value of the forest crop.



Beech Bark disease (source: Linda Haugen, USDA)

10

Paper Birch

(*Betula papyrifera*)

Paper birch is a very desirable commercial tree. Its life span is about 70-90 years and it requires a small clear cut with plenty of light to regenerate. The tree is susceptible to ice damage.

Distinguishing Characteristics:

- ▶ Leaves: The leaves are pointed and doubly toothed, roughly oval, rounded at the base, and 2-3" long.
- ▶ Fruit: cylindrical, about 5.5" long and .5" in diameter and hangs from a slender stalk. The fruit disintegrates when mature.
- ▶ Bark: white papery bark which peels off horizontally curled and ragged at ends.
- ▶ Tree: usually slender and graceful, often growing in clumps of 2- 4 individuals, and attaining a height of 80' with trunk diameter seldom greater than 2'. The crown is usually rounded and irregular, average life span 70-90 years, mature at 90 years.
- ▶ Wood: hard, strong, light and close grained.
- ▶ Application: used for veneer, spools, bobbins, dowels, toothpicks, golf ties, tongue depressors and other wood turning products, furniture, birch bark canoes and pulpwood.



White Birch (source: Acadia National Park)



White Birch Bark (source: Wikimedia Commons)

11

Northern Red Oak

(*Quercus rubra*)

This is a very desirable lumber tree. High quality red oak veneer is used in furniture. Its acorn, although not as favored as white oak, is still an important overwintering food for many species of wildlife including deer, turkey, squirrels, bear, ruffed grouse and some songbirds.

Distinguishing Characteristics:

- ▶ Leaves: 5-8" long and have 7-11 lobes. Each lobe is usually 3 toothed, sharply pointed with bristles on the points. The leaves turn red in the fall.
- ▶ Acorns: usually about 1" long with a flat, shallow cup at the base, have a bitter taste, not as preferred as the sweet tasting white oak acorn.
- ▶ Bark: smooth, dark in young trees, grooved often with cinnamon reddish coloring at base of groove.
- ▶ Tree: will reach a height of 60'-80' and three or more feet in diameter, the crown is rounded and comparatively narrow, average life span 150-200 years mature at 150 years.
- ▶ Wood: very strong and porous, stiff, and hard with a high shock resistance.
- ▶ Application: flooring, furniture, millwork, boxes, crates, timbers, handles, wooden ware, when treated it is used for cross-ties, mine timbers, and fence posts.



Red Oak Fall Foliage (source: Wikimedia Commons)

12

Red Spruce

(*Picea rubens*)

Distinguishing Characteristics:

- ▶ Needles; yellow-green, 1/2 inch long, square, rather bluntly-pointed and lustrous, spiraling around the branches and extending on all sides, 4 angled stiff and sharp pointed.
- ▶ Cones: 3.75-2 inches long, with scales that are smooth-edged, light reddish-brown and lustrous, hang downward, egg-shaped.
- ▶ Bark: dark brown to gray bark is broken into irregularly shaped scales with reddish inner bark showing between.
- ▶ Tree: reaches a height of 60-70 feet with trunk diameters of 1-2 feet, pyramidal with dense crowns and tall tapering trunks, average life span 90-120 years, mature at 100 years.
- ▶ Wood: light and soft.
- ▶ Uses: construction lumber and pulpwood.



Red Spruce (source: Gymnosperm Database)

13

Big-Tooth Aspen

(*Populus grandidentata*)

Unlike most hardwoods, an aspen sends up sucker sprouts from its root system, resulting in numerous shoots extending in a circle to the outer reaches of its roots. It does not sprout from the stump. It is an excellent species for wildlife. Ruffed grouse inhabit young stands of sapling and pole size aspen and feed on the buds of mature aspen during the winter months.

Distinguishing Characteristics:

- ▶ Leaves: almost round with conspicuous large rounded teeth, dark green on the upper surface but lighter green on the lower side, 2-3 inches long and wide.
- ▶ Bark: thin, smooth and light-gray to green on young trees and the upper portions of older trees, at the base of older trees it is dark brown.
- ▶ Tree: grows to 60-70 feet and 2 feet in diameter, narrow round- topped crown, life span 40 -70 years, mature at 60-70 years.
- ▶ Wood: soft, light colored.
- ▶ Uses: interior parts of furniture, molding, pulpwood, excelsior.



Big-Tooth Aspen (source: Wikimedia Commons)

14

Pileated Woodpecker Damage

The cavity that you see before you was excavated by the handsome, crow-sized Pileated Woodpecker. This bird thrives in mature deciduous, mixed and coniferous forests creating large oblong cavities in large diameter living trees that have evidence of decay. The woodpecker feeds on larvae and adults of many kinds of insects especially ants. Most feeding is done in decayed wood. These woodpeckers have an uncanny ability to find the ant activity which has caused the decay in the tree, where the bird will excavate in order to find food. Other birds and some small mammals will use the resulting cavity for nesting purposes.



Pileated Woodpecker Damage (source: Ashby Lake, Ontario)

15

White Ash

(*Fraxinus americana*)

White ash is a very desirable tree for use in tool handles. It is strong and can be bent into curves. It is one of the few trees that can be burned when unseasoned and still provide warmth.

Distinguishing Characteristics:

- ▶ Leaves: 8-12 inches long with 5-9 oblong leaflets that are 3-5 inches long and that have smooth or finely toothed margins. The upper surface of the leaf is dark green; undersides are pale light green to whitish.
- ▶ Fruit: a single winged samara with a single seed, borne in clusters.
- ▶ Bark: thick, divided by narrow ridges into a net-like pattern.
- ▶ Tree: may reach a height of 120 feet, but more commonly are 70-80 feet with trunk diameters up to 3 feet. Average life span is 70-90 years and they mature at 90 years.
- ▶ Wood: heavy, hard, strong, stiff with good shock resistance, excellent bending qualities.
- ▶ Application: tool handles, baseball bats, furniture, flooring, cabinets.



White Ash (source: Wikimedia Commons)

16

Red Maple, Swamp Maple, White Maple

(*Acer rubrum*)

Red maple is a shade-tolerant tree that regenerates readily in shade, often in accompaniment with beech, by stump sprouts and seed. The young, succulent sprouts that develop from freshly cut stumps are ideal browse for deer, moose, rabbits and other mammals. It often occupies the understory of a selectively thinned white . Not as desirable as the rock or sugar maple, many red maple trees are destined to become a low quality pallet or firewood product.

Distinguishing Characteristics:

- ▶ Leaves: 3-5 lobed, and coarsely toothed margins, 2-6 inches long and some-broader than long. They turn brilliant scarlet orange, red, or yellow in the autumn.
- ▶ Fruit: occurs in V shaped winged pairs.
- ▶ Bark: on old trunks it is thick, dark gray and flakes off easily in large plate-like scales. Young trees have smooth, dark gray bark with a blotchy appearance.
- ▶ Tree: may reach 120 feet in height, commonly grows to 70-80 feet with a trunk of 1-2 feet . The average life span is 90 to 150 years and the tree matures at 100 years.
- ▶ Wood: strong, heavy, stiff, high resistance to shock, and high shrinkage.
- ▶ Application: flooring, furniture, crates, firewood, paper.



Red Maple (source: Wikimedia Commons)

17

Yellow Birch

(*Betula alleghaniensis*)

Yellow birch, unlike white birch, is long-lived. It can attain an age of more than 300 years. It also has a much higher BTU value than white birch. It furnishes browse for deer, and its buds and catkins are food for grouse and other wildlife.

Distinguishing Characteristics:

- ▶ Leaves: 3-5 inches long, pointed and sharply-toothed, and roughly oblong-oval in shape.
- ▶ Fruit: oval, erect, 1-1 1/2 inches long, and about 3/4 inch thick.
- ▶ Bark: yellowish-bronze color, peels into long, ragged strips.
- ▶ Tree: may reach 100 feet and 2-3 feet in diameter, found in either wet lands or moderately drained rich loamy sites. Average life span is 150 to 200 years; it matures at 200 years.
- ▶ Wood: heavy, hard, strong, stiff with high shock resistance. Shrinkage is large and the wood has a winter green flavor.
- ▶ Application: lumber, veneer, furniture, millwork, wooden ware, pulpwood, used in the distillation for wood alcohol.



Yellow Birch (source: Robert Mohlenbrock USDA)

18

Sugar Maple

(*Acer saccharum*)

These are the trees that are tapped each Spring so that their sap may be boiled to form maple syrup, a major industry in the northeast.

Distinguishing Characteristics:

▶ Leaves: 5 lobes that are separated by rounded, shallow sinuses. They are 3-5 inches across, rounded at the base, with sparse, large, pointed teeth on the margins. The leaves are exceptionally colorful in the fall with brilliant yellows, reds and oranges.

▶ Fruit: A U-shaped pair of winged seeds which ripen in the fall.

▶ Bark: The bark of mature trees is thick, light gray to brown and broken by vertical furrows into plate-like scales.

▶ Tree: May reach a height of 75-100 feet with a trunk diameter of 3-4 feet. In crowded forested conditions, the tree grows tall and straight with a narrow crown. Open grown trees have a shorter stem and a large round crown. The tree may attain an age of 300-400 years. Most mature at between 150-200 years.

▶ Wood: The wood is heavy, hard, strong and stiff with resistance to shock. Although usually straight grained some select trees have a curly, wavy or "bird's eye" grain. These trees are extremely valuable. The wood turns well on a lathe.

▶ Application: Maple wood is used for furniture, flooring, turning stock, cabinets and a host of other products. It is especially useful for bowling alleys, gyms and dance floors. And the sap is boiled to make maple syrup.



Sugar Maple (source: Wikimedia Commons)

19

Hemlock Stand

The hemlock forest type occurs on wet flats, rocky ridge tops, and moist slopes in southern and central New Hampshire. This species not only produces an important timber for the production of dimension lumber and pulpwood, but also provides a critical deer yard habitat during winters when snow depths pose a threat to the survival of this important game animal.

When managing hemlock, it is important to maintain a fairly tight canopy of trees, occasionally removing a mature or low quality tree to allow a minimal amount of light to reach the forest floor and encourage new seedling development.

During heavy snow winters, the dense canopy reduces the amount of snow reaching the forest floor. The thick understory of new growth protects deer from chilling winds. The bark from the hemlock saplings serves as a not very nutritional source of food pending the arrival of spring and better food.



Hemlock Stand (source: Town of Salisbury VT)

20

Eastern Hemlock

(*Tsuga canadensis*)

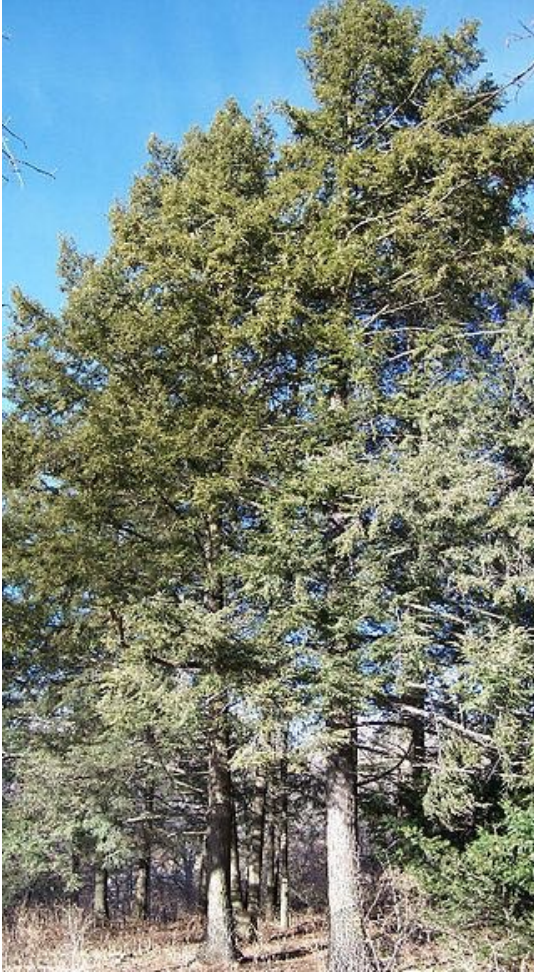
Hemlock can germinate and survive under intense shade. It is a climax species meaning it keeps reproducing itself and maintains a presence on a site rather than serving as a transition to other species. Hemlock forests play a critical role in providing winter habitat for white tailed deer during severe winters. The tight canopy controls the snow depths and thick understory regeneration provides shelter from the winds.

Hemlock trees are very sensitive to site disturbance. Compaction of the soil from heavy equipment, filling over root systems and severing roots from the skidding of logs results in frequent mortality of these trees.

Hemlock Woolly Adelgid is a major pest. It threatens this species throughout its range.

Distinguishing Characteristics:

- ▶ Needles: flat, 1/3-2/3 inches in length, two, parallel, white lines on the underside.
- ▶ Cones: small and oval shaped with scales.
- ▶ Bark: divided with ridges, formerly used to tan hides.
- ▶ Tree: a graceful lacy foliated tree found generally on cool moist sites, pyramidal in shape, attains a height of 60-70+ feet, and 2-3 feet in diameter. It can live to over 400 years although the average life span is 150 to 200 years. It matures at 300 to 400 years.
- ▶ Wood: light, soft and strong.
- ▶ Application: construction lumber, timbers and paper.



Eastern Hemlock (source: Wikimedia Commons)

21

Fish Habitat and Riparian Zones

Protecting the aesthetic beauty of Cold River and maintaining its status as a quality trout stream requires implementation of some basic management principles. Harvesting timber within a distance of 150 feet from the rivers edge should be kept to a minimum. This will not only reduce erosion of soil into the river, but it also shade the stream from direct sunlight, maintaining the ideal water temperatures. Excessive temperature and siltation are perhaps the two biggest threats to the maintenance of healthy fishing habitat.

The presence of decaying debris from fallen trees contributes to the value of this fishing haven. This woody material helps shape stream channels and provide cover and food for young resident fish. It is used by a variety of organisms, either directly as a source of food and cover or indirectly, by taking advantage of the stream features created by the debris.

The primary effects of logs and trees on the stream channel relate to streamflow patterns. Pools are formed by the stream scouring around and under logs. Gravel and sediment are stored behind logs and debris jams. Undercut banks are created by water deflected against a stable bank. All these help create habitat types that trout and the organisms they feed on can use.



Cold River

A Burl

The bulge growing on this tree is a burl, abnormal growths that can develop on the trunk or limbs of nearly any kind of tree. They are caused by the extremely irregular grain orientation that is often combined with small, partly developed buds and streaks of darker color. It maybe the equivalent of tree cancer, but does not appear to be fatal to any tree.

Burls are prized by wood workers. Turned on a lathe, they make beautiful bowls and other small furniture items. The unique grain pattern is a thing of beauty.



A Burl (source: Wikimedia Commons)

23

Hemlock Witness Tree

This over-mature hemlock is roughly 250-300 years old. It is referenced in a deed dated 1790 making it a witness tree. The property line was shifted in a boundary line agreement from across the brook to the center line of the brook. Property corners at that time were often identified by a pile of rocks, a stone post and later pieces of pipe or rebar—or by trees surrounding the corner, blazed with an ax with the blaze mark facing the corner. If the tree represents the corner alone, then it is often blazed on all four faces of the tree.

Over time blazes will completely heal over with scar tissue.

Hemlock Cavity Tree

Decay in a tree may arise from many different causes. It allows the tree to perform a variety of functions that benefit wildlife. This decay provides food and shelter for different insects. Ants in particular inhabit these defective parts of the tree. They, in turn, encourage woodpecker activity which transforms the defect into various shaped cavities which provide shelter for many species of small mammals and birds.

A tree, in this way, may serve many useful purposes during its lifetime. Even after it is dead and entirely decomposed, it adds to the organic matter in the soil and helps provide needed nutrients for new life.

Trees like people live to be different ages, die from many different causes, serve many different functions during their lifetime. Each one is unique and will never be exactly replicated.

Water Bars Control Erosion

Water bars—that is to say, diagonal berms or mounds of earth—are essential in preventing gully erosion on roads and trails. These earthen dams divert running water into the woods where it can be absorbed into the forest floor without negatively impacting the land. The placement of water bars is dictated by the steepness of the slope of the land. The greater the per cent grade or slope the closer the spacing of water bars. A 2% slope requires water bars to be 250 feet apart, 10% slope requires 80 feet, and a 30% slope requires a 35-foot distance between water bars. The slope of this trail is about 25%. It is also important to seed, lime, fertilize and mulch a road that is put to bed in order to establish a good grass cover and protect it from erosion. This vegetative cover provides important wildlife forage for a variety of animals.



Water bar, Wentworth Trail, Mt. Israel

26

Small Forest Openings

Creating small openings or clear-cuts in the forest has a number of benefits. In a mature forest, it is one way to introduce seedlings and saplings to create diversity, important from a wildlife perspective and also to make sure there is a healthy mix of different age classes in the forest.

If your goal includes trying to introduce white birch into the forest, a small clear-cut is essential in order to regenerate this important tree species. White birch requires full sunlight to become established. Selectively thinning the forest will not create an environment where white birch can establish itself and develop into a quality tree.

Notice the bark scrapings on the striped maple stems. A moose has fed on the bark of this weed tree providing essential food during the long winter months. If you examine the scraping closely, you will notice the teeth marks. A moose has lower teeth and uses these to rip the bark from the stem in an upward motion.

Striped Maple Clump

(*Acer pennsylvanica*)

Striped maple does not produce a mature, lumber tree. It is extremely shade tolerant and instead of growing upwards regenerates profusely in the understory. It can choke out more desirable regeneration if it becomes dominant.

Distinguishing Characteristics:

- ▶ Leaves: large, maple shaped with a toothed margin, light green in color, yellow in the fall.
- ▶ Fruit: occurs in winged-shaped V pairs.
- ▶ Bark: yellow-green with stripes.
- ▶ Tree: very shade tolerant shrub or small diameter tree, reaches 20-30 feet in height. Average life span of 20 to 30 years.
- ▶ Wood: soft, does not generally reach a large enough size to produce lumber.
- ▶ Application: moose and deer feed on the bark.



Striped Maple Clump (source: burntmeadow.com)

Logging Damage

This damaged tree was injured during the 1982 timber sale. When harvested trees are extracted from the forest, some damage to peripheral trees is inevitable. Care must be exercised by the logging contractor to minimize the debarking of standing trees. Most of the damage occurs along the major skid roads. It is a good idea leave low quality "bumper trees" along skid trails to absorb most of the damage when the harvested trees are yarded out of the forest behind the skidder or tractor.

When trees get debarked, the tree reacts by setting up a chemical barrier zone around the wound inhibiting invasion by most microorganisms. Certain of these can, however, grow through the barrier. When this happens, a second wave of microorganism moves in behind the first. Still others follow. A succession of microorganisms is involved in the process that results in decay.

When a tree is debarked, each year's successive growth adds to the closure of the injured area. This closure occurs at a very slow rate. If a large portion of the circumference of the tree is damaged, closure of the wounded area is not very feasible. If decay sets in or the wood is discolored, then this damaged portions of the tree can possibly be used for pulpwood or firewood.

Bear Claw Marks

If you examine this beech tree closely, you will notice scars on the surface of the bark that have calloused over. These marks were made from a bear that climbed this tree to feast on beech nuts, one of its favored foods. Beech is one of the important mast trees that support a host of wildlife. Beech trees ordinarily begin producing seed at age 40 and by the time they reach 60 years of age may produce large quantities. Good beech seed years occur on 2-3 year intervals. The black bear will make long vertical claw marks in the bark of the stem as they climb into the crown to access the nut crop. In some instances, the bear will climb out on a large limb and reach out and grab the small nut bearing branches and literally pull the branches towards them. This can result in the branches breaking but still remaining attached to the limb. Such collections of broken branches are sometimes called bear nests.

Bears seem to have an uncanny ability to identify those beech trees that are good nut producers. Perhaps their keen sense of smell allows them to identify a tree worth climbing to get their fill of this nutritional snack. Once a tree has been marked, it is very likely it will be visited again.

30

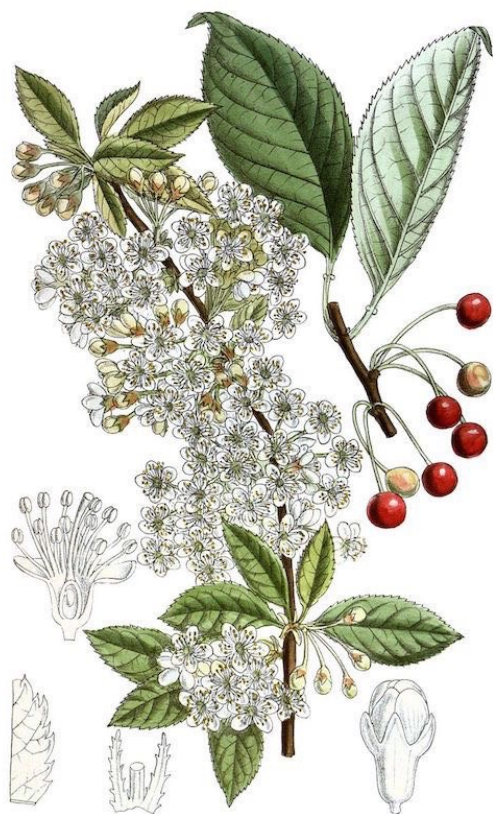
Pin Cherry

(*Prunus pensylvanica*)

Pin cherry is a small tree (10-30 feet tall) that grows in a variety of places, especially in dry, disturbed, or waste sites. The fruits are valuable as bird food, especially for eastern bluebird. Other common names are fire cherry, bird cherry, and wild red cherry. It is a prolific seeder and one of the first trees to occupy a clearcut. The seed is reported to remain viable and dormant in the ground for years and when a major disturbance such as a clearcut or a blow down occurs, the dormant seed germinates and seedlings quickly occupy the site. As other trees gain dominance over the pin cherry, it is choked out and generally dies off as a sapling or pole size tree. It rarely attains the size greater than 6 or so inches in diameter.

Distinguishing Characteristics:

- ▶ Bark: Reddish-brown, shiny and smooth, marked with short horizontal bars.
- ▶ Leaves: Alternate, simple, 2-5 inches long, lanceolate, yellow- green on upper surfaces.
- ▶ Flowers: Small, white blossoms forming in umbels on the sides of branchlets.
- ▶ Fruit: Small red, rounded, edible drupes, 1/4 inch in diameter.



Pin Cherry (source: Wikimedia Commons)

31

Staghorn Sumac

(*Rhus typhina*)

This shrub provides good cover in summer for birds and mammals and emergency food in winter for a wide range of wildlife. The brilliant fruiting heads are highly ornamental in the autumn.

Distinguishing Characteristics:

- ▶ Leaves: alternate, compound, 12-14 inches in length with 11-31 leaflets, margins toothed, surface bright green, autumn color orange-red.
- ▶ Fruit: bright red, .25 inch in diameter, forming in dense clusters.
- ▶ Bark: stems very hairy.
- ▶ Tree: this small tree or shrub grows in a circular clump or in hedge-rows on well-drained soils or field margins, roadsides and burned-over areas.



Staghorn Sumac (source: Wikimedia Commons)

Gravel Pit

This semicircular pit was most likely excavated to provide an on-site source of gravel to fill low areas on the logging road last used during the 1960s. Using local material for woods roads, if it is available, is a major cost saver for a harvest operation. It is also a good idea to reshape the site once the excavation work is completed and even restore vegetation either in the form of a grass cover or planting small seedlings. Mother Nature, of course, will ultimately reforest the site with a mix of tree species.

33

Log Landing

This site, which is mowed on a regular basis, was the area used to congregate the forest products harvested during the 1981-1982 timber harvest on this 70 acre town forest. This operation generated the following volume of forest products and income to the Town of Sandwich:

SAW TIMBER PRODUCTS

Species	Volume harvested (in board feet)	Income generated
White Birch	82,015	\$7381.35
White Ash	24,190	\$2419.00
Sugar Maple	10,080	\$806.40
Red Maple	4,870	\$121.75
Beech	17,985	\$539.55
Red Oak	1,485	\$148.50
White Pine	6,195	\$526.58
Hemlock	7,565	\$189.13
<u>Spruce</u>	<u>385</u>	<u>\$9.63</u>
Totals	154,770	\$12,141.89

PULPWOOD PRODUCTS (in cords)

Hardwood Pulp	213.79	\$1,282.74
<u>Softwood Pulp</u>	<u>30.29</u>	<u>\$151.45</u>
Totals	243.08	\$1,434.19

FUELWOOD sold to townspeople (in cords)

Total	432	\$15,540.00
<u>Less cost to log and truck</u>		<u>\$15,240.00</u>
Net		\$300.00

Total income earned by the town was approximately \$13,876.08

This open landing serves as an important wildlife area as well as a recreation site for skiers and hikers.

Old Logging Brow

This staging or loading area appears to have been used in the 1960s during one of the last timber harvests on this property. Logs were loaded by hand using a peavy. To make use of gravity in the loading process, natural embankments or sloped ramps excavated into the ground were used. The logging truck backed down into this excavated hole. The logs were lined up on the top of the ground and then rolled onto the truck using the peavy. The first few tiers of logs fell onto the truck bed. Once the loaded logs were level with the ground, movable planks were placed into position to permit additional tiers to be placed on the truck. This was hard physical work, very demanding and dangerous as well. When fully loaded, these single axle logging trucks would haul about 1500 board feet of logs.

Today, logging contractors use hydraulic loaders to load tri-axle trucks and trailers with anywhere from 4000-10,000 board feet of logs per load.



A Peavy (source: Wikimedia Commons)

A Mature White Pine

This white pine is approximately 70-80 years old, about 70 feet tall, and 30 inches in diameter. Knowing these two dimensions, we can determine the approximate board footage of usable lumber in the tree. A board foot is a piece of lumber 12" by 12" by 1". This tree has about 900 board feet of lumber in it. Construction of an average single family home of, say, 1300 square feet of floor space requires about 12,000-13,000 board feet of lumber. Thus it would take 14 trees of this size to produce the lumber needed to construct an average sized home.

Close examination of this tree reveals that it has a disease. If you look up the trunk of the tree you notice a deformity about 16 feet up. This canker is the result of the white pine blister rust fungus. It has attacked the stem and partially girdled the tree. This disease can kill a white pine. This is an old canker and still has not completely girdled the stem. So the tree lives on. If we were thinning the forest, this is one tree we would harvest because of this disease problem.



A Mature White Pine