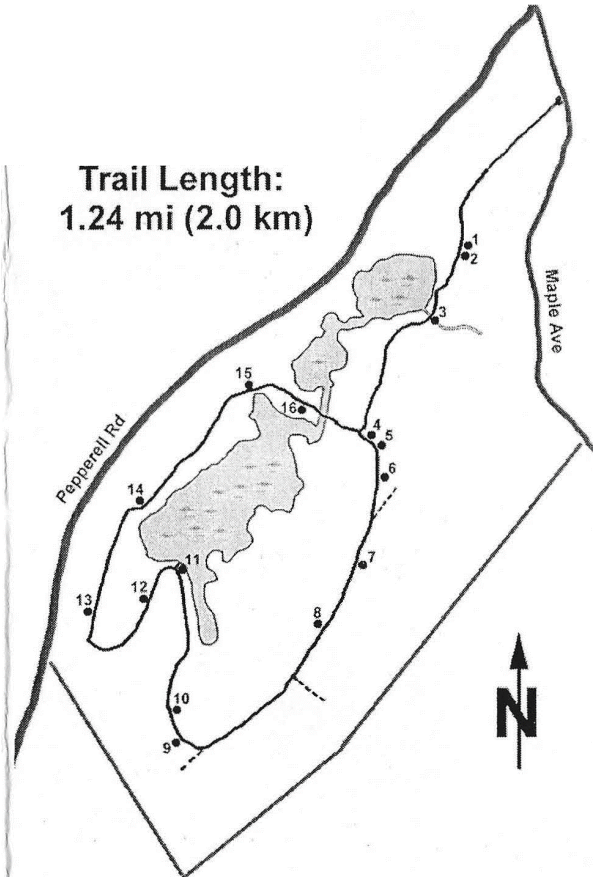
Station 1: Welcome!

Welcome to Hayes Woods! This 46-acre land parcel was the generous gift of Joseph and Elsa Hayes who donated it to the Groton Conservation Trust in 1994. Philip Lyons of BSA Troop 3 took on the task of creating this nature trail, complete with bridges. Brad Taylor later added the original stations and paper brochures for his Eagle Scout project for Troop 1. Now twenty-some years later we have digitized and updated his work to increase accessibility and address the natural changes which inevitably happened in the course of two decades.



The Groton Trails Committee provides this interactive map which notes all of the trailheads and conservation land in the town, as well as live location tracking, links to navigation, and many beautiful photos taken by visitors. It also allows visitors to report any trail hazards (downed trees, flooding, missing trail markers) directly to the team responsible for the creation and maintenance of our beautiful trails, so it is definitely a link worth saving.

As you continue on this trail you will encounter 15 more stations just like this one, each with a unique subject and short description to accompany it. Have a wonderful walk!

Station 2: Natives and Invasives

The common barberry is a woody shrub that was brought to this country by European settlers. As such, the animals here are not accustomed to eating it and it quickly grows out of control, taking away important habitats from native species. Both common and japanese barberry are non-native ***invasive*** species which are banned from sale and propagation in many states, and although attempts have been made to eliminate their populations, they are still commonly found in the Northeastern states. There is also a recorded correlation between barberry growths and tick populations, as scientists believe they create a "microhabitat" in which ticks thrive.

Despite these environmental intruders, this station also contains several ***native*** plants worth noting. Two of these are small vine-like ground covers with distinct flowers and berries.

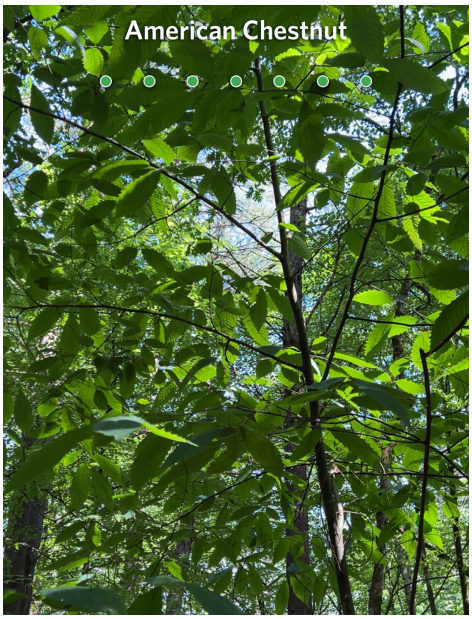
- Partridgeberry has small, white, trumpeting, four-petaled flowers, and distinctive red berries.
- Wintergreen also has bright red berries, but has distinctively bell-shaped flowers.

Additionally, this station harbors the sometimes elusive solomon's seal, another plant with bell-like flowers, but on a taller, more leafy stalk. The King Solomon's seal and the hairy Solomon's seal are native local varieties, while the broad-leafed Solomon's seal, though non-native, is also commonly found.

Station 3: Pond Critters and Chestnut

This pond is home to a wide variety of plants and animals, and serves as the main water source for inhabitants of this forest. For a more in-depth introduction to the history of this pond, keep an eye out for Station 11, located at a beautiful vantage point on the opposite shore.

These are common reptiles/amphibians found in the pond:
Green Frog- green body, brown spotted legs
Bull Frog- large, dull green
Pickerel Frog- tan, hind leg undersides are bright orange-yellow
Wood Frog- brown, prominent black "mask"
Spotted Turtle- dotted with yellow or orange spots
Painted Turtle- green carapace with yellow stripes
Northern Water Snake- gray, black horizontal stripes
Eastern Ribbon Snake- reddish brown, dorsal stripes



As you continue up the hill towards Station 4, note the American chestnut sapling on your left. The American chestnut tree was once abundant throughout the Appalachian Mountains, from Maine to Mississippi, prior to the turn of the 20th century. Its bark was used in dyes and medicines, and the nuts roasted or boiled for consumption. However, populations have been decimated by a fungal blight. The smooth bark of the young trees will begin to show rust colored vertical cracks with the onset of the blight, which does not allow them to mature enough to send out seeds. Now the survival of the species is based [mainly] on the fact that new growth sprouts from old stumps with living roots. Scientists have long been attempting to grow blight resistant chestnuts in hopes of saving this important species; as of 2023, this has been achieved by scientists who inserted a single wheat gene (OxO) into the American chestnut, creating the genetically modified “darling chestnut”, but this project is still in the experimental stages.

Station 4: Glacial Geology

The geology of the Hayes Woods property can be traced to glaciers, huge ice mountains moving along the earth's surface. The ridges on the property, including the one you are standing on, are known as eskers and were caused by huge rivers that once ran through cracks in the glacier.These rivers deposited sediment, creating a network of hills and valleys which were exposed once the water had dissipated. Kettle holes are another geological feature of Hayes Woods; they are formed when huge blocks of ice break off from the glacier and soils are deposited around them. When the ice melts it leaves huge depressions. Other features on the property include kames, kame terraces, and a glacial moraine.

Station 5: Lady’s Slipper and Star Flower

The lady's slipper is the best known North American species of orchid. It can also be referred to as the moccasin flower. They blossom in a variety of colors and may grow for up to 10 years before producing a single showy flower, which hangs from the slender stem. Partly because of this, they are a protected species and must not be picked or disturbed. The most common color to see locally is the pink lady’s slipper, although we do have the occasional yellow as well. The flowers can be found from late May through early June. You may have seen some of the distinct two-leafed plants as you entered the loop trail (or may upon exiting if you took it backwards).

Another native flower you may find at this station is the starflower, a much smaller white flower with a star-shaped array of petals. Similarly to blueberries, this groundcover thrives in acidic soils and therefore is often found under pines, where the decomposing needles lower the pH.

This station also contains several sarsaparilla plants, small leafy green shrubs which are easily mistaken for young saplings. These plants are sometimes used as a substitute for sassafras in the making of root beer or picked specifically for sarsaparilla soda.

Station 6: Birch

Birch trees are very common in this part of New England. The two main species in this area are the black birch and the paper (also called white) birch. The black birch is distinguished from the paper by its longer leaves and the dark color of the bark on older trees. In both species, the bark becomes increasingly plate-like as the tree ages.

Locally, birches provide much of the vibrant yellow portion of our fall foliage, much like aspens, ginkgo, poplar and ash do in other regions. Birch sap, if collected and boiled down, yields a tasty syrup much like maple but with a unique flavor and spice.

Birches grow well around pines because they prefer more acidic soil, so they are often found between the northern coniferous (evergreen) and the southern deciduous (leafy green) forests which converge here.

Many birds and insects rely on the food and shelter provided by birch trees. The sap provides food for insects and sapsuckers, while other birds will eat these insects and the catkins containing the birch seeds.

Station 7: Dead Wood Benefits + Birdsong

This dead tree has many visible holes in its bark and wood. This is the work of wood boring insects which have infested the tree and begun the process of decomposition. This often happens after the dead tree has fallen; however, certain tree species are prone to infestation by specialist insects while standing, such as ash trees which are killed by the emerald ash borer. Dead trees, whether still standing, decomposing on the ground, or floating in the pond, are an essential part of the woodland ecosystem. They provide food for insects, and consequently also food for insect-eating birds and critters. Abandoned woodpecker cavities become nests for snakes, songbirds, squirrels, ducks and owls; mosses, lichens and fungi climb over, or in the absence of, bark. On the ground, worms, salamanders, bees and other insects make homes in the soft wood. In the water, turtles bask on sunny logs, flycatchers survey from above, and fish hide from herons underneath.

This is also a wonderful place to pause and listen to the birdsong from the canopy above. Several local species say their names in their song; the chickadee sings “chicka-dee-dee-dee” and the phoebe sings “pheee-bee”.

Station 8: Hemlock

Hemlocks are a dominant species of tree in this neck of the woods. The hemlock is an evergreen that reaches 50-80 feet in height, has dark green needles of 1/2 inch (or less) long, and has rough red-brown bark.

The hemlock is threatened by a parasitic insect called the wooly adelgid (pictured), which was introduced from Asia. The adelgid sucks the sap from young twigs, stunting new growth. With no new growth, the tree can die within a few years.

Loss of the hemlock would have devastating consequences on the area's ecology. The shade provided by hemlock groves provides a sheltered, cool environment, one which deer, for example, depend on for access to the ground in winter.

Station 9: Pines + Blueberries

Two common types of coniferous trees found in Massachusetts are the white pine and the red pine. You will notice there is a large white pine to the left side of the trail and a red pine to the right (if you are taking the loop in chronological order). The white pine is best noted for having five needles to a bunch, whereas the red pine has two. The red pine or Norway pine is distinguished from the white pine because the bark has a slight reddish tint. In the past, red pines were often used in reforestation projects.
You may have noticed a small recurrent green bush along the path and especially among groves of pine; if you are lucky and have visited in the late summer/early fall, the familiar berries will also be on display. These are wild lowbush blueberries, native to New England and very tasty! They grow especially well in pine forests because the decomposing needles lower the pH of the soil to their preferred range (between 4.5 and 5.5).

Station 10: Oaks

Surrounding Station 10 are several species of oak tree. Identifying specific types of oak is difficult, as oaks of the same group may interbreed, producing a hybrid red or hybrid white offspring.
Types of oak found in Massachusetts include the white oak, northern red oak, black oak, and scarlet oak, although the red, black, and scarlet are all red varieties. Distinguishing between the white and red groups is fairly straightforward: white oaks have smooth, rounded leaves, whereas red oaks have sharper, more pointed leaves.
This part of the trail also marks the beginning of the prevalent mountain laurel, which is a native shrub that grows throughout the eastern United States. It is a signature plant in Hayes Woods. In the springtime the hillsides are covered in the light pink bowl-shaped flowers.

Station 11: Beaver Pond

This pond was created by beavers. The industrious beaver is known as a "keystone species," meaning it has a great effect on its environment. Beavers build ponds by damming streams, creating a significant change in the environment. Those trees covered by the pond will die, yet the blue heron now has a perfect area for its nests. The pond is home to the larvae and/or adults of many insects, including dragonflies, mayflies, mosquitoes, black flies, waterstriders, and dozens of others. Small ponds and pools are important breeding grounds for almost all flying insects. As you gaze across the pond you may notice several bird species:

<u>Herons</u>

Great Blue Heron- (up to 4ft tall) gray blue in color, and white about the head.

Green Heron- (16"-22") deep green, with a brown neck.

American Bittern- (23") stalky brown with white stripes on its underside

<u>Woodpeckers</u>

Hairy W.- (9 1/2") white underside and black with white speckled wings. Bill length is equal to or greater than the length of the head. Males have a red patch on their heads.

Downy W.- (6 1/2") smaller than the Hairy. Bill is shorter than the length of head. Males have a red patch on their heads.

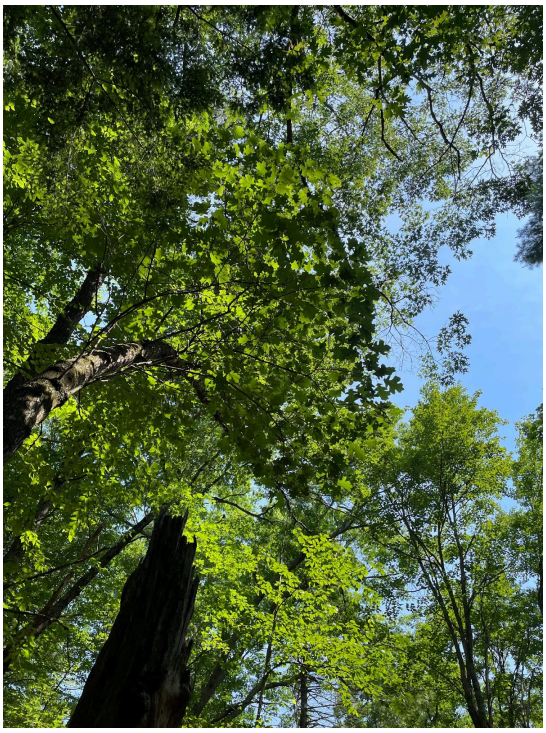
<u>Ducks</u>

Mallard- (23") male has a green head, while the females' heads are a light brown.

Common owls in Massachusetts include barred, great horned, and screech owls.

Station 12: Light Gap, Pileated Nest

This station points out a "light gap" directly above in the forest canopy. A light gap is a small, well-defined area that has somehow become clear of large trees, allowing sunlight to hit the forest floor. This allows many young trees, particularly light-loving ones, to spring up. Here you can see small birches, maples, oak, and hickory.



If you look straight ahead a short way down the hill, you will see a series of oblong holes in an old dead pine tree. These were pileated woodpecker roosts or nest cavities which have since been abandoned; the woodpeckers will create a new nest for each brood and therefore a new nest cavity every year. A non-breeding pileated woodpecker, however, may create up to twelve roosting cavities in this same time span. The abandoned cavities become winter roosts for songbirds and are often adopted in the spring as prime nesting sites by a variety of other animals. Oftentimes, however, the holes you will encounter will be shallower “foraging holes” which are used by the birds to find food.

Station 13: Linking Undeveloped Land

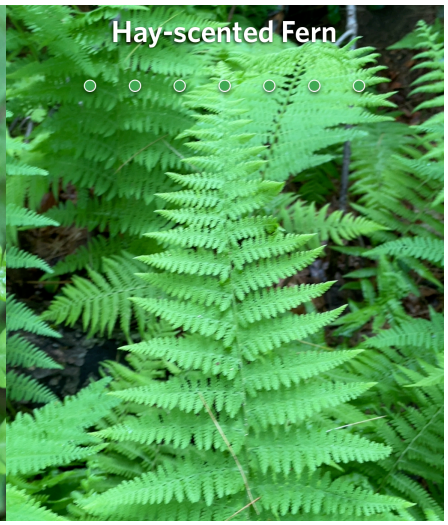
Here you will notice that the trail comes within view of Pepperell Road and the developed property across the street. By remaining undeveloped, Hayes Woods forms a biological "stepping stone" or wildlife corridor that species can use to move between surrounding conservation areas. It provides a link between Kemp Woods (New England Forestry Foundation) and the Johnston Conservation Area (Groton Conservation Commission). This is part of a larger chain of properties leading from the Squannacook River Wildlife Management Area to a string of conservation areas along the Nashua River. This makes conserving Hayes Woods incredibly important, as the linking of properties is essential to maintaining genetic diversity in area animal populations. Our local forests are primarily a mix of coniferous northern hardwoods (hemlock), red and white pines, with deciduous oak, maple, ash and hickory. As such a point of convergence, in Groton we find species that exist exclusively north of us sharing habitats with species that live exclusively south.
In February of 2020, the GCT acquired June's Wood, the undeveloped portion of the woods across the street, extending this wildlife highway and connecting Hayes Woods to Kemp Woods and Throne Hill. June's Wood has a similar environment but also contains meadows and a vernal pool (a seasonal pool with a unique ecosystem).

Station 14: Lone Wolf Pine

Station 14 concerns a very large, very old White Pine tree. This tree is an example of a "lone wolf" tree. Its many low, dead branches indicate that it once received a lot of sunlight, without other trees to block it. These trees stand as a testament to the original forests which were here before the land was farmed. Whether the trees around them were cleared to make the fields, or they beat the odds as small saplings and grew to their majesty alone, they are the true ancients of the forest. You will likely see more as you progress on the loop; they are identifiable by their often split trunks (like multiple small trees which converge at the base) and the aforementioned low, dead branches.
Oftentimes, wolf trees with split trunks (such as this one) were victims of white pine weevils, an insect which lays its eggs under the bark of the biggest shoot on a young pine. When the eggs hatch, they eat the shoot and the surrounding shoots must compensate for this loss, resulting in a divided trunk. These weevils prefer to attack pines with direct sunlight, so lone trees are logical and common targets.

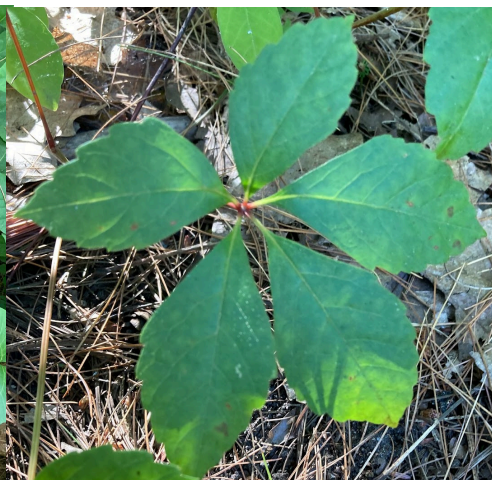
Station 15: Ferns + Poison Ivy

Several species of fern can be found along this section of trail. Ferns are common in New England and are often found in low, wooded, swampy areas such as this, although they grow in upland areas as well. On this property one might encounter the hay-scented fern, lady fern, sensitive fern, cinnamon fern, bracken fern, interrupted fern, christmas fern, marsh fern, New York fern, silvery glade fern, royal fern, and various other



evergreen ferns.

As you continue towards Station 16, be aware of path-side poison ivy. Poison ivy is a climbing vine native to New England which produces an oil called *urushiol,* an irritant which most people are allergic to and causes raised itchy rashes. The rhyme, “leaves of three, leave it be” can help with identification, as it is often confused with the non-allergenic Virginia creeper, a vine with five leaflets. See below images for further reference.

Station 16: Princess Pine and Mountain Laurel

Princess pine can be found along most of the trail. Princess pine is a member of the club moss group. Club mosses are now small but that was not always the case; during the Carboniferous period, 360 to 285 million years ago, club mosses could reach 100 ft. in height. The history of these plants is important because they formed most of the world's coal and oil deposits. The princess pine is less than a foot in height and grows best in moist hardwood forests and usually grows in clusters. You may also find fan club moss, which looks similar, among the princess pine.

This section of the trail has the largest and most spectacular mountain laurel growth in the forest, abutting this shore of the pond. There are also swamp laurels scattered throughout, with flowers of a more vibrant pink, on smaller, lighter green stalks.

Acknowledgements

Brad's Original Gratitudes:

Joseph and Elsa Hayes made a gift of this 46-acre parcel to the Groton Conservation Trust in 1994. We are all indebted to them for sharing this beautiful place with us.

Many individuals, groups, and businesses donated their time, expertise, materials, and financial resources to the successful completion of this project. Among those who have contributed are:

- The Groton Conservation Trust
- Michael Veit, David Black, & Bob Pine
- Bev Rodrigues
- Moore's Lumber in Ayer
- Moison Ace Hardware
- Groton House of Pizza
- Main Street Cafe
- Johnson's Drive-In
- The Rainbow Cafe
- The scouts and adults of BSA Troop 1 West Groton

Without their help, this nature trail would not have been possible.

•••

A big thank you to Brad Taylor and Philip Lyons for twenty years of this beautiful nature trail and accompanying guide! You can find Brad's original brochure here, we kept many of the original descriptions and are so grateful for the work he put into creating them. We hope that our restoration of this project encourages new visitors to explore Hayes Woods and get involved with our local conservation efforts. Thank you to Debbie Howell, Holly Estes and Susan Hughes for your guidance and beautiful photography, and to the Groton Trails Committee for maintaining our walkable town forests!
~ Nathalie Pierpont

References/Further Reading

Poison Ivy
https://my.clevelandclinic.org/health/diseases/10655-poison-plants-poison-ivy--poison-oak--poison-sumac

Chestnuts
https://www.fs.usda.gov/inside-fs/delivering-mission/sustain/scientists-work-create-blight-resistant-chestnut-hopes

Sarsaparilla
https://gobotany.nativeplanttrust.org/species/aralia/nudicaulis/

Woodpecker Cavities
https://georgiawildlife.com/out-my-backdoor-woodpecker-cavities-help-other-birds-survive-winter#:~:text=These%20birds%20use%20tree%20cavities,use%2C%20they%20abandon%20it).

Wolf Trees
https://hinesburgrecord.org/outdoors/wolf-trees-from-the-past-and-for-the-future/
https://newenglandforestry.org/meet-the-eastern-white-pine/
https://www.seacoastonline.com/story/news/local/york-star/2019/01/03/weevil-attacks-wolf-pines-are/6394235007/
https://extension.psu.edu/white-pine-weevil

Massachusetts Forests
https://masswoods.org/massachusetts-forests#:~:text=Massachusetts's%20forests%20are%20covered%20by,elm%2Fash%2Fred%20maple.

Club Mosses
https://hgic.clemson.edu/factsheet/clubmoss/#:~:text=The%20abundance%20of%20tree%2Dlike,deposits%20that%20are%20mined%20today.

Blueberries pH Preference
https://www.ontario.ca/page/soil-ph-blueberry-plants#:~:text=Learn%20the%20importance%20of%20growing,pH%20is%207.0%20or%20more.

Barberry
https://ohioline.osu.edu/factsheet/anr-0106#:~:text=Both%20non%2Dnative%20barberry%20species,banned%20from%20sale%20and%20propagation.

Starflower
https://www.fs.usda.gov/wildflowers/plant-of-the-week/trientalis_borealis.shtml

Groton Trails Interactive Map
https://www.grotontrails.org/Interactive_Maps.html#map=14/42.60800/-71.57200

Brad Taylor's Original Brochure
https://www.gctrust.org/wp-content/uploads/2015/02/Hayes-Woods-Brochure.pdf