

Hemlock Forest



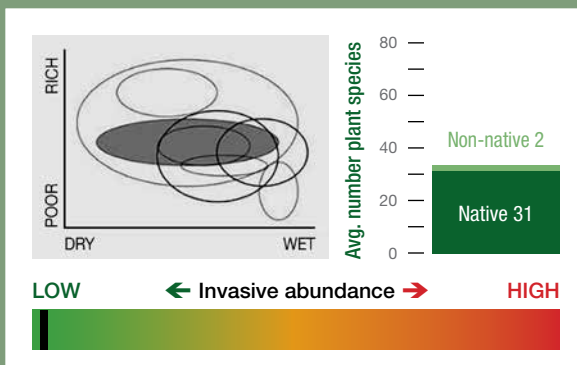
This forest habitat is defined by its abundance of Hemlock trees and occurs throughout Columbia County, often in small stands of “ancient forest” remnants on steep, rocky terrain near headwater streams. Hemlock Forest helps to maintain clear, cool, oxygen-rich water in adjacent streams, serves as breeding habitat for a number of rare birds, and provides winter shelter for a variety of animals. People tend to experience this forest as a protective and peaceful place in all seasons. This habitat was probably much more extensive in Columbia County before the nineteenth century when Hemlock bark was in high demand for the tanning industry. The future of the remaining Hemlock Forest stands is now threatened by an invasive insect, the Hemlock Woolly Adelgid.

First Glimpse

This forest is characterized by its darkness, but is inviting to walk through because of its open understory and the soft ground composed of fallen needles. The dense evergreen canopy blocks out sunlight, keeping the air cool in summer and inhibiting the growth of herbaceous plants, shrubs, and seedlings of trees other than the shade-tolerant Hemlock itself. In winter, Hemlock branches intercept the elements, creating a sheltered environment below. Hemlock Forests tend to be quiet, as there is not much rustling of wind in the leaves above and the dense canopy muffles sounds from farther away.



Hemlock Forest often lines the slopes of steep ravines, which are also known as Hemlock Ravines.



Location

Hemlock Forest is found throughout Columbia County, most commonly in the eastern, hilly regions, where it tends to grow on steep, rocky slopes facing north, or—to a lesser degree—west or east. Often, it occurs in cool ravines formed either by rocky headwater streams (see Streams chapter), in the Taconic Mountains and their foothills, or in clay ravines formed by small tributaries along the shore of the Hudson River (described in the Clay Bluff and Ravine chapter). It can be found on sedimentary and metamorphic bedrock, both acidic and calcareous, and is often associated with rock outcrops (described in the Wooded Rock Outcrop chapter).

Distribution of Hemlock Forest and Places to Visit

1. Schor Cons. Area
2. Harris Cons. Area
3. Harvey Mtn. State Forest
4. High Falls Cons. Area
5. Livingston State Forest
6. New Forge State Forest
7. Taconic State Park



Visiting

Three examples of public areas with Hemlock Forests are High Falls Conservation Area, New Forge State Forest, and Taconic State Park. Many other public areas have smaller patches of this habitat that can be explored. Visit year-round to experience the coolness of a Hemlock Forest on a hot summer's day, its protection from cold winds during a blizzard, and its peace and quiet at almost any time.

What to Look For

Plants: Hemlock tends to be the most common tree in the canopy, as well as in the understory of Hemlock Forest (suggesting that, barring disease or disaster, these forests will replace themselves). Black Birch, Red Oak, Red Maple, Sugar Maple, White Pine, Hop-hornbeam, and Chestnut Oak often are mixed in with the Hemlock. Other tree species might occur in the canopy in smaller numbers. The understory is sparse and consists mostly of young trees of species represented in the canopy, as well as Witch-hazel and Striped Maple. There tend to be few shrubs, and the forest floor is mostly covered by leaf litter (composed of dry needles and oak leaves), rather than living plants. Occasionally, one sees a cluster of Marginal or Evergreen Wood Fern, or a small patch of Canada Mayflower.

We have found only two plant species of conservation concern in Hemlock Forests. The regionally scarce Spotted Coralroot is a mycotrophic orchid that does not photosynthesize (it obtains its carbon from other plants via mycorrhizal fungi) and is therefore quite tolerant of shade. The cool microclimate in this habitat seems to suit the Northern Wood Sorrel, which is rare in our county, but commonly found in the Catskills and Adirondacks.

Birds and Mammals: Hemlock Forests provide breeding habitat for the regionally scarce Black-throated Green, Magnolia, and Blackburnian Warblers, Dark-eyed Junco, Hermit Thrush, Golden-crowned Kinglet, and Northern Saw-whet Owl. Several other owl species prefer this habitat for roosting.

Deer browse on Hemlock twigs and needles and use this habitat for winter cover. Reportedly, Fisher and Bobcat also seek out Hemlock Forests for shelter in the winter. Hemlock bark is a mainstay of the winter diet of



The Black-throated Green Warbler is one of our regionally scarce birds known to breed in Hemlock Forest.

Characteristic Plants

The following species are common in this habitat, but not necessarily unique to it.

- * Indicator species ○ Non-native species
- Invasive species

TREES

Black Birch
Chestnut Oak
Hemlock *
Red Maple
Red Oak
White Pine

SHRUBS

Maple-leaved Viburnum
Witch-hazel

FORBS (e.g. WILDFLOWERS)

Canada Mayflower
White Wood Aster
Grasses, Sedges, & Rushes
Pennsylvania Sedge

FERNS

Evergreen Wood Fern
Hay-scented Fern
Marginal Wood Fern



Hemlock bark is an important winter food for Porcupines, who also use Hemlock trees as dens.



Hemlock trees have both male and female flowers, respectively producing pollen and seed on the same tree. The light bluish-green structure on the left is a female flower, while the yellow-green structures on the right are male flowers. Female flowers develop into small cones (at the center of the image is an old cone from a previous year that has long since shed its seed).



Witch-hazel is a native shrub found in a variety of forest types, but one of the few shrub species that are sometimes found in Hemlock Forest. It flowers in late autumn, at the same time as its leaves turn yellow and the ripe fruits from last year's flowers disperse their seeds.

Porcupines, which also like to den in Hemlock trees. Red Squirrels and mice feed on Hemlock seeds. While not confined to this forest type, Snowshoe Hares may occur in higher-elevation stands, where they might eat the twigs and needles of hemlock and other woody plants.

Amphibians: Amphibians are not uncommon in this forest type; Red-backed Salamanders, Wood Frogs, and Spring Peepers are at least occasional. Surprisingly, although they were not common, this was the habitat where we found the most Jefferson Salamanders. A few online sources also note the occurrence of this species in Hemlock Forests, as well as in deciduous forests.

Insects and Other Invertebrates: Perhaps the most noted insect of this forest is the Hemlock Woolly Adelgid, an accidentally introduced sucking insect related to aphids. The “woolly” descriptor refers to the conspicuous strands of white waxy fluff these insects cover themselves with. See Stewardship and Interact sections for more information on this insect. We found relatively few ants and ground beetles, and none of the species were unique to or even particularly abundant in this habitat. The Hemlock Looper and Hemlock Angle are two moths commonly found in these forests and whose caterpillars feed on Hemlock. The Angle consumes few if any other species, and has likely declined substantially because of Adelgid-associated Hemlock die-off.



The Jefferson Salamander is rarely seen in our region and seems to be more common in Hemlock Forests than in other habitats. (Jefferson Salamanders readily hybridize with Blue-spotted Salamanders, and we did not try to distinguish them.)

Some Species of Conservation Concern

Geographic region of conservation concern is indicated by **CC** (Columbia County), **HV** (Hudson Valley), **NYS** (New York State), **US** (United States); see Introduction for explanation.

PLANTS

Northern Wood Sorrel	CC
Spotted Coralroot	HV

BIRDS

Black-throated Green Warbler	HV
Blackburnian Warbler	HV
Magnolia Warbler	HV
Dark-eyed Junco ¹	HV
Hermit Thrush	HV
Golden-crowned Kinglet	HV
Northern Saw-whet Owl	NYS

MAMMALS

Snowshoe Hare	HV
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AMPHIBIANS

Jefferson Salamander “Complex”	NYS
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INSECTS

Hemlock Angle (Moth) ²	
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1. Rare during breeding season.

2. Will probably decline if there is extensive Hemlock die-off



Hemlock Looper is a moth whose caterpillars feed on Hemlock needles.



Spotted Coralroot is a native orchid without leaves. It gets its nutrients from mycorrhizal fungi and can live in deep shade.



Similar Habitats and Variation within the Habitat

Northern Hardwood Forest can have quite a few Hemlock trees and resemble a Hemlock Forest. However, a typical Northern Hardwood Forest tends to occur on deeper, moister, and richer soils, and usually has Sugar Maple as a common canopy tree, as well as a number of other tree species rarely found in a Hemlock Forest. On the other hand, Chestnut Oak, which is often a common species in Hemlock Forest, is rare in the Northern Hardwood Forest.

We have also observed small pockets of a Hemlock-dominated variety of Swamp Forest (see Swamp Forest chapter), which can be distinguished from the upland Hemlock Forest by its saturated soils and wetland plants.

Stewardship

Hemlock Forests can play an important role in maintaining clear, cool, oxygen-rich, and permanently flowing headwater streams that are prime habitat for Brook Trout. For that reason, Hemlock trees in the vicinity of streams deserve special protection.

Currently, the biggest concern for Hemlock Forests throughout the Northeast is the Hemlock Woolly Adelgid, an invasive insect that has the capacity to devastate entire stands of Hemlock Forest in our region. Columbia County is currently at the northern edge of the range of the Adelgid, which has been steadily spreading north from Virginia, where it was first detected in the 1950s. Since 2013 we have observed Hemlock Woolly Adelgid in all parts of the county except the northeastern corner and the higher elevations.

While pesticides are sometimes used to control Adelgid on individual Hemlocks, there are currently no stand-scale control measures available to members of the public. That said, intensive studies of biocontrol methods—using introduced Adelgid predators—are underway with experimental biocontrol releases in Hemlock Forests infested by Adelgids. The results are being closely monitored. Whether or not the biocontrol efforts will be successful in the long term, it is important to provide Hemlock Forests the space to take advantage of mitigating factors. For example, isolated stands might escape the infestation, cold winters can limit the overall damage of the Adelgid, and individual trees may prove resistant. In order to increase our Hemlock Forests' chance of survival, we recommend no salvage logging of Hemlocks, and no clearing of Hemlock Forest stands for development, timber, or agriculture.

History

Hemlock Forest is one of the forest types that naturally develops over a long time in undisturbed areas of suitable soil and microclimatic conditions. Once established, the Hemlock Forest tends to perpetuate itself, with its shade-tolerant seedlings and young trees persisting for decades under the canopy of their parents, ready to quickly fill in any canopy opening left by a dying or fallen tree. Most examples of Hemlock Forests in our landscape today seem to represent ancient forests that might never have been cleared for agriculture. Therefore, they resemble islands of relatively unaltered nature surrounded by a sea of recently reforested post-agricultural land.

Hemlock Forests have a mixed recent history in our landscape. On the one hand, their tendency to be on rocky slopes, thin soils, and in ravines means that they were more often spared the brunt of early land-clearing for agriculture—they simply did not tend to occur on good farmland. In addition, Hemlock was apparently of mediocre quality for timber and firewood, although not unusable. It was used for some particular applications such as in lathing but, in general, was not as desirable as some of our other timber species.

On the other hand, its bark was favored by tanners. We estimate that, during the first half of the 1800s, Columbia County tanneries used the equivalent of about 5,600 acres of Hemlock Forest. Certainly, Hemlock was not the only tree species used for tanning (Chestnut and oaks, for example, were also employed, sometimes in cocktails with Hemlock), and not all bark used in the county was harvested locally. However, this estimate does suggest

that, at least around certain tanneries, there was probably an appreciable Hemlock harvest. Such was certainly true in the Catskills.

Because Hemlocks smaller than about 14-inch DBH were not cut for bark, Hemlocks did regrow on some sites. John Burroughs reported that cut sites in the Catskills regenerated to cherry in some cases and oak and Chestnut in others. He found the logs left by tanners (most often trees were dropped, debarked and the stripped logs left to rot) scattered among Sugar Maple and Beech.

The biggest tannery in the county was probably that of the New Lebanon Shakers. It operated from the late eighteenth through late nineteenth centuries, and tanned not only local skins (for example, Woodchuck, Deer, and local livestock) but also hides from as far away as Africa. No doubt local Hemlocks helped feed the tanning vats. Indeed, early deed records suggest that Hemlock was, as it probably still is, most common in the northeast corner of the county. However, by 1880, New Lebanon Shakers were buying 6,000 tons of Hemlock bark from Pennsylvania, implying that most accessible local sources were probably expended.

Aside from providing tanning bark, Hemlock was also used in the timber framing of buildings, and Native Americans and colonists were reported to use it medicinally and as a dye. The Iroquois used Hemlock boughs to line their corn-storage pits. None of these uses are likely to have impacted regional forest composition.

“I make my [tanning] liquors of hemlock bark, ground and put in leeches [soaking vats].”

— Fred Sizer, Shaker tanner at Mount Lebanon, 1860s



Hemlocks are cut and stripped of their bark in this image from the 1852 Biography of Zadock Pratt of Prattsville NY [Greene County]. The bark was then sold to tanneries.

Perspectives

White sky, over the hemlocks bowed with snow,
Saw you not at the beginning of the evening
the antlered buck and his doe
Standing in the apple-orchard? I saw them.
I saw them suddenly go,
Tails up, with long leaps lovely and slow,
Over the stone-wall into the wood of hemlocks
bowed with snow.

Edna St. Vincent Millay,
excerpt from “The Buck in Snow”

Writing these lines from her home in Austerlitz in the late 1920s, poet Edna St. Vincent Millay captures a central role of the Hemlock Forest in winter that we heard about from hunters—providing shelter. As one hunter explained, “The bucks usually like large trees, and in the winter they look for Hemlock trees because there is some open area at the base of the tree where they can comfortably bed.”

A few years after Millay’s poem was penned, in 1934, fellow author and Hillsdale resident John Cowper Powys set off up Phudd Hill, in the northwest corner of Hillsdale, on the heels of a January snowstorm. He wrote in his journal his own impression of the shelter under a Hemlock tree: “I got to that big Hemlock under which so laden with snow it was like a warm little chancel [altar] of peace.” Two weeks later he was out again walking Phudd Hill and wrote, “I cannot tell you how I like these great grey rocks & moss & lichen & frozen snow & fallen branches & the brown earth under the Dark Hemlocks.”

Eighty years after Powys wrote those reflections, we led a group on a habitat outing into what may well have been the same Hemlock forest on Phudd Hill and heard their reflections. “Even though we were totally covered, so there was no vista to look at the sky, there was a sense of comfort, shelter,” expressed one participant.

Another participant shared: “I thought what was so cool about the Hemlock area was all the different varieties of decay. I mean, all the levels of decay. Like all of the fun-guses and mosses, that was where the nature was.”

In our landscape photo survey, the Hemlock Forest was also very favorably perceived and, in fact, one of the habitats people responded to most positively. Out of the 19 habitats in the survey, the Hemlock Forest received the highest rating for familiarity and was in the top three for qualities of likeability, invitingness, and peacefulness—a special place for humans and deer alike.



Edna St. Vincent Millay wrote poetry from her home in Austerlitz, New York.



This “botanical portrait” of a Hemlock Forest was created by artist Jill Jakimetz using material collected by participants in the habitat outing to a Hemlock Forest. The assignment was to collect items that best captured each person’s experience of the habitat. In reflecting on the material gathered, the group felt that their experience of a Hemlock Forest was well captured.



Interact with a Hemlock Forest

Look for Hemlock Woolly Adelgid infestations and observe

As the invasive Hemlock Woolly Adelgid spreads throughout our region, there is a concurrent state-wide effort to research and apply biocontrol to manage infestations. The New York State Department of Environmental Conservation (NYS DEC) is partnering with the New York State Hemlock Initiative (NYSHI) in this effort, and you can play a role by closely observing and reporting on Hemlock Forests near you.

To assess whether a Hemlock Forest is infested by Hemlock Woolly Adelgid, look for:

1. Trees that look stressed, are losing needles, have grayish needles, or have many dead branches. Such signs may also reflect other infestations, such as scale insects.
2. White “woolly” egg sacs on the underside of twigs near the base of the needles (see photo). These are easiest to detect from late fall through early spring.

If you see signs of an infestation, you can submit a report through either the NYS DEC or the NYSHI or, if you prefer, by participating in the citizen science project NYiMapinvasives.org; all of these ways of reporting are linked into the biocontrol effort. Such information helps identify potential areas for treatment as well as understanding the likely spread of new infestations.

For those interested in additional opportunities, the NYSHI has a number of citizen science initiatives that engage community members in monitoring Hemlock Forests and Hemlock Woolly Adelgid. One example is a partnership with the New York Phenology Project to track the life cycle stages of the Adelgid—the HWA Phenology Project. Such monitoring is an important part of the biocontrol program, providing information about the best timing for biocontrol releases.

As with many areas of current scientific research, the story is still being written on the efficacy of biocontrol in managing the Adelgid, and the conclusion is not yet known. Even if biocontrol efforts are ultimately successful in managing the Adelgid throughout New York State, many Hemlock Forests are already largely dead or dying. If you know of a dying Hemlock Forest, another way to interact with it is through long-term observation of forest change. What new species replace the dying Hemlocks? What kind of habitat does the Hemlock Forest become?

Finally, it is important to take steps to avoid further spreading the Hemlock Woolly Adelgid by not transporting forest material that may be infested and by cleaning boots and other gear when you have been exposed to an infested area.



A Hemlock Forest full of dying trees. Dying and dead Hemlock trees are easily identified by their reddish trunks, which are revealed when woodpeckers remove the bark in search of insects living in the rotting wood.



These woolly masses enclose adults and egg sacs of the Hemlock Woolly Adelgid. Located on the underside of Hemlock twigs near the base of needles, they are one way to identify an Adelgid infestation from late fall through early spring.



These brown scale-like insects on the underside of Hemlock needles are often mistaken for the Hemlock Woolly Adelgid, but are in fact a type of invasive scale insect. Scale insects also infect Hemlock trees and can make them more susceptible to Adelgid attacks.