# Pine-Northern Hardwood Forest

Pitch pine-oak forest at Verona Beach State Park

Photo credits: *Shane Gebauer*

**System** Terrestrial

**Subsystem** Forested Uplands

**Did you know?**
Eastern white pine is a long-lived tree commonly reaching 200 years if undisturbed; maximum age may exceed 450 years. It has a remarkable rate of growth compared to other pine and hardwood species within its range. White pine also has the distinction of being the tallest tree in eastern North America. In natural pre-colonial stands it is reported to have grown to as tall as 70 meters (230 ft) tall, at least on rare occasions; the current tallest individuals reach to between 50 and 55 meters (160-180 ft).

## Summary

**Protection** Not listed in New York State, not listed federally.

**Rarity** G4, S4

A global rarity rank of G4 means: Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.
A state rarity rank of S4 means: Apparently secure in New York State.

### Conservation Status in New York

There are an estimated 500 to 4,000 occurrences statewide. A few documented occurrences have good viability and several are protected on public land or private conservation land. This community is widespread throughout upstate New York and includes several very large, high quality, old-growth examples. The current trend of this community is probably stable for occurences on public land and private conservation land, or declining slightly elsewhere due to moderate threats related to intensive logging and development pressure.

### Short-term Trends

The number and acreage of pine-northern hardwood forests in New York have probably declined moderately in recent decades as a result of intensive logging, agriculture, and other development.

### Long-term Trends

The number and acreage of pine-northern hardwood forests in New York have probably declined substantially from historical numbers likely correlated with past logging, agiculture, and other development.

# Conservation and Management

### Threats

Threats to forests in general include changes in land use (e.g., clearing for development), forest fragmentation (e.g., roads, excessive logging), recreational overuse (e.g., snowmobile trails, hiking trails), and invasive species (e.g., insects, diseases, and plants). Other threats may include over-browsing by deer, fire suppression, and air pollution (e.g., ozone and acidic deposition). Examples of this community that occur at higher elevations (e.g., >3,000 feet) may be more vulnerable to the adverse effects of atmospheric deposition and climate change, especially acid rain and temperature increase.When occurring as expansive forests, the largest threat to the integrity of pine-northern hardwood forests are activities that fragment the forest into smaller pieces. These activities, such as road building and other development, restrict the movement of species and seeds throughout the entire forest, an effect that often results in loss of those species that require larger blocks of habitat (e.g., black bear, bobcat, certain birds). Additionally, fragmented forests provide decreased benefits to neighboring societies of services these societies often substantially depend on (e.g., clean water, mitigation of floods and droughts, pollination in agricultural fields, and pest control) (Daily et al. 1997). White pine blister rust may be considered a threat to occurrences of pine-northern hardwood forest that experience extreme outbreaks, especially if it coincides with other stresses and reduces white pine regeneration. White pine blister rust (Cronartium ribicola) is highly virulent throughout the range of white pine. Trees are susceptible from the seedling stage through maturity. Blister rust can cause high losses both in regeneration and in immature timber stands (Wilson et al. 1965).

### Conservation Strategies and Management Practices

Management should focus on activities that help maintain regeneration of the species associated with this community. Deer have been shown to have negative effects on forest understories (Miller et al. 1992, Augustine & French  1998, Knight 2003) and management efforts should strive to ensure that regenerating trees and shrubs are not so heavily browsed that they cannot replace overstory trees when required to do so. Avoid cutting old growth examples and encourage selective logging areas that are under active forestry.

### Development and Mitigation Considerations

Strive to minimize fragmentation of large forest blocks by focusing development on forest edges, minimizing the width of roads and road corridors extending into forests, and designing cluster developments that minimize the spatial extent of the development. Development projects with the least impact on large forests and all the plants and animals living within these forests are those developments built on brownfields or other previously developed land. These projects have the added benefit of matching sustainable development practices (for example, see: The President's Council on Sustainable Development 1999 final report, US Green Building Council's Leadership in Energy and Environmental Design certification process at http://www.usgbc.org/).

### Inventory Needs

Inventory any remaining large and/or old-growth examples across the state. Continue searching for large sites in good condition (A- to AB-ranked).

### Research Needs

Research the composition of pine-northern hardwood forests statewide in order to characterize variations (e.g., coastal plain and northern types). Collect sufficient plot data to support the recognition of several distinct pine-northern hardwood forest types based on composition and by ecoregion (e.g., red pine dominant vs. white pine dominant). More data are needed in order to clearly separate this community from Appalachian oak-pine forests and successional northern hardwoods dominated by white pine.

### Rare Species

Bald Eagle (*Haliaeetus leucocephalus*)
Hooker's Orchid (*Platanthera hookeri*)
Houghton's Sedge (*Carex houghtoniana*)
Northern Running-pine (*Diphasiastrum complanatum*)

# Identification Comments

Pine-northern hardwood forest occurs on gravelly outwash plains, delta sands, eskers, and dry lake sands in the Adirondacks. Generally, the combined cover of indicator species such as white pine (Pinus strobus) and red pine ( P. resinosa) in the woody layers must be at least 20% and ideally at least 50%, otherwise the occurrence may grade into other forest types such as hemlock-northern hardwood forest or beech-maple mesic forest. Physiognomy ranges from a semi-broadleaf deciduous (75% cover of hardwoods, 25% cover of conifers) to needleleaf evergreen forest.

### The Best Time to See

Several wildflower species of pine-northern hardwood forests can be observed in bloom throughout the spring and summer. During the early spring, flowers of miterwort (Mitella diphylla) appear on the forest floor, followed by wild sarsaparilla (Aralia nudicaulis), Canada mayflower (Maianthemum canadense), bunchberry (Cornus canadensis), and goldthread (Coptis trifolia).

## Characteristics Most Useful for Identification

Pine-northern hardwood forests in New York are often characterized by an emergent canopy of white pines (Pinus strobus) that overtop a mixed forest of white and/or red pine (Pinus resinosa) with northern hardwood species such as red maple (Acer rubrum), red oak (Quercus rubra), paper birch (Betula papyrifera), and yellow birch (Betula alleghaniensis). Blueberries (Vaccinium angustifolium, V. myrtilloides) are characteristic shrubs, bracken fern (Pteridium aquilinum) is a common herb, and mosses and lichens may be common to abundant.

Characteristic animals include pine warbler (Dendroica pinus) in mature, well-spaced pines and pileated woodpecker (Drycopus pileatus).

## Elevation Range

Known examples of this community have been found at elevations between 360 feet and 2225 feet.

## Similar Ecological Communities

**Hemlock-northern hardwood forest:** Hemlock-northern hardwood forests tend to be found in moister areas than pine-northern hardwood forests, which occur in drier, more well-drained soils. Pine-northern hardwood forests have more white pine (Pinus strobus) or red pine (P. resinosa) and less hemlock, a species that characterizes and dominates hemlock-northern hardwood forests.

**Beech-maple mesic forest:** Beech-maple mesic forests are characterized by co-dominance of American beech (Fagus grandifolia) and sugar maple (Acer saccharum). The combined cover of those species in pine-northern hardwood forests is generally less than 50%.

**Successional northern hardwoods:** Successional northern hardwoods that are dominated by or with greater than 20% cover of white pine (Pinus strobus) should also have characteristic successional features including successional indicator species, young canopy trees with small dbh, evidence of recent logging or relatively recent succession from a more open cultural community, and a canopy layer with poor tree diversity and poor development of multiple strata. Pine-northern hardwood forests lack these successional indicators.

**Spruce-northern hardwood forest:** Spruce-northern hardwood forests have significant and dominant cover of red spruce (Picea rubens), which can be present in pine-northern hardwood forests but is much less abundant.

**Appalachian oak-pine forest:** Appalachian oak-pine forests are located in the Lower New England ecoregion and are dominated by Central Appalachian species such as white oak (Quercus alba), chestnut oak (Quercus montana), black oak (Quercus velutina), scarlet oak (Quercus coccinea), and hickories (Carya spp.). Pine-northern hardwood forests are located in the Northern Appalachians and are characterized by the presence and/or dominance of white pine (Pinus strobus), red pine (Pinus resinosa), spruce (Picea spp.), and paper birch (Betula papyrifera).

## Characteristic Species

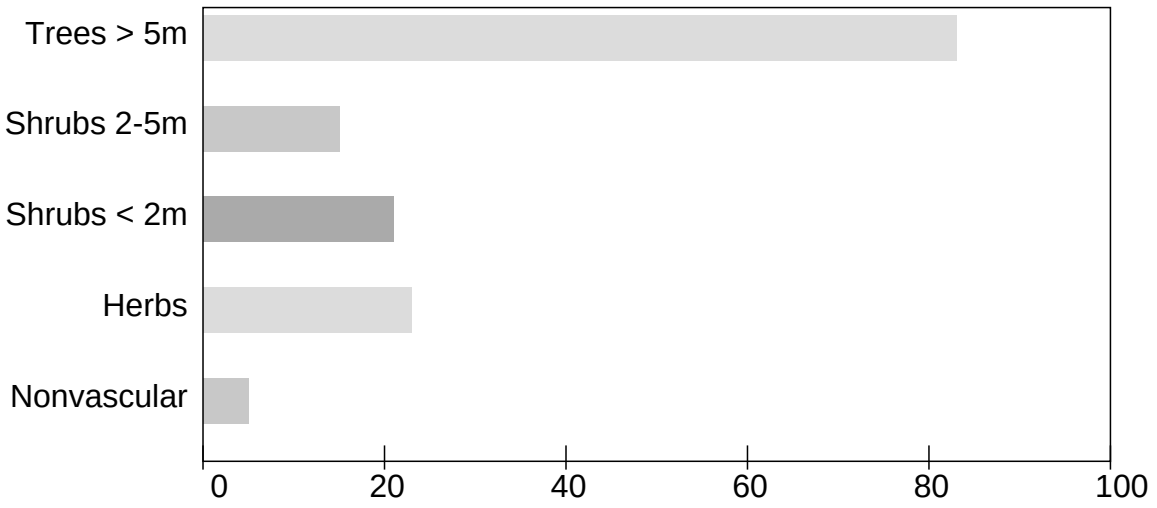
**Trees > 5m**
Striped Maple (*Acer pensylvanicum*)
Red Maple (*Acer rubrum*)
Sugar Maple (*Acer saccharum*)
Paper Birch (*Betula papyrifera*)
Red Spruce (*Picea rubens*)
Red Pine (*Pinus resinosa*)
Eastern White Pine (*Pinus strobus*)
Red Oak (*Quercus rubra*)
Eastern Hemlock (*Tsuga canadensis*)

**Shrubs 2-5m**
Balsam Fir (*Abies balsamea*)
Red Pine (*Pinus resinosa*)
Eastern White Pine (*Pinus strobus*)
Wild Black Cherry (*Prunus serotina*)
Red Oak (*Quercus rubra*)

**Shrubs < 2m**
Balsam Fir (*Abies balsamea*)
Red Maple (*Acer rubrum*)
Black Huckleberry (*Gaylussacia baccata*)
Red Spruce (*Picea rubens*)
Eastern White Pine (*Pinus strobus*)
Red Oak (*Quercus rubra*)
Lowbush Blueberry (*Vaccinium angustifolium*)
Velvetleaf Huckleberry (*Vaccinium myrtilloides*)

**Herbs**
Wild Sarsaparilla (*Aralia nudicaulis*)
Goldthread (*Coptis trifolia*)
Bunchberry (*Cornus canadensis*)
Wavy Hair Grass (*Deschampsia flexuosa*)
Evergreen Woodfern (*Dryopteris intermedia*)
Teaberry (*Gaultheria procumbens*)
Canada May-flower (*Maianthemum canadense*)
Twoleaf Miterwort (*Mitella diphylla*)
Eastern Bracken (*Pteridium aquilinum*)

**Nonvascular**
*Dicranum montanum*
*Hypnum imponens*
*Pleurozium schreberi*
*Polytrichum ohioense*




This figure helps visualize the structure and "look" or "feel" of a typical pine-northern hardwood forest. Each bar represents the amount of "coverage" for all the species growing at that height. Because layers overlap (shrubs may grow under trees, for example), the shaded regions can add up to more than 100%.

### International Vegetation Classification System Associations

This New York natural community encompasses all or part of the concept of the following International Vegetation Classification (IVC) natural community associations. These are often described at finer resolution than New York's natural communities. The IVC is developed and maintained by NatureServe.

Jack Pine / Blueberry / Feathermoss Forest (CEGL002441)

Northern Hardwood - White Pine Forest (CEGL005005)

Red Pine - White Pine Forest (CEGL006253)

### NatureServe Ecological System Associations

This New York natural community falls into the following ecological system(s). Ecological systems are often described at a coarser resolution than New York's natural communities and tend to represent clusters of associations found in similar environments. The ecological systems project is developed and maintained by NatureServe.

Boreal Jack Pine-Black Spruce Forest (CES103.022)

Laurentian-Acadian Pine-Hemlock-Hardwood Forest (CES201.563)

Laurentian Pine-Oak Barrens (CES201.718)

Laurentian-Acadian White Pine-Red Pine Forest (CES201.719)

Appalachian Hemlock-Hardwood Forest (CES202.593)

# Additional Resources

## Links

**Wikipedia on Eastern white pine**
http://en.wikipedia.org/wiki/Eastern_White_Pine

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**New York Natural Heritage Program**
625 Broadway, 5th Floor,
Albany, NY 12233-4757
Phone: (518) 402-8935
acris@nynhp.org



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