Appalachian Oak-Hickory Forest

Appalachian Oak-Hickory Forest

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System Terrestrial

Subsystem Forested Uplands

Did you know?
The New York Natural Heritage Program considers Appalachian oak-hickory forests "matrix forests." Matrix forests blanket large regions of the state and include patches of other natural communities. If the High Allegheny Plateau along the New York-Pennsylvania line were thought of as a giant chocolate chip cookie, then Appalachian oak-hickory forests would be the cookie dough and the chips would be the other embedded communities such as lakes, bogs, and swamps.

Summary

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

Rarity G4G5, S4

A global rarity rank of G4G5 means: Apparently or Demonstrably Secure globally - Uncommon to common in the world, but not rare; usually widespread, but may be rare in some parts of its range; possibly some cause for long-term concern due to declines or other factors. More information is needed to assign a single conservation status.
A state rarity rank of S4 means: Apparently secure in New York State.

Conservation Status in New York

There are several hundred occurrences statewide. Some documented occurrences have good viability and many are protected on public land or private conservation land. This community has statewide distribution and includes several very large, high quality examples. The current trend of this community is probably stable for occurrences on public land, or declining slightly elsewhere due to moderate threats related to development pressure.

Short-term Trends

The number and acreage of Appalachian oak-hickory forests in New York has probably declined moderately in recent decades as a result of logging, agriculture, and other development.

Long-term Trends

The number and acreage of Appalachian oak-hickory forests in New York has probably declined substantially from historical numbers likely correlated with past logging, agriculture, 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), 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). When occurring as expansive forests, the largest threat to the integrity of Appalachian oak-hickory 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 bird species). Additionally, fragmented forests provide decreased benefits to neighboring societies from 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). Appalachian oak-hickory forests are threatened by development (e.g., residential, agricultural, communication antennas), either directly within the community or in the surrounding landscape. Other threats include habitat alteration (e.g., roads, utility ROWs, excessive logging, mining, deer over-browsing), and recreational overuse (e.g., ATVs, hiking trails, campgounds, ski slopes). A few Appalachian oak-hickory forests are threatened by invasive species, such as buckthorn (Rhamnus cathartica), bluegrass (Poa compressa), barberry (Berberis thunbergii), shrubby honeysuckle (Lonicera morrowii), tree-of-heaven (Ailanthus altissima), and multiflora rose (Rosa multiflora). Intentionally planted pine species (e.g., Pinus resinosa, P. strobus) may become established and be a threat to a few examples. Appalachian oak-hickory forests may be threatened by the non-native gypsy moth (Lymantria dispar) which is one of North America's most devastating forest pests. The gypsy moth is known to feed on the foliage of hundreds of species of plants in North America but its most common hosts are oaks and aspen. Gypsy moth populations are typically eruptive in North America; in any forest stand densities may fluctuate from near 1 egg mass per ha to over 1,000 per ha. When densities reach very high levels, trees may become completely defoliated. Several successive years of defoliation, along with contributions by other biotic and abiotic stress factors, may ultimately result in tree mortality (McManus et al. 1980, Liebhold 2003).

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 and 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. 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 excellent to good condition (A- to AB-ranked).

Research Needs

Regularly assess the presence and degree of impact that gypsy moths have on this community. Research the composition of Appalachian oak-hickory forests statewide in order to characterize variations. Collect sufficient plot data to support the recognition of several distinct Appalachian oak-hickory forest types based on composition and by ecoregion.

Rare Species

Basil Mountain-mint (*Pycnanthemum clinopodioides*)
Glaucous Sedge (*Carex glaucodea*)
James' Sedge (*Carex jamesii*)
Black-edge Sedge (*Carex nigromarginata*)
Reflexed Sedge (*Carex retroflexa*)
Handsome Sedge (*Carex formosa*)
Timber Rattlesnake (*Crotalus horridus*)
Gray Petaltail (*Tachopteryx thoreyi*)
Virginia Snakeroot (*Endodeca serpentaria*)
Wild Comfrey (*Cynoglossum virginianum var. virginianum*)
Blanding's Turtle (*Emydoidea blandingii*)
Fence Lizard (*Sceloporus undulatus*)
Bald Eagle (*Haliaeetus leucocephalus*)
Green Gentian (*Frasera caroliniensis*)

Woodland Agrimony (*Agrimonia rostellata*)
Back's Sedge (*Carex backii*)
Variable Sedge (*Carex polymorpha*)
Lined Sedge (*Carex striatula*)
Puttyroot (*Aplectrum hyemale*)
Hooker's Orchid (*Platanthera hookeri*)
Nodding Pogonia (*Triphora trianthophora*)
Carolina Sedge (*Carex caroliniana*)
Indiana Bat (*Myotis sodalis*)
Eastern Wormsnake (*Carphophis amoenus*)
Appalachian Azure (*Celastrina neglectamajor*)
Eastern Small-footed Myotis (*Myotis leibii*)
Allegheny Woodrat (*Neotoma magister*)
Green Rock-cress (*Boechera missouriensis*)
Violet Wood-sorrel (*Oxalis violacea*)
Torrey's Mountain-mint (*Pycnanthemum torrei*)
Small-flowered Crowfoot (*Ranunculus micranthus*)
Cork Elm (*Ulmus thomasii*)
Douglas' Knotweed (*Polygonum douglasii*)
Narrow-leaved Sedge (*Carex amphibola*)
Wood Reedgrass (*Calamagrostis perplexa*)
Reznicek's Sedge (*Carex reznicekii*)
White-m Hairstreak (*Parrhasius m-album*)
Wild Pink (*Silene caroliniana ssp. pensylvanica*)
Kentucky Warbler (*Geothlypis formosa*)
False Lettuce (*Lactuca floridana*)
Nodding Wild Onion (*Allium cernuum var. cernuum*)
Porter's Reedgrass (*Calamagrostis porteri ssp. porteri*)

Identification Comments

A hardwood forest that occurs on well-drained sites, usually on ridgetops, upper slopes, or south- and west-facing slopes. The soils are usually loams or sandy loams. This is a broadly defined forest community with several variants. The dominant trees include one or more species of oak.

The Best Time to See

Early spring is a good time to catch many of the understory trees and shrubs in bloom. Flowering dogwood, shadbush, choke cherry, and maple-leaf viburnum all provide visual sprays of color in the spring.

Characteristics Most Useful for Identification

This forest invariably has a mixture of tree oaks (red, white, black) and hickories (pignut, shagbark, sweet pignut). Also, maple-leaf viburnum is commonly found in the understory.

Elevation Range

Known examples of this community have been found at elevations between 200 feet and 2280 feet.

Similar Ecological Communities

Allegheny oak forest: The Allegheny oak forest tends to have a more diverse tree canopy layer and ground flora than the Appalachian oak-hickory forests. In New York, the Allegheny oak forest is restricted to the unglaciated portions of the Allegheny plateau.

Oak-tulip tree forest: Oak-tulip tree forests tend to have tulip tree, beech, and black birch in addition to oaks, while Appalachian oak-hickory forest will tend not to have these species, but will have some hickories.

Appalachian oak-pine forest: Appalachian oak-pine forests are characterized by the presence of white pine or pitch pine, while Appalachian oak-hickory forests tend not to have pines and tend to have more hickories.

Coastal oak-hickory forest: The coastal oak-hickory forest occurs only on the Atlantic coastal plain while the Appalachian oak-hickory forest occurs more inland.

Chestnut oak forest: Chestnut oak forests tend to have a higher abundance of chestnut oak in the tree (overstory) layer as well as more black huckleberry, mountain laurel, and blueberry in the shrub layers.

Beech-maple mesic forest: Beech-maple mesic forests tend to have fewer oaks and hickories and more sugar maple, beech, yellow birch, and white ash than Appalachian oak-hickory forests.

Characteristic Species

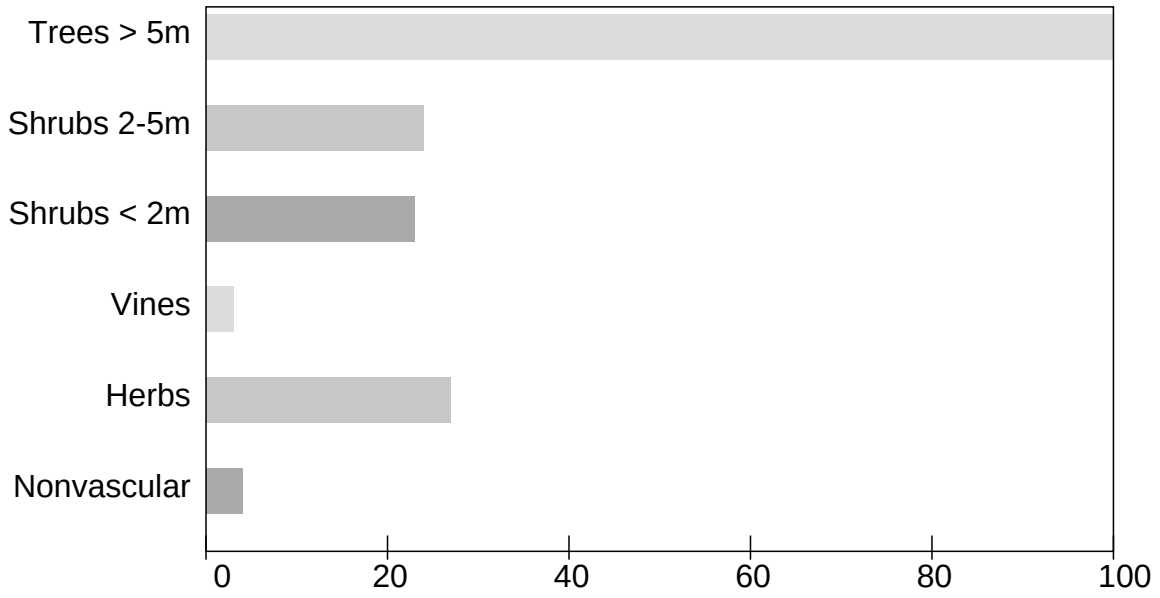
Trees > 5m
Red Maple (*Acer rubrum*)
Sugar Maple (*Acer saccharum*)
Pignut Hickory (*Carya glabra*)
Shagbark Hickory (*Carya ovata*)
White Ash (*Fraxinus americana*)
Hophornbeam (*Ostrya virginiana*)
White Oak (*Quercus alba*)
Chestnut Oak (*Quercus montana*)
Red Oak (*Quercus rubra*)

Shrubs 2-5m
Flowering Dogwood (*Cornus florida*)
American Witch-hazel (*Hamamelis virginiana*)

Shrubs < 2m
Beaked Hazelnut (*Corylus cornuta*)
Early Lowbush Blueberry (*Vaccinium pallidum*)

Mapleleaf Viburnum (*Viburnum acerifolium*)

Herbs
Wild Sarsaparilla (*Aralia nudicaulis*)
Pennsylvania Sedge (*Carex pensylvanica*)
Black Snakeroot (*Cimicifuga racemosa*)
Hepatica americana
Smilacina racemosa



This figure helps visualize the structure and "look" or "feel" of a typical appalachian oak-hickory 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.

Sugar Maple - Northern Red Oak / Round-lobe Liverleaf Forest (CEGL006046)

(Pignut Hickory, Shagbark Hickory) - White Ash - Oak species Forest (CEGL006236)

Oak - Hickory / Hop-hornbeam Forest (CEGL006301)

Dry Oak-Hickory Forest (CEGL006336)

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.

Central Appalachian Oak and Pine Forest (CES202.591)

Additional Resources

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