Upper Hudson Watershed Region

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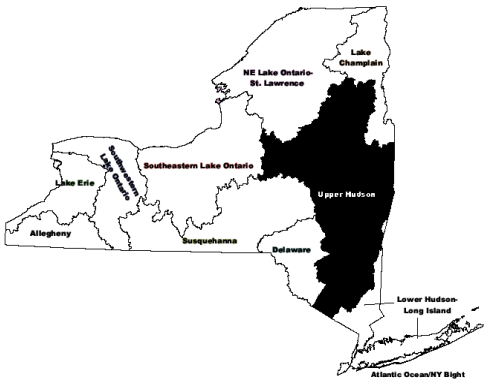
Cornell University Cooperative Extension

new york state Comprehensive Wildlife Conservation Strategy



Over 70% of the Upper Hudson watershed region is covered in forest, of which at least 80% is privately owned. Consequently, the health and prosperity of the watershed's wildlife populations depend on how well these owners protect and enhance the habitat on which the hundreds of species of insects, amphibians, reptiles, fish, birds and mammals depend. The good news is that most forest wildlife species are thriving, but unfortunately many are not. These species of greatest conservation need **(SGCN)** have been identified in the NY Comprehensive Wildlife Conservation Strategy **(CWCS).** 158 SGCN are found in the Upper Hudson basin.

A major goal of the CWCS is to inform forest owners of the need for management practices to enhance forest biodiversity and keep SGCN from becoming rare or endangered. So much of the critical habitats for these species exist on private lands that landowner cooperation will be the ultimate deciding factor on whether species declines can be halted. The plan further lists the threats to these species and management strategies that will improve their habitat. Fortunately, for forest owners and wildlife alike, many species will benefit from sustainable forest practices, including timber production, when implemented in accordance with NYS best management practices (BMPs). Sometimes, letting nature follow the course of natural succession, where grasslands convert (or succeed) over time to shrublands, to pole-stand forests, and ultimately to old-age forest (a.k.a. climax) stands, may not be best for all wildlife. There is a suite of species that depend on early successional forests as habitat. Humans have made an effort to suppress most of the natural forest disturbances that once generated young forests in the watershed. Without disturbances such as floods, fire, pest outbreaks and disease to set succession back to younger forests, many of the species that rely on this habitat are now in decline. In the absence of natural disturbances, there is now a need for forest owners to actively manage their land to create habitat for SGCN.

The task of creating early successional forest is carried out through even-aged silvicultural methods such as clear-cutting. Clear-cutting for permanent conversion to development or in the tropical rainforest may be poor ecosystem management, but is a legitimate silvicultural tool for northeastern hardwood forests. It is an economically efficient manner to produce forest products for landowners and society, while simultaneously regenerating young forest habitat. Patch and irregular shaped clear-cuts optimize the creation of edges where young and old forests interface, which is also ideal habitat for many wildlife species. Over time these young forests mature into older forests which provide critical unique habitat for a different suite of wildlife species. When done correctly, this pattern of harvesting, regeneration, and growth over time, on a landscape scale, can provide a sustainable mix of habitats composed of stands of diverse tree species and diverse age- and size-classes. Recent

research findings by the Audubon Society has shown that even many song bird species that generally prefer mature forests, actually do quite well in managed forests that are composed of a mix of successional stages.

There are several SGCN that reside in forested habitats. When selecting a forest management regime (e.g., selection, shelterwood, clear cut, etc.), it may be difficult for public and private forest managers to coordinate the wide array of habitat needs of these species with their timber management goals. It is important to understand the habitat needs of species that rely on various forested habitats (i.e., varying successional stages, vertical structure, tree and shrub species composition,) and how to accommodate SGCN with seemingly competing habitat requirements. Obviously, no one forest stand or ownership parcel can supply all the habitat needs of all species simultaneously. Management objectives and activities should take into consideration the needs of area sensitive species and the availability of adjacent habitat across the overall landscape.

For example, if your forest stand is home to an "area sensitive" species that needs large un-fragmented forest tracts (e.g., wood thrush, scarlet tanager, cerulean warbler, timber rattlesnake), it is best to manage your stand as a mature forest and use uneven-aged silvicultural techniques, so that harvests do not drastically alter the habitat. But, some early successional forest species such as the golden-winged warbler are area sensitive and may require large patches of young forest/shrubland habitat. Harvest techniques that promote such habitats would include large clear-cuts. Large patches of any habitat are generally rarer across the landscape and are more valuable than smaller patches because they provide habitat for both area sensitive and non area sensitive species.

It is also important to consider the context of your land. If your forest is one of the only large forests within several miles, uneven-aged techniques that do not drastically change the habitat or a forest preserve would be best for the wildlife that relies on your land. On the other hand, if your forest stand is in a highly forested landscape, using even-aged techniques to create early successional forest (either large or small patches) will provide new and important habitat for some species without jeopardizing those that rely on the adjacent more mature forest.

Prominent threats to SGCN

Habitat loss and fragmentation:

- loss of connectivity between forest patches
- increased negative edge effects (increases susceptibility to predation)
- decline of area sensitive species such as timber rattlesnakes and cerulean warblers which need large continuous tracts of mature forest
- increased urbanization and development

Degraded water quality:

- destruction of vegetative riparian zones causes soil erosion and leads to increased sedimentation in streams and rivers
- elevated mercury levels are found in almost every species group
- runoff introduces toxins and excess nutrients into water
- acid precipitation

Inappropriate forestry/agriculture practices:

- a need exists for more ecologically based objectives on a landscape scale
- forestry operations that do not comply with best management practices and that are poorly planned and executed can damage habitat function and reduce habitat quality for SGCN
- mature and early successional forest habitats may suffer because of public reluctance or ability to engage in active management of these habitats

Invasive/overabundant species:

- threaten to reduce biodiversity
- exotic insects such as hemlock wooly adelgid, emerald ash borer and Asian longhorn beetle lack natural predators and threaten to alter the composition of forest stands.
- compete with species of concern for forage or nest sites (e.g. blue-winged vs. golden-winged warblers)
- reduce habitat quality by altering vegetative composition and structure (e.g., black locust invading Karner blue butterfly habitat, deer overbrowse, limiting forest regeneration, hay-scented ferns dominating understory)

Human wildlife interactions:

- vehicular and structural collisions
- illegal and unregulated harvest, (migrating birds, bats, and amphibians and reptiles are most susceptible)
- public misconceptions about reptiles, particularly snakes, may promote the killing and/or collection of these animals

Climate change:

- in the Upper Hudson basin, where boreal ecosystems are at the southern edge of their range, entire forest communities and their flora and fauna are at risk of extirpation
- the local hydrologic cycles that support the world renowned amphibian and reptile diversity of the Hudson Valley are likely to be affected, particularly as human demands for water supply increase in this region
- increased possibility of more severe weather
- reduced depth and duration of snow cover

MODEL SPECIES OF GREATEST CONSERVATION NEED

Deciduous Mixed Forest Breeding Birds

Cerulean Warbler

- prefers relatively mature forests and needs large unfragmented forest tracts
- increasing forest patch size can reduce the risk of predation
- implementing deer control where it is affecting forest and species regeneration can increase potential habitat
- requires low levels of forest management (light harvesting/patches)
- lengthen timber harvest cycle

Early Successional Forest/Shrubland Birds

Golden-winged Warbler

- there is an annual average decline of 5.8% of the populations of early successional forest/shrubland birds
- prefers shrubby openings near tree lines or scattered trees and herbaceous ground cover

- threats include: the reversion of shrubland to forest and early successional forest to mature forest; fire suppression; inadequate forest management that includes even-aged and heavy partial removal and the public perception that forest management is harmful to birds
- interbreeding with blue-winged warblers is lowering the golden-winged population
- conservation efforts should focus on areas where blue-winged warblers are absent
- the decline signals a need for more sound and planned timber and abandoned agriculture field management
- a landowner incentive program is needed to convert and create habitat.

Boreal Forest Birds

Spruce Grouse

- spruce grouse have declined to a very low level
- work with private landowners to implement land management techniques that favor spruce grouse
- focus on high elevation areas in Hamilton and Essex counties
- long-term species viability at stake if no action is taken, the species may be extirpated in 20 years

- maturation of forest a factor in decline
- prefer mix of older and younger coniferous forest
- forest preserves prohibit the management that creates necessary habitat, so management on private lands is critical
- without management, good habitat has become spotty and isolated which could lead to extirpation
- acid rain is also a factor as it stresses coniferous forests
- fire suppression limits natural set back of succession

High Altitude Conifer Forest Birds

Bicknell's Thrush

- limited breeding range and narrow habitat preferences result in a relatively small overall population
- threats to the species in NY include acid rain, global warming, disease and insect outbreaks that affect high elevation conifers
- biggest threat may be habitat loss and fragmentation on its wintering grounds in the Dominican Republic
- preferred habitat are spruce-fir regenerating thickets, although almost all of its breeding habitat exists on state land protected under forest preserve regulations that prohibit logging and allow minimal active management to create young regenerating spruce-fir thickets

Woodland/Grassland Snakes

Timber Rattlesnake

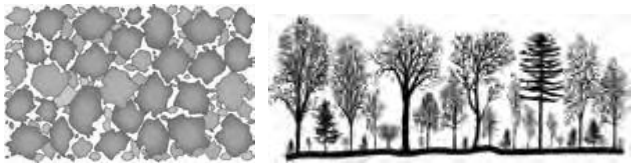
- timber rattlesnakes provide many ecological benefits to a community and maintain an ecological balance through serving as both predator and prey
- prefers large tracts of relatively undisturbed forest habitats (mixed deciduous and coniferous) and open woodlands with talus/rocky outcrops
- habitat degradation and fragmentation, and public misconception about rattlesnakes leads to unlawful killing and collecting

Vernal Pool Salamanders

Blue-spotted and Jefferson Salamanders

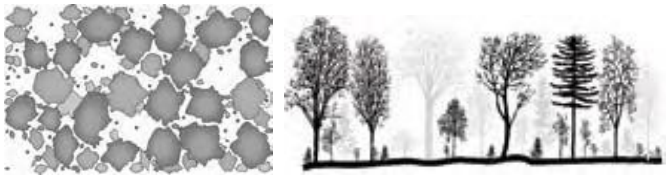
- vernal pools are small unregulated wetlands that dot forested landscapes
- conservation efforts include securing large blocks of habitat containing both forest and wetlands, limiting off-road vehicles in surrounding area (vehicular collisions are a large source of mortality) and pursuing the legal protection of wetlands under 12.4 acres that contain SGCN habitat
- keep forest harvesting at least 100 feet from any vernal pools or spring seeps and maintain overhead canopy

SILVICULTURAL SYSTEMS

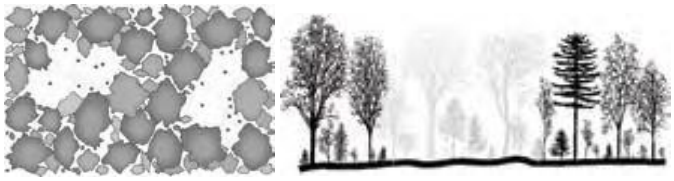


All-age or Uneven-age Silvicultural Systems
Stands are composed of trees of a variety of ages and sizes, including saplings, poles, and sawtimber sizes.

Single tree selection creates relatively small breaks in the forest canopy and therefore also favors shade tolerant tree species. Deer browse can prevent the regrowth of more palatable species and can lead to long-term losses in plant biodiversity. This system is not a viable option in areas with high deer populations.



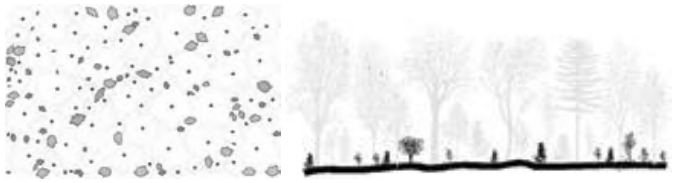
A **group selection/patch clear-cutting** regime creates larger openings in the forest canopy which encourages a greater diversity of regenerating species when patches are large enough to let shade intolerant species compete.



Even-aged Silvicultural Systems
Stands are composed of trees that are generally within 20 years of each other.

The **shelterwood** system clears trees in a series of 2 or 3 cuts over a decade and can increase the abundance of mid-tolerant and initially slow growing species such as oak.

Clear-cutting provides the necessary amount of sunlight for shade intolerant species such as aspen, paper birch, and black cherry to develop. This silviculture system is oftentimes the most efficient at producing early successional habitat.



A **reserve tree** or **seed tree** system can be described as a hybrid between a clear-cut and a shelterwood system. It preserves a few remaining trees from the clear-cut. These trees provide habitat for raptors and other birds and also serve as a seed source. This system promotes regeneration of shade intolerant and mid-tolerant species. Leads to 2-aged stands if seed trees are not harvested for a number of years.

UPPER HUDSON FOREST COMMUNITIES

By region:

Adirondack and Catskill Mountains: beech/maple, hemlock-northern hardwood, spruce-fir boreal

Albany Pine Bush: pitch pine-scrub oak barrens,

Hudson River Valley: red maple-black gum swamp, chestnut-oak, Appalachian oak-hickory, pitch pine oak heath rocky summit,

Shawangunk Mountains: chestnut-oak, pitch pine-oak heath rocky summit

Taconic Mountains: hemlock-northern hardwood, spruce flats, Appalachian oak-hickory

COMMON FOREST COMMUNITIES

Appalachian Oak-Hickory

Description: A hardwood forest that occurs on well-drained sites, usually on ridge tops, upper slopes, or south- and west-facing slopes. This is a broadly defined forest community with several variants. The dominant trees include one or more species of oak. Characteristic SGCN include whip-poor-will, an early successional forest ground nesting birds.

Range: This community is currently known from the lower Hudson Valley within the Hudson Highlands, the Hudson Limestone Valley, Catskill Mountains and the Taconic Foothills.

Beech-Maple

Description: Beech-maple mesic (well-balanced supply of moisture) forest communities are closed-canopy hardwood forests with co-dominating sugar maple and American beech. This is a broadly defined community type with several regional and soil-based variants. These forests occur on moist, well-drained, usually acid soils. There are many spring ephemerals that bloom before the canopy trees leaf out. Hemlock may be present at a low density. In the Adirondacks a few red spruce may also be present. The black-throated blue warbler, a SGCN, is characteristic of this community.

Range: This community forms the matrix forest of the Northern Appalachian Ecoregion in the Adirondacks and Catskills and is present throughout the watershed.

Chestnut-Oak

Description: A hardwood forest that occurs on well-drained and often rocky sites in glaciated portions of the Appalachians and on the coastal plain. The dominant trees are typically chestnut oak and red oak with mountain laurel, huckleberry, and low-bush blueberries in the understory.

Range: This community is currently known from the lower Hudson Valley where it is most common in the Hudson Highlands and Shawangunk Mountains. Chestnut oak forests are also known from the Catskill Mountains, the Rensselaer Plateau, and it reaches its northern limit in the Lake George Valley.

Hemlock-Northern Hardwood

Description: A mixed forest that typically occurs on middle to lower slopes of ravines, on cool, mid-elevation slopes, and on moist, well-drained sites at the margins of swamps. Eastern hemlock is co-dominant with any one to three of the following tree species: American beech, sugar maple, red maple, black cherry, white pine, yellow birch, black birch, red oak, and basswood. The relative cover of eastern hemlock is quite variable, ranging from nearly pure stands in some steep ravines to as little as 20% of the canopy cover. Striped maple is often prominent as a mid-story tree.

Range: This community is currently known from across the state north of the Coastal Plain. Numerous patches of hemlock-northern hardwood forest are known from the Catskill Mountains, the Shawangunk Mountains, the Hudson Highlands, the Rensselaer Plateau, and the Adirondack Mountains.

Pitch Pine-Oak Heath Rocky Summit

Description: A community that occurs on warm, dry, rocky ridge tops and summit. The vegetation may be sparse or patchy, with numerous rocky outcrops. This community is broadly defined and includes examples that may lack pines and instead are dominated by scrub oak or heath shrubs; this variation is apparently related to fire regime.

Range: This community is currently known from the Catskill Peaks of the Appalachian Plateau in Ulster and Greene Counties, the Hudson Valley in Orange and Ulster Counties, the Taconic Highlands in Dutchess County, the Hudson Highlands in Orange and Putnam Counties, and the eastern Adirondack foothills in Washington County.

- **Pitch Pine-Scrub Oak Barrens**

Description: A pine barrens community that occurs on well-drained sandy soils that have developed on sand dunes, glacial till, and outwash. Pitch pine is the dominant tree and forms an open canopy of 20 to 60% cover. The shrub layer is dominated by scrub oaks, and heath species such as lowbush blueberry, and black huckleberry. Scattered within the shrub thicket are savanna openings dominated by herbaceous species such as little bluestem, Indian grass, big bluestem, bush-clovers, and wild lupine. This community is adapted to and maintained by periodic fires with a frequency ranging from 6 to 15 years. SGCN in this community include: Karner blue butterfly, frosted elfin, Buck moth, brown thrasher and the prairie warbler.

Range: This community is restricted to the Hudson Valley in Albany and Warren Counties within the Hudson Glacial Lake Plains subsection in the Upper Hudson watershed.

Red Maple-Blackgum Swamp

Description: Dominated by red maple and blackgum, which occurs in maritime, coastal, and inland areas, within poorly-drained depressions.

Range: Primarily a coastal community, a few inland examples are also known in the Hudson Limestone Valley and the Eastern Adirondack Low Mountains.

Spruce-Fir Boreal

Description: Mountain spruce-fir forests have a closed canopy dominated by red spruce and balsam fir, with associates, paper birch, yellow birch, and mountain ash. The shrub layer is dominated by canopy tree seedlings, and the ground layer has moderate herbaceous cover and a dense carpet of mosses. Mountain spruce-fir forests occur on cool upper slopes at elevations between 900 and 1,200 m (3,000 to 4,000 feet).

Range: Mountain spruce-fir forests are essentially restricted to the Adirondack High Peaks of the Adirondacks and the Catskill peaks of the Appalachian Plateau. Small occurrences are likely in other areas of the Adirondacks and Appalachian Plateau. Few small stands occur in the Rensselaer County portion of the Taconic Mountains.

Spruce Flats

Description: A mixed forest that occurs along the borders of swamps and in low flats along lakes and streams in the Adirondacks, often in a tight mosaic with balsam flats. The canopy is usually dominated by red spruce and red maple (mixed with a variety of possible associates. Heath species dominate the shrub layer, and the forest floor is a carpet of ferns, mosses and herbs.

Range: This community is limited to the northern portion of the state. It is concentrated in the Adirondack Mountains where it is represented by large patches. It is peripheral on the Rensselaer Plateau.

COMMON TREES

AMERICAN BEECH

Beech is a common species in forest preserves and high-graded stands. This slow-growing, long-lived species is our most shade-tolerant hardwood and can develop in all but the darkest shade. American beech nuts provide food for large mammals such as black bears and small mammals such as white-footed mice, as well as a variety of birds. American beech are prone to develop cavities. The proliferation of the beech scale disease has devastated mature stands throughout the northeast. Its ability to stump and root sprout and lack of palatability to deer has resulted in complete understory domination in many stands.

Birches

Common birch species in the Northeast include paper, black, and yellow birch. Paper birch is a cold-climate species adapted to a variety of soils. Black birch, a warmer climate birch, is found on average sites. The range of yellow birch overlaps the two—it is found on moist to wet sites throughout its range. Black birch is now a common tree species as a result of its ability to reseed disturbed soils following partial cutting. Yellow and black birch contain oil of wintergreen (methyl salicylate), which gives birch beer its distinctive taste. The presence of this chemical, poisonous at high doses, provides some protection from deer browse damage. Birch provide important spring food for ruffed grouse, a SGCN. Although birch seedlings can grow in partial shade, overstory removal or death is necessary for seedlings to develop into mature trees.

Eastern Hemlock

Eastern hemlock occurs with a broad array of associate tree species including many northern hardwoods. It is very shade tolerant and therefore can persist in the understory for decades. In such conditions it grows very slowly. When gaps occur in the overhead canopy due to the death of adjacent trees or when stands are harvested, it can start growing again, although typically relatively slowly. Because it can persist in the understory it provides important understory and mid-story structure that many wildlife species need, but also shades out herbaceous ground cover. It often is the only conifer in stands that are dominated by hardwoods, thereby providing more diverse habitat for many wildlife species, especially those needing winter shelter. It is a preferred browse species of deer. It is typically found on steep slopes and on north and east facing slopes. It provides summer shade to streams and therefore contributes to brook trout habitat. It provides valuable habitat for wildlife that need dens and cavities. Clear-cut harvests tend to covert hemlock stands to hardwoods. The hemlock wooly adelgid has recently invaded the Susquehanna watershed and poses a serious threat to the existence of hemlock in the watershed.

Eastern White Pine

Eastern white pine can grow on sites ranging from dry ridge tops to swampy valleys. Although eastern white pine seedlings can grow in partial shade, overstory removal (final stage shelterwood or clear-cutting) is eventually necessary for seedlings to develop into mature trees.

Maples

Red and sugar maple are found throughout the Northeast. Red maple has become the most common tree in many Northeastern States and may account for one-quarter of all trees. This increase has been attributed to fire suppression and the increased use of partial cutting (as opposed to the earlier practice of clear-cutting). Red maples are also profuse stump sprouters. Their ability to grow in light (red maple) to heavy shade (sugar maple) allows both species to persist for decades as small saplings under the shade of larger trees. The large hollows commonly found in centenarians are favorite den sites of raccoons, porcupines, and

flying squirrels. Chickadees, wrens, and cardinals eat the seeds; deer eat the leaves and twigs.

Oaks

Oaks are disturbance-dependent species; most of our oak forests arose on lands that were burned or clear-cut in the late 1800s to early 1900s. Northern red oak is one of the most valuable timber trees. Although oak seedlings can grow in partial shade, overstory removal (final stage shelterwood, clear-cutting, or patch cutting) is eventually required to achieve the full sunlight conditions necessary for seedlings to develop into mature trees. Oaks need protection from browsing where deer herds are large. Prescribed burning can enhance seedling height growth.

Spruces

Red, white, and black spruce are the most common eastern spruces. Red spruce is a medium-sized, shade-tolerant tree that can live more than 400 years. It often grows in association with balsam fir and is tolerant to extremely shade tolerant. In early years especially, red spruce grows slower than its common associates (balsam fir, and hardwood trees and shrubs). Release and thinning may be needed to allow trees to reach upper canopy.

VERNAL POOLS

Description: Vernal pools are temporarily, small, shallow depressions usually located within an upland forest. They are typically flooded in spring after snow melt, or after a heavy rainfall, but are usually dry during summer and may fill again in autumn. The substrate is dense leaf litter over hydric soils. Vernal pools typically occupy a confined basin (i.e., a standing water body without a flowing outlet), but may have an intermittent stream flowing out of it during high water. Since vernal pools cannot support fish populations, there is no threat of fish predation on amphibian eggs and larvae. Vernal pools are home to SGCN salamanders such as the blue-spotted salamander, Jefferson's salamander and marbled salamander.

Range: Widespread throughout New York State.

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Cornell Lab of Ornithology – The labs mission is to interpret and conserve the earth's biological diversity through research, education, and citizen science focused on birds. *http://www.birds.cornell.edu*

National Wild Turkey Federation – A national nonprofit conservation and hunting organization that, along with its volunteers, partners and sponsors, has worked for the conservation of the wild turkey and preservation of the hunting tradition. *http://www.nwtf.org/*

New Hampshire Cooperative Extension Forestry and Wildlife Program – Their website is an excellent source of information about wildlife, their habitats, and habitat management. *http://extension.unh.edu/Wildlife/Wildlife.htm*

New York Natural Heritage Program –The program facilitates conservation of New York's biodiversity by providing comprehensive information and scientific expertise on rare species and natural ecosystems to resource managers and other conservation partners. *http://www.nynhp.org*

NYSDEC Comprehensive Wildlife Conservation Strategy – The overall plan describes the details for protection and management of the habitats and wildlife that live in NY State's 11 major watersheds. The plan for the Upper Hudson Watershed Region: *http://www.dec.ny.gov/docs/ wildlife_pdf/ upperhudsontxt.pdf*

The Ruffed Grouse Society – Dedicated to promoting conditions suitable for ruffed grouse, American woodcock and related wildlife to sustain our sport hunting tradition and outdoor heritage. *http://www.ruffedgrousesociety.org*

USGS – National Map of Land-Cover Vegetation. Depicts areas with various habitat types. Works well on a county basis. *http://www.gap.uidaho.edu/landcoverviewer.html*