Susquehanna Watershed Region

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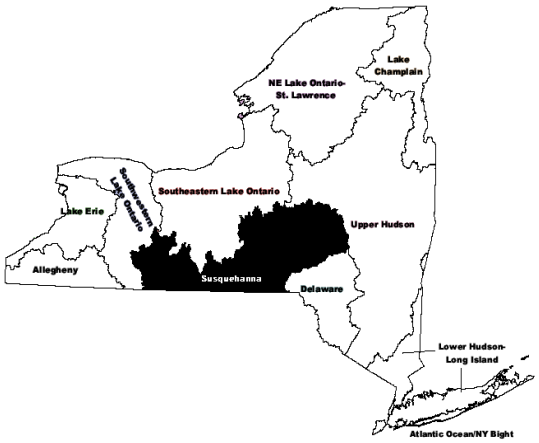
new york state
Comprehensive Wildlife Conservation Strategy



Over 70% of the Susquehanna watershed region is covered in forest of which at least 85% 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 hundreds of species of invertebrates, amphibians, reptiles, fish, birds and mammals depend. The good news is that most forest wildlife species are thriving, but unfortunately many are not. Ninety species of greatest conservation need **(SGCN)** in the Susquehanna watershed have been identified in the NY Comprehensive Wildlife Conservation Strategy **(CWCS).**

A major goal of the CWCS is to inform forest owners of the need for management practices that will enhance forest biodiversity and thereby keep these SGCN from becoming rare or endangered. So much of the critical habitats for these species exists 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 DEC timber harvesting guidelines, *http://www.dec.ny.gov/lands/5240.html* to protect water quality. Private forest owners are strongly encouraged to contact their regional DEC forester to seek professional management advice *(http://www.dec.ny.gov/lands/4972.html).*

Sometimes, simply 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 stands may not be best for all wildlife. There is a suite of species that depends on early successional forest as habitat. Humans have made an effort to suppress most of the natural forest disturbances that once generated young forest in the watershed. Without disturbances such as 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 these natural disturbances, there is now a need for forest owners to actively manage their land to create habitat for these SGCN.

Oftentimes the task of creating early successional forest is carried out through even-aged silvicultural methods such as clear-cutting. Permanent conversion of forests to non-forest development or clear-cutting in the tropical rainforest may be poor ecosystem management, but clear-cutting is a legitimate silvicultural tool for northeastern hardwood forests. It is an economically efficient manner to procure forest products for

landowners and society, while simultaneously regenerating young forest habitat. Over time these young forests mature into older forests which also provide critical unique habitat for a different suite of wildlife species. When done correctly, this pattern of harvesting 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 Audubon New York, has shown that 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, etc.) 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 "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 light to moderate partial harvests, so that harvests do not drastically alter the habitat. But, some early successional forest species such as the golden-winged warbler are also 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 more rare 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 heavily 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 rattlesnake and cerulean warbler which need large continuous tracts of mature forest
- reduction of forest size also results in reduction of populations and reduction in the types of species the forest patch can support.
- increased urbanization and development

Degraded water quality:

- destruction of vegetative riparian zones causes soil erosion and leads to increased sedimentation in streams and rivers
- on-site septic systems contaminate local ground water and surface water
- runoff introduces toxins and excess nutrients into water
- American Rivers (www.americanrivers.org) recently listed the Susquehanna as one of the nation's endangered rivers due to sewer pollution and dam construction
- agricultural pesticides are often broad in their action and may kill off additional non-target species such as benign and beneficial invertebrates and amphibians

Inappropriate forestry and agriculture practices:

- a need exists for more ecologically based objectives on a landscape scale
- cattle allowed near stream banks can cause severe erosion leading to sediment overloading
- 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

Human disturbance/interactions:

- habitats fragmented by roads and power lines increase direct mortality of SGCN due to collisions
- illegal and unregulated harvest, (migrating birds, bats and herps most susceptible)
- illegal capture and sale of herpetofauna
- public misconceptions about reptiles, particularly snakes, may promote the killing and/or collection of these animals
- a lack of zoning in many towns often results in structures built too close to streams (which have a higher than average tendency to migrate in this watershed)-emergency measures taken to protect these structures further compounds unstable stream conditions
- vehicular and structural collisions

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)
- pose a predation threat
- reduce habitat quality by altering vegetative composition and structure (e.g., garlic mustard dominating understory, deer overbrowse limiting forest regeneration, hay-scented ferns dominating understory)

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

Forest Breeding Raptors:

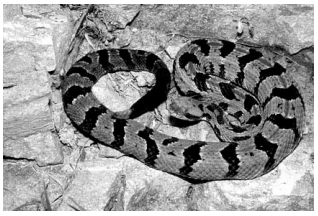
Red-shouldered hawk

- relatively large forest tracts are needed for successful breeding
- clear-cutting is a major source of raptor breeding habitat fragmentation
- disturbance around the nest site during breeding can cause nest failure
- creating small openings with wetlands or small ponds benefits forest breeding raptors

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

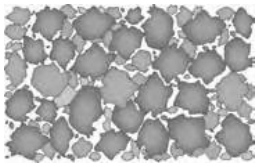


Vernal Pool Salamanders

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

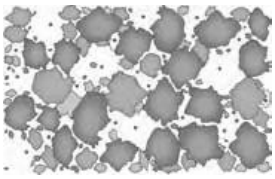
SILVICULTURAL SYSTEMS



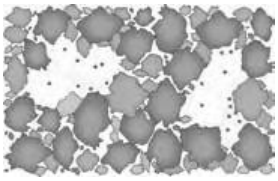
All-age or Uneven-age Silvicultural Systems

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.



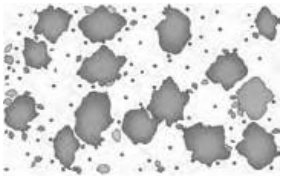
A **group selection/patch clear-cutting** regime creates larger openings in the forest canopy which encourages a greater diversity of regenerating species when patches are large enough to let shade intolerant species compete.



Even-aged Silvicultural Systems

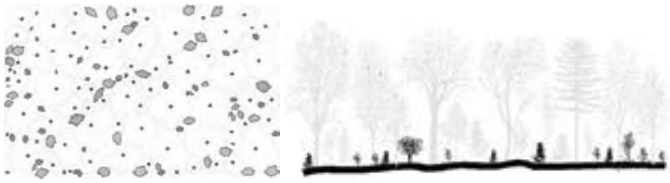
Stands are composed of trees that are generally within 20 years of each other.

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.

SUSQUEHANNA 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 bird.

Range: This community is currently known from the western Finger Lakes Region, as well as the lower Hudson Valley within the Hudson Highlands, the Hudson Limestone Valley, and the Taconic Foothills. Appalachian oak-hickory forests are also known from the Catskill Mountains, and the Upper Delaware River Valley.

Appalachian Oak-Pine

Description: Appalachian oak-pine forests occur on sandy or rocky soils, on slopes, ravines, or in pine barrens. The canopy is dominated by any of several oak species, with white pine making up at least 25% of the total cover. On rocky slopes, the canopy abundance of pitch pine could be greater than that of white pine at some sites. The shrub layer is dominated by acidic soil dependant shrubs such as lowbush blueberry and huckleberry. The herbaceous layer is usually sparse and low in species diversity SGCN found here include the timber rattlesnake.

Range: This community is currently known from the central High Allegheny Plateau, and the Lake Ontario Lake Plain, as well as located in the Catskill Mountains, the Eastern Adirondack Low Mountains (Lake George Valley), and the St. Lawrence Valley.

Beech-Maple

Description: Beech-maple mesic 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 red spruce may also be present. The Kentucky warbler, a SGCN, is characteristic of this community

Range: This community is widespread throughout upstate New York. It forms the matrix forest of the Northern Appalachian Ecoregion in the Adirondacks and Tug Hill. Beech-maple mesic forest is also present in the High Allegheny Plateau ecoregions, Lower New England, and the Great Lakes.

Floodplain Forest

Description: A hardwood forest that occurs on mineral soils on low terraces of river floodplains and river deltas. These sites are characterized by their flood regime; low areas are annually flooded in spring and high areas are flooded irregularly. This is a broadly defined community; floodplain forests are quite variable and may be very diverse. Species indicative of floodplains, such as bluejoint grass, jumpseed, smallspike false nettle, and nettles should be more abundant than aquatic species. Other native species characteristic of floodplain forests include spotted jewelweed, Canada goldenrod, Virginia cutgrass, and possibly eastern cottonwood. The composition of the forest apparently changes in relation to flood frequency and elevation of floodplain terraces along larger rivers (Edinger et al. 2002). Characteristic SGCN include the bald eagle, timber rattlesnake and the ostrich fern-borer moth.

Range: Large examples of this community are currently known from dozens of rivers and large streams across the state. Several high quality floodplain forests are known from the Lake Ontario Lake Plain, and across the High Allegheny Plateau, as well as the Upper Delaware Valley, the Central Hudson Valley, the Lake Champlain Valley, the Adirondack Mountains, the Mohawk Valley.

Hemlock-Hardwood Swamp

Description: Hemlock-hardwood swamps are closed-canopy, mixed species swamps, dominated by hemlock, with abundant red maple, yellow birch, and blackgum. They occur on mineral soils and deep muck in depressions that receive groundwater discharge. The shrub layer is typically sparse, and features any of several shrub species, including highbush blueberry, great rhododendron, and winterberry. The ground layer may be sparse, and often includes cinnamon fern and sensitive fern (Edinger et al. 2002). SGCN species found in this community include the prothonotary warbler.
Range: Hemlock-hardwood swamps are found throughout upstate New York, north of the coastal lowlands/north Atlantic coast, except perhaps in localized regions such as the High Peaks area of the Adirondacks. The community is apparently concentrated in the high Alleghany regions and lower New England.

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. SGCN include the timber rattlesnake and longtail salamander.

Range: This community is currently known from across the state north of the Coastal Plain.

Maple-Basswood Rich Mesic Forest

Description: A species-rich hardwood forest that typically occurs on well-drained, moist soils of around neutral pH. Rich-soil herbs are predominant in the ground layer and are usually correlated with calcareous bedrock, although bedrock does not have to be exposed. The dominant trees are sugar maple, basswood, and white ash (Edinger et al. 2002). The bald eagle and the timber rattlesnake are characteristic SGCN of this community.
Range: This community is currently known from

calcareous areas across the Ontario Lake Plain, the St. Lawrence Valley, and the Adirondack Mountains. Maple-basswood rich mesic forests are also known from the Taconic Mountains and along the Helderberg Escarpment. Several high quality examples are known from the unglaciated section of the High Allegheny Plateau and within Allegany State Park.

Red Maple-Hardwood Swamp

Description: A hardwood swamp that occurs in poorly drained depressions, usually on inorganic soils with peat, if present, that is less than 20 cm deep. This is a broadly defined community with many variants. In any one stand red maple is either the only canopy dominant, or it is codominant with one or more hardwoods. Blackgum and sweetgum, if present, are only minor associates. The shrub layer is usually well-developed and may be quite dense. The herbaceous layer may be diverse and is often dominated by ferns. Characteristic SGCN include the bald eagle.

Range: This community is known throughout the state except perhaps at the southern portion of Staten Island, where the community is replaced by the related red maple-sweetgum swamp. Apparently also absent from the higher elevations of the central Adirondacks and adjacent foothills (possible very small, scattered occurrences in the latter area). Different variants are concentrated in different ecoregions.

Rich Hemlock-Hardwood Peat Swamp

Description: A mixed conifer-hardwood swamp that occurs on peat, and receives calcareous groundwater discharge. These swamps usually have a fairly open canopy (50 to 70% cover), scattered shrubs, and a diverse ground layer of sedges, mosses, ferns, and forbs. Characteristic canopy trees include eastern hemlock, which usually has at least 20% cover, and various hardwood and conifer associates. Characteristic understory species include sedges, ferns, and a number of species intolerant to acidic conditions, such as skunk cabbage and alder-leaved buckthorn. The red-shouldered hawk is a characteristic SGCN of this community.

Range: This community is sparsely scattered but is probably widespread throughout upstate New York, north of the Hudson Highlands. It may be concentrated in the High Allegheny Plateau Ecoregions, especially the Finger Lakes Highlands, and Great Lakes and suspected to extend northeast

in this part of the state only to about Oneida County.

Silver Maple-Ash Swamp

Description: Silver maple-ash swamps are hardwood basin swamps that occur in poorly-drained depressions or on poorly-drained soils along the borders of large lakes or, less frequently, rivers. The sites are characterized by uniformly wet conditions, with minimal seasonal fluctuation in water levels. The tree canopy is dominated by silver maple and green ash, but typically includes a variety of other hardwood species such as American elm, red maple, swamp white oak, and ironwood. This community has a well-developed understory of tall shrub, short shrub, and herbaceous species. Silver maple-ash swamps often occur over calcareous bedrock, and the plant species composition may reflect this influence with the presence of calciphiles such as northern white cedar and alder-leaf buckthorn (Edinger et al. 2002). The prothonotary warbler is a characteristic SGCN of this community.

Range: This community is primarily limited to the lowlands of central and western New York. It is concentrated in the Great Lakes and High Allegheny Plateau Ecoregions.

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 is prone to develop cavities. This tree is among the most shade-tolerant hardwood species in the Northeast. 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 provides 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

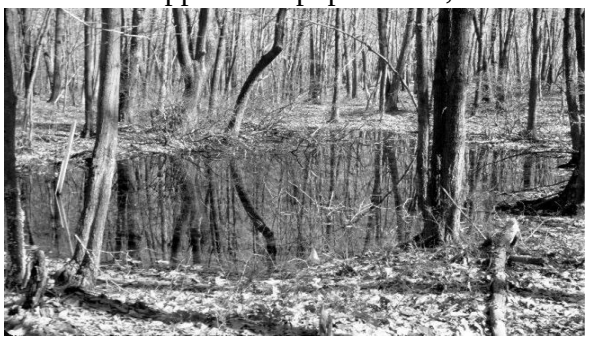
Eastern white pine can grow on sites ranging from dry ridge tops to swampy valleys. Although eastern white pine seedlings can grow in partial shade, overstory removal (final stage shelterwood or clear-cutting) is eventually necessary for seedlings to develop into mature trees.

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. Oak 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.

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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Edinger, G.J., D.J. Evans, S. Gebauer, T.G. Howard, D.M. Hunt, and A.M. Olivero (editors). 2002. ***Ecological Communities of New York State. Second Edition. A revised and expanded edition of Carol Reschke's Ecological Communities of New York State.*** (Draft for review). New York Natural Heritage Program, New York State Department of Environmental Conservation, Albany, NY. *http://www.dec.ny.gov/animals/29392.html*

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*

FOREST SPECIES OF GREATEST CONSERVATION NEED
SUSQUEHANNA WATERSHED REGION

All species of conservation need in the Susquehanna basin total to 90 and include 39 birds, 21 insects, 17 herpetofauna, 6 fish (freshwater and marine), 4 mammals and 3 mollusks.

Species:	***Habitat:***	***Status:***
Birds:		
Black-throated blue warbler	Deciduous/mixed forest	Stable
Cerulean warbler	Deciduous/mixed forest	Increasing
Kentucky warbler	Deciduous/mixed forest	Unknown
Prothonotary warbler	Deciduous/mixed forest	Unknown
Red-headed woodpecker	Deciduous/mixed forest	Decreasing
Wood thrush	Deciduous/mixed forest	Decreasing
Worm-eating warbler	Deciduous/mixed forest	Unknown
American woodcock	Early successional forest/shrubland	Decreasing
Black-billed cuckoo	Early successional forest/shrubland	Decreasing
Blue-winged warbler	Early successional forest/shrubland	Decreasing
Brown thrasher	Early successional forest/shrubland	Decreasing
Canada warbler	Early successional forest/shrubland	Decreasing
Golden-winged warbler	Early successional forest/shrubland	Decreasing
Prairie warbler	Early successional forest/shrubland	Increasing
Ruffed grouse	Early successional forest/shrubland	Decreasing
Whip-poor-will	Early successional forest/shrubland	Decreasing
Willow flycatcher	Early successional forest/shrubland	Decreasing
Yellow-breasted chat	Early successional forest/shrubland	Stable
Bald eagle	Forest breeding raptors	Increasing
Peregrine falcon	Forest breeding raptors	Stable
Cooper's hawk	Forest breeding raptors	Stable
Golden eagle	Forest breeding raptors	Unknown
Long-eared owl	Forest breeding raptors	Unknown
Northern goshawk	Forest breeding raptors	Increasing
Red-shouldered hawk	Forest breeding raptors	Increasing
Sharp-shinned hawk	Forest breeding raptors	Increasing
Herpetofauna:		
Coal skink	Forested hillsides	Unknown
Longtail salamander	Forested Streams	Decreasing
Northern red salamander	Forested Streams	Unknown
Four-toed salamander	Freshwater wetlands	Unknown
Wood turtle	Lake/river/forest	Unknown
Blue-spotted salamander	Vernal pools	Unknown
Jefferson salamander	Vernal pools	Unknown
Black ratsnake	Woodlands/grasslands	Decreasing
Eastern hognose snake	Woodlands/grasslands	Unknown
Northern black racer	Woodlands/grasslands	Unknown
Short-headed gartersnake	Woodlands/grasslands	Decreasing
Smooth greensnake	Woodlands/grasslands	Unknown
Timber rattlesnake	Woodlands/grasslands	Decreasing

Insects:

Frosted elfin	Open woods/forest edge	Decreasing
Mottled duskywing	Open woods	Decreasing
Ostrich fern borer moth	Floodplain forests	Unknown
Silvery blue	Open woods	Decreasing

Mammals:

River otter	Lake/stream/forest	Stable
Eastern red bat	Tree bats	Unknown
Hoary bat	Tree bats	Unknown
Silver-haired bat	Tree bats	Unknown