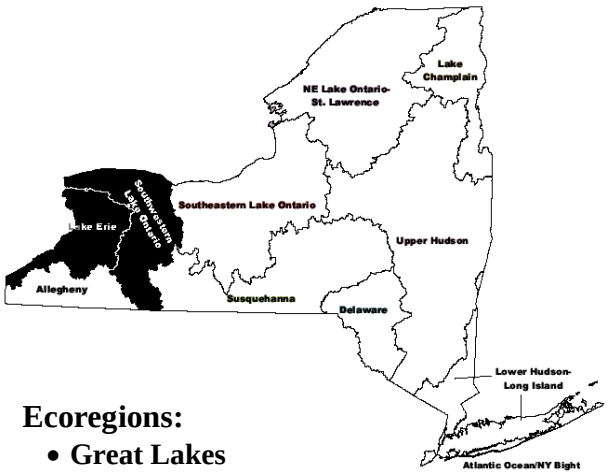
Lake Erie/Southwest Lake Ontario Watershed Regions*

Authors: Gary Goff, Rich Taber, Miranda Reed, Cornell University Cooperative Extension
For copies: 607-254-6556

Cornell University Cooperative Extension

new york state Comprehensive Wildlife Conservation Strategy



Ecoregions:

- **Great Lakes**
- **High Alleghany Plateau**
- **Western Alleghany Plateau**

Watersheds:

- **Southwest Lake Ontario:** 38% forest, 55% agriculture
- **Lake Erie:**
- 42% forest, 46% agriculture

***Counties:** Allegheny, Cattaraugus, Chautauqua, Erie, Genesee, Livingston, Monroe, Niagara, Ontario, Orleans & Wyoming.

Almost half of the Lake Erie/Southwest Lake Ontario watershed regions are covered in forest, most of which 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. The species of greatest conservation need **(SGCN)** in the two watersheds have been identified in the N.Y. Comprehensive Wildlife Conservation Strategy **(CWCS).** 59 of these species inhabit the forested landscapes in these basins.

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. Because most of the critical habitat for these species exists on private lands, 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 to protect water quality Best Management Practices (BMP's). *http://www.dec.ny.gov/lands/5240html)*

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 forest stands, may not be best for all wildlife. There is a suite of species that depends on early successional forest 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 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 and shelterwood harvests. 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 produce forest products for landowners and society, while also regenerating young forest habitat. 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 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 method, (e.g. selection, shelterwood, clear cut), 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 different species that rely on various forested habitats (e.g. 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 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 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, early succession 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 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.

New York's forests are now predominantly even-aged northern hardwoods. Most of the trees were established around the same time, during the period of farmland abandonment. Public reluctance to practice appropriate forestry, coupled with the absence of natural disturbances, may result in a homogenous forested landscape with relatively little structural and vegetative species diversity. It is important that forest owners and managers consider the wildlife benefits that both early and

late-successional (mature forest) forest management and restoration provides. These habitat attributes include the development of coarse woody debris, standing dead wood, structural variability, and multiple successional stages across the forested landscape. Contact a forester to develop a plan that meets your ownership objectives and incorporates habitat for SGCN.

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 wildlife species the habitat can support
- increased urbanization and development

Degraded water quality/pesticide use:

- 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
- 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/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 are poorly planned and executed are unsustainable and 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 are most susceptible)
- 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 flood in this watershed)
- 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 will 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., garlic mustard dominating understory, deer over browse limiting forest regeneration, hay-scented ferns dominating understory)

The amount of land in agriculture in the Southwest Lake Ontario Basin has been reduced from 92% in 1900 to 55% in 2002.

The Southwest Lake Ontario Basin is home to the only oak savannah in New York State; the Rush Oak Opening Unique area. Oak savannahs were common in the pre-settlement Midwest where the prairie met the eastern forests.

Based on original survey records, up to 14 distinct forest community types may have occurred in the Lake Erie basin. Today, remnants of these matrix communities can be found in about 30,000 acres of contiguous forested areas unbounded by roads.

Priority issues in the basin

- Protection and management of large, contiguous forest blocks for SGCN-30% of native species have been extirpated from the Lake Erie basin.
- Addressing poor forestry practices
- Management, restoration, and protection of stream buffers to protect SGCN
- Stream protection including sedimentation and nutrient reduction
- Reduction of point source, non-point source pollution and nutrient overloading
- Decelerating habitat fragmentation and sprawl

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 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 these warblers
- 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

- 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 within wetlands or small ponds benefits forest breeding raptors
- relatively large forest tracts are needed for successful breeding

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

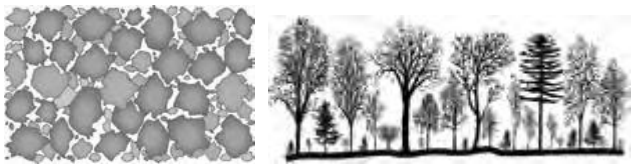
- habitat degradation and fragmentation, and public misconception about rattlesnakes leads to unlawful killing and collecting

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 forests and wetlands, limiting off-road vehicles in surrounding area 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.

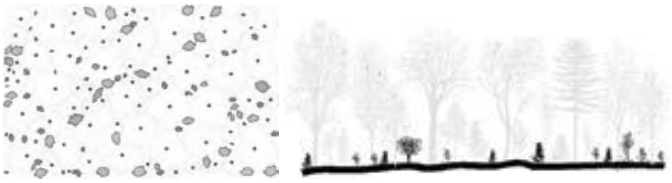
Single tree selection creates small breaks in the forest canopy and favors shade tolerant tree species. Deer browsing prevents the regrowth of more palatable species and leads to long-term losses in plant biodiversity. This system is not a viable option in areas with high deer populations.

Group selection/small patch clear-cutting 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.

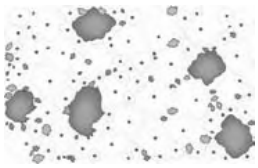
Even-aged Silvicultural Systems
Stands are composed of trees that are generally within 20 years of each other.

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 silvicultural 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 serves as a seed source. This system promotes regeneration of shade intolerant and mid-tolerant tree species. It leads to two-aged stands if seed trees are not harvested for a number of years.




COMMON FOREST COMMUNITIES AND MANAGEMENT STRATEGIES

Northern Hardwoods (beech, birch, maple)

- Clear-cutting creates dense shrub, herbaceous ground cover layers, soft mast, slash and low exposed perches that support more wildlife than untreated timber stands. Leave some wildlife trees (high exposed perches, cavity trees, coniferous overstory inclusion, snag trees).
- A shelterwood system creates a partial overstory and promotes regeneration of an even-aged early successional forest.
- Both clear-cutting and shelterwood techniques lead to an increase in raptor hunting areas.
- Silvicultural selection and thinning techniques have little impact on wildlife if done correctly.
- Profuse root and stump sprouting of beech can impede regeneration of desired species. Treatment of freshly cut stumps with glyphosate is recommended.

Swamp Hardwoods (red and silver maple, elm, ash)

- Home to salamanders, frogs, turtles and snakes.
- Swamp hardwoods are usually of low economic value so wildlife management is often the primary reason for timber harvest.
- Clear-cutting with reserved patches and wildlife, den, nest and cavity trees is the most common and effective silvicultural technique.

- **Allegheny Hardwoods (red and sugar maple, black cherry, white ash)**

- Associated tree species vary by geographic region but often include hemlock, oaks, birch, and hickories. Such diversity contributes to overall wildlife diversity.
- Regeneration can be problematic due to deer browsing and interfering understory plants.
- Appropriate silvicultural techniques for regeneration must take into consideration the shade tolerance of desired tree species.

Eastern Hemlock

- Occurs with a broad array of associated tree species and provides a conifer component.
- Valuable for den and cavity using wildlife.
- Shelterwood method most effective at regeneration.
- Clear-cutting tends to convert the forest type to northern hardwood communities.
-

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.

Oak Openings

Oak openings, or grass-savanna openings within oak-hickory matrix forests were never very common in New York. Far more common in the midwestern United States, this community type has declined dramatically throughout its range due to a combination of fire suppression, land development, and competition by invasive species. Widespread fire suppression has led to the succession of nearly all oak openings to mature forest. Historically, oak openings were created through fire disturbance; as openings succeeded to woody vegetation, fires in the landscape prevented canopy closure and dominance by woody vegetation.

COMMON TREE SPECIES

- **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. The proliferation of the beech scale disease has devastated 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.

- **Birch**

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, 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 is necessary for seedlings to develop into mature trees.

- **Eastern Hemlock**

Eastern hemlock occurs with an array of tree species including 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 slowly. Because it can persist in the understory it provides important understory and

mid-story structure that many wildlife species need, and 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 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 nearby watersheds and poses a serious threat to the existence of hemlock in the watershed. .

- **Eastern White Pine**

Eastern white pine grows on sites ranging from dry ridge tops to swampy valleys. Although 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. 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 old trees s 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; 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 survival and height growth

VERNAL POOLS

Vernal pools are tempory, small, shallow depressions usually located in 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 wet 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.

REFERENCES AND RESOURCES:

DeGraaf, Richard M., Mariko Yamasaki, William B. Leak, and Anna M. Lester. ***Landowner's Guide to Wildlife Habitat: Forest Management for the New England Region*.** Burlington, VT: University of Vermont Press, 2005.

DeGraaf, Richard M., Mariko Yamasaki, William B. Leak, and Anna M. Lester. ***Technical Guide to Forest Wildlife Habitat Management in New England*.** 1st ed. Burlington, VT: University of Vermont Press, 2006.

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.htm*

FOREST SPECIES OF GREATEST CONSERVATION NEED

SOUTHWESTERN LAKE ONTARIO WATERSHED BASIN

Species	***Habitat***	***Status***	***Erie***	***SW Ontario***
Birds				
Barn owl	Grassland/woodland	Unknown		√
Louisiana waterthrush	Deciduous/mixed forest	Unknown	√	√
Red-headed woodpecker	Deciduous/mixed forest	Decreasing	√	√
Scarlet tanager	Deciduous/mixed forest	Unknown	√	
Scarlet tanager	Deciduous/mixed forest	Decreasing		√
Wood thrush	Deciduous/mixed forest	Decreasing	√	√
American woodcock	Early successional forest/shrubland	Decreasing	√	√
Black-billed cuckoo	Early successional forest/shrubland	Decreasing	√	√
Brown thrasher	Early successional forest/shrubland	Decreasing		√
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	Unknown	√	√
Warbler: Black-throated blue	Deciduous/mixed forest	Stable	√	√
Cerulean	Deciduous/mixed forest	Increasing	√	√
Prothonotary, Kentucky, Blue-winged, Canada	Deciduous/mixed forest	Unknown		√
Blue-winged, Canada	Deciduous/mixed forest	Decreasing	√	
Golden-winged	Early successional forest/shrubland	Decreasing	√	√
Prairie	Early successional forest/shrubland	Increasing	√	√
Hawk: Cooper's, Sharp-shinned	Forest	Increasing	√	√
Red-shouldered	Forest	Decreasing	√	√
Golden eagle	Forest	Unknown	√	√
Long-eared owl	Forest	Unknown	√	√
Northern goshawk	Forest	Increasing	√	√
Peregrine falcon	Forest	Stable	√	√
Common loon	Forest/open water	Unknown	√	
Common nighthawk	Early successional forest/shrubland	Decreasing	√	
Osprey	Forest	Unknown	√	
Bald Eagle	Mature/old growth forest/open water	Increasing	√	√
Species	***Habitat***	***Status***	***Erie***	***SW Ont.***
Herpetofauna				
Coal skink	Forest	Unknown		√
Blanding's turtle	Forest/wetlands	Unknown	√	√
Spotted turtle	Forest/wetlands	Unknown		√
Snapping turtle	Forested ponds/lakes/streams	Unknown		√
Eastern massasauga	Freshwater wetland	Decreasing		√
Eastern ribbonsnake	Lake/river/forest	Unknown	√	√
Spiny softshell	Lake/river/forest	Decreasing		√

Species	***Habitat***	***Status***		
Wood turtle	Lake/river/forest	Unknown	√	√
Smooth greensnake	Woodland/grassland	Unknown	√	√
Timber rattlesnake	Woodland/grassland	Decreasing		√
Black ratsnake	Woodland/grassland	Decreasing	√	
Salamander: Blue-spotted, Jefferson	Vernal pool	Unknown		√
Four-toed	Freshwater wetland	Unknown	√	√
Fowler's toad	Freshwater wetland	Unknown	√	
Insects				
American rubyspot	Forested rivers/streams	Unknown		√
Arrow clubtail	Forested rivers/streams	Unknown		√
Blue-tipped dancer	Forested rivers/streams	Unknown		√
Midland clubtail	Forested rivers/streams	Unknown		√
Arrowhead spiketail	Forested seeps/rivulets	Unknown		√
Gray petaltail	Forested seeps/rivulets	Unknown		√
Mottled duskywing	Open woodland	Decreasing	√	√
Persius duskywing	Open woodland	Unknown		√
Fawn Brown Dart moth	Open woodland	Decreasing		√
Cobblestone tiger beetle	Riparian forest	Unknown	√	
Mammals				
River otter	Riparian forest	Unknown	√	√
Bat: Eastern red, Hoary,	Forest	Unknown	√	√
Silver-haired	Forest	Unknown		√