

Wildlife and Fisheries

The Schoharie watershed is literally crawling with life. An amazing variety of habitats, people, plants, and animals are all interconnected in a fragile web of life, often called biodiversity. Every member is essential to keeping this web in balance. For example, the list of species required for the life cycle of a single tree may be in the hundreds or thousands. Moreover, the list of animals that will utilize a single fallen tree is



A very young fawn crosses the Schoharie Creek, summer 2006.

in the thousands, but a few of the more well known creatures include squirrels, woodpeckers, grouse, bears, foxes, skunks, beavers, otters, mice, and shrews as well as worms, salamanders, beetles, ants, centipedes, sowbugs, and other insect larvae. There are twice as many species of beetles that live on dead and dying wood as there are species of mammals, birds, reptiles, and amphibians in the entire world (Kyker-Snowman, 2003). The fallen tree also provides critical habitat, steady moisture, and food for a multitude of mosses, fungi, trees, and vascular plants. If our fallen tree had been removed either during land use changes or during “clean up” efforts after falling, the ramifications would reverberate throughout the web. Certainly, this doesn’t preclude us from taking a few trees for firewood, but if enough fallen trees are removed, the structure of the overall community would likely change.

The fallen tree example was meant to demonstrate the complexity of the web of life, and how eliminating one organism or habitat will ultimately affect many. It is very difficult to predict the consequences of removing individual strands from the web of life. Therefore, as an integral piece of the web, humans should work toward protection and preservation of the functions necessary for our survival. There are many ecosystem functions we receive from nature including cleaner air through vegetation respiration, cleaner water through soil and wetland filtration, soil formation from forests, pollination of food crops from our native insects, natural flood water retention/groundwater recharge, and pest control from our native bats, birds, and insects (e.g. dragonflies/damselflies). For example, bees pollinate about a

trillion apple blossoms each year in New York State, micro-organisms biodegrade much of our garbage as well as fallen leaves, sticks and other dead animal and plant matter, soil bacteria turn nitrogen into nitrate fertilizer and plants use up carbon dioxide and produce oxygen, thereby slowing global climate change. One example that affects us locally is the maintenance of healthy biodiversity and community structure, which if done properly can reduce the incidence of Lyme disease (LoGiudice et al., 2003); and forest fragmentation which can increase white-footed mouse populations, that in turn increases the human risk of exposure to Lyme disease (Allan et al. 2003). Therefore, the benefits of a healthy and diverse ecosystem extend far beyond clean air and water and into the fabric of human health and quality of life.

In the United States the economic services provided by a vibrant/healthy biological web of life (biodiversity) contribute an estimated \$319 billion per year, or 5% of the gross domestic product (Pimentel et al., 1997). The worldwide benefits are estimated to be \$2,928 billion per year, or approximately 11% of the world economy (Pimentel et al., 1997). Closer to home, the economic impact of the Schoharie hasn't been calculated, but anecdotally considering it's uses for recreation, water supply and aesthetics the economic value is most likely high. Clearly, our economic vitality depends on maintaining healthy biodiversity, which in turn indicates clean water and a good quality of life.

The plants and animals that inhabit the Schoharie watershed are suited to the habitats provided by our temperate climate. The other major factor is human alteration of the landscape. Pre-European colonization the watershed was predominantly forested with some small areas cleared by Native Americans for hunting. Early European settlers attempted to farm the land, but abandoned it soon after due to a short growing season, steep slopes and rocky and shallow soils. Between 1800 and the early 1900s gristmills, woolen mills, sawmills, the tanning industry, quarrying for bluestone, logging, furniture making, railroads and resorts cleared the Catskills of its forest cover. Since the early 1900s these industries have declined and areas that were previously cleared have grown back into forest, with approximately 85% of the Schoharie-basin's land cover being classified as forest in a 2001 NYCDEP analysis. The reaction of wildlife has varied to the changing land uses. A few, such as the timber wolf, eastern cougar, New England cottontail and passenger pigeon have been extirpated from the region (passenger pigeon is extinct worldwide); and some such as



Small wood turtle (Clemmys insculpta) spotted along the Schoharie Creek, summer 2006. The wood turtle is a species of special concern in New York State

tiger beetle and timber rattlesnake are disappearing from the Catskills. Beaver, pileated woodpeckers, and bald eagles were once gone from this region due to over hunting, habitat loss, and pesticide poisoning respectively, but have since returned with reduced hunting pressure, an increase in second-growth forests, and a ban on DDT. Some species, such as the bobcat,

black bear, river otter and osprey are less common than they were prior to European colonization. However, other common species, such as the white tailed deer,

raccoon, skunk, red fox, robin, and painted turtle have thrived.

We often focus on human-induced land use changes as the dominant factor in habitat and natural landscape changes. However, many wildlife and plant species also influence the landscape. Heavy deer browsing of seeds, seedlings, and saplings can dramatically alter the composition of a forest to encourage the growth of species that deer find less palatable (Curtis, 2004). Species imported from other areas that thrive in our region, often called invasive species, can also have dramatic effects on the landscape. For example, Japanese knotweed (*Polygonum cuspidatum*) is native to Asia, but has run rampant in the Schoharie basin choking out native species, diminishing recreation opportunities and possibly making soil more susceptible to erosion (more info in section 2.6). The wooly adelgid (*Adelges tsugae*), a small aphid-like insect pest native to China and Japan, is threatening to decimate our eastern hemlock (*Tsuga canadensis*)

populations. Once infested, hemlock mortality rates range between 50%-99% (Orwig, 2002).

The plant species most likely to replace hemlocks are hardwood tree species and possibly other invasive species. Ultimately, this will have a dramatic effect on the structure of these communities. For example, the distribution and abundance of brook trout and diversity of aquatic insects will likely decline



Tent caterpillars along the Schoharie Creek, summer 2006.

with the hemlock forests (Evans, 2002). Hemlock forests maintain stable, lower water temperatures and more stable hydrologic regimes (i.e. they don't dry up as much) than the hardwood forests that will likely replace them (Snyder et al., 2002). These are just a few examples of how, in a global society, careless actions that import and release invasive species can cause drastic changes in our ecological communities.

Native pests often have native predators that control their populations. For example, the forest tent caterpillar (*Malacosoma disstria*) can cause a large amount of damage to Catskill forests. However, their population tends to be controlled by a natural predator fly

(*Sarcophaga aldrichi*) whose population explodes following the explosion of the caterpillar's population and help bring the caterpillar populations back under control. A bacterial disease, known as "wilt" and cold, wet, weather conditions in early spring also help to control the caterpillar population. This demonstrates the checks-and-balances of native versus non-native pests. Native pests often have a naturally-evolved control measure that eventually bring the populations under control, but non-native species do not.

The upper Schoharie, and many of its tributaries, are primarily cold water streams, meaning they provide suitable water temperatures for organisms, such as brook trout and sculpins, which require cold water (less than 72° F (22°C)). The Schoharie main stem is stocked annually with 19,250 brown trout from the Prattsville fish barrier dam to the mouth of the Roaring Kill. Below the Prattsville fish barrier the primary sport fish species are smallmouth bass (*Micropterus dolomieu*) and walleye (*Stizostedion vitreum*). The fish barrier dam was constructed in 1939 to restrict the movement of bass upstream, and seemed to have some effect, but in the 1960s smallmouth bass were still the most abundant sport fish downstream of the Schoharie/East Kill confluence (Keller and Fieldhouse, 1993). Smallmouth bass in the Schoharie tended to grow very slow and were much smaller than



Tent caterpillar damage within the Schoharie Watershed, summer, 2006. Favorable climatic conditions were good, so many of these trees probably grew a second growth of leaves after the caterpillar population dwindled in late June.

other streams in the region (Keller and Fieldhouse, 1993). Trout were the most abundant species above the East Kill/Schoharie Creek confluence. Gooseberry Creek, a Schoharie tributary near Tannersville, was stocked exclusively with brook trout and may provide sanctuary for these native trout. The upgrading of sewer treatment plants in the Schoharie basin, including the Tannersville STP on the Gooseberry Creek, should improve the fishery. Species collected since 1954 during NYSDEC fishery surveys upstream of the Prattsville fish barrier are available in Table 2.9.1. Interestingly, researchers found that over a relatively short period of time (3 years), modified-natural channel design restorations that incorporated fish habitats increased fish biomass, including trout biomass and numbers (Baldigo et al., 2006).

Table 2.9.1. Fish species collected since 1954 during NYSDEC fishery surveys upstream of the Prattsville fish barrier.

Common Name	Scientific Name
Creek chub	<i>Semotilus atromaculatus</i>
Common shiner	<i>Luxilus cornutus</i>
Pumpkinseed	<i>Lepomis gibbosus</i>
Golden shiner	<i>Notemigonus crysoleucas</i>
White sucker	<i>Catostomus commersoni</i>
Stone roller	<i>Campostoma anomalum</i>
Cutlips minnow	<i>Exoglossum maxillingua</i>
Marginated madtom	<i>Noturus insignis</i>
Brown trout	<i>Salmo trutta</i>
Brook trout	<i>Salvelinus fontinalis</i>
Rainbow trout	<i>Oncorhynchus mykiss</i>
Blacknose dace	<i>Rhinichthys atratulus</i>
Longnose dace	<i>Rhinichthys cataractae</i>
Tesselated darter	<i>Etheostoma olmstedii</i>
Largemouth bass	<i>Micropterus salmoides</i>
Slimy sculpin	<i>Cottus cognatus</i>
Stone cat	<i>Noturus flavus</i>
Bluntnose minnow	<i>Pimephales notatus</i>
Fallfish	<i>Semotilus corporalis</i>
Northern hog sucker	<i>Hypentelium nigricans</i>
Brown bullhead	<i>Ameirus nebulosus</i>
Banded killifish	<i>Fundulus diaphanous</i>
Smallmouth bass	<i>Micropterus dolomieu</i>
Yellow perch	<i>Perca flavescens</i>

It should be noted that a high-predatory warm-water species was sited often during the 2006 assessment in areas that would typically support a cold water fishery. These largemouth bass were stocked or escaped into the stream from adjacent ponds and could compete with trout for resources. However, they may also migrate to more suitable habitat conditions and/or suffer high mortality rates during the cold winter months.



Largemouth bass in the East Kill, summer 2006.

Wildlife of Stream Corridors and Conservation Recommendations for the Upper Schoharie Watershed, Greene County, March, 2007

The Upper Schoharie Watershed contains a high degree of biological diversity with a species assemblage that is unusual within the Hudson River Valley. Forests with features such as talus slopes, cliffs, and mature stands are habitat for plants and animals adapted to these conditions. The large, unfragmented nature of the forests creates favorable habitat for wide-ranging animals (such as black bear and bobcat) and wildlife that prefer forest interiors (such as black-throated blue warbler). It is likely that forests of the Upper Schoharie watershed are important breeding areas for raptors such as broad-winged hawk, Northern goshawk, and sharp-shinned hawk.

Forests that occur adjacent to the stream create habitat for a wide range of small mammals, including rarely seen moles, voles, and shrews, and fox, weasel, mink, beaver, and muskrat. The change in elevation from stream valley floor to Catskill peaks, and the presence of both evergreen and deciduous forests contribute to the watershed's biodiversity. High-altitude coniferous forests are habitat for the rare Bicknell's thrush and blackpoll warbler.

In the Upper Schoharie watershed, abundant streams with cobble beds, undercut banks, and streamside wetlands and forests are habitat for damselflies, dragonflies, stream salamanders, turtles, and frogs. The wood turtle lives almost exclusively in and near streams, while spotted turtles might be found in streamside wetlands. Riparian forests are particularly important breeding habitat for birds such as the Louisiana waterthrush and yellow-throated

vireo. Stream corridors are the preferred foraging habitat for the many bat species that are likely to occur in the watershed.

Grassy fields, open woods, and shrubby patches make important contributions to biodiversity of the watershed. These open and scrubby areas can provide nesting habitat for the wood turtle and shrubland bird species that are declining in New York State as old farms revert to forests. Young forests are habitat for Canada warbler, American woodcock, and ruffed grouse, while open shrublands and dense thickets are preferred by brown thrasher.

Many species, like American woodcock and wood turtle, require a complex of different habitats to complete breeding, foraging, overwintering, and migration portions of their life cycles. As a result, maintaining connectivity between the stream and the adjacent uplands is very important for biodiversity conservation. NYSDEC Species of Greatest Conservation Need (SGCN), included in the State Wildlife Plan, and Hudson Valley regionally rare species that may use the Schoharie basin are listed in Table 2.9.2. A complete list of potential species and an occurrence map is provided in Appendix C, and a map of rare species and significant ecosystems is provided in Figure 2.9.1.

Management Recommendations

Stream managers should consider the following general recommendations to maintain and protect important stream corridor habitats:

- Limit disturbance and protect both small and large stream corridor wetlands that provide significant habitat for amphibians, reptiles, and breeding birds in the watershed;
- Most shrubland breeding birds are relatively tolerant of human development if appropriate habitats exist, and unlike some grassland birds, do not require large habitat patches for breeding. While open lands should not be created at the expense of mature, unfragmented forests, agricultural and suburban landowners who maintain shrubby thickets in the uplands adjacent to stream corridors can support shrubland birds;
- Where possible, plant native species appropriate to the pre-existing or predicted ecological community for a site;

- Stream managers are encouraged to learn to recognize the Appalachian tiger beetle and other declining and threatened species and report observations to the NY Natural Heritage Program.

Riparian buffer widths can be established to conserve habitat function, in addition to water quality, hydrologic, and geomorphic functions. It is particularly important to maintain habitat connectivity needed by wildlife to complete their life cycles. To evaluate connectivity, consider the needs of indicator species, or species of conservation concern in the watershed.

- The forest area within 300 ft of the forest edge is considered “edge” habitat. Edge habitats support increased densities of deer and invasive plants, and are avenues for nest predators to enter forests. A minimum 300 ft forested stream buffer will protect forest health and provide better breeding habitat for forest wildlife;
- Riparian forests at least 50 acres in size with an average total width of at least 300 ft can provide forest interior habitat and should be highly valued. Breeding bird diversity increases substantially between 300 and 1,500 ft from the stream’s edge;
- Most of the amphibian and reptile observations in this watershed are within or near stream corridors. Seek to create a minimum 500 ft forested buffer around stream corridor wetlands to provide terrestrial habitat required by stream- and vernal pool-breeding amphibians to complete their life cycles, and to protect wetlands from adjacent land uses;
- Stream buffers up to 1,000 ft will encompass most wood turtle nesting sites and summer habitats (wood turtles are on land during the spring and summer and over-winter in rivers). These buffers should be maintained along one or more miles of stream length to accommodate the yearly movements of wood turtles up and down the stream channel;
- Buffer widths of 30-100 ft should be maintained for riparian forest canopies to provide enough shading and cooling of streams to maintain trout populations. These buffers need to be nearly continuous. Some studies suggest 80% of banks

along a stream supporting trout populations must have forests at least 30 ft wide to provide sufficient shade for trout;

- Minimum buffers of 50-100 ft are often recommended to protect aquatic communities. Large woody debris deposited into streams provides important shelter for fish, and in particular for trout. At a minimum, a 50 ft buffer appears necessary to maintain sufficient woody debris inputs to streams. Riparian vegetation provides leaves and other forms of litter that feed macroinvertebrates. In turn, aquatic macroinvertebrates are the major food source for most freshwater fish. A minimum 100 ft buffer is recommended to protect aquatic macroinvertebrate and fish abundance.

Typically, the locations of wood turtle nesting sites are not known. However, stream managers can use the following information to identify possible nesting areas near the stream and maintain adequate buffer widths to protect nesting wood turtles:

- Wood turtles typically nest in sandy, bare areas well exposed to sunlight and close to water, but elevated. Usually, nesting areas are within 200 ft of the stream channel, but wood turtles will travel up to 2,000 ft from the stream to reach suitable nesting areas. Nesting sites are often exposed stream banks, but can include cultural features such as nearby railroad tracks, abandoned sand and gravel mines, utility right-of-ways, and meadows/fields with gravelly soils. Wood turtles will nest in corn fields and other recently disturbed areas. If possible, identify potential wood turtle nesting sites near streams and protect them. Buffers between the stream and suitable nesting areas should be used lightly or not at all, particularly during nesting season (May to July, peak in June);
- Where the wood turtle is likely to occur, maintain stream geomorphology with naturally elevated banks and gravel deposits (used for winter hibernation, basking, and nesting).

A number of stream corridor species depend on natural channel processes to provide habitat during parts of their life cycles:

- Stream salamanders are generally sensitive to siltation, scouring, nutrient enrichment, channelization, and diversion of water. Maintain natural stream processes and riparian buffers to protect salamander habitats. Spring salamander is probably the most sensitive species and is found in relatively unpolluted headwater streams of the Catskills;

- There is one known remaining occurrence of Appalachian tiger beetle in this watershed. There are only 10 rivers in NYS with populations of this species. The Appalachian tiger beetle (right) is



typically found on riverside sand and cobble bars at the edges of forested streams. Stream management practices should maintain natural stream processes, including natural flooding regimes that prevent dense plant growth on cobble bars. Gravel mining and off-road vehicle use of sand and gravel bars can destroy beetle larvae.

Table 2.9.2. NYSDEC Species of Greatest Conservation Need and other species of conservation concern that may occur in the Upper Schoharie watershed (a complete list of species and NYNHP classification descriptions are available in appendix C, below) (Prepared by the NYSDEC Hudson River Estuary Program, Feb. 2007).

Predicted Terrestrial Vertebrate Species (source: Hudson River Valley GAP)

Terrestrial, vertebrate species that are predicted to occur within the watershed based upon presumed associations of species with habitats. See the HRV-Gap Analysis Project report to view predicted species distribution maps.

Mammals		TNC Status	Legal Status	NYNHP Species	NYSDEC SGCN	Regional
Eastern Pipistrelle	Pipistrellus subflavus	G5, S3				R
Eastern Red Bat	Lasiurus borealis	G5, S5B, SZN			X	R
Hoary Bat	Lasiurus cinereus	G5, S4B, SZN			X	R
Indiana Myotis	Myotis sodalis	G2, S1	FE, SE	X	X	
Silver-haired Bat	Lasionycteris noctivagans	G5, S4B, SZN	SC		X	Rm
Woodland Jumping Mouse	Napaeozapus insignis	G5, S5				R
Long-tailed Shrew	Sorex dispar	G4, S4				R
Southern Bog Lemming	Synaptomys cooperi	G5, S4				R
Porcupine	Erethizon dorsatum	G5, S5				R
Black Bear	Ursus americanus	G5, S5	G			S

Fisher	<i>Martes pennanti</i>	G4G5, S4	G			S
Bobcat	<i>Lynx rufus</i>	G5, S4	G			V
Eastern Cougar	<i>Felis concolor cougar</i>	G5TH, SX	FE, SE		X	
River Otter	<i>Lutra canadensis</i>	G5, S5	G		X	S
Amphibians		TNC Status	Legal Status	NYNHP Species	NYSDEC SGCN	Regional
Jefferson Salamander	<i>Ambystoma jeffersonianum</i>	G5, S4	SC		X	
Jefferson Salamander Complex	<i>Ambystoma jeffersonianum x laterale</i>	G4, S3	SC		X	
Spotted Salamander	<i>Ambystoma maculatum</i>	G5, S5				V
Northern Dusky Salamander	<i>Desmognathus fuscus</i>	G5, S5				D, V
Longtail Salamander	<i>Eurycea longicauda longicauda</i>	G5, S2S3	SC	X	X	
Four-toed Salamander	<i>Hemidactylium scutatum</i>	G5			X	
Common Mudpuppy	<i>Necturus maculosus</i>	G5, S4			X	
Northern Red Salamander	<i>Pseudotriton ruber ruber</i>	G5, S3S4			X	
Northern Leopard Frog	<i>Rana pipiens</i>	G5, S5	G			R
Wood Frog	<i>Rana sylvatica</i>	G5, S5	G			V
Reptiles		TNC Status	Legal Status	NYNHP Species	NYSDEC SGCN	Regional
Wood Turtle	<i>Clemmys insculpta</i>	G4, S3	SC, G		X	
Timber Rattlesnake	<i>Crotalus horridus</i>	G5, S3	ST		X	
Smooth Greensnake	<i>Opheodrys vernalis</i>	G5, S4			X	D
Eastern Box Turtle	<i>Terrapene c. carolina</i>	G5, S3	SC		X	

Observed Breeding Birds (source: 1980-1985 Breeding Bird Atlas)

Breeding bird species known or suspected to be breeding within the watershed. The species list is derived from reports of observed breeding bird activity within Breeding Bird Atlas Blocks that overlap the watershed. Parties using these data for environmental review purposes do so at their own risk.

Key: TNC Status: For State and Global Rank explanations see www.natureserve.com; Legal Status: FE = Federal Endangered; FT = Federal Threatened; SE = State Endangered; ST = State Threatened; G = Game species; SC = State Special Concern; NYNHP Species: Rare species tracked by the NY Natural Heritage Program; NYSDEC SGCN: Species of Greatest Conservation Need included in State Wildlife Plan; Other Ranking: Listed Partners in Flight WatchList

Birds		TNC Status	Legal Status	NYNHP Species	NYSDEC SGCN	Other Ranking	# Blocks (35 total)
American Black Duck	<i>Anas rubripes</i>	S4, G4	G		X	WL, PIF	3
American Woodcock	<i>Scolopax minor</i>	S5, G5	G		X	WL, PIF	9
Bicknell's Thrush	<i>Catharus bicknelli</i>	S2S3B, G4	SC	X	X	WL, PIF	5
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	S5, G5			X		2
Black-throated Blue Warbler	<i>Dendroica caerulescens</i>	NR, G5			X		23
Blue-winged Warbler	<i>Vermivora pinus</i>	S5, G5			X	WL, PIF	3
Bobolink	<i>Dolichonyx oryzivorus</i>	S5, G5			X	PIF	15
Brown Thrasher	<i>Toxostoma rufum</i>	S5, G5			X		21
Canada Warbler	<i>Wilsonia Canadensis</i>	S5, G5			X		13
Cooper's Hawk	<i>Accipiter cooperii</i>	S4, G5	SC		X		5
Eastern Meadowlark	<i>Sturnella magna</i>	S5, G5			X		14
Golden-winged Warbler	<i>Vermivora chrysoptera</i>	S4, G4	SC		X	WL, PIF	1
Louisiana Waterthrush	<i>Seiurus motacilla</i>	NR, G5			X		18
Northern Bobwhite	<i>Colinus virginianus</i>	S4, G5	G		X		1
Northern Goshawk	<i>Accipiter gentiles</i>	S4B, S3N, G4	SC		X		7
Olive-sided Flycatcher	<i>Contopus cooperi</i>	S5, G5			X	WL, PIF	3

Prairie Warbler	Dendroica discolor	S5, G5			X		12
Red-headed Woodpecker	Melanerpes erythrocephalus	S4, G5	SC		X	WL, PIF	1
Ruffed Grouse	Bonasa umbellus	NR, G5	G		X		20
Scarlet Tanager	Piranga olivacea	NR, G5			X		34
Sharp-shinned Hawk	Accipiter striatus	S4, G5	SC		X		9
Vesper Sparrow	Poocetes gramineus	S5, G5	SC		X		3
Whip-poor-will	Caprimulgus vociferous	S4, G5	SC		X	PIF	2
Willow Flycatcher	Empidonax traillii	S5, G5			X	WL, PIF	5
Wood Thrush	Hylocichla mustelina	S5, G5			X	WL, PIF	30
Worm-eating Warbler	Helmitheros vermivorus	S4, G5			X		1

Observed Rare Species and Significant Ecological Communities (source: NY Natural Heritage Program)

Rare plant and animals species with known populations within the watershed and documented examples of rare and high quality ecosystems within the watershed. Information regarding the locations of rare species is considered sensitive. The distribution of information which identifies the locations of rare species or their habitats may lead to the collection or disturbance of the animals and plants at those locations.

Key: TNC Status: For State and Global Rank explanations see www.natureserve.com ; Legal Status: FE = Federal Endangered; FT = Federal Threatened; SE = State Endangered; ST = State Threatened; G = Game species; SC = State Special Concern; NYNHP Species: Rare species tracked by the NY Natural Heritage Program; NYSDEC SGCN: Species of Greatest Conservation Need included in State Wildlife Plan; Other Ranking: Listed Partners in Flight WatchList					
Rare Birds		TNC Status	Legal Status	NYNHP Species	NYSDEC SGCN
Bald eagle	Haliaeetus leucocephalus	S2S3B, S2N, G5	ST, FT	X	X
Bicknell's Thrush	Catharus bicknelli	S2S3B, G4	SC	X	X
Rare Plants		TNC Status	Legal Status	NYNHP Species	NYSDEC SGCN
Blunt-lobe Grape Fern	Botrychium oneidense	S2S3, G4Q	SE	X	
Climbing Fern	Lygodium palmatum	S1, G4	SE	X	
Musk Root	Adoxa moschatellina	S1, G5	SE	X	
Rough Avens	Geum virginianum	S2, G5	SE	X	
Whorled Mountain-mint	Pycnanthemum verticillatum var. verticillatum	S1S2, G5T5	ST	X	
Rare Invertebrates		TNC Status	Legal Status	NYNHP Species	NYSDEC SGCN
Appalachian Tiger Beetle	Cicindela ancocisconensis	S1, G3	U	X	X
Natural Communities		TNC Status	Legal Status	NYNHP	NYSDEC SGCN
Hemlock-northern hardwood forest		S4, G4G5		X	
Beech-Maple Mesic Forest		S4, G4		X	
Spruce-Northern Hardwood Forest		S3S4, G3G4		X	
Mountain fir forest		S2, G3		X	
Mountain Spruce-Fir Forest		S2S3, G3		X	

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 Online at: <http://www.dec.state.ny.us/website/dfwmr/wildlife/bba/index.html>
- NYS Comprehensive Wildlife Conservation Strategy
 Online at: <http://www.dec.state.ny.us/website/dfwmr/swg/cwcsmainpg.html>
- NYS Threatened, Endangered & Special Concern Species List
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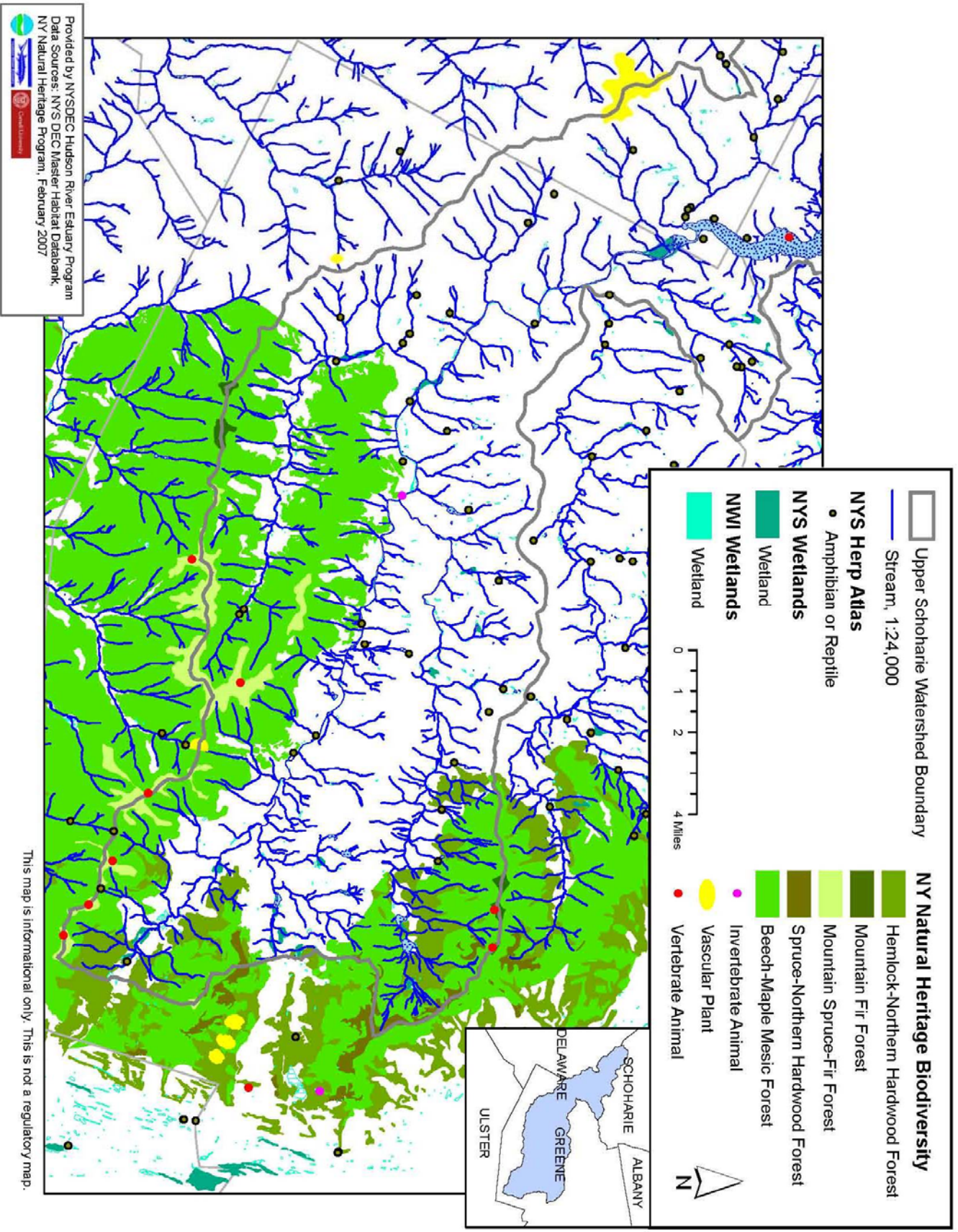


Figure 2.9.1. Known examples of plants, animals, and significant ecosystems in the Schoharie Basin. Other significant wildlife habitats exist, but have not been mapped.

Appendix C: Biodiversity of the Upper Schoharie Creek

Prepared by the NYSDEC Hudson River Estuary Program, February 2007

Predicted Terrestrial Vertebrate Species (source: Hudson River Valley GAP)

Terrestrial, vertebrate species that are predicted to occur within the watershed based upon presumed associations of species with habitats. See the HRV-Gap Analysis Project report to view predicted species distribution maps. *New York Natural Heritage Program Rarity Rank Definitions provided at the end of this document.*

Key: TNC Status: For State and Global Rank explanations see www.nynhp.org; Legal Status: FE = Federal Endangered, FT = Federal Threatened, SE = State Endangered, ST = State Threatened, G = Game species, SC = State Special Concern; NYNHP Species: Rare species tracked by the NY Natural Heritage Program; NYSDEC SGCN: Species of Greatest Conservation Need included in State Wildlife Plan; Hudsonia Regional: Hudson Valley regional status: R = regionally rare, Rm = regionally rare migrant, S = regionally scarce, D = declining, V = vulnerable

Mammals		TNC Status	Legal Status	NYNHP Species	NYSDEC SGCN	Regional	Notes: (This section lists mapping criteria for elevation and nearness to water identified in the HRV-GAP. For more information on habitat associations, see the HRV-GAP report and references below.)
Big Brown Bat	<i>Eptesicus fuscus</i>	G5					
Eastern Pipistrelle	<i>Pipistrellus subflavus</i>	G5, S3				R	
Eastern Red Bat	<i>Lasiurus borealis</i>	G5, S5B, SZN			X	R	
Eastern Small-Footed Myotis	<i>Myotis leibii</i>	G3, S2	SC	X	X		
Hoary Bat	<i>Lasiurus cinereus</i>	G5, S4B, SZN			X	R	
Indiana Myotis	<i>Myotis sodalis</i>	G2, S1	FE, SE	X	X		
Little Brown Myotis	<i>Myotis lucifugus</i>	G5					
Northern Long-eared Myotis	<i>Myotis septentrionalis</i>	G2G3					
Silver-haired Bat	<i>Lasionycteris noctivagans</i>	G5, S4B, SZN	SC		X	Rm	
Eastern Cottontail	<i>Sylvilagus floridanus</i>	G5					
Snowshoe Hare	<i>Lepus americanus</i>	G5					
Eastern Chipmunk	<i>Tamias striatus</i>	G5					
Woodchuck	<i>Marmota monax</i>	G5					
Eastern Gray Squirrel	<i>Sciurus carolinensis</i>	G5					Found in suitable habitats at elevations below 910 m (3000 ft)
Northern Flying Squirrel	<i>Glaucomys sabrinus</i>	G5					Found in suitable habitats at elevations above 180 m (600 ft)
Red Squirrel	<i>Tamiasciurus hudsonicus</i>	G5					
Southern Flying Squirrel	<i>Glaucomys volans</i>	G5					
Deer Mouse	<i>Peromyscus maniculatus gracilis</i>	G5					
Meadow Jumping Mouse	<i>Zapus hudsonius</i>	G5					
Woodland Jumping Mouse	<i>Napaeozapus insignis</i>	G5, S5				R	
White-footed Mouse	<i>Peromyscus leucopus</i>	G5					
Meadow Vole	<i>Microtus pennsylvanicus</i>	G5					

Rock Vole	<i>Microtus chrotorrhinus</i>	G5					Found in suitable habitats at elevations above 760 m (2500 ft)
Southern Red-backed Vole	<i>Clethrionomys gapperi</i>	G5					
Woodland Vole	<i>Microtus pinetorum</i>	G5					Found in suitable habitats at elevations below 610 m (2000 ft)
Long-tailed Shrew	<i>Sorex dispar</i>	G4, S4				R	Found in suitable habitats at elevations above 180 m (600 ft)
Masked Shrew	<i>Sorex cinereus</i>	G5					
Northern Short-tailed Shrew	<i>Larina brevicauda</i>	G5					
Pygmy Shrew	<i>Sorex hoyi</i>	G5					
Smoky Shrew	<i>Sorex fumeus</i>	G5					
Water shrew	<i>Sorex palustris</i>	G5					Found in suitable habitats within 90 m (300 ft) of streams or lakes at elevations between 180 m (600 ft) and 1320 m (4350 ft)
Hairy-tailed Mole	<i>Parascalops breweri</i>	G5					Found in suitable habitats at elevations below 910 m (3000 ft)
Eastern Mole	<i>Scalopus aquaticus</i>	G5					
Star-nosed Mole	<i>Condylura cristata</i>	G5					
American Beaver	<i>Castor canadensis</i>	G5					Found in suitable habitats within 90 m (300 ft) of streams and lakes
Common Muskrat	<i>Ondatra zibethicus</i>	G5					Found in suitable habitats within 90 m (300 ft) of streams and lakes and in all occurrences of Shrub Swamp, Salt Shrub, Emergent Marsh/Open Fen/Wet Meadow, Salt Marsh, and Fresh Water land cover types
Southern Bog Lemming	<i>Synaptomys cooperi</i>	G5, S4				R	Found in suitable habitats at elevations below 1320 m (4350 ft)
Porcupine	<i>Erethizon dorsatum</i>	G5, S5				R	
Coyote	<i>Canis latrans</i>	G5					
Red Fox	<i>Vulpes vulpes</i>	G5					Found in suitable habitats at elevations below 610 m (2000 ft)
Gray Fox	<i>Urocyon cinereoargenteus</i>	G5					Found in suitable habitats at elevations below 610 m (2000 ft)
Black Bear	<i>Ursus americanus</i>	G5, S5	G			S	
Common Raccoon	<i>Procyon lotor</i>	G5					
Fisher	<i>Martes pennanti</i>	G4G5, S4	G			S	
Short-tailed Weasel	<i>Mustela erminea</i>	G5					
Long-tailed Weasel	<i>Mustela frenata</i>	G5					Found in suitable habitats at elevations below 610 m (2000 ft)
Mink	<i>Mustela vison</i>	G5					Found in suitable habitats within 90 m (300 ft) of streams and lakes and in all occurrences of Shrub Swamp, Salt Shrub, Emergent Marsh/Open Fen/Wet Meadow, Salt Marsh, and Fresh Water land cover types
Striped Skunk	<i>Mephitis mephitis</i>	G5					Found in suitable habitats at elevations below 760 m (2500 ft)
Bobcat	<i>Lynx rufus</i>	G5, S4	G			V	
Eastern Cougar	<i>Felis concolor cougar</i>	G5TH, SX	FE, SE		X		Extirpated
White-tailed Deer	<i>Odocoileus virginianus</i>	G5					
Virginia Opossum	<i>Didelphis virginiana</i>	G5					Found in suitable habitats at elevations below 460 m (1500 ft)
River Otter	<i>Lutra canadensis</i>	G5, S5	G		X	S	Found in all land cover types within 90 m (300 ft) of water
Amphibians		TNC Status	Legal Status	NYNHP Species	NYSDEC SGCN	Regional	Notes: (This section lists mapping criteria for elevation and nearness to water identified in the HRV-GAP. For more information on habitat associations, see the HRV-GAP report and references below.)
Jefferson Salamander	<i>Ambystoma jeffersonianum</i>	G5, S4	SC		X		Found in suitable habitats at elevations below 760 m (2500 ft)

Jefferson Salamander Complex	Ambystoma jeffersonianum x laterale	G4, S3	SC		X		Found in suitable habitats at elevations below 760 m (2500 ft)
Spotted Salamander	Ambystoma maculatum	G5, S5				V	Found in suitable habitats at elevations below 610 m (2000 ft)
Eastern American Toad	Bufo americanus americanus	G5					Found in suitable habitats at elevations below 1400 m (4600 ft)
Northern Dusky Salamander	Desmognathus fuscus	G5, S5				D, V	Found in suitable habitats at elevations below 1400 m (4600 ft)
Allegheny Dusky Salamander	Desmognathus ochrophaeus	G5					
Northern Two-lined Salamander	Eurycea bislineata	G5					
Longtail Salamander	Eurycea longicauda longicauda	G5, S2S3	SC	X	X		Found in suitable habitats within 90 m (300 ft) of water
Northern Spring Salamander	Gyrinophilus porphyriticus porphyriticus	G5					Found in suitable habitats at elevations below 910 m (3000 ft)
Four-toed Salamander	Hemidactylium scutatum	G5			X		
Gray Treefrog	Hyla versicolor	G5					
Common Mudpuppy	Necturus maculosus	G5, S4			X		Found in suitable habitats at elevations below 1060 m (3500 ft); Lakes, rivers, and streams
Red-spotted Newt	Notophthalmus viridescens viridescens	G5					
Northern Redback Salamander	Plethodon cinereus cinereus	G5					
Northern Slimy Salamander	Plethodon glutinosus complex	G5					Found in suitable habitats at elevations below 550 m (1800 ft)
Northern Spring Peeper	Pseudacris crucifer crucifer	G5					Found in suitable habitats within 30 m (100 ft) of streams and lake/pond edges
Northern Red Salamander	Pseudotriton ruber ruber	G5, S3S4			X		
Bullfrog	Rana catesbeiana	G5					Found in suitable habitats at elevations below 1060 m (3500 ft)
Green Frog	Rana clamitans melanota	G5					Found in suitable habitats at elevations below 1060 m (3500 ft)
Pickerel Frog	Rana palustris	G5					Found in suitable habitats within 30 m (100 ft) of streams and lake/pond edges at elevations below 760 m (2500 ft)
Northern Leopard Frog	Rana pipiens	G5, S5	G			R	Found in suitable habitats at elevations below 760 m (2500 ft)
Wood Frog	Rana sylvatica	G5, S5	G			V	Found in suitable habitats at elevations below 1400 m (4600 ft)
Reptiles		TNC Status	Legal Status	NYNHP Species	NYSDEC SGCN	Regional	Notes: (This section lists mapping criteria for elevation and nearness to water identified in the HRV-GAP. For more information on habitat associations, see the HRV-GAP report and references below.)
Common Snapping Turtle	Chelydra serpentina serpentina	G5					Found in suitable habitats at elevations below 1060 (3500 ft)
Painted Turtle	Chrysemys picta	G5					Found in suitable habitats at elevations below 910 m (3000 ft); Slow moving stream
Wood Turtle	Clemmys insculpta	G4, S3	SC, G		X		Found in suitable habitats within 1610 m (1 mile) of streams and rivers at elevations below 1060 m (3500 ft)
Timber Rattlesnake	Crotalus horridus	G5, S3	ST		X		Found in suitable habitats at elevations between 30 m (100 ft) and 520 m (1700 ft)

Northern Ringneck Snake	Diadophis punctatus edwardsii	G5					Found in suitable habitats at elevations below 760 m (2500 ft)
Eastern Milk Snake	Lampropeltis triangulum triangulum						Found in suitable habitats at elevations below 610 m (2000 ft)
Smooth Greensnake	Opheodrys vernalis	G5, S4			X	D	Found in suitable habitats at elevations below 610 m (2000 ft)
Northern Redbelly Snake	Storeria occipitomaculata occipitomaculata	G5					Found in suitable habitats at elevations below 550 m (1800 ft)
Eastern Box Turtle	Terrapene c. carolina	G5, S3	SC		X		
Garter Snake	Thamnophis sirtalis	G5					Found in suitable habitats at elevations below 1400 m (4600 ft)

Observed Breeding Birds (source: 1980-1985 Breeding Bird Atlas)

Breeding bird species known or suspected to be breeding within the watershed. The species list is derived from reports of observed breeding bird activity within Breeding Bird Atlas Blocks that overlap the watershed. Parties using these data for environmental review purposes do so at their own risk.

Key: TNC Status: For State and Global Rank explanations see www.natureserve.com; Legal Status: FE = Federal Endangered; FT = Federal Threatened; SE = State Endangered; ST = State Threatened; G = Game species; SC = State Special Concern; NYNHP Species: Rare species tracked by the NY Natural Heritage Program; NYSDEC SGCN: Species of Greatest Conservation Need included in State Wildlife Plan; Other Ranking: Listed Partners in Flight WatchList

Birds		TNC Status	Legal Status	NYNHP Species	NYSDEC SGCN	Other Ranking	# Blocks (35 total)	Notes: (This section lists mapping criteria for elevation and nearness to water identified in the HRV-GAP. For more information on habitat associations, see the HRV-GAP report and references below.)
Alder Flycatcher	Empidonax alnorum	S5, G5					13	
American Black Duck	Anas rubripes	S4, G4	G		X	WL, PIF	3	
American Crow	Corvus brachyrhynchos	S5, G5					34	
American Goldfinch	Carduelis tristis	S5, G5					33	
American Kestrel	Falco sparverius	S5, G5					10	
American Redstart	Setophaga ruticilla	S5, G5					32	
American Robin	Turdus migratorius	S5, G5					34	
American Woodcock	Scolopax minor	S5, G5	G		X	WL, PIF	9	
Baltimore Oriole	Icterus galbula	S5, G5					29	
Bank Swallow	Riparia riparia	S5, G5					11	Found in suitable habitats within 500 m (1640 ft) of streams and rivers
Barn Swallow	Hirundo rustica	S5, G5					35	
Barred Owl	Strix varia	S5, G5					13	
Belted Kingfisher	Ceryle alcyon	S5, G5					22	Found in suitable habitats within 1000 m (3280 ft) of streams and rivers
Bicknell's Thrush	Catharus bicknelli	S2S3B, G4	SC	X	X	WL, PIF	5	
Black-and-white Warbler	Mniotilta varia	S5, G5					28	
Black-billed Cuckoo	Coccyzus erythrophthalmus	S5, G5			X		2	
Blackburnian Warbler	Dendroica fusca	S5, G5					25	
Black-capped Chickadee	Poecile atricapillus	S5, G5					32	
Blackpoll Warbler	Dendroica striata	S3, G5					7	

Black-throated Blue Warbler	Dendroica caerulescens	NR, G5			X		23	
Black-throated Green Warbler	Dendroica virens	S5, G5					27	
Blue Jay	Cyanocitta cristata	S5, G5					34	
Blue-gray Gnatcatcher	Poliophtila caerulea	S5, G5					5	
Blue-headed Vireo	Vireo solitarius	S5, G5					24	
Blue-winged Warbler	Vermivora pinus	S5, G5			X	WL, PIF	3	
Bobolink	Dolichonyx oryzivorus	S5, G5			X	PIF	15	
Broad-winged Hawk	Buteo platypterus	S5, G5					10	
Brown Creeper	Certhia Americana	S5, G5					13	
Brown Thrasher	Toxostoma rufum	S5, G5			X		21	
Brown-headed Cowbird	Molothrus ater	S5, G5					32	
Canada Goose	Branta Canadensis	S5, G5					1	Found in the Suburban/Residential land cover type when located within 90 m (300 ft) of water
Canada Warbler	Wilsonia Canadensis	S5, G5			X		13	
Cedar Waxwing	Bombycilla cedrorum	S5, G5					34	
Chestnut-sided Warbler	Dendroica pensylvanica	S5, G5					30	
Chimney Swift	Chaetura pelagica	S5, G5					19	
Chipping Sparrow	Spizella passerina	S5, G5					33	
Cliff Swallow	Petrochelidon pyrrhonota	S5, G5					22	
Common Grackle	Quiscalus quiscula	S5, G5					33	
Common Merganser	Mergus merganser	S5, G5					2	
Common Nighthawk	Chordeiles minor	S5, G5					1	
Common Raven	Corvus corax	S5, G5					2	
Common Snipe	Gallinago gallinago	S5, G5					1	
Common Yellowthroat	Geothlypis trichas	S5, G5					33	
Cooper's Hawk	Accipiter cooperii	S4, G5	SC		X		5	
Dark-eyed Junco	Junco hyemalis	S5, G5					29	
Downy Woodpecker	Picoides pubescens	S5, G5					30	
Eastern Bluebird	Sialia sialis	S5, G5					18	
Eastern Kingbird	Tyrannus tyrannus	S5, G5					32	
Eastern Meadowlark	Sturnella magna	S5, G5			X		14	
Eastern Phoebe	Sayornis phoebe	S5, G5					34	
Eastern Screech-Owl	Otus asio	S5, G5					2	
Eastern Towhee	Pipilo erythrophthalmus	S5, G5					27	
Eastern Wood-Pewee	Contopus virens	S5, G5					26	
European Starling	Sturnus vulgaris	SE, G5					34	
Evening Grosbeak	Coccothraustes vespertinus	S5, G5					1	
Field Sparrow	Spizella pusilla	S5, G5					31	
Golden-crowned Kinglet	Regulus satrapa	S5, G5					13	
Golden-winged Warbler	Vermivora chrysoptera	S4, G4	SC		X	WL, PIF	1	
Gray Catbird	Dumetella carolinensis	S5, G5					35	

Great Blue Heron	Ardea herodias	S5, G5		X			10	
Great Crested Flycatcher	Myiarchus crinitus	S5, G5					24	
Great Horned Owl	Bubo virginianus	S5, G5					12	
Green Heron	Butorides virescens	S5, G5					8	Found in suitable habitats at elevations below 610 m (2000 ft)
Green-winged Teal	Anas crecca	S3, G5					2	
Hairy Woodpecker	Picoides villosus	S5, G5					25	
Hermit Thrush	Catharus guttatus	S5, G5					28	
Hooded Merganser	Lophodytes cucullatus	S4, G5					1	
House Finch	Carpodacus mexicanus	SE, G5					19	
House Sparrow	Passer domesticus	SE, G5					29	
House Wren	Troglodytes aedon	S5, G5					32	
Indigo Bunting	Passerina cyanea	S5, G5					26	
Killdeer	Charadrius vociferous	S5, G5					17	
Least Flycatcher	Empidonax minimus	S5, G5					29	
Louisiana Waterthrush	Seiurus motacilla	NR, G5			X		18	Found in suitable habitats within 100 m (330 ft) of streams and rivers
Magnolia Warbler	Dendroica magnolia	S5, G5					23	
Mallard	Anas platyrhynchos	S5, G5					10	Found in the Suburban/Residential land cover type when located within 90 m (300 ft) of water
Mallard x Am. Black Duck Hybrid	Anas platyrhynchos x A. rubripes	NR					1	
Mourning Dove	Zenaida macroura	S5, G5					27	
Mourning Warbler	Oporornis Philadelphia	S5, G5					7	
Nashville Warbler	Vermivora ruficapilla	S5, G5					10	
Northern Bobwhite	Colinus virginianus	S4, G5	G		X		1	
Northern Cardinal	Cardinalis cardinalis	S5, G5					14	
Northern Flicker	Colaptes auratus	S5, G5					33	
Northern Goshawk	Accipiter gentiles	S4B, S3N, G4	SC		X		7	
Northern Mockingbird	Mimus polyglottos	S5, G5					5	
Northern Rough-winged Swallow	Stelgidopteryx serripennis	S5, G5					15	Found in suitable habitats within 500 m (1640 ft) of streams and rivers or near cliff faces with a slope gradient greater than 40%
Northern Waterthrush	Seiurus noveboracensis	S5, G5					7	
Olive-sided Flycatcher	Contopus cooperi	S5, G5			X	WL, PIF	3	
Ovenbird	Seiurus aurocapillus	S5, G5					29	
Pileated Woodpecker	Dryocopus pileatus	S5, G5					15	
Pine Siskin	Carduelis pinus	S5, G5					3	
Prairie Warbler	Dendroica discolor	S5, G5			X		12	
Purple Finch	Carpodacus purpureus	S5, G5					27	
Red Crossbill	Loxia curvirostra	S3, G5					2	
Red-breasted Nuthatch	Sitta Canadensis	S5, G5					19	
Red-eyed Vireo	Vireo olivaceus	S5, G5					33	
Red-headed Woodpecker	Melanerpes erythrocephalus	S4, G5	SC		X	WL, PIF	1	

Red-tailed Hawk	<i>Buteo jamaicensis</i>	S5, G5					17	
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	S5, G5					34	
Ring-necked Pheasant	<i>Phasianus colchicus</i>	SE, G5					6	
Rock Dove	<i>Columba livia</i>	SE, G5					10	
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	S5, G5					29	
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	S5, G5					22	
Ruffed Grouse	<i>Bonasa umbellus</i>	NR, G5	G		X		20	
Savannah Sparrow	<i>Passerculus sandwichensis</i>	S5, G5					9	
Scarlet Tanager	<i>Piranga olivacea</i>	NR, G5			X		34	
Sharp-shinned Hawk	<i>Accipiter striatus</i>	S4, G5	SC		X		9	
Song Sparrow	<i>Melospiza melodia</i>	S5, G5					35	
Spotted Sandpiper	<i>Actitis macularia</i>	S5, G5					8	Found in suitable habitats within 90 m (300 ft) of streams or rivers.
Swainson's Thrush	<i>Catharus ustulatus</i>	S5, G5					7	
Swamp Sparrow	<i>Melospiza Georgiana</i>	S5, G5					13	
Tree Swallow	<i>Tachycineta bicolor</i>	S5, G5					32	
Tufted Titmouse	<i>Baeolophus bicolor</i>	S5, G5					3	
Turkey Vulture	<i>Cathartes aura</i>	S4, G5					26	
Veery	<i>Catharus fuscescens</i>	S5, G5					29	
Vesper Sparrow	<i>Poocetes gramineus</i>	S5, G5	SC		X		3	
Warbling Vireo	<i>Vireo gilvus</i>	S5, G5					16	
Whip-poor-will	<i>Caprimulgus vociferous</i>	S4, G5	SC		X	PIF	2	
White-breasted Nuthatch	<i>Sitta carolinensis</i>	S5, G5					29	
White-throated Sparrow	<i>Zonotrichia albicollis</i>	S5, G5					29	
Wild Turkey	<i>Meleagris gallopavo</i>	S5, G5					18	
Willow Flycatcher	<i>Empidonax traillii</i>	S5, G5			X	WL, PIF	5	
Winter Wren	<i>Troglodytes troglodytes</i>	S5, G5					16	
Wood Duck	<i>Aix sponsa</i>	S5, G5					6	
Wood Thrush	<i>Hylocichla mustelina</i>	S5, G5			X	WL, PIF	30	
Worm-eating Warbler	<i>Helmitheros vermivorus</i>	S4, G5			X		1	
Yellow Warbler	<i>Dendroica petechia</i>	S5, G5					32	
Yellow-bellied Flycatcher	<i>Empidonax flaviventris</i>	S3, G5					4	
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	S5, G5					26	
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	S5, G5					4	
Yellow-rumped Warbler	<i>Dendroica coronata</i>	S5, G5					23	
Yellow-throated Vireo	<i>Vireo flavifrons</i>	S5, G5					15	Found in suitable habitats within 500 m (1640 ft) of streams or rivers

Observed Rare Species and Significant Ecological Communities (source: NY Natural Heritage Program)

Rare plant and animals species with known populations within the watershed and documented examples of rare and high quality ecosystems within the watershed. Information regarding the locations of rare species is considered sensitive. The distribution of information which identifies the locations of rare species or their habitats may lead to the collection or disturbance of the animals and plants at those locations.

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Rare Birds		TNC Status	Legal Status	NYNHP Species	NYSDEC SGCN	Notes: (this section contains habitat association and distribution status information reported by the NY Natural Heritage Program)
Bald eagle	Haliaeetus leucocephalus	S2S3B, S2N, G5	ST, FT	X	X	Schoharie reservoir
Bicknell's Thrush	Catharus bicknelli	S2S3B, G4	SC	X	X	Found in high altitude spruce-fir forest typically above 3500 feet
Rare Plants		TNC Status	Legal Status	NYNHP Species	NYSDEC SGCN	Notes: (this section contains habitat association and distribution status information reported by the NY Natural Heritage Program)
Blunt-lobe Grape Fern	Botrychium oneidense	S2S3, G4Q	SE	X		Historical occurrence
Climbing Fern	Lygodium palmatum	S1, G4	SE	X		Historical occurrence
Musk Root	Adoxa moschatellina	S1, G5	SE	X		
Rough Avens	Geum virginianum	S2, G5	SE	X		Historical occurrence
Whorled Mountain-mint	Pycnanthemum verticillatum var. verticillatum	S1S2, G5T5	ST	X		
Rare Invertebrates		TNC Status	Legal Status	NYNHP Species	NYSDEC SGCN	Notes: (this section contains habitat association and distribution status information reported by the NY Natural Heritage Program)
Appalachian Tiger Beetle	Cicindela ancocisconensis	S1, G3	U	X	X	Stream (cobble); Found on cobble bars
Natural Communities		TNC Status	Legal Status	NYNHP Species	NYSDEC SGCN	Notes: (this section contains habitat association and distribution status information reported by the NY Natural Heritage Program)
Hemlock-northern hardwood forest		S4, G4G5		X		Lowest elevations, adjacent to and forming a mosaic with beech-maple mesic forest, found in ravines
Beech-Maple Mesic Forest		S4, G4		X		Matrix forest at mid to high elevations ranging from 900 to 3720 feet
Spruce-Northern Hardwood Forest		S3S4, G3G4		X		Mid to high elevations, ridgelines at slightly lower elevations than highest
Mountain fir forest		S2, G3		X		Highest elevations
Mountain Spruce-Fir Forest		S2S3, G3		X		Highest elevations

New York Natural Heritage Program Rarity Rank Definitions

NY LEGAL STATUS - Animals:

Categories of Endangered and Threatened species are defined in New York State Environmental Conservation Law section 11-0535. Endangered, Threatened, and Special Concern species are listed in regulation 6NYCRR 182.5.

E - Endangered Species: any species which meet one of the following criteria:

- Any native species in imminent danger of extirpation or extinction in New York.
- Any species listed as endangered by the United States Department of the Interior, as enumerated in the Code of Federal Regulations 50 CFR 17.11.

T - Threatened Species: any species which meet one of the following criteria:

- Any native species likely to become an endangered species within the foreseeable future in NY.
- Any species listed as threatened by the U.S. Department of the Interior, as enumerated in the Code of the Federal Regulations 50 CFR 17.11.

SC - Special Concern Species: those species which are not yet recognized as endangered or threatened, but for which documented concern exists for their continued welfare in New York. Unlike the first two categories, species of special concern receive no additional legal protection under Environmental Conservation Law section 11-0535 (Endangered and Threatened Species).

P - Protected Wildlife (defined in Environmental Conservation Law section 11-0103): wild game, protected wild birds, and endangered species of wildlife.

U - Unprotected (defined in Environmental Conservation Law section 11-0103): the species may be taken at any time without limit; however a license to take may be required.

G - Game (defined in Environmental Conservation Law section 11-0103): any of a variety of big game or small game species as stated in the Environmental Conservation Law; many normally have an open season for at least part of the year, and are protected at other times.

NY LEGAL STATUS - Plants:

The following categories are defined in regulation 6NYCRR part 193.3 and apply to NYS Environmental Conservation Law section 9- 1503.

E - Endangered Species: listed species are those with:

- 5 or fewer extant sites, or
- fewer than 1,000 individuals, or
- restricted to fewer than 4 U.S.G.S. 7 ½ minute topographical maps, or
- species listed as endangered by U.S. Department of Interior, as enumerated in Code of Federal Regulations 50 CFR 17.11.

T - Threatened: listed species are those with:

- 6 to fewer than 20 extant sites, or
- 1,000 to fewer than 3,000 individuals, or
- restricted to not less than 4 or more than 7 U.S.G.S. 7 and ½ minute topographical maps, or
- listed as threatened by U.S. Department of Interior, as enumerated in Code of Federal Regulations 50 CFR 17.11.

R - Rare: listed species have:

- 20 to 35 extant sites, or
- 3,000 to 5,000 individuals statewide.

V - Exploitably Vulnerable: listed species are likely to become threatened in the near future throughout all or a significant portion of their range within the state if causal factors continue unchecked.

U - Unprotected: no state status.

FEDERAL STATUS (PLANTS and ANIMALS):

The categories of federal status are defined by the United States Department of the Interior as part of the 1974 Endangered Species Act (see Code of Federal Regulations 50 CFR 17). The species listed under this law are enumerated in the Federal Register vol. 50, no. 188, pp. 39526 - 39527. The codes below without parentheses are those used in the Federal Register. The codes below in parentheses are created by Heritage to deal with species which have different listings in different parts of their range, and/or different listings for different subspecies or varieties.

(blank): No Federal Endangered Species Act status.

LE: The element is formally listed as endangered.

LT: The element is formally listed as threatened.

PE: The element is proposed as endangered.

PT: The element is proposed as threatened.

C: The element is a candidate for listing.

LE,LT: The species is formally listed as endangered in part of its range, and as threatened in the other part; or, one or more subspecies or varieties is listed as endangered, and the others are listed as threatened.

LT,PDL: Populations of the species in New York are formally listed as threatened, and proposed for delisting.

(LE): If the element is a full species, all subspecies or varieties are listed as endangered; if the element is a subspecies, the full species is listed as endangered.

LT,T(S/A): One or more subspecies or populations of the species is formally listed as threatened, and the others are treated as threatened because of similarity of appearance to the listed threatened subspecies or populations.

PS: Partial status: the species is listed in parts of its range and not in others; or, one or more subspecies or varieties is listed, while the others are not listed.

GLOBAL AND STATE RANKS (animals, plants, ecological communities and others):

Each element has a global and state rank as determined by the NY Natural Heritage Program. These ranks carry no legal weight. The global rank reflects the rarity of the element throughout the world and the state rank reflects the rarity within New York State. Intraspecific taxa are also assigned a taxon rank to reflect the intraspecific taxon's rank throughout the world. ? = Indicates a question exists about the rank. Range ranks, e.g. S1S2, indicate not enough information is available to distinguish between two ranks.

GLOBAL RANK:

G1: Critically imperiled globally because of extreme rarity (5 or fewer occurrences), or very few remaining acres, or miles of stream) or especially vulnerable to extinction because of some factor of its biology.

G2: Imperiled globally because of rarity (6 - 20 occurrences, or few remaining acres, or miles of stream) or very vulnerable to extinction throughout its range because of other factors.

G3: Either rare and local throughout its range (21 to 100 occurrences), or found locally (even abundantly at some of its locations) in a restricted range (e.g. a physiographic region), or vulnerable to extinction throughout its range because of other factors.

G4: Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.

G5: Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.

GH: Historically known, with the expectation that it might be rediscovered.

GX: Species believed to be extinct.

NYS RANK:

S1: Typically 5 or fewer occurrences, very few remaining individuals, acres, or miles of stream, or some factor of its biology making it especially vulnerable in New York State.

S2: Typically 6 to 20 occurrences, few remaining individuals, acres, or miles of stream, or factors demonstrably making it very vulnerable in New York State.

S3: Typically 21 to 100 occurrences, limited acreage, or miles of stream in New York State.

S4: Apparently secure in New York State.

S5: Demonstrably secure in New York State.

SH: Historically known from New York State, but not seen in the past 15 years.

SX: Apparently extirpated from New York State.

SZ: Present in New York State only as a transient migrant.

SxB and SxN, where Sx is one of the codes above, are used for migratory animals, and refer to the rarity within New York State of the breeding (B)populations and the non-breeding populations (N), respectively, of the species.

TAXON (T) RANK:

The T-ranks (T1 - T5) are defined the same way as the Global ranks (G1 - G5), but the T-rank refers only to the rarity of the subspecific taxon.

T1 through T5: See Global Rank definitions above.

Q: Indicates a question exists whether or not the taxon is a good taxonomic entity.

References:

Hudson River Valley - Gap Analysis Program (GAP)

Smith, C.R., S.D. DeGloria, M.E. Richmond, S.K. Gregory, M. Laba, S.D. Smith, J.L. Braden, W.P. Brown, and E.A. Hill. 2001. An Application of Gap Analysis Procedures to Facilitate Planning for Biodiversity Conservation in the Hudson River Valley, Final Report, Part I: Gap Analysis of the Hudson River Valley and Part 2: Atlas of Predicted Ranges for Terrestrial Vertebrates in the Hudson River Valley. New York Cooperative Fish and Wildlife Research Unit, Department of Natural Resources, Cornell University, Ithaca, N.Y.

NY Natural Heritage Program

Online at: www.nynhp.org

NY Natural Heritage Program Conservation Guides

Online at: <http://www.acris.nynhp.org/>

Biodiversity Assessment Manual for the Hudson River Estuary Corridor

Kiviat, E. and G. Stevens. 2001. Biodiversity Assessment Manual for the Hudson River Estuary Corridor. Published by the NY State Department of Environmental Conservation with funding provided by the Hudson River Estuary Program. Hudsonia, Ltd., Bard College, Annandale, NY.

NYS Amphibian and Reptile Atlas

Online at: <http://www.dec.state.ny.us/website/dfwmr/wildlife/herp/>

NYS Breeding Bird Atlas

Online at: <http://www.dec.state.ny.us/website/dfwmr/wildlife/bba/index.html>

NYS Comprehensive Wildlife Conservation Strategy

Online at: <http://www.dec.state.ny.us/website/dfwmr/swg/cwcsmainpg.html>

NYS Threatened, Endangered & Special Concern Species List

Online at: <http://www.dec.state.ny.us/website/dfwmr/wildlife/endspec/>