



***SIGNIFICANT HABITATS  
AND HABITAT COMPLEXES  
OF THE  
NEW YORK BIGHT WATERSHED***

**Catskill High Peaks  
COMPLEX #34**

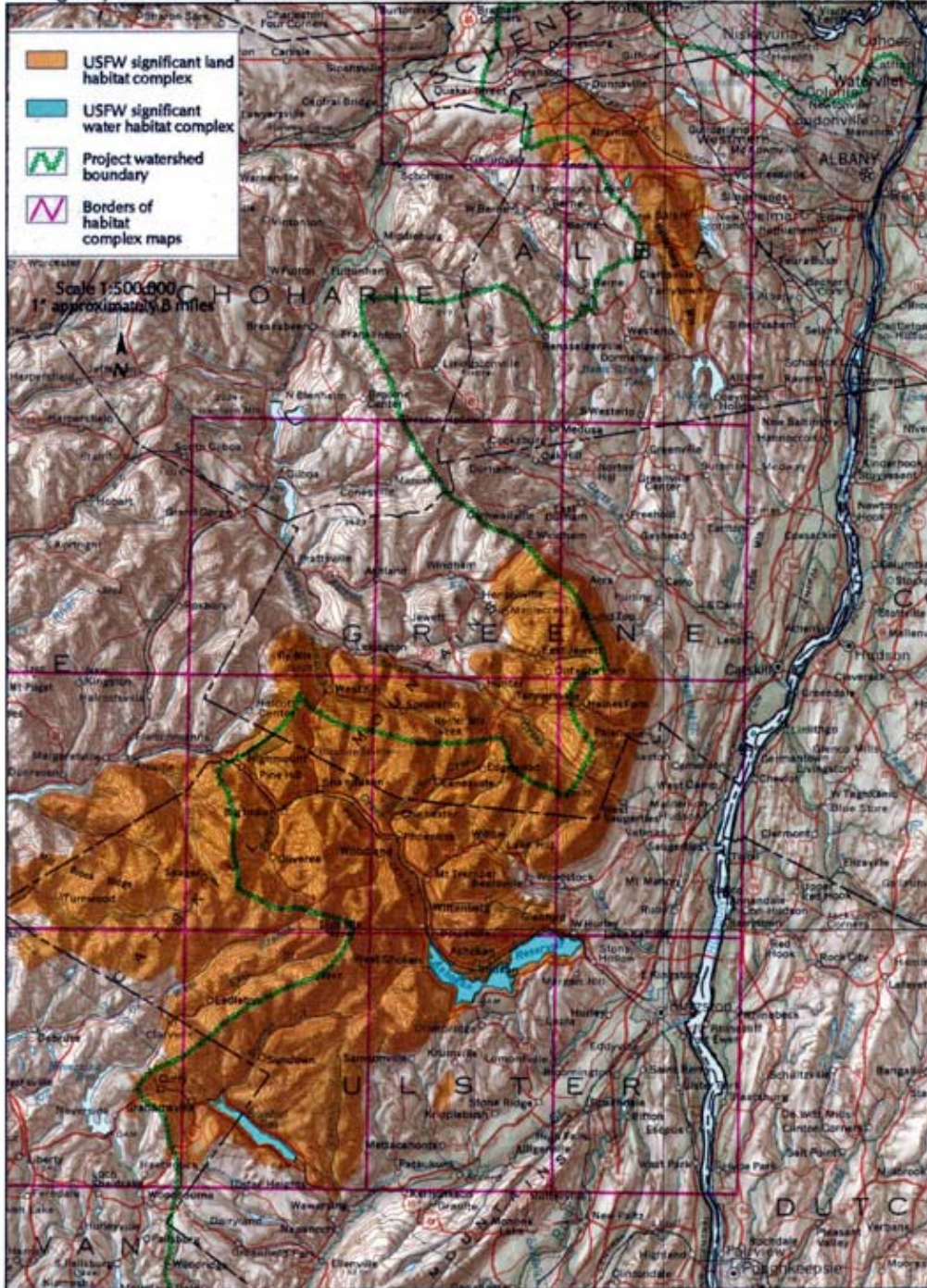
**U.S. FISH AND WILDLIFE SERVICE**

**SOUTHERN NEW ENGLAND - NEW YORK BIGHT  
COASTAL ECOSYSTEMS PROGRAM**

**CHARLESTOWN, RHODE ISLAND**

**COMPLETED NOVEMBER 1996  
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**Allegheny Plateau Complexes** **Significant Habitats of the New York Bight Watershed**



Links to maps can be reached from the following web page: [http://library.fws.gov/pubs5/web\\_link/text/chp-idx.htm](http://library.fws.gov/pubs5/web_link/text/chp-idx.htm)

**I. SITE NAME:** Catskill High Peaks

**II. SITE LOCATION:** The Catskill Mountains are in eastern New York on the west side of the Hudson River valley, about 130 kilometers (80 miles) northwest of New York City.

**TOWNS:** Cairo, Catskill, Denning, Halcott, Hardenbergh, Hunter, Hurley, Jewett, Lexington, Middletown, Neversink, Olive, Rochester, Saugerties, Shandaken, Wawarsing, Windham, Woodstock

**COUNTIES:** Delaware, Greene, Sullivan, Ulster

**STATE:** New York

**USGS 7.5 MIN QUADS:** Rondout Reservoir, NY (41074-74), Grahamsville, NY (41074-75), Kingston West, NY (41074-81), Ashokan, NY (41074-82), West Shokan, NY (41074-83), Peekamoose Mountain, NY (41074-84), Claryville, NY (41074-85), Willowemoc, NY (41074-86), Woodstock, NY (42074-11), Bearsville, NY (42074-12), Phoenicia, NY (42074-13), Shandaken, NY (42074-14), Seager, NY (42074-15), Arena, NY (42074-16), Kaaterskill, NY (42074-21), Hunter, NY (42074-22), Lexington, NY (42074-23), West Kill, NY (42074-24), Fleischmanns, NY (42074-25), Freehold, NY (42074-31), Hensonville, NY (42074-32), Prattsville, NY (42074-34)

**USGS 30 x 60 MIN QUADS:** Monticello, NY-PA (41074-E1), Pepacton Reservoir, NY (42074-A1)

**III. BOUNDARY DESCRIPTION AND JUSTIFICATION:** The Catskill High Peaks habitat complex is a roughly circular area about 64 kilometers (40 miles) in diameter that includes the core forested high-elevation area of the eastern Catskill Mountains and adjacent reservoirs and reservoir lands. The boundary follows the break in slope along the escarpment between the Catskills and the Hudson Valley on the east, the southern boundaries of the Ashokan and Rondout Reservoir watersheds on the south, and generally follows the 610-meter (2,000-foot) contour on the west and north. With the exception of the reservoir lands, this boundary generally corresponds to the Catskill High Peaks Ecozone as defined by the New York State Department of Environmental Conservation. All parcels within the eastern part of the Catskill Forest Preserve are included (see below). The Catskill High Peaks habitat area includes major unfragmented forests, including first-growth forest, as well as alpine communities, gorges, pristine headwater streams, and reservoirs; the area supports regionally significant populations of forest interior-nesting birds, bald eagle, large mammals, coldwater fish, reptiles, and rare communities and plants.

**IV. OWNERSHIP/PROTECTION/RECOGNITION:** The 2,821-square kilometer (1,089-square mile) Catskill Park designated by the state of New York is a mix of public (about 40%) and private ownership; Catskill Park lands that are not publicly owned are not protected. The Catskill Forest Preserve within the park is a collection of parcels owned and managed by the New York State Department of Environmental Conservation totaling 1,100 square kilometers (425 square miles) to be "forever kept as wild forest lands." The parcels of the Forest Preserve within the High Peaks include: Windham High Peak Wild Forest, North Mountain Wild Forest, Kaaterskill Wild Forest, Indian Head Mountain-Plateau Mountain Wilderness Area, Big Indian-Beaverkill Range Wilderness Area, Dry Brook Ridge-Huckleberry Brook Wild Forest, Slide Mountain-Panther Mountain Wilderness Area, Balsam Lake Mountain Wild Forest, and Peekamoose Valley Wild Forest. Several other parcels of Forest Preserve lands occur to the west of the High Peaks region. The New York State Department of Environmental Conservation also manages the Vinegar Hill Wildlife Management area near the northernmost edge of the Catskill High Peaks. The New York State Natural Heritage Program, in conjunction with The Nature Conservancy, recognizes several Priority Sites for Biodiversity with the Catskill High Peaks habitat complex. These sites are listed here along with their biodiversity ranks: Doubletop Mountain/Upper Beaverkill (B2 - very high biodiversity significance), Catskill Escarpment (B3 - high biodiversity significance), Neversink River Claryville (B3), Peekamoose Gorge (B3), and Slide Mountain (B3). The city of New York owns several large reservoirs and reservoir lands in both the Hudson and Delaware drainages of the Catskill Mountains, a total of 229 square kilometers (88 square miles) in the larger Catskill region. New York City also has authority to regulate land use and buy land in the watersheds of reservoirs, especially in the riparian zones of the tributaries feeding into the reservoirs, and is proposing to buy additional lands in the watersheds to protect the water supply and comply with U.S. Environmental Protection Agency regulations. The city of New York provides sewage treatment facilities for several villages in its watershed. The town of Woodstock has determined that all state-designated freshwater wetlands in the town are critical environmental areas requiring more stringent review under the State Environmental Quality Review Act. Wetlands are regulated in New York under the state's Freshwater Wetlands Act of 1975 and Tidal Wetlands Act of 1977; these statutes are in addition to federal regulation under Section 10 of the Rivers and Harbors Act of 1899, Section 404 of the Clean Water Act of 1977, and various Executive Orders.

**V. GENERAL AREA DESCRIPTION:** The Catskills are the highest and easternmost part of the Allegheny Plateau physiographic province (the northern end of the larger Appalachian Plateau which extends southwest to Alabama). The High Peaks of the Catskills rise sharply above the Hudson Valley to the east and gradually decrease in elevation toward the west. The bedrock in the Catskills is composed of sedimentary rock, primarily shale, sandstone, and conglomerate. The High Peaks region in the eastern Catskills is dominated by the more erosion-resistant sandstones and conglomerates, while the more easily eroded shales in the western Catskills result in gentler slopes and lower elevations. The clay, silt, sand, and gravel sediments that make up this bedrock were originally deposited during the Devonian period (about 400 million years ago) as a large delta extending westward from what was then the Acadian Mountains into an inland sea. These sediments were compressed and subsequently uplifted at the end of the Paleozoic era (about 225 million years ago) to form a plateau that has since been



broken up by erosion. The resulting dissected plateau has deep valleys and many peaks at about the same elevation, with 34 peaks over 1,067 meters (3,500 feet) within the High Peaks region. Elevations range from about 305 meters (1,000 feet) above sea level along the Hudson Valley to 1,274 meters (4,180 feet) at the top of Slide Mountain, the highest point within the New York Bight project area. Glacial ice covered the Catskills during the most recent (Wisconsin) glaciation, eroding rock from the mountains and depositing it in the valleys. The glacial till in the high peaks is generally not thick, ranging from 0 to about 3 meters (0 to 10 feet) on the slopes and summits, versus over 30.5 meters (100 feet) in some of the valleys. There is more exposed bedrock in the eastern high peaks than in the western high peaks. The soils are generally acidic, with an average pH of about 5.0. In addition to having the highest elevations in the New York Bight project area, the Catskill High Peaks have the lowest mean summer temperatures and the highest rainfall. Rainfall in the eastern and south-central High Peaks averages over 178 centimeters (70 inches) per year in contrast to the coastal plain which averages about 114 centimeters (45 inches) per year. These high precipitation levels are due to moist air rising abruptly over the Catskills from the southeast and southwest, cooling, and precipitating out as rain or snow (referred to as orographic precipitation). These physical and climatic extremes support regionally rare communities and species.

The three major forest types in the eastern Catskills, from the highest elevations to the lowest, include spruce-fir forest, northern hardwoods forest, and oak-hickory forest. The dominant forest type on the moist, well-drained, acidic soils on the slopes of the Catskills is the northern hardwoods forest generally dominated by one or more of three hardwood species, American beech (*Fagus grandifolia*), sugar maple (*Acer saccharum*), and yellow birch (*Betula alleghaniensis*), with lesser amounts of red maple (*Acer rubrum*), black cherry (*Prunus serotina*), red oak (*Quercus rubra*), basswood (*Tilia americana*), and white pine (*Pinus strobus*). In the western Catskills, a variant of the northern hardwoods forest, referred to as ridge hardwoods, occurs above 1,200 meters (3,000 feet). This forest type has comparable dominant tree species to the northern hardwoods, with the notable absence or rarity of sugar maple. In many places in the Catskills eastern hemlock (*Tsuga canadensis*) is co-dominant with one or more of the hardwood species. A recent infestation of the hemlock wooly adelgid (*Adelges tsugae*) has killed many of the hemlocks in the region and, if it spreads throughout the Catskills, will likely result in a major change in this forest community. Striped maple (*Acer pensylvanicum*) is a typical mid-story tree, and the shrub layer consists of hobblebush (*Viburnum lantanoides*), maple-leaved viburnum (*Viburnum acerifolium*), and raspberries (*Rubus* spp.). This hemlock-hardwoods forest type is generally found from about 305 to 1,006 meters (1,000 to 3,300 feet). Drier, warmer, south and west-facing slopes and lower elevations are often characterized by the Appalachian oak-hickory forest dominated by red, white, chestnut, and scrub oaks (*Quercus alba*, *Q. prinus* and *Q. ilicifolia*) mixed with lesser densities of shagbark and bitternut hickories (*Carya ovata* and *C. cordiformis*) and small numbers of white ash (*Fraxinus americana*), red maple, and eastern hop hornbeam (*Ostrya virginiana*), and a sub-canopy of small trees and large shrubs consisting of flowering dogwood (*Cornus florida*), witch hazel (*Hamamelis virginiana*), shadbush (*Amelanchier arborea*), and choke-cherry (*Prunus virginiana*). In much of the Catskills, the oak-hickory forest does not extend much above 457 meters (1,500 feet) but occurs along the escarpment up to about 1,200 meters (3,000 feet) where areas have been repeatedly burned. On many of the higher elevation peaks in the Catskills, from 900 to 1,200 meters (3,000 to 4,000 feet), is a mountain spruce-fir forest dominated by red spruce (*Picea rubens*) and balsam fir

(*Abies balsamea*), with yellow birch and sub-canopy trees that include mountain ash (*Sorbus americana*), mountain maple (*Acer spicatum*), pin cherry (*Prunus pensylvanica*), and striped maple. Several of the highest peaks, including Slide Mountain and Blackhead Mountain, have a mountain fir forest where balsam fir is dominant, with a few paper birch, red spruce, and mountain ash. The occurrence of ridge hardwood forests on summits in the northwestern High Peaks, at elevations where one would expect spruce-fir forest, seems to be due to post-glacial forest history and other factors that include greater soil depth (more than a foot) in that area. On the exposed ledges and ridgetops are pitch pine-oak-heath rocky summit and spruce-fir rocky summit communities. Spruce-fir rocky summit occurs on the cooler ridgetops between 457 and 1,200 meters (1,500 and 3,000 feet), with sparse woods dominated by red spruce with balsam fir, eastern hemlock, white pine, and red pine (*Pinus resinosa*), and a shrub layer dominated by huckleberry (*Gaylussacia baccata*), lowbush blueberry (*Vaccinium angustifolium*), and mountain laurel (*Kalmia latifolia*), and numerous rocky outcrops. On warmer ridgetops is the pitch pine-oak-heath rocky summit, a stunted oak and pine forest with dwarf shrub openings. Dominant trees are red oak, chestnut oak, pitch pine (*Pinus rigida*), and red pine, as well as balsam fir, eastern hemlock, white pine, and red maple, with shrubs dominated by huckleberry and lowbush blueberry. The pitch pine-oak-heath rocky summit found in the Catskills differs from a similar community type found in the Highlands and Shawangunk - Kittatinny Ridge by the presence of red pine and red spruce.

Most of the forests in the Catskills are second or third-growth because much of the forested land was cleared or selectively logged during the 18th and 19th centuries. Hemlock forests in the Catskills were decimated in the early 1800s to support the tanning industry; the bark of the hemlock contains a chemical (tannin) used for tanning leather. Often the trees were simply stripped of bark and the dead wood left standing. Other parts of the forest were cleared or logged for lumber, charcoal, and agriculture. Hardwood saplings in the young forest that grew up in the place of the original forest were cut to form barrel hoops for the barrel hoop industry. The protection of the forests of the Catskills began over 100 years ago with the creation of the Catskill Forest Preserve in 1885 and the creation and protection of a water supply system for New York City beginning in 1905. Some areas of first growth forest remain (see below).

There are several deep, steep-sided gorges in the Catskills, such as Peekamoose Gorge, with cliff and talus slopes, waterfalls, and cooler temperatures than those of the surrounding areas. Several of the gorges have ice cave talus communities, i.e., deep crevices in the talus slopes that retain ice through much of the summer, resulting in a cool microenvironment that supports northern species such as mountain paper birch, eastern hemlock, and yellow birch. Several rare plant species occur in these gorges.

The Catskills High Peaks have numerous rocky headwater streams that start as intermittent streams in the highest reaches and then become upper perennial streams that are shaded moderate to steep-gradient streams flowing over eroded bedrock, cobbles, and gravel with alternating riffle and pool sections and numerous waterfalls. There is low primary productivity with, generally, few rooted aquatic plants, aside from periphytic algae and mosses, within these headwater streams. Further down in the valleys of the Catskills High Peaks region are mid-reach streams with well-defined patterns of alternating pool, riffle, and run sections and some aquatic macrophytes such as pondweed (*Potamogeton* spp.) and waterweed (*Elodea canadensis*). The

Catskill High Peaks are drained by three major river systems, the Delaware, the Hudson, and the Mohawk. Major tributaries in the Hudson drainage drain the eastern and southeastern High Peaks and include: Esopus Creek and its tributaries, Birch Creek, Bushnellsville Creek, Stony Clove Creek, Beaver Kill, and Little Beaver Kill, all of which feed into the Ashokan Reservoir; Rondout Creek which feeds into the Rondout Reservoir; and Kaaterskill Creek which feeds directly into the Hudson. In the Delaware drainage on the west and southwest High Peaks, the East and West branches of the Neversink River feed into the Neversink Reservoir; Vly Creek, Bush Kill, Dry Brook, Mill Brook, and the East Branch of the Delaware River feed into the Pepacton Reservoir; and the Beaver Kill feeds into the Delaware River well below the Pepacton Reservoir. In the Mohawk drainage of the northern High Peaks, Schoharie Creek feeds into the Schoharie Reservoir. Only two major streams are not impounded by the New York City reservoir system: the Beaver Kill in the southwest and Kaaterskill Creek in the northeast. Reservoirs within the habitat complex include the 3,265-hectare (8,068-acre) Ashokan, and 822-hectare (2,031-acre) Rondout; these, along with the other reservoirs in the Catskills, make up the largest surface water supply system in the world. Reservoirs are vegetated with free-floating and submerged macrophytes.

Palustrine and lacustrine wetlands are sparse in the Catskill High Peaks. According to the National Wetlands Inventory (NWI), only 1.2% of the Catskill-Delaware Reservoir watersheds are wetlands. On the highest slopes are small bogs and occasional small impounded ponds and lakes. Small areas of palustrine wetlands occur in the valleys in the Catskills including red maple-hardwood swamp, hemlock-hardwood swamps, scrub-shrub swamps, and emergent marshes. An expanding population of beaver has resulted in numerous beaver ponds and wetlands along the tributaries; NWI data indicates that 312 hectares (770 acres) or 8.8% of the palustrine wetlands in reservoir watersheds are beaver-modified wetlands. Larger palustrine wetlands occur in the Catskills outside of the High Peaks. Vly Swamp, for example, is a red maple-tamarack (*Larix laricina*) peat swamp surrounded by hemlock-hardwood swamp and hemlock-hardwood forest located south of Ashokan Reservoir.

In the valleys and other areas outside the Catskill Forest Preserve are a few small agricultural areas, mostly dairy and poultry farms, conifer plantations, and residential areas. Roads and villages in the Catskills are concentrated in the valleys.

**VI. ECOLOGICAL SIGNIFICANCE/UNIQUENESS OF SITE:** The ecological significance of the Catskill High Peaks relates to its large, continuous forest and pristine headwater stream habitats, and the species dependent on these habitats. There are 118 species of special emphasis, incorporating 19 species of plants and 73 species of birds, and including the following federally and state-listed species. (Living resources and their habitats are dynamic; therefore, the ecological significance and species information presented here may not be complete or up-to-date. State and federal environmental agencies [see [Appendix III](#) for office contacts] should be consulted for additional information.)

### **Federally listed threatened**

bald eagle (*Haliaeetus leucocephalus*)  
northern monkshood (*Aconitum noveboracense*)

### **State-listed endangered**

shoreline sedge (*Carex hyalinolepis*)  
roseroot stonecrop (*Sedum rosea*)

### **State-listed threatened**

timber rattlesnake (*Crotalus horridus*)  
red-shouldered hawk (*Buteo lineatus*)  
fragrant cliff fern (*Dryopteris fragrans*)  
moschatel (*Adoxa moschatellina*)  
Appalachian Jacob's ladder (*Polemonium van-bruntiae*)

### **State-listed special concern animals**

spotted salamander (*Ambystoma maculatum*)  
eastern hognose snake (*Heterodon platirhinos*)  
spotted turtle (*Clemmys guttata*)  
wood turtle (*Clemmys insculpta*)  
common raven (*Corvus corax*)  
eastern bluebird (*Sialia sialis*)

### **State-listed rare plants**

Bush's sedge (*Carex bushii*)  
squashberry (*Viburnum edule*)

## **Forests**

Although the majority of the forests in the Catskills were cleared, there are some areas that were never logged due to their inaccessibility. In these areas are remnant stands of first-growth (or old-growth) forest, of which less than 1% remains in the eastern deciduous forest region of eastern North America. Thirty-seven first-growth forest tracts ranging from 25 to 6,400 hectares (62 to 15,800 acres) have been mapped in the Catskills, with the largest areas in the vicinity of **Slide Mountain** and **Big Indian Mountain**. These first-growth areas are generally above 823 meters (2,700 feet). The total area of first-growth forests in the Catskills is estimated at between 21,600 and 25,600 hectares (53,400 and 63,300 acres). These forests are primarily ridge-hardwood forests and hemlock-northern hardwood forests. First-growth spruce-fir stands occur on only a few Catskill Peaks, including **Cornell-Balsam Cap, Panther, Plateau, and Indian Head**. The High Peaks contain the largest stands of mountain spruce-fir forest between the Adirondacks and the southern Appalachians, and the southernmost outpost of such spruce-fir stands within the glaciated region of North America. There are also exemplary occurrences of unfragmented mature second-growth forests in the Catskills. Exemplary occurrences of spruce-fir rocky summit and pitch pine-oak-heath rocky summit occur on the Catskill Escarpment.



## **Plants**

Several populations of the federally listed threatened northern monkshood occur at a number of locations within the Catskill High Peaks habitat complex. Large populations occur in several headwater ravines such as the Beaverkill and the Rondout where the cool, moist microclimate and protected forests are ideal for this species. Downstream occurrences, below the headwater ravines in one case, are probably seeded from the upstream populations. These downstream populations occur in more dynamic riparian habitat that is more threatened by natural erosion and disturbance from nearby roads and trails. The globally rare Jacob's ladder occurs in shaded wet springs and riparian habitat in numerous locations in the High Peaks, including several streams where northern monkshood also occurs. Squashberry and shoreline sedge occur in riparian areas near northern monkshood. The moist woods in the Catskills support two of the only three known extant populations of three-bird's orchid (*Triphora trianthophora*) in New York and the only populations of moschatel. The large number and pristine condition of steep-sided ravines in the Catskills is ecologically significant; these ravines, such as Wildcat Ravine, occur on the headwater streams feeding into Kaaterskill Clove, which bisects the Catskill Escarpment. Cliff and ledge communities in these ravines support rare plants, including the state-listed endangered roseroot stonecrop and the state-listed threatened fragrant cliff fern. In the Catskills are the only known locations in New York State for hyssop skullcap (*Scutellaria integrifolia*), one of the northernmost-known occurrences of this more typically coastal plain species. Other more typically southern species found in the Catskills include Bush's sedge and weak stellate sedge (*Carex seorsa*). The alpine plant three-toothed cinquefoil (*Potentilla tridentata*) occurs at several locations in the high peaks with mountain sandwort (*Arenaria groenlandica*) at one location on the eastern escarpment. Vly Swamp contains exemplary occurrences of red maple-tamarack peat swamp and hemlock-hardwood swamp that support several rare plant and invertebrate species. Plants include weak stellate sedge, Appalachian vittaria (*Vittaria appalachiana*), and the moss *Entodon brevisetus*. Rare dragonflies found at Vly Swamp include the arrowhead spiketail (*Cordulegaster obliqua*) and taper-tailed damer (*Gomphaeschna antilope*).

## **Birds**

The Catskills support over 120 species of breeding birds, including the only occurrences of several species within the New York Bight watershed project area. The conifer forests on the high peaks of the Catskills are the only location in the New York Bight watershed project area where Bicknell's thrush (*Catharus bicknellii*) is found, although it also occurs in the Adirondacks in the upper watershed region. In 1881, Eugene Bicknell discovered this new breeding thrush on Slide Mountain in the Catskills. Long considered a subspecies or race of the gray-cheeked thrush (*Catharus minimus bicknellii*), it has recently been recognized as a full species. The Bicknell's thrush is found only at high elevations in northern New England and New York and in the Canadian Maritimes. In the Catskills, Bicknell's thrush prefers the cool upper slopes in stunted stands of spruce and fir. Other boreal species that occur only in higher elevation forest in the Catskill High Peaks within the project area include Swainson's thrush (*Catharus ustulatus*), blackpoll warbler (*Dendroica striata*), and yellow-bellied flycatcher (*Empidonax flaviventris*). Species more widespread in the region and state but concentrated in the hemlock-northern hardwood forests in the Catskills include winter wren (*Troglodytes troglodytes*), golden-crowned

kinglet (*Regulus satrapa*), hermit thrush (*Catharus guttatus*), solitary vireo (*Vireo solatarius*), black-throated blue warbler (*Dendroica caerulescens*), yellow-rumped warbler (*Dendroica coronata*), black-throated green warbler (*Dendroica virens*), Blackburnian warbler (*Dendroica fusca*), and Canada warbler (*Wilsonia canadensis*). Other northern species occurring in the Catskills include common raven and evening grosbeak (*Coccothraustes vespertinus*). Although breeding waterfowl are not abundant, several species do occur along the streams, ponds, and reservoirs in the Catskills, including Canada goose (*Branta canadensis*), wood duck (*Aix sponsa*), mallard (*Anas platyrhynchos*), American black duck (*Anas rubripes*), hooded merganser (*Lophodytes cucullatus*), and common merganser (*Mergus merganser*).

The federally listed threatened bald eagle uses the reservoirs in the Catskills for nesting and wintering. These eagles originated from a reintroduction effort that has released about 200 eagles in New York State since 1976. Pairs have successfully nested and fledged young at **Ashokan and Rondout Reservoirs**. These reservoirs are also used during the winter by as many as 30 adult and juvenile bald eagles. In winter, the eagles feed just below the reservoir dam where the water remains open throughout the winter and fish killed or injured as they pass through the dam make easy prey. Nesting and summering eagles tend to feed more in the upper reaches of the reservoirs on spawning and resident fish. Bald eagles nest and winter at other locations in the Catskills region outside of the High Peaks, including Schoharie Reservoir, Pepacton Reservoir, Neversink Reservoir, and the Neversink, Mongaup, and Delaware Rivers. About 42 miles of the Neversink River from Claryville in the High Peaks down to the junction with the Delaware River at Port Jervis, including the reservoir, support wintering by 10 to 20 pairs of bald eagles. The Mongaup and Delaware Rivers south of the Catskill High Peaks host the largest wintering bald eagle concentrations in the state and one of the largest in the northeastern United States. Other regionally rare raptors that breed in the Catskills include red-shouldered hawk, barred owl (*Strix varia*), sharp-shinned hawk (*Accipiter striatus*), and broad-winged hawk (*Buteo platypterus*).

Hawk watches to the southeast of the Catskills on the Shawangunk Ridge and northwest of the Catskills at Oneonta suggest that hawks migrate along a broad front though this part of New York State. Spring and fall flights at both locations are dominated by red-tailed hawk (*Buteo jamaicensis*), broad-winged hawks, sharp-shinned hawks, American kestrel (*Falco sparverius*), and osprey (*Pandion haliaetus*).

### **Reptiles and Amphibians**

Timber rattlesnake occur on the warmer lower-elevation ridges in the High Peaks where there are sufficient open ledges for basking habitat. There are three known den sites within the High Peaks and several den sites on the outskirts of the High Peaks, including a concentration of den sites on a ridge between the Catskills and the Shawangunk Ridge. Other regionally rare reptiles and amphibians in the Catskills include the eastern hognose snake, spotted turtle, wood turtle, and spotted salamander (*Ambystoma maculatum*).

### **Riverine Communities/Fish Populations**

In the Catskills there are numerous examples of pristine upper riverine communities, including intermittent streams, rocky headwater streams, and mid-reach streams, that support healthy

populations of coldwater fish. The trout waters of the Catskills are legendary. Many anglers, especially flyfishers, have fished the trout fisheries of the Catskills such as the Beaverkill, Neversink, Willowemoc, Esopus, and the upper reaches of the East and West Branches of the Delaware River for brown (*Salmo trutta*), rainbow (*Oncorhynchus mykiss*), and brook trout (*Salvelinus fontinalis*), as well as for American shad (*Alosa sapidissima*) in the Delaware system. There are few natural Catskill lakes; however, there are several large water supply reservoirs that have important warmwater fisheries for smallmouth bass (*Micropterus dolomieu*), redbfin pickerel (*Esox americanus*), yellow perch (*Perca flavescens*), and occasional brown and rainbow trout. These pristine water supply reservoirs require special fishing and boating permits and are regulated by the New York City Department of Environmental Protection.

### **Mammals**

The Catskills serve as a major core area for several regionally rare large mammal species, including black bear (*Ursus americanus*), bobcat (*Lynx rufus*), and fisher (*Martes pennanti*). The black bear population in the Catskills is estimated to be about 300 bears. Fishers were reintroduced into the Shawangunks and Catskills and have successfully reproduced. Fishers from these introduced New York populations have been seen in numerous locations between the Shawangunk Ridge and the southern Catskills, suggesting a regular migration between these wooded mountain areas. Bobcats are rare and secretive, but are likely found throughout the Catskills. There is a limited hunting season for all three of these species in New York.

**VII. THREATS AND SPECIAL PROBLEMS:** While most of the peaks and higher elevations are owned by the state as part of the Catskill Forest Preserve, the streams and floodplains and valleys are primarily privately owned. Agricultural, residential, and commercial activities and roads are concentrated in these valleys. There is continuing pressure to develop remaining undeveloped lands in these valleys, especially for second homes. The tributaries in the valleys are threatened by turbidity and nutrients from agriculture, silviculture, construction activities (including road improvements), and natural runoff; further loss of riparian habitat would threaten rare natural communities and plant, reptile, and bird populations. New York City may sell off its watershed lands, potentially opening up these lands for development. Fragmentation of forest lands by development or clearing would threaten plant, fish, and wildlife populations dependent on large tracts of unfragmented, undisturbed forest. The bald eagle population would be threatened by any disturbance or destruction of roosting, nesting, and feeding habitat, as well as by changes in water levels or reductions in water quality. Northern monkshood populations, especially the populations in the riparian zones near roads, may be disturbed by hikers, collectors, and roadside activity. Logging in areas where northern monkshood occurs has destroyed some of the plants and threatens to destroy more. Hemlock wooly adelgid threatens the hemlock forests on the ridge. There is loss of natural brook trout due to habitat alterations and competition from introduced species.

**VIII. CONSERVATION RECOMMENDATIONS:** The highest priority in the Catskills is the protection of riparian and upland habitat in the valleys, including old-growth forests and habitats of rare plants. This should be accomplished through a cooperative land planning and protection effort among the state, the city, local communities, and private landowners. New York City should maintain its land holdings and work with landowners along the stream corridors to avoid impacts to tributary water quality and habitat. Riparian vegetation that has been degraded or destroyed should be restored or allowed to recover naturally after removal of disturbances. The Catskills is significant in the region for its unfragmented forest. It is important to maintain the unfragmented nature of these forests by restricting or limiting logging and maintaining the largest possible uncleared core area within the broad forest landscape; maintaining connectors and corridors to adjacent landscapes is equally important. Special focus should be provided to good occurrences of regionally rare natural communities, such as mountain spruce-fir forest and ice cave talus communities. Vly Swamp and the surrounding uplands should be protected as part of the Catskills Forest Preserve or through landowner agreements. Disturbing northern monkshood sites should be avoided through working with landowners to protect known sites; additional surveys should be conducted for this species. Applicable recovery tasks and objectives for northern monkshood should be supported and implemented by federal and state agencies and organizations, including protecting existing sites through landowner agreements, avoiding impacts from road and trail use, maintaining existing sites, and searching for new sites in the Catskills. Known and potential eagle nesting and roosting trees around the Ashokan and Rondout Reservoirs should be protected by limiting disturbance and destruction of nesting, roosting, and feeding areas. Human presence within 500 meters (1,600 feet) of perches should be avoided. Riparian vegetation should be allowed to mature to provide snags (older-growth trees) for perching. The prey base for eagles should be maintained by protecting water quality and minimum base flows. Native brook trout spawning areas should be protected and enhanced; the introduction of non-native species should be avoided in these areas. Coordinated regional land-use planning would be useful in the Catskills.

## **IX. REFERENCES:**

Adams, A.G. 1988. *The Catskills: a guide to the mountains and nearby valleys*. Purple Mountain Press, Fleischmanns, NY.

Andrle, R.F. and J.R. Carroll (eds.). 1988. *The atlas of breeding birds in New York State*. A project of the Federation of New York State Bird Clubs, Inc., New York State Department of Environmental Conservation, and Cornell Laboratory of Ornithology. Cornell University Press, Ithaca, NY. 551 p.

Bierhorst, J. 1995. *The Ashokan Catskills: a natural history*. Catskill Center for Conservation and Development, Arkville, New York and Purple Mountain Press, Fleischmanns, NY.

Catskill Center for Conservation and Development. 1994. Catskills region biosphere reserve nomination form. Catskill Center for Conservation and Development, Arkville, NY. 65 p.

Dickinson, N.R. 1979. A division of southern and western New York State into ecological zones. Unpublished report for the New York State Department of Environmental Conservation, Wildlife Resources Center, Delmar, NY.

Francis, A.M. 1983. *Catskill River: birthplace of American fly fishing*. Winchester Press, NJ.

Fraser, J.D. 1988. A strategy for protecting bald eagles in Sullivan County, NY. Report prepared for the Catskill Center for Conservation and Development, Arkville, NY.

Heintzelman, D.S. 1986. *The migration of hawks*. Indiana University Press. 369 p.

Hoffer, A. and E. Mikols. 1974. *Unique natural areas in the Catskills*. Catskill Center for Conservation and Development, Inc., Arkville, NY.

Huang, C-S. 1990. Catskill gateway conservation study: a design strategy for land protection. Prepared for the Catskill Center for Conservation and Development, Arkville, NY. 64 p.

Huth, P. 1994. Personal communication. Smiley Research Center, Mohonk Preserve, New Paltz, NY.

Kerlinger, P. and M. Bennett. 1977. Hawk migration at Oneonta. *Kingbird* 27(2): 74-79.

Kudish M. 1976. The history of the Catskill forests. Report prepared for the Catskill Center for Conservation and Development, Inc. Arkville, NY.

Kudish, M. 1971. Vegetational history of the Catskill High Peaks. Ph.D. dissertation, New York State College of Environmental Science and Forestry, Syracuse, NY.

Kudish, M. 1989. First growth areas in the Catskills. Unpublished report. Paul Smiths College, Paul Smiths, NY.

McIntosh, R.P. 1972. Forests of the Catskill Mountains, New York. *Ecological Monographs*, vol. 42: pp. 143-161.

McIntosh, R.P. and R.T. Hurley. 1964. The spruce-fir forests of the Catskill Mountains. *Ecology* 45: 314-326.

Meck, C. and G. Hoover. 1992. *Great rivers - great hatches*. Stackpole Books, Harrisburg, PA.

New York State Biological Survey. 1987. New York State fisheries biological survey, region 3.

New York State Department of Environmental Conservation. 1995. Trout and salmon fishing. Albany, NY.

Ovellet, H. 1993. Bicknell's thrush: taxonomic status and distribution. *Wilson Bulletin* 105:545-572.

Resche, C. 1990. Ecological communities of New York State. New York Natural Heritage Program, Latham, NY. 96 p.

Satterthwaite, S. 1969. The Catskills and the future. The first of two reports for the Catskill Center for Conservation and Development, Inc. Arkville, NY. Preliminary draft.

Smith, C.L. 1985. The inland fishes of New York State. New York State, Department of Environmental Conservation, Albany, NY.

Tiner, R.W. 1995. Wetlands of New York City's watersheds: vital resources for water quality, wildlife and you. U.S. Fish and Wildlife Service, Region 5, Ecological Services, Hadley, MA. Prepared for New York City Department of Environmental Protection, Valhalla, NY.

U.S. Fish and Wildlife Service. 1983. Natural recovery plan for northern monkshood (*Aconitum noveboracense*). Region 3 office, Fort Snelling, MN.

U.S. Fish and Wildlife Service. 1983. Northern states bald eagle recovery plan. U.S. Fish and Wildlife Service, Fort Snelling, MN.

Van Valkenburgh, N.J. 1985. *New York State Forest Preserve centennial fact book*. New York State Department of Environmental Conservation, Albany, NY.





<i>Ambystoma maculatum</i>	spotted salamander	G5		S5	U/SC	S3	D	BW4	+
<b>REPTILES</b>									+
<i>Crotalus horridus</i>	timber rattlesnake	G5		S3	T	S2	E	BW2	+
<i>Heterodon platirhinos</i>	eastern hognose snake	G5		S3S4	U/SC	S5	D	BW4	+
<i>Clemmys guttata</i>	spotted turtle	G5		S4	U/SC	S5		BW4BW5	+
<i>Clemmys insculpta</i>	wood turtle	G4		S4	G/SC	S3	T	BW2	+
<i>Terrapene c. carolina</i>	eastern box turtle	G5		S4	G (SC)	S5	S	BW4	+
<b>BIRDS</b>									+
<i>Ardea herodias</i>	great blue heron	G5		S5	P	S2	T/S	BW2BW3	B
<i>Branta canadensis</i>	Canada goose	G5		S5	G	S5		BW5	B
<i>Aix sponsa</i>	wood duck	G5		S5	G	S5		BW5	B
<i>Anas platyrhynchos</i>	mallard	G5		S5	G	S5		BW5	B
<i>Anas rubripes</i>	American black duck	G4		S4	G	S4		BW4	B
<i>Lophodytes cucullatus</i>	hooded merganser	G5		S4	G	SN		BW2	B
<i>Mergus merganser</i>	common merganser	G5		S5	G	S4		BW4	B
<i>Accipiter striatus</i>	sharp-shinned hawk	G5		S4	P (SC)	S1	U/U	BW2	B
<i>Buteo lineatus</i>	red-shouldered hawk	G5		S4	T (SC)	S2	E/T	BW1	B
<i>Buteo platypterus</i>	broad-winged hawk	G5		S5	P	S4	S/S	BW4	B
<i>Haliaeetus leucocephalus</i>	bald eagle	G3G4	T	S1B,S1N	E	S1	E	BW1	B/W
<i>Coccyzus americanus</i>	yellow-billed cuckoo	G5		S5	P	S4	S/S	BW4	B
<i>Coccyzus erythrophthalmus</i>	black-billed cuckoo	G5		S5	P	S4	S/S	BW3	B
<i>Aegolius acadicus</i>	northern saw-whet owl	G5		S3	P	SN		BW1	B
<i>Strix varia</i>	barred owl	G5		S5	P	S3	T/T	BW3	B
<i>Caprimulgus vociferus</i>	whip-poor-will	G5		S4	P (SC)	S4	D/S	BW3	B
<i>Archilochus colubris</i>	ruby-throated hummingbird	G5		S5	P	S4	D/S	BW4	B

<i>Chaetura pelagica</i>	chimney swift	G5		S5	P	S5	S/S	BW4BW5	B
<i>Dryocopus pileatus</i>	pileated woodpecker	G5		S5	P	S4	S/S	BW3BW4	B
<i>Melanerpes erythrocephalus</i>	red-headed woodpecker	G5		S4	P (SC)	S3	T/T	BW3	B
<i>Sphyrapicus varius</i>	yellow-bellied sapsucker	G5		S5	P	SN	S	BW3	B
<i>Contopus virens</i>	eastern wood-pewee	G5		S5	P	S4	S/S	BW4	B
<i>Empidonax alnorum</i>	alder flycatcher	G5		S5	P	S3	S/S	BW3	B?
<i>Empidonax flaviventris</i>	yellow-bellied flycatcher	G5		S3	P	SN	S	BW1	B
<i>Empidonax minimus</i>	least flycatcher	G5		S5	P	S4	S/S	BW3BW4	B
<i>Empidonax traillii</i>	willow flycatcher	G5		S5	P	S4	INC/S	BW4	B
<i>Empidonax virescens</i>	acadian flycatcher	G5		S3	P	S4	INC/S	BW3	B?
<i>Myiarchus crinitus</i>	great crested flycatcher	G5		S5	P	S4	S/S	BW4BW5	B
<i>Nuttallornis borealis</i>	olive-sided flycatcher	G5		S5	P	SN	S	BW1	B
<i>Tyrannus tyrannus</i>	eastern kingbird	G5		S5	P	S5	D/D	BW4BW5	B
<i>Hirundo pyrrhonota</i>	cliff swallow	G5		S5	P	S2	T/S	BW2	B
<i>Stelidopteryx serripennis</i>	northern rough-winged swallow	G5		S5	P	S4	S/S	BW4	B
<i>Corvus corax</i>	common raven	G5		S4	P/SC (P)	S1	EX	BW1	B
<i>Certhia americana</i>	brown creeper	G5		S5	P	S4	S/S	BW3BW4	B
<i>Catharus bicknellii</i>	Bicknell's thrush			S2S3	P	SN	S	BW1	B
<i>Catharus fuscescens</i>	veery	G5		S5	P	S4	S/S	BW4	B
<i>Catharus guttatus</i>	hermit thrush	G5		S5	P	S4	S/S	BW3	B
<i>Catharus ustulatus</i>	Swainson's thrush	G5		S5	P	SN	S	BW1	B
<i>Hylocichla mustelina</i>	wood thrush	G5		S5	P	S5	S/S	BW4	B
<i>Polioptila caerulea</i>	blue-gray gnatcatcher	G5		S5	P	S4	INC/S	BW4	B

<i>Sialia sialis</i>	eastern bluebird	G5		S5	P/SC (P)	S4	S	BW4	B
<i>Dumetella carolinensis</i>	gray catbird	G5		S5	P	S5	S/S	BW5	B
<i>Vireo flavifrons</i>	yellow-throated vireo	G5		S5	P	S4	S/S	BW4	+
<i>Vireo solitarius</i>	solitary vireo	G5		S5	P	S3	S/S	BW3	+
<i>Dendroica caerulescens</i>	black-throated blue warbler	G5		S5	P	S4	S/S	BW3	B
<i>Dendroica coronata</i>	yellow-rumped warbler	G5		S5	P	S4	S/S	BW2BW3	B
<i>Dendroica discolor</i>	prairie warbler	G5		S5	P	S5	S/S	BW4BW5	B?
<i>Dendroica fusca</i>	blackburnian warbler	G5		S5	P	S4	S/S	BW3	B
<i>Dendroica magnolia</i>	magnolia warbler	G5		S5	P	S4	S/S	BW3	B
<i>Dendroica pensylvanica</i>	chestnut-sided warbler	G5		S5	P	S4	S/S	BW4	B
<i>Dendroica striata</i>	blackpoll warbler	G5		S3	P	SN	S	BW1	B
<i>Dendroica virens</i>	black-throated green warbler	G5		S5	P	SN	S	BW3	B
<i>Helmitheros vermivorus</i>	worm-eating warbler	G5		S4	P	S4	S/S	BW3	B?
<i>Mniotilta varia</i>	black-and-white warbler	G5		S5	P	S4	S/S	BW4	B
<i>Oporomis philadelphia</i>	mourning warbler	G5		S5	P	SN	S	BW1	B
<i>Seiurus aurocapillus</i>	ovenbird	G5		S5	P	S5	S/S	BW4	B
<i>Seiurus motacilla</i>	Louisiana waterthrush	G5		S5	P	S4	S/S	BW4	B
<i>Seiurus noveboracensis</i>	northern waterthrush	G5		S5	P	S4	S/S	BW3	B
<i>Setophaga ruticilla</i>	American redstart	G5		S5	P	S5	S/S	BW4BW5	B
<i>Vermivora chrysoptera</i>	golden-winged warbler	G4		S4	P (SC)	S3	D/S	BW3	B
<i>Vermivora pinus</i>	blue-winged	G5		S5	P	S4	INC/S	BW4	B

	warbler								
<i>Vermivora ruficapilla</i>	Nashville warbler	G5		S5	P	S3	S/S	BW3	B
<i>Wilsonia canadensis</i>	Canada warbler	G5		S5	P	S4	S/S	BW3	B
<i>Piranga olivacea</i>	scarlet tanager	G5		S5	P	S4	S	BW4	B
<i>Pheucticus ludovicianus</i>	rose-breasted grosbeak	G5		S5	P	S4	S/S	BW4	B
<i>Junco hyemalis</i>	dark-eyed junco	G5		S5	P	S4	S/S	BW3BW4	B
<i>Passerculus sandwichensis</i>	savannah sparrow	G5		S5	P	S2	T/T	BW3	B?
<i>Pipilo erythrophthalmus</i>	rufous-sided towhee	G5		S5	P	S5	S/S	BW4	B
<i>Zonotrichia albicollis</i>	white-throated sparrow	G5		S5	P	SN	S/S	BW2	B
<i>Dolichonyx oryzivorus</i>	bobolink	G5		S5	P	S2	T/T	BW3	B
<i>Icterus spurius</i>	northern oriole	G5		S5	P	S5	S/S	BW4BW5	B
<i>Carduelis pinus</i>	pine siskin	G5		S5	P	SN	S	BW1BW2	B?
<i>Carpodacus purpureus</i>	purple finch	G5		S5	P	S4	S/S	BW3	B
<b>MAMMALS</b>									+
<i>Lynx rufus</i>	bobcat	G5		S3S4	G	S4	E/G	BW3	+
<i>Lutra canadensis</i>	river otter	G5		S5	G	S4		BW4	+
<i>Martes pennanti</i>	fisher	G5		S4	G	SX		BW1	+
<i>Ursus americanus</i>	black bear	G5		S5	G	S3		BW4	+
<b>VASCULAR PLANTS</b>									+
<i>Vittaria appalachiana</i>	Appalachian vittaria	G4		S1	E	NA		BW1	+
<i>Dryopteris fragrans</i>	fragrant cliff wood-fern	G5		S1	T	NA		BW1	+
<i>Gymnocarpium dryopteris</i>	oak fern	G5		C		S2		BW4	+
<i>Carex brunnescens</i>	brownish sedge	G5		C		S1	E	BW3BW4	+
<i>Carex bushii</i>	Bush's sedge	G4		S3	R	S1	E	BW2	+
<i>Carex seorsa</i>	weak stellate sedge	G4		S2	R	S4		BW3BW4	+
<i>Streptopus roseus</i>	rosy twisted-stalk bellwort	G5		C		S1	E	BW3BW4	+
<i>Triphora trianthophora</i>	three birds orchid	G4		S1	V	S1	E	BW1	+

<i>Ilex montana</i>	mountain holly	G5		C		S1	E	BW1?	+
<i>Aster schreberi</i>	large-leaf aster	G5		S3	U	S4		BW3BW4	+
<i>Cynoglossum virginianum</i> var. <i>virginianum</i>	wild comfrey	G5T5		SH	U	S2		BW1	+
<i>Viburnum edule</i>	squashberry	G5		S2	R	NA		BW1	+
<i>Sedum rosea</i>	roseroot stonecrop	G5		S1	E	NA?		BW1?	+
<i>Scutellaria integrifolia</i>	hyssop skullcap	G5		S1	U	C		BW3BW4	+
<i>Polemonium vanbruntiae</i>	Jacob's ladder	G3	3C	S3	T	SX.1		BW1	+
<i>Aconitum noveboracense</i>	northern wild monkshood	G3	T	S2	T	NA		BW1	+
<i>Potentilla tridentata</i>	three-toothed cinquefoil	G5		C		S1.1	E	BW2	+
<i>Salix lucida</i>	shining willow	G5		C		S2		BW3?	+
<i>Viola canadensis</i>	Canada violet	G5		C		S1	E	BW3?	+
<b>COMMUNITIES AND ECOSYSTEMS</b>									+
Red Maple-Tamarack Peat Swamp		G3G4		S2S3	U			BW1	+
Pitch Pine-Oak-Heath Rocky Summit		G4		S3S4	U			BW2	+
Ice Cave Talus Community		G3?		S1S2	U			BW1	+
Spruce-Fir Rocky Summit		G4		S3S4	U			BW1	+
Chestnut Oak Forest		G3G4		S4	U	S4		BW4	+
Hemlock-Northern Hardwood Forest		G4G5		S4	U	S3S4		BW3	+
Mountain Fir Forest		G3G4		S2S3	U			BW1	+
<i>See Appendix I for definition of federal, global, state, and bight watershed (BW) ranks and status</i>									
<i>Catskills column contains codes indicating the status of a species population within the Catskill High Peaks habitat complex :</i>									
<i>+ = known to occur in the area; seasonal use not specified; B = breeds in the area; S = regular non-breeding use in the summer</i>									
<i>M = migrates through the area and has identifiable migratory stopover or staging areas within the area; W = overwinters in the area</i>									
<i>P = primarily pelagic; ? = unconfirmed or questionable occurrence or seasonal use; H = occurred historically in the area</i>									