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**Upper Hudson Table 1.** Multi-Resolution Land Classification (MRLC) land cover classifications and corresponding percent cover in the Upper Hudson River Basin.

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<b>Classification</b>	<b>% Cover</b>
Deciduous Forest	40.91
Mixed Forest	19.17
Evergreen Forest	11.07
Pasture/Hay	10.71
Row Crops	7.08
Low Intensity Residential	2.96
Water	2.75
Wooded Wetlands	2.22
High Intensity Commercial/Industrial	1.21
High Intensity Residential	0.91
Parks, Lawns, Golf Courses	0.65
Emergent Wetlands	0.26
Barren; Quarries, Strip Mines, Gravel Pits	0.10

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**Upper Hudson Table 2.** Species of Greatest Conservation Need currently occurring in the Upper Hudson River Basin (n=158). Species are sorted alphabetically by taxonomic group and species common name. The Species Group designation is included, indicating which Species Group Report in the appendix will contain the full information about the species. The Stability of this basin's population is also indicated for each species.

TaxaGroup	Species	SpeciesGroup	Stability
Bird	Bald eagle	Bald Eagle	Increasing
Bird	Barn owl	Barn owl	Unknown
Bird	Cape May warbler	Boreal forest birds	Unknown
Bird	Olive-sided flycatcher	Boreal forest birds	Decreasing
Bird	Rusty blackbird	Boreal forest birds	Unknown
Bird	Spruce grouse	Boreal forest birds	Decreasing
Bird	Tennessee warbler	Boreal forest birds	Unknown
Bird	Three-toed woodpecker	Boreal forest birds	Unknown
Bird	American black duck	Breeding waterfowl	Decreasing
Bird	Blue-winged teal	Breeding waterfowl	Decreasing
Bird	Common loon	Common loon	Increasing
Bird	Common nighthawk	Common nighthawk	Decreasing
Bird	Black-throated blue warbler	Deciduous/mixed forest breeding birds	Stable
Bird	Cerulean warbler	Deciduous/mixed forest breeding birds	Increasing
Bird	Louisiana waterthrush	Deciduous/mixed forest breeding birds	Unknown
Bird	Red-headed woodpecker	Deciduous/mixed forest breeding birds	Decreasing
Bird	Scarlet tanager	Deciduous/mixed forest breeding birds	Decreasing
Bird	Wood thrush	Deciduous/mixed forest breeding birds	Decreasing
Bird	Worm-eating warbler	Deciduous/mixed forest breeding birds	Decreasing
Bird	American woodcock	Early successional forest/shrubland birds	Decreasing
Bird	Black-billed cuckoo	Early successional forest/shrubland birds	Decreasing
Bird	Blue-winged warbler	Early successional forest/shrubland birds	Decreasing
Bird	Brown thrasher	Early successional forest/shrubland birds	Decreasing
Bird	Canada warbler	Early successional forest/shrubland birds	Decreasing
Bird	Golden-winged warbler	Early successional forest/shrubland birds	Decreasing
Bird	Prairie warbler	Early successional forest/shrubland birds	Increasing
Bird	Ruffed grouse	Early successional forest/shrubland birds	Decreasing
Bird	Whip-poor-will	Early successional forest/shrubland birds	Decreasing
Bird	Willow flycatcher	Early successional forest/shrubland birds	Decreasing
Bird	Cooper's hawk	Forest breeding raptors	Increasing
Bird	Golden eagle	Forest breeding raptors	Decreasing
Bird	Long-eared owl	Forest breeding raptors	Unknown
Bird	Northern goshawk	Forest breeding raptors	Increasing
Bird	Red-shouldered hawk	Forest breeding raptors	Increasing
Bird	Sharp-shinned hawk	Forest breeding raptors	Increasing
Bird	American bittern	Freshwater marsh nesting birds	Decreasing
Bird	King rail	Freshwater marsh nesting birds	Decreasing
Bird	Least bittern	Freshwater marsh nesting birds	Stable
Bird	Pied-billed grebe	Freshwater marsh nesting birds	Decreasing
Bird	Yellow rail	Freshwater marsh nesting birds	Unknown
Bird	Bobolink	Grassland birds	Decreasing
Bird	Eastern meadowlark	Grassland birds	Decreasing
Bird	Grasshopper sparrow	Grassland birds	Decreasing
Bird	Horned lark	Grassland birds	Decreasing
Bird	Northern harrier	Grassland birds	Unknown
Bird	Sedge wren	Grassland birds	Unknown
Bird	Upland sandpiper	Grassland birds	Decreasing
Bird	Vesper sparrow	Grassland birds	Decreasing
Bird	Bicknell's thrush	High Altitude Conifer Forest Birds	Unknown
Bird	Osprey	Osprey	Stable
Bird	Peregrine falcon	Peregrine falcon	Increasing
Bird	Buff-breasted sandpiper	Transient shorebirds	Unknown
Crustacea/Meristomata	Blue crab	Blue crab	Unknown
Freshwater fish	Blackchin shiner	Blackchin shiner	Unknown
Freshwater fish	Brook trout, Heritage strains	Brook trout, Heritage strains	Stable
Freshwater fish	Comely shiner	Comely shiner	Stable
Freshwater fish	Round whitefish	Round whitefish	Decreasing
Herpetofauna	Eastern box turtle	Box Turtle	Decreasing
Herpetofauna	Eastern spadefoot	Eastern Spadefoot Toad	Unknown
Herpetofauna	Four-toed salamander	Freshwater wetland amphibians	Unknown
Herpetofauna	Fowler's toad	Freshwater wetland amphibians	Decreasing
Herpetofauna	Northern cricket frog	Freshwater wetland amphibians	Decreasing
Herpetofauna	Eastern ribbonsnake	Lake/river reptiles	Unknown
Herpetofauna	Northern map turtle	Lake/river reptiles	Unknown
Herpetofauna	Spiny softshell	Lake/river reptiles	Unknown
Herpetofauna	Wood turtle	Lake/river reptiles	Unknown
Herpetofauna	Common five-lined skink	Lizards	Unknown

Upper Hudson Table 2. (continued)

TaxaGroup	Species	SpeciesGroup	Stability
Herpetofauna	Snapping turtle	Snapping Turtle	Unknown
Herpetofauna	Longtail salamander	Stream salamanders	Decreasing
Herpetofauna	Northern red salamander	Stream salamanders	Unknown
Herpetofauna	Blanding's turtle	Uncommon turtles of wetlands	Decreasing
Herpetofauna	Bog turtle	Uncommon turtles of wetlands	Decreasing
Herpetofauna	Spotted turtle	Uncommon turtles of wetlands	Unknown
Herpetofauna	Stinkpot	Uncommon turtles of wetlands	Unknown
Herpetofauna	Blue-spotted salamander	Vernal pool salamanders	Unknown
Herpetofauna	Jefferson salamander	Vernal pool salamanders	Unknown
Herpetofauna	Marbled salamander	Vernal pool salamanders	Decreasing
Herpetofauna	Black ratsnake	Woodland/grassland snakes	Decreasing
Herpetofauna	Eastern hognose snake	Woodland/grassland snakes	Decreasing
Herpetofauna	Northern black racer	Woodland/grassland snakes	Decreasing
Herpetofauna	Northern copperhead	Woodland/grassland snakes	Unknown
Herpetofauna	Smooth greensnake	Woodland/grassland snakes	Decreasing
Herpetofauna	Timber rattlesnake	Woodland/grassland snakes	Decreasing
Herpetofauna	Worm snake	Woodland/grassland snakes	Decreasing
Insect	Barrens buck moth	Barrens buck moth	Unknown
Insect	Karner blue	Karner blue butterfly	Decreasing
Insect	Black meadowhawk	Odonates of bogs/fens/ponds	Unknown
Insect	Ebony boghaunter	Odonates of bogs/fens/ponds	Unknown
Insect	Forcipate emerald	Odonates of bogs/fens/ponds	Unknown
Insect	Incurvate emerald	Odonates of bogs/fens/ponds	Unknown
Insect	Taper-tailed darner	Odonates of bogs/fens/ponds	Unknown
Insect	Comet darner	Odonates of lakes/ponds	Unknown
Insect	Lake emerald	Odonates of lakes/ponds	Unknown
Insect	New England bluet	Odonates of lakes/ponds	Unknown
Insect	Spatterdock darner	Odonates of lakes/ponds	Unknown
Insect	American rubyspot	Odonates of rivers/streams	Unknown
Insect	Blue-tipped dancer	Odonates of rivers/streams	Unknown
Insect	Brook snaketail	Odonates of rivers/streams	Unknown
Insect	Common sanddragon	Odonates of rivers/streams	Unknown
Insect	Extra-striped snaketail	Odonates of rivers/streams	Unknown
Insect	Midland clubtail	Odonates of rivers/streams	Unknown
Insect	Pygmy snaketail	Odonates of rivers/streams	Unknown
Insect	Rapids clubtail	Odonates of rivers/streams	Unknown
Insect	Russet-tipped clubtail	Odonates of rivers/streams	Unknown
Insect	Septima's clubtail	Odonates of rivers/streams	Unknown
Insect	Arrowhead spiketail	Odonates of seeps/rivulets	Unknown
Insect	Tiger spiketail	Odonates of seeps/rivulets	Unknown
Insect	Mocha emerald	Odonates of small forest streams	Unknown
Insect	Ocellated emerald	Odonates of small forest streams	Unknown
Insect	Brazilian skipper	Other butterflies	Unknown
Insect	Checkered white	Other butterflies	Decreasing
Insect	Frosted elfin	Other butterflies	Decreasing
Insect	Henry's elfin	Other butterflies	Unknown
Insect	Mottled duskywing	Other butterflies	Decreasing
Insect	Northern metalmark	Other butterflies	Decreasing
Insect	Northern oak hairstreak	Other butterflies	Stable
Insect	Persius duskywing	Other butterflies	Unknown
Insect	Regal fritillary	Other butterflies	Unknown
Insect	Silvery blue	Other butterflies	Decreasing
Insect	Tawny crescent	Other butterflies	Decreasing
Insect	<i>Semiothisa banksianae</i>	Other moths	Unknown
Insect	<i>Apamea inordinata</i>	Other moths	Unknown
Insect	<i>Phoberia orthosioides</i>	Other moths	Unknown
Insect	Acadian swordgrass moth	Other moths	Unknown
Insect	Coastal barrens buckmoth	Other moths	Unknown
Insect	Golden aster flower moth	Other moths	Unknown
Insect	Pine barrens zanclognatha	Other moths	Unknown
Insect	Pine devil	Other moths	Unknown
Insect	<i>Cicindela patruela</i>	Pine barrens tiger beetles	Decreasing
Insect	<i>Cicindela ancociscconensis</i>	Riparian tiger beetles	Unknown
Insect	<i>Eurylophella bicoloroides</i>	Stoneflies/Mayflies of lotic waters	Unknown
Insect	<i>Epeorus suffusus</i>	Stoneflies/Mayflies of lotic waters	Unknown
Insect	<i>Heptagenia culacantha</i>	Stoneflies/Mayflies of lotic waters	Unknown

Upper Hudson Table 2. (continued)

TaxaGroup	Species	SpeciesGroup	Stability
Insect	<i>Brachycercus maculatus</i>	Stoneflies/Mayflies of lotic waters	Unknown
Insect	Tomah mayfly	Tomah mayfly	Unknown
Mammal	American marten	Furbearers	Unknown
Mammal	River otter	Furbearers	Stable
Mammal	New England cottontail	Game species of concern	Decreasing
Mammal	Indiana bat	Indiana Bat	Increasing
Mammal	Eastern red bat	Tree bats	Unknown
Mammal	Hoary bat	Tree bats	Unknown
Mammal	Silver-haired bat	Tree bats	Unknown
Marine fish	American eel	American eel	Unknown
Marine fish	American shad	American shad	Decreasing
Marine fish	Atlantic sturgeon	Atlantic sturgeon	Unknown
Marine fish	Alewife	Alewife	Decreasing
Marine fish	Blueback herring	Blueback herring	Unknown
Marine fish	Common pipefish	Estuarine associates of SAV	Unknown
Marine fish	Threespine stickleback	Estuarine associates of SAV	Unknown
Marine fish	Fourspine stickleback	Estuarine associates of SAV	Unknown
Marine fish	Rainbow smelt	Rainbow smelt	Decreasing
Marine fish	Shortnose sturgeon	Shortnose sturgeon	Stable
Marine fish	Atlantic tomcod	Tomcod	Unknown
Mollusk	Alewife floater	Freshwater bivalves	Decreasing
Mollusk	Eastern pearlshell	Freshwater bivalves	Unknown
Mollusk	Eastern pondmussel	Freshwater bivalves	Unknown
Mollusk	Elktoe	Freshwater bivalves	Unknown
Mollusk	Yellow lamp mussel	Freshwater bivalves	Unknown

**Upper Hudson Table 3.** Upper Hudson River species diversity relative to the total number of SGCN statewide.

Taxa Group	# Species Groups in the Basin	# Species in the Basin	Total # SGCN Statewide	% of Total SGCN for this Group
<b>BIRDS</b>	<b>15</b>	<b>52</b>	<b>118</b>	<b>44.1</b>
Bald Eagle		1		
Barn Owl		1		
Boreal Forest Birds		6	7	85.7
Breeding Waterfowl		2	4	50.0
Common Loon		1		
Common Nighthawk		1		
Deciduous/Mixed Forest Breeding Birds		7	9	77.8
Early Successional Forest Breeding Birds		10	12	83.3
Forest Breeding Raptors		6	6	100.0
Freshwater Marsh Nesting Birds		5	6	83.3
Grassland Birds		8	11	72.7
High-Altitude Conifer Forest Birds		1	1	100.0
Osprey		1		
Peregrine Falcon		1		
Transient Shorebirds		1	14	7.1
<b>CRUSTACEA</b>	<b>1</b>	<b>1</b>	<b>7</b>	<b>14.3</b>
Blue Crab		1		
<b>FRESHWATER FISH</b>	<b>4</b>	<b>4</b>	<b>40</b>	<b>10.0</b>
Blackchin Shiner		1		
Heritage-Strain Brook Trout		1		
Comely Shiner		1		
Round Whitefish		1		
<b>HERPETOFAUNA</b>	<b>10</b>	<b>27</b>	<b>44</b>	<b>61.4</b>
Box Turtle		1		
Eastern Spadefoot Toad		1		
Freshwater Wetland Amphibian		3	5	60.0
Lake/River Reptiles		4	5	80.0
Lizards		1	3	33.3
Snapping Turtle		1		
Stream Salamanders		2	2	100.0
Uncommon Turtles of Wetlands		4	5	80.0
Vernal Pool Salamanders		3	4	75.0
Woodland/Grassland Snakes		7	8	87.5
<b>INSECT</b>	<b>13</b>	<b>51</b>	<b>197</b>	<b>25.9</b>
Barrens Buckmoth		1		
Karner Blue Butterfly		1		
Odonates of Bogs/Fens/Ponds		5	10	50.0
Odonates of Lakes/Ponds		4	5	80.0
Odonates of Rivers/Streams		10	19	52.6
Odonates of Seeps/Rivulets		2	4	50.0
Odonates of Small Forest Streams		2	3	66.7
Other Butterflies		11	18	61.1
Other Moths		8	92	8.7
Pine Barrens Tiger Beetles		1	3	33.3
Riparian Tiger Beetles		1	2	50.0
Stoneflies/Mayflies - Lotic		4	20	20.0
Tomah Mayfly		1		
<b>MAMMAL</b>	<b>4</b>	<b>7</b>	<b>21</b>	<b>33.3</b>
Furbearers		2	2	100.0
Game Species of Concern		1		
Indiana Bat		1		
Tree Bats		3	3	100.0
<b>MARINE FISH</b>	<b>9</b>	<b>11</b>	<b>51</b>	<b>21.6</b>
Alewife		1		
American Eel		1		
American Shad		1		
Atlantic Sturgeon		1		
Blueback Herring		1		
Estuarine Associates of SAV		3	5	60.0
Rainbow Smelt		1		
Shortnose Sturgeon		1		
Tomcod		1		
<b>MOLLUSK</b>	<b>1</b>	<b>5</b>	<b>59</b>	<b>8.5</b>
Freshwater Bivalves		5	39	12.8
<b>TOTAL</b>	<b>57</b>	<b>158</b>	<b>537</b>	<b>29.4</b>
<b>% of all spp groups statewide</b>	<b>44.5%</b>			

**Upper Hudson Table 4.** SGCN that historically occurred in the Upper Hudson River Basin, but are now believed to be extirpated from the basin (n=53).

Taxa Group	Species	Species Group
Crustacea/Meristomata	Piedmont groundwater amphipod	Freshwater crustacea
Herpetofauna	Tiger salamander	Vernal pool salamanders
Insect	Ringed boghaunter	Odonates of bogs/fens/ponds
Insect	Subarctic damner	Odonates of bogs/fens/ponds
Insect	Ringed emerald	Odonates of high elevation lakes
Insect	Arrow clubtail	Odonates of rivers/streams
Insect	Cobra clubtail	Odonates of rivers/streams
Insect	Riverine clubtail	Odonates of rivers/streams
Insect	Skilllet clubtail	Odonates of rivers/streams
Insect	Gray petaltail	Odonates of seeps/rivulets
Insect	A noctuid moth ( <i>Abagrotis barnesi</i> )	Other moths
Insect	A noctuid moth ( <i>Agrotis obliqua</i> )	Other moths
Insect	A noctuid moth ( <i>Amphipoea erepta ryensis</i> )	Other moths
Insect	A noctuid moth ( <i>Anomogyna rhaetica</i> )	Other moths
Insect	A noctuid moth ( <i>Apamea inordinata</i> )	Other moths
Insect	A noctuid moth ( <i>Apamea mixta</i> )	Other moths
Insect	A noctuid moth ( <i>Chaetagnaea cerata</i> )	Other moths
Insect	A noctuid moth ( <i>Chytonix ruperti</i> )	Other moths
Insect	A noctuid moth ( <i>Chytonix sensilis</i> )	Other moths
Insect	A noctuid moth ( <i>Eucloptocnemis fimbriaris</i> )	Other moths
Insect	A noctuid moth ( <i>Euxoa lidia thanatologia</i> )	Other moths
Insect	A noctuid moth ( <i>Euxoa pleuritica</i> )	Other moths
Insect	A noctuid moth ( <i>Fagitana littera</i> )	Other moths
Insect	A noctuid moth ( <i>Fishia enthea</i> )	Other moths
Insect	A noctuid moth ( <i>Heterocampa varia</i> )	Other moths
Insect	A noctuid moth ( <i>Hydraecia stramentosa</i> )	Other moths
Insect	A noctuid moth ( <i>Lithophane lepida lepida</i> )	Other moths
Insect	A noctuid moth ( <i>Orthodes obscura</i> )	Other moths
Insect	A noctuid moth ( <i>Paectes abrostolella</i> )	Other moths
Insect	A noctuid moth ( <i>Phoberia orthosioides</i> )	Other moths
Insect	A noctuid moth ( <i>Psaphida thaxteriana</i> )	Other moths
Insect	A noctuid moth ( <i>Richia acclivis</i> )	Other moths
Insect	A noctuid moth ( <i>Schinia bifascia</i> )	Other moths
Insect	A noctuid moth ( <i>Synedoida adumbrata</i> )	Other moths
Insect	A noctuid moth ( <i>Zale largera</i> )	Other moths
Insect	Barrens dagger moth	Other moths
Insect	Bird dropping moth	Other moths
Insect	Imperial moth	Other moths
Insect	Pink sallow	Other moths
Mammal	Canada lynx	Extirpated large mammals
Mammal	Eastern cougar	Extirpated large mammals
Mammal	Gray wolf	Extirpated large mammals
Mollusk	Green floater	Freshwater bivalves
Mollusk	Paper pondshell	Freshwater bivalves
Mollusk	Pink heelsplitter	Freshwater bivalves
Mollusk	Pocketbook	Freshwater bivalves
Mollusk	Tidewater mucket	Freshwater bivalves
Mollusk	Buffalo pebblesnail	Freshwater gastropods
Mollusk	Campeloma spire snail	Freshwater gastropods
Mollusk	Globe siltsnail	Freshwater gastropods
Mollusk	Lance aplexa	Freshwater gastropods
Mollusk	Mossy valvata	Freshwater gastropods
Mollusk	Watercress snail	Freshwater gastropods

**Upper Hudson Table 5.** Significant biodiversity areas of the Hudson River Estuary corridor that fall within the Upper Hudson River Basin (n=12). More detailed descriptions of these habitats and the species and threats associated with them can be found in Penhollow et al. (2002).

Significant Biodiversity Area	County	DEC Region	Acres	Description
Albany Pine Bush	Albany	4	9,000	The largest remaining inland pine barrens in the Hudson River Estuary Corridor. Contains globally rare pitch pine scrub oak barrens and pine-barrens vernal pools, as well as rare butterflies (e.g., Karner blue butterfly) and moths. Threats to this habitat include suppression of fire resulting in the conversion of pine barrens to hardwood forest, and invasive exotic and native plant species.
Catskill Mountains	Delaware, Greene, Sullivan, Ulster	3, 4	435,000 in Greene & Ulster counties (485K total)	Contains major unfragmented forests, including first growth forest, as well as alpine communities and pristine headwater streams. Predominant vegetation types are beech-maple mesic forests and hemlock-northern hardwood forest. Supports regionally significant populations of forest interior nesting birds including Bicknell's thrush in high altitude spruce-fir forests, bald eagle, timber rattlesnake, spotted turtle, wood turtle, and rare plant communities. Threats include Incompatible residential & commercial development.
Dutchess County Wetlands	Dutchess	3	66,000	A network of four major wetland complexes (Milan Window, Stissing Mountain, La Grange/East Fishkill, East Park/Hyde Park) that provide important habitat for the most diverse turtle community in the State including Blanding's turtle, bog turtle, spotted turtle, wood turtle, and box turtle. Northern cricket frog, blue-spotted salamander, marbled salamander, four-toed salamander, and Eastern ribbonsnake are also found here, as well as the only consistent overwintering site by golden eagles. Important habitats include red maple-hardwood swamps, floodplain forest, deep emergent marsh, rich sloping fen, and medium fen communities. Threats include incompatible residential & commercial development, and runoff from roads, agricultural lands, and developed areas.
Esopus/Lloyd Wetlands and Ridges	Ulster	3	32,400	Contains wetland and upland habitat important to amphibians and breeding waterfowl including Northern cricket frog. Important habitats include mature hemlock-northern hardwood forest, red maple-hardwood swamp, Appalachian oak-hickory forest, beech-maple mesic forest, and one of the largest dwarf shrub bogs in the Hudson River Valley. Threats include incompatible residential development, and runoff from roads, agricultural lands, and developed areas.
Harlem Valley Calcareous Wetlands	Putnam, Dutchess, Columbia	3, 4	94,000	Found in the valleys and adjacent ridges of the Taconic Highlands, these wetlands contain high quality habitat for wetland-dependent species and some of the best bog turtle habitat in the Hudson River Valley. This area also includes adjacent upland ridge and ledge habitat important for timber rattlesnake and five-lined skink. Important habitats include red maple-hardwood swamp, floodplain forest, fens, and shallow emergent marsh. The area is comprised of two wetland complexes - the Northeast-Anoram fen complex to the north, and the Great Swamp area to the south. Threats include incompatible residential development, wetland succession, and invasive plant species (e.g., purple loosestrife).

Upper Hudson Table 5. (continued)

Significant Biodiversity Area	County	DEC Region	Acres	Description
Highlands	Dutchess, Orange, Putnam, Rockland, Westchester	3	405,300	A relatively undeveloped corridor of forests, wetlands, and grasslands of regional importance to breeding and migratory birds, resident herps, and rare plant communities. Species indicative of large, contiguous areas of undisturbed forest and wetland habitats include wood turtle, timber rattlesnake, and warblers and thrushes such as cerulean warbler. The area also contains mines used as bat hibernacula including the Indiana bat and small-footed bat. Important habitats include Appalachian oak-hickory forest, chestnut oak forest, and oak-tulip tree forest. The biggest threat is conversion and fragmentation of the area's forests and wetlands by development and roads.
Hudson Valley Limestone and Shale Ridges	Albany, Green, Ulster	3, 4	127,000	A regionally significant geologic feature that contains habitats that support rare mammal, amphibian, reptile, bird, and plant species. The area is comprised of the Helderberg escarpment to the north and the Potic Mountain ridge to the south. Important habitats include red maple-blackgum swamp, vernal pool, chestnut oak forest, Appalachian oak hickory forest, and pitch pine-oak-heath-rocky summit. Limestone caves on the Helderberg Escarpment provide bat habitat including the Indiana bat. Rare wildlife include Henslow's sparrow, upland sandpiper, sedge wren, and least bittern, spotted salamander, Jefferson salamander, blue-spotted salamander, and wood turtle. Threats include incompatible residential development and invasive plant species (e.g., garlic mustard, tree-of-heaven).
Rensselaer Plateau	Rensselaer	4	121,200	Contains a diverse mix of wetland and upland communities including spruce-fir swamp, shallow emergent marsh, sedge meadow, hemlock-northern hardwood forest, spruce flats, and boreal wetland communities. The high quality, large, contiguous nature of this area provides habitat for forest-interior bird species and large mammals (e.g., fisher, river otter). The biggest threat is conversion and fragmentation of the area's forests and wetlands by development and roads.
Rosendale Limestone Cave Complex	Ulster	3	5,000	Area consists of a series of extensive abandoned limestone mines that serve as critical habitat for several native bat species. This complex is among the top 15 sites in the world for hibernating Indiana and small-footed bats. Wetlands within the area provide habitat for Northern cricket frog and pied-billed grebe. Whiteport Wildlife Management Area is part of this complex. Threats include human disturbance to these sites.
Shawangunk Kill / Shawangunk Grasslands	Orange, Ulster	3	11,470	The Shawangunk Kill is a relatively undisturbed Hudson River tributary, flowing northeast between the Shawangunk Ridge and Walkkill River, then into the Hudson. Its relatively low nutrient levels, cool water, and lack of major water control structures allow it to support a regionally rare biological community including a high diversity of fish and mussels, unusual for the Hudson River corridor. Rare species include the brook floater, swollen wedge mussel, and wood turtle. This site includes the Shawangunk grasslands that are important for grassland birds including Henslow's sparrow, northern harrier, upland sandpiper, and short-eared owl. Threats to the Shawangunk Kill include excessive water withdrawals (impacting flow, water quality, dissolved oxygen, nutrients, and silt) for agricultural operations. Threats to the grasslands include insensitive agricultural practices (e.g., early haying).

Upper Hudson Table 5. (continued)

Significant Biodiversity Area	County	DEC Region	Acres	Description
Shawangunk Ridge	Orange, Sullivan, Ulster	3	87,000 (205K total)	Shawangunk Ridge contains a wide range of topography and substrate. The area contains habitats that range from wetland to forest to ridgetop, slope, and cliff. The forest matrix is chestnut oak forest (chestnut oak, red oak), hemlock-northern hardwood forest, and pitch pine-oak-heath rocky summit. The forest habitats are important migratory corridors for raptors and other migratory birds. Vernal pools and surrounding habitats support spotted salamander, Jefferson salamander, and long-tailed salamander. Timber rattlesnake, northern copperhead, eastern hognose snake, and five-lined skink occur at several locations. Turtles inhabiting the ridge include spotted turtles in ponds and wetlands, and wood turtles in riparian habitats. The area also supports rare odonates and moths. There are several threats to this area including forest and wetland habitat conversion and fragmentation and invasive exotics including hemlock wooly adelgid. In the future, overbrowsing by deer on vegetation could become a problem if deer populations increase. Also, radio towers could present a hazard to migratory raptors and other landbirds.
Taconic Mountains	Columbia, Dutchess, Rensselaer	3, 4	78,700	This area encompasses large areas of contiguous, high quality, northern hardwood forest, and it serves as a recharge area for numerous rich fens. Important habitats include hemlock northern hardwood forest and Appalachian oak-hickory forest. This area supports a diverse population of resident and migratory bird species as wintering and breeding habitat, and as a migratory corridor for passerine birds and raptors. Rare herp species found here include bog turtle and timber rattlesnake. The primary threat to this area is habitat fragmentation, especially on ridgetops, due to incompatible residential and other development.

**Upper Hudson Table 6.** Significant Coastal Fish and Wildlife Habitats (n=30) within the Upper Hudson River Basin. DEC evaluates the significance of coastal fish and wildlife habitat areas, and following a recommendation from DEC, the Department of State designates and maps specific areas.

Habitat Name	County	Acres	Significance Value <sup>a</sup>	Description
North and South Tivoli Bays	Dutchess	1852	162	The largest undeveloped, tidal freshwater wetland complex on the Hudson River, rare in NYS; osprey (T), least bittern (SC), wood turtle (SC), and spotted turtle (SC) have been documented; part of the Hudson River Estuarine Sanctuary; statewide significance for research and regional significance for recreational and educational uses
Hudson River Mile 44-56	Putnam	3353	148	An extensive area of deep, turbulent river channel with strong currents and rocky substrates; bald eagle (E) wintering area; possibly an important nursery for shortnose sturgeon (E); one of several important spawning areas for Hudson River striped bass; striped bass production in this area supports commercial and recreational fisheries throughout the northeastern U.S.
Ramshorn Marsh	Greene	1245	133	One of the largest tidal, forested wetlands in the Hudson Valley, a rare ecosystem type in NYS; least bittern (SC) and wood turtle (SC) have been documented; wildlife-related recreational uses
Germantown - Clermont Flats	Columbia	989	121	An extensive area of shallow, freshwater tidal flats and aquatic beds, rare in NYS; one of the major shad spawning areas in the Hudson River; some of the largest concentrations of migrant waterfowl on the Hudson; area supports commercial shad fishery of statewide significance; popular recreational fishing area in the Hudson Valley
The Flats	Ulster	581	118	An extensive area of shallow, freshwater tidal flats, rare in NYS; shortnose sturgeon (E) documented; one of the major shad spawning areas in the Hudson River; area supports a commercial shad fishery of statewide significance
Stockport Creek and Flats	Columbia	2172	115	An extensive area of undeveloped freshwater wetlands and mudflats, including a major tributary of the Hudson River; concentrations of waterfowl and various anadromous fishes unusual in the Hudson Valley ecoregion; scientific/educational value as an estuarine sanctuary is of statewide significance
Kingston Deep Water Habitat	Ulster	1768	110	An extensive area of deep, freshwater, estuarine habitat, rare in NYS; A shortnose sturgeon (E) wintering area; concentrations of sturgeon and other estuarine species; commercial netting of shad on overlying waters
Poughkeepsie Deepwater Habitat	Dutchess	2493	110	An extensive area of deep, freshwater, estuarine habitat, rare in NYS; a shortnose sturgeon (E) wintering area; concentrations of sturgeon and other estuarine species

**Upper Hudson Table 6.** (continued)

Habitat Name	County	Acres	Significance Value <sup>a</sup>	Description
Rogers Island	Columbia	656	104	One of the largest tidal, forested wetlands in the Hudson Valley, a rare ecosystem type in NYS; concentrations of various fish and wildlife species unusual in the Hudson Valley ecoregion; one of the major waterfowl hunting areas on the Hudson River and a substantial contributor to the commercial shad fishery in the region
Esopus Estuary	Ulster	961	98	One of the major freshwater tributaries of the Hudson River; includes high diversity of estuarine communities; black bass use the mouth as an overwintering area; Rare species include migratory osprey (T)
Moodna Creek	Orange	310	92	A major freshwater tributary of the lower Hudson River including the largest tidal marsh in Orange County; summer and winter use of the area by bald eagle (E), concentrations of osprey (T) during migration, least bittern (SC) nesting documented; concentrations of wetland wildlife and anadromous fishes unusual in Orange County
Fishkill Creek	Dutchess	178	80	One of the major freshwater tributaries of the lower Hudson River and a relatively large, wooded peninsula isolated from human disturbance; concentration of osprey (T) and least bittern nesting (SC) has been documented; concentrations of osprey during migration unusual in the lower Hudson Valley; concentrations of anadromous and resident fishes unusual in Dutchess County
Schodack, Houghtal Islands/Schodack Creek	Rensselaer	2067	77	A large, undeveloped floodplain and wetland ecosystem type, rare on the Hudson River; an osprey (T) roosting and feeding area has been documented; commercial shad fishery of regional significance; recreational fishing and waterfowl hunting important at county level
Esopus Meadows	Ulster	385	71	Relatively large area of shallow, freshwater tidal flats and aquatic beds, rare in NYS; shortnose sturgeon (E) may occur in the area; a major concentration area for various fish and waterfowl species in the mid-Hudson Valley; one of the most popular waterfowl hunting and recreational fishing areas on the Hudson River; commercial shad fishery of regional significance.
Rondout Creek	Ulster	519	70	One of the major freshwater tributaries of the Hudson River accessible to anadromous fishes; however, human disturbance has threatened the habitat; osprey (T) concentrate at the mouth of the creek during spring migration; black bass use the mouth as an overwintering area; recreational fishing and waterfowl hunting attract recreationists from throughout the mid-Hudson Valley
Constitution Marsh	Putnam	428	69	One of the largest, undeveloped tidal wetlands on the Hudson River; however, chemical contamination has occurred; Least bittern (SC) nest site documented

**Upper Hudson Table 6.** (continued)

Habitat Name	County	Acres	Significance Value <sup>a</sup>	Description
Vosburg Swamp and Middle Ground Flats	Greene	1307	57	An extensive area of tidal mudflats, wetlands, and littoral zones, rare in the Hudson Valley region; mud turtle (T) and least bittern (SC) may occur in this area; commercial shad fishery and waterfowl hunting important to residents of the Hudson Valley
Catskill Creek	Greene	156	54	One of the major freshwater tributaries of the Hudson River; however, human disturbance has threatened the habitat; wood turtle (SC) documented, as well as a major spawning stream for anadromous fishes; black bass use the mouth as an overwintering area; popular recreational fishing site
Wappinger Creek	Dutchess	224	54	One of the major freshwater tributaries of the lower Hudson River, containing a diversity of habitats and several rare plant species; however, human disturbance threatens this area; osprey (T) concentrate at the creek mouth during migration; black bass use the mouth as an overwintering area; popular fishing area in Dutchess County
Mill Creek Wetlands	Columbia	280	53	Tidal freshwater forested and scrub/shrub wetlands unusual in NYS; concentrations of many wildlife species
Inbocht Bay & Duck Cove	Greene	655	52	A relatively large area of sheltered littoral zones and mudflats, rare in the Hudson Valley ecoregion; some of the largest concentrations of migrant and wintering waterfowl in the Hudson Valley; one of the major waterfowl hunting areas in the Hudson Valley
Papscaene Marsh & Creek	Rensselaer	712	48	One of the major freshwater tributaries of the Hudson River; however, human disturbance has threatened the habitat; least bittern (SC) nesting has been documented; concentrations of various migratory birds and anadromous fish species uncommon in the ecozone; provides a variety of wildlife-related recreational uses for regional residents
Roeliff - Jansen Kill	Columbia	109	46	One of the major freshwater tributaries of the Hudson River which is relatively undisturbed and accessible to anadromous fishes; concentrations of various fish species unusual in Columbia County; recreational fishing opportunities attract anglers from throughout the mid-Hudson Valley
Coxsackie Island Backwater	Greene	137	35	Vegetated backwater area, unusual in the Hudson Valley ecoregion; important wintering area for bass, one of four known in the upper Hudson estuary; popular recreational fishing area
Hannacroix Creek	Greene	30	31	A relatively undisturbed freshwater tributary of the Upper Hudson River; one of only 10 significant spawning streams for anadromous fishes in the upper Hudson River; popular fishing and waterfowl hunting area for county residents

**Upper Hudson Table 6.** (continued)

Habitat Name	County	Acres	Significance Value <sup>a</sup>	Description
Normans Kill	Albany	33	31	A relatively undisturbed freshwater tributary of the Upper Hudson River; one of only 10 significant spawning streams for anadromous fishes in the upper Hudson River; popular fishing area for county residents
Coxsackie Creek	Greene	55	26	A relatively undisturbed freshwater tributary of the upper Hudson River, rare in the ecological subzone; one of only 10 significant spawning streams for anadromous fishes in the upper Hudson River; black bass use the mouth as an overwintering area
Coeymans Creek	Albany	51	26	Freshwater tributary of the Hudson River; one of only 10 significant spawning streams for anadromous fishes in the upper Hudson River; popular fishing and waterfowl hunting area for county residents
Shad and Schermerhorn Islands	Albany	1103	22	Large, undeveloped floodplain area with important littoral zones and tributary streams, uncommon in the upper-Hudson Valley; however, human disturbance has threatened the habitat; includes two significant spawning streams for anadromous fishes, including one of the top 10 in the upper-Hudson Valley; recreational hunting and fishing important to county residents
Vanderburg Cove and Shallows	Dutchess	536	20	Relatively large, sheltered freshwater tidal coves and adjoining shallows; shortnose sturgeon (E) may occur in the area; one of the major waterfowl concentration areas in Dutchess County; popular waterfowl hunting area

<sup>a</sup> Significance Value = [(Ecosystem Rarity + Species Vulnerability + Human Use + Population Level) x Replaceability]

**Upper Hudson Table 7.** Office of Parks, Recreation & Historic Preservation (OPRHP) land units (n=27) within the Upper Hudson River Basin.

Unit Name (DEC Region)	DEC Region	Acres
Bristol Beach State Park	3	209
Minnewaska State Park	3	11,610
Highland Lakes State Park	3	3,082
Storm King State Park	3	1,403
Goose Pond Mountain State Park	3	1,513
Bear Mountain State Park	3	4,787
Hudson Highlands State Park	3	5,031
James Baird State Park	3	604
Margaret Lewis Norrie State Park	3	845
Clarence Fahnestock State Park	3	10,050
Harriman State Park	3	46,725
Sterling Forest State Park	3	16,833
Lake Taghkanic State Park	4	1,563
Taconic State Park	4	5,664
Grafton Lakes State Park	4	2,310
Hudson River Islands State Park	4	96
Schodack Island State Park	4	864
Cherry Plain State Park	4	152
Peebles Island State Park	4	161
John Boyd Thacher State Park	4	1,657
Thompson's Lake State Park	4	308
Max V. Shaul State Park	4	76
Mine Kill State Park	4	464
Moreau Lake State Park	5	4,465
Saratoga Spa State Park	5	1,748
Pixley Falls State Park	6	373
Delta Lake State Park	6	311

**Upper Hudson Table 8.** NYSDEC Wildlife Management Area (WMA) land units (n=18) within the Upper Hudson River Basin.

Unit Name (DEC Region)	DEC Region	Acres
Bashakill Wildlife Management Area	3	2,957
Tivoli Bay Wildlife Management Area	3	1,722
Whiteport Wildlife Management Area	3	10
Black Creek Marsh Wildlife Management Area	4	490
Capital District Wildlife Management Area	4	4,144
Franklinton Vlaie Wildlife Management Area	4	196
Great Vly Wildlife Management Area	4	184
Knox/Margaret Burke Wildlife Management Area	4	246
Louise E. Keir Wildlife Management Area	4	177
Partridge Run Wildlife Management Area	4	4,594
Rogers Island Wildlife Management Area	4	281
Vinegar Hill Wildlife Management Area	4	394
Carter's Pond Wildlife Management Area	5	446
Parcel 45 Wildlife Management Area	5	59
Wilton Wildlife Preserve Wildlife Management Area	5	165
Oriskany Flats Wildlife Management Area	6	787
Plantation Island Wildlife Management Area	6	215
Utica Marsh Wildlife Management Area	6	213

**Upper Hudson Table 9.** NYSDEC State Forest, Wild Forest, Wilderness, Primitive Area, and Unique Area land units (n=133) within the Upper Hudson River Basin.

Unit Name	County	DEC Region	Acres
Depot Hill State Forest	Dutchess	3	267
Lafayetteville State Forest	Dutchess	3	715
Roeliff Jansen Kill State Forest	Dutchess	3	128
Stissing Mountain State Forest	Dutchess	3	596
Taconic Hereford State Forest	Dutchess	3	919
West Mountain State Forest	Dutchess	3	821
Hawk Watch Trailway	Orange	3	5
Kowawese State Unique Area	Orange	3	107
Moodna Creek Unique Area	Orange	3	60
Stewart State Forest	Orange	3	5,113
Castle Rock Unique Area	Putnam	3	130
Painter Hill State Forest	Sullivan	3	104
Roosa Gap State Forest	Sullivan	3	682
Wurtsboro Ridge State Forest	Sullivan	3	1,043
Big Indian Wilderness	Ulster	3	33,500
Hemlock Ridge State Forest	Ulster	3	51
Highwoods State Forest	Ulster	3	42
Oak Ridge State Forest	Ulster	3	100
Overlook Mountain Wild Forest	Ulster	3	563
Shawangunk Ridge State Forest	Ulster	3	1,491
Shawangunk State Forest	Ulster	3	55
Slide Mountain Wilderness	Ulster	3	47,500
Sundown Wild Forest	Ulster	3	29,132
Turkey Point State Forest	Ulster	3	138
Vernooykill State Forest	Ulster	3	3,686
Witchs Hole State Forest	Ulster	3	451
Indian Head Wilderness	Ulster/Greene	3/4	17,381
Phoenicia Wild Forest	Ulster/Greene	3/4	7,510
Shandaken Wild Forest	Ulster/Greene	3/4	5,245
West Kill Mountain Wilderness	Ulster/Greene	3/4	19,250
Cole Hill State Forest	Albany	4	871
Partridge Run State Forest	Albany	4	940
Pine Bush State Unique Area	Albany	4	1,500
Rensselaerville State Forest	Albany/Schoharie	4	2,604
Scott Patent State Forest	Albany/Schoharie	4	1,432
Beebe Hill State Forest	Columbia	4	1,402
New Forge State Forest	Columbia	4	621
Nutten Hook State Unique Area	Columbia	4	105
Stockport Creek State Wetland Preservation Area	Columbia	4	N/A
Ashland Pinnacle State Forest	Greene	4	949
Bearpen Mountain State Forest	Greene	4	2,492
Blackhead Range Wild Forest	Greene	4	11,368
Cairo-Lockwood State Forest	Greene	4	48
Colgate Lake Wild Forest	Greene	4	598
Halcott Mountain Wild Forest	Greene	4	4,817
Hunter Mountain Wild Forest	Greene	4	10,738
Huntersfield State Forest	Greene	4	1,338
Kaaterskill Wild Forest	Greene	4	11,905
Mount Pisgah State Forest	Greene	4	567
Windham High Peak Wild Forest	Greene	4	4,203
Charleston State Forest	Montgomery	4	3,947
Lost Valley State Forest	Montgomery	4	744
Rural Grove State Forest	Montgomery	4	1,295
Yatesville State Forest	Montgomery	4	724
Berlin State Forest	Rensselaer	4	1,970
Pittstown State Forest	Rensselaer	4	1,191
Taconic Ridge State Forest	Rensselaer	4	3,741
Tibbetts State Forest	Rensselaer	4	906
Featherstonhaugh State Forest	Schenectday	4	714
Armlin Hill State Forest	Schoharie	4	515
Bates State Forest	Schoharie	4	1,143
Blenheim Hill State Forest	Schoharie	4	782
Burnt-Rossman Hills State Forest	Schoharie	4	10,472
Clapper Hollow State Forest	Schoharie	4	800
Cotton Hill State Forest	Schoharie	4	513
Dutch Settlement State Forest	Schoharie	4	1,021
Dutton Ridge State Forest	Schoharie	4	1,246

Upper Hudson Table 9. (continued)

Unit Name	County	DEC Region	Acres
Gates Hill State Forest	Schoharie	4	741
High Knob State Forest	Schoharie	4	1,355
Honey Hill State Forest	Schoharie	4	1,044
Keyserville State Forest	Schoharie	4	1,159
Lutheranville State Forest	Schoharie	4	1,809
Mallet Pond State Forest	Schoharie	4	2,572
Patria State Forest	Schoharie	4	2,136
Petersburg Pass State Forest	Schoharie	4	1,087
South Mountain State Forest	Schoharie	4	1,477
Stone Store State Forest	Schoharie	4	734
Champlain II - Submerged Heritage Preserve	Essex	5	N/A
Dix Mountain Wilderness	Essex	5	44,710
Giant Mountain Wilderness	Essex	5	22,764
Hammond Pond Wild Forest	Essex	5	40,149
Hoffman Notch Wilderness	Essex	5	36,013
Blue Mountain Wild Forest	Essex/Hamilton	5	39,705
High Peaks Wilderness	Essex/Hamilton	5	190,455
Hudson Gorge Primitive Area	Essex/Hamilton	5	16,683
Gooseneck Pond Primitive Area	Essex/Warren	5	1
Pharaoh Lake Wilderness	Essex/Warren	5	44,650
Vanderwhacker Mountain Wild Forest	Essex/Warren	5	91,628
Lasselsville State Forest	Fulton	5	2,355
Peck Hill State Forest	Fulton	5	2,725
Rockwood State Forest	Fulton	5	869
Shaker Mountain Wild Forest	Fulton/Hamilton	5	40,429
Blue Ridge Wilderness	Hamilton	5	46,792
Cathead Mountain Primitive Area	Hamilton	5	212
Dug Mountain Primitive Area	Hamilton	5	50
Jessup River Wild Forest	Hamilton	5	47,408
Silver Lake Wilderness	Hamilton	5	105,795
Wakely Mountain Primitive Area	Hamilton	5	226
Siamese Ponds Wilderness	Hamilton/Warren	5	113,220
Daketown State Forest	Saratoga	5	504
Lake Desolation State Forest	Saratoga	5	445
Lincoln Mountain State Forest	Saratoga	5	1,001
Middle Grove State Forest	Saratoga	5	558
Wilcox Lake Wild Forest	Saratoga/Fulton/Hamilton/Warren	5	124,954
Land Tortoise - Submerged Heritage Preserve	Warren	5	N/A
Ralph Road State Forest	Warren	5	523
Sunken Fleet of 1758 - Submerged Heritage Preserve	Warren	5	N/A
Battenkill State Forest	Washington	5	519
Chestnut Woods State Forest	Washington	5	795
Goose Egg State Forest	Washington	5	456
Lake George Wild Forest	Washington	5	44,171
Mount Tom State Forest	Washington	5	1,723
Ferris Lake Wild Forest	Fulton/Hamilton/Herkimer	5/6	147,997
Moose River Plains Wild Forest	Hamilton/Herkimer	5/6	81,925
West Canada Lake Wilderness	Hamilton/Herkimer	5/6	169,021
West Canada Mountain Primitive Area	Hamilton/Herkimer	5/6	3,267
Black Creek State Forest	Herkimer	6	994
Hinckley State Forest	Herkimer	6	1,559
Ohisa State Forest	Herkimer	6	689
Otsquago State Forest	Herkimer	6	408
Steuben Hill State Forest	Herkimer	6	1,020
Black River Wild Forest	Herkimer/Oneida	6	108,091
Cottrell State Forest	Lewis	6	592
Mohawk Springs State Forest	Lewis	6	614
Buck Hill State Forest	Oneida	6	1,679
Clark Hill State Forest	Oneida	6	2,904
Jackson Hill State Forest	Oneida	6	1,185
Penn Mountain State Forest	Oneida	6	3,701
Point Rock State Forest	Oneida	6	1,207
South Hill State Forest	Oneida	6	517
Tassell Hill State Forest	Oneida	6	2,627
Webster Hill State Forest	Oneida	6	1,068
West Branch State Forest	Oneida	6	528

**Upper Hudson Table 10.** Bird Conservation Areas (BCA) within the Upper Hudson River Basin (n=10). NYSDEC's BCA Program, established in 1997, is modeled after the National Audubon Society's Important Bird Areas (IBA) program, which began in New York in 1996. The BCA Program applies criteria developed under the IBA program to state-owned properties.

Bird Conservation Area	County	DEC Region	Acres	Description
Catskill High Peaks <sup>1</sup>	Greene/Ulster	3	3,700	Over 3,500 feet in elevation, with dense subalpine coniferous forests. Bicknell's Thrush prefers dense thickets of stunted or young growth of balsam fir. This species of special concern is found less frequently in young or stunted spruce and heavy second growth of fir, cherry or birch. Another bird species of interest at this site is Blackpoll Warbler.
Sterling Forest <sup>2</sup>	Orange	3	16,833	Within a natural area of state and national importance due to its watershed, wildlife habitat, cultural resources, open space and outdoor recreation significance. A comprehensive inventory by the New York Natural Heritage Program indicates that most of the Park is covered by either ecological communities that have statewide significance or of such quality that they should be protected as significant examples within New York State. The Park has considerable biodiversity including a diversity of bird species. A part of the Hudson Highlands, the area has strong relief ranging from 800-1200' in elevation.
Constitution Marsh <sup>2</sup>	Putnam	3	270	Large fresh/brackish tidal marsh located on the east shore of the Hudson River. It is one of only five large tidal marshes on the Hudson River. Significant breeding bird species include Least Bittern (threatened), Virginia Rail, Marsh Wren, and Swamp Sparrow. It is an important waterfowl wintering and migratory stop-over site, particularly American black duck. Other species that use the site during migration and/or winter include Pied-billed Grebe (threatened), Osprey (special concern), Bald Eagle (threatened), Northern Harrier (threatened), and Peregrine Falcon (endangered).
Fahnestock <sup>2</sup>	Putnam	3	10,050	Large, wooded tract which includes six lakes, a hemlock/stream ravine, and some marsh habitat. Much of the forest is mature oak and mixed hardwoods with an understory of mountain laurel. Relatively large stands of hemlock are also present in some areas of the park. The BCA supports a representative community of breeding birds that prefer mature hardwood forests, as well as some marsh and water-dependent bird species.
Bashakill <sup>1</sup>	Sullivan	3	2,957	Habitat is primarily non-tidal emergent wetlands through which the Bashakill River meanders. Wetlands are surrounded by deciduous woods and mixed woods, with some shrub lands. The area hosts a number of rare plants and animals (Spreading Globeflower, Ironcolor Shiner, Spotted Sunfish and Long-tailed Salamander). Limestone caves exist in the area as well. The area supports characteristic breeding wetland-dependent species (such as Great Blue Heron, Virginia Rail, Sora and Common Moorhen), abundant waterfowl and several species at risk. Species at risk include: Pied-billed Grebe, American Bittern, Least Bittern, Osprey, Bald Eagle, Northern Harrier, Sharp-shinned Hawk, Cooper's Hawk, Northern Goshawk, and Red-shouldered Hawk. The site hosts large migratory concentrations of Canada Goose (5,000) Ring-necked Duck and Wood Duck (1,000-2,000), as well as many other species of waterfowl.

Upper Hudson Table 10. (continued)

Bird Conservation Area	County	DEC Region	Acres	Description
Helderberg <sup>1</sup>	Albany	4	6,594	An upland complex that includes hardwood and conifer (plantation) forests, young regenerating forests, old fields, shrublands, reverting farmland, wooded swamp, shrub wetlands, and numerous ponds and wetlands. Some of the species of interest include American Woodcock, Ruffed Grouse, Brown Thrasher, Eastern Towhee, Prairie Warbler, Chestnut-sided Warbler, Nashville Warbler, Blue-winged Warbler, as well as a wide variety of forest warblers and songbirds, winter finches. Woodland raptors include Northern Goshawk (special concern).
Thacher/Thompsons Lake <sup>2</sup>	Albany	4	1,800	Thacher is dominated by forested uplands. The Thompson's Lake area consists of additional upland forest, old fields and a bur oak-black ash swamp adjacent to the lake. There are 171 species of birds that have been identified within the John Boyd Thacher/Thompson's Lake BCA, of which 102 are confirmed or probable breeders, including: Sharp-shinned hawk (Special Concern), Cooper's Hawk (Special Concern), Northern Goshawk (Special Concern) and Golden-winged Warbler (Special Concern). The forests support some of the area's highest densities of breeding songbirds such as Hermit Thrush, Winter Wren, Magnolia, Black-throated Blue, Black-throated Green, Blackburnian, Canada and Worm-eating Warblers and Louisiana and Northern Waterthrushes.
Schodack Island <sup>2</sup>	Rensselaer/Columbia/Greene	4	864	A peninsula in the tidal portion of the Hudson River. Forested communities dominate the site. There are also large areas of wetlands that include tidal wetlands. Ecological communities include successional old field, successional shrubland, dredge spoil forest, freshwater intertidal mudflat, freshwater tidal marsh, freshwater tidal swamp, and floodplain forest. Cerulean Warbler and Bald Eagle are key species here, and a Great Blue Heron rookery on the island contains about 50 nests. The western side of the Island, along the Hudson River shoreline, is predominately floodplain forest, and is of particular importance in regard to its use by eagles.
Carters Pond <sup>1</sup>	Washington	5	446	Wetland/upland complex that includes open water, emergent marsh, wooded swamp, shrub wetlands, forests, old fields, grasslands, and shrublands. Species of interest include: Pied-billed Grebe (Threatened), Least Bittern (Threatened), Osprey (Special Concern), Virginia Rail, Common Moorhen, American Coot, Marsh Wren, Great Blue Heron, Green-backed Heron, American Black Duck, Blue-winged Teal and American Woodcock.
Adirondack Sub-alpine Forest <sup>1</sup>	Franklin/Clinton/Essex/Warren	5	69,000	This BCA includes Adirondack Mountain summits above 2,800 feet in Clinton, Essex, Franklin, Hamilton and Warren counties. Surveyed and confirmed nesting locations for Bicknell's Thrush include: Mount Marcy, Algonquin Peak, Blue Mountain, Cascade Mountain, Giant Mountain, Kilburn Mountain, Hurricane Mountain, Lower Wolfjaw Mountain, Lyon Mountain, Mount Haystack, Phelps Mountain, Porter Mountain, Rocky Ridge Peak, Santanoni Peak, Snowy Mountain, Vanderwhacker Mountain, Wakely Mountain, Whiteface Mountain and Wright Peak. Critical habitats include dense subalpine coniferous thickets, and to a lesser degree, young or stunted and heavy second growth of cherry or birch.

<sup>1</sup> Managing agency is NYSDEC

<sup>2</sup> Managing agency is OPRHP

**Upper Hudson Table 11.** Critical Environmental Areas (CEA) within the Upper Hudson River Basin (n=28). CEAs are traditionally designated by DEC to protect drinking water supplies; however, DEC and other government agencies may designate CEAs to protect wildlife and their habitats and other natural resource elements

Critical Environmental Area	Location	DEC Region	Reason for Designation
Clinton Hollow Hamlet	Clinton, Dutchess County	3	Exceptional or Unique Character
Clinton Cornors Hamlet	Clinton, Dutchess County	3	Exceptional or Unique Character
Old Bulls Head Hamlet	Clinton, Dutchess County	3	Exceptional or Unique Character
Hibernia Hamlet	Clinton, Dutchess County	3	Exceptional or Unique Character
Frost Mills Hamlet	Clinton, Dutchess County	3	Exceptional or Unique Character
Pleasant Plains Hamlet	Clinton, Dutchess County	3	Exceptional or Unique Character
Schultzville Hamlet	Clinton, Dutchess County	3	Exceptional or Unique Character
Dutchess County Airport Balefill	Dutchess County	3	Inactive Landfill, Toxic Pollutants Present
Aquifer Protection Areas	Fishkill, Dutchess County	3	Protect Public Water Supply
Little Whaley Lake&Watershed	Pawling, Dutchess County	3	Unpolluted Drinking Water Source
Buttercup Farm Sanctuary	Stanford, Dutchess County	3	Preserve Farmland, Wetland, & Mountain Habitat
Ryder Pond & Cagney Marsh	Stanford, Dutchess County	3	Protection of Waterfowl
Bontecou Lake	Stanford, Dutchess County	3	Protect Migratory & Nesting Birds
Snake Hill	Stanford, Dutchess County	3	Protect Rare Plants and Animal Communities
Wappinger Lake	Wappinger Falls, Dutchess County	3	Protection of Natural Resource
Chadwick Lake Reservoir	Newburgh, Orange County	3	Development Threat to Public Health
Ridge Preservation Areas	Wawayanda, Orange County	3	Preserve Ridgelines to Reduce Erosion
All State Wetlands	Woodstock, Ulster County	3	Protect the Wetlands
Shawangunk Ridge	Shawangunk, Ulster County	3	Soil Type, Slope, Wildlife Habitat
Wallkill Public Water Supply	Shawangunk, Ulster County	3	Protect Water Supply
Aquifer Area Overlay Zone	Rotterdam, Schenectady County	4	Conserve, Improve, & Protect Natural Resources
Roxbury Water District Aquifer	Roxbury, Town of	4	Protect Groundwater Aquifers
Wright Karst Area	Wright, Schoharie County	4	Protect Water Quality
Loughberry Lake Watershed	Saratoga Springs, Saratoga County	5	Protect Loughberry Lake Water Supply
Easton	Easton, Washington County	5	Unique Character of Resources
Round Pond	Queensbury, Warren County	5	Protect Water Quality & Natural Resources
Rush Pond	Queensbury, Warren County	5	Protect Water Quality & Natural Resources
Glen Lake and Surrounding Area	Queensbury, Warren County	5	Protect Water Quality & Natural Resources

**Upper Hudson Table 12.** Critical **aquatic** habitats found in the Upper Hudson River Basin, classified at the system and sub-system level, adapted from Edinger et al. (2002). The number of SGCN that indicate each system/sub-system association as a critical habitat is indicated.

<b>System</b>	<b>Sub-System</b>	<b>Number of Species</b>
Palustrine	mineral soil wetland	28
Riverine	coldwater stream	23
Riverine	warmwater stream	12
Estuarine	intertidal	11
Palustrine	peatlands	11
Lacustrine	warm water shallow	10
Riverine	deep water river	9
Estuarine	shallow sub-tidal	7
Lacustrine	cold water deep	7
Estuarine	unknown	5
Lacustrine	cold water shallow	5
Estuarine	deep sub-tidal	4
Lacustrine	coastal plain	4
Riverine	coastal plain stream	4
Riverine	unknown	4
Lacustrine	unknown	2
Lacustrine	warm water deep	2
Estuarine	cultural	1
Estuarine	warmwater stream	1
Palustrine	unknown	1
Riverine	cultural	1
Riverine	deep sub-tidal	1
Riverine	shallow sub-tidal	1

**Upper Hudson Table 13.** Critical **terrestrial** habitats found in the Upper Hudson River Basin, classified at the system and sub-system level, adapted from Edinger et al. (2002). The number of SGCN that indicate each system/sub-system association as a critical habitat is indicated.

<b>System</b>	<b>Sub-System</b>	<b>Number of Species</b>
Terrestrial	forested	53
Terrestrial	open upland	43
Terrestrial	barrens/woodlands	26
Unknown	unknown	7
Terrestrial	alpine/mountain	4
Subterranean	natural/cultural	1

**Upper Hudson Table 14.** Summary of threats, number of (and percent of all) species groups affected, and percentage of all threats for SGCN in the Upper Hudson River Basin. For details on threats, see Appendix: *Threats Characterization for Wildlife and Their Habitats*.

Threats	# of Species Groups Affected	% of All Spp Groups in Basin	% of All Threats in Basin
Habitat Loss - cultural	39	69.6	12.3
Contaminants	28	50.0	8.8
Degradation of Water Quality	21	37.5	6.6
Human Disturbance - illegal/unregulated harvest	20	35.7	6.3
Human Disturbance - collisions	18	32.1	5.7
Barriers (dams, weirs, culverts, bridges)	14	25.0	4.4
Disrupted Predator/Prey Cycles	14	25.0	4.4
Habitat Loss - natural (e.g., succession)	14	25.0	4.4
Fragmentation	13	23.2	4.1
Interspecific Competition for Resources	13	23.2	4.1
Disease	12	21.4	3.8
Human Disturbance - general	9	16.1	2.8
Active Alteration of Natural Processes	9	16.1	2.8
Habitat Composition Altered by Terrestrial Invasive Species	8	14.3	2.5
Unsustainable Agricultural/Silvicultural Practices	8	14.3	2.5
Competition from Invasive Exotics	6	10.7	1.9
Sedimentation/Erosion	6	10.7	1.9
Reduction of Patch Size/Shape/Area	5	8.9	1.6
Loss of Connectivity/Metapopulation Dynamics	5	8.9	1.6
Climate Change (change in species range, distb'n, migration)	5	8.9	1.6
Loss of Streamside Buffers	4	7.1	1.3
Pollution	4	7.1	1.3
Altered Hydrology (water level mgmt/extraction)	4	7.1	1.3
Human Disturbance - entanglement/entrainment	4	7.1	1.3
Susceptibility to Stochastic Events (storms)	4	7.1	1.3
Habitat Composition Altered by Aquatic Invasive Species	3	5.4	0.9
Loss of Host Species	3	5.4	0.9
Detrimental Hybridization	3	5.4	0.9
Parasites	3	5.4	0.9
Susceptibility to Stochastic Events (isolated pop'ns)	3	5.4	0.9
Susceptibility to Stochastic Events (rare species)	3	5.4	0.9
Climate Change (change in water level, temperature)	3	5.4	0.9
Unknown Threats	3	5.4	0.9
Barriers to Movement (roads, powerlines)	2	3.6	0.6
Terrestrial Habitat Composition Altered by Overuse (e.g., deer)	2	3.6	0.6
Aquatic Habitat Composition Altered by Overuse (e.g., swans, beaver)	1	1.8	0.3
Negative Edge Effects	1	1.8	0.3
Impacts of Erosion on Terrestrial Habitats	1	1.8	0.3

**Upper Hudson Table 15.** Approved State Wildlife Grant studies relevant to the Upper Hudson River Basin (Coordination Grant T-1, Wildlife Grants T-2-1 and T-2-2, and Fish/Marine Grant T-3).

State Wildlife Grant Study	Location	Description
<b>COORDINATION GRANT</b>		
<b>Project 1: Comprehensive Wildlife Conservation Planning &amp; Coordinator</b>		
Job 1: SWG Coordination & Development of the Comprehensive Wildlife Conservation Strategy	Statewide	New York will develop a Comprehensive Wildlife Conservation Strategy by October 2005, focusing on species of greatest conservation need in the state. We will work closely with partner organizations and the public to develop the plan, which will identify management needs, goals and strategies for more than 500 animal species that are rare, declining, vulnerable, or status unknown in New York State.
<b>WILDLIFE CONSERVATION GRANT</b>		
<b>Project 1: Conservation Planning for Species of Greatest Conservation Need</b>		
<i>Bird Conservation</i>		
Job 1: New York State's 2nd Breeding Bird Atlas	Statewide	New York completed its first Breeding Bird Atlas during 1980-1985, and the second atlas project (2000-2004) is underway. State Wildlife Grant funding will ensure completion of the second atlas, which will document the current distribution of breeding birds in New York State and quantify changes in distributions of species between the two atlas periods. Once completed, Atlas results will be made available in book and web-based formats for use by conservation biologists, planners, and the public.
Job 2: Developing a Grassland Bird Conservation Plan for New York State	Statewide, where grassland habitats are present	Because of widespread loss and fragmentation of grassland habitat, grassland bird populations are declining in New York and throughout North America. This project will develop a comprehensive plan to guide and direct grassland bird conservation and management on public and private lands in New York State. The plan will help direct conservation efforts to the most important areas, provide guidance to grassland owners and managers, and identify monitoring and research needs for grassland birds.
Job 3: Spruce Grouse in Lowland Boreal Habitat of New York State: Distribution, Populations and Movements	Essex, Hamilton, Herkimer counties	The spruce grouse is an endangered species in New York, where some of its spruce-fir forest habitat has been lost due to forest maturation, habitat fragmentation, and logging. Confusion with the more common ruffed grouse has led to accidental hunting, and the species' unwariness has made it vulnerable to human disturbance. Urgently needed are: surveys to determine status and distribution; research to assess factors causing rarity or declines; population or habitat protection and management to secure the species' status; and completion and implementation of a state recovery plan. This project will help address those needs.
Job 4: Common Loon Migration and Wintering Areas	Adirondack Park	We know very little about where common loons, a species of special concern in New York State, spend their non-breeding periods. This project will use satellite telemetry to determine migration routes, wintering areas and seasonal movements of loons that summer in New York. The results will help identify potential threats to common loons during non-breeding periods, including coastal energy developments, exposure to Type E botulism in the Great Lakes, ocean contaminants, and commercial fishing gear.
Job 5: Golden-winged Warbler Habitat and Hybridization Study	Sterling Forest State Park, Orange County	The golden-winged warbler has declined at an annual rate of 8 percent for the last 35 years in the northeastern U.S. Possible factors in its decline include reforestation and range expansion of the blue-winged warbler. This project will investigate genetics and habitat segregation among these two species. Results will help to establish whether they should be considered distinct species and provide guidance for habitat management plans to sustain golden-winged warbler populations.
Job 17: Marshbird Conservation in New York State	Statewide, where freshwater emergent marshes are present	Baseline information on distribution and abundance is needed for many marsh-nesting species in New York State. Species of concern include pied-billed grebe, black tern, least bittern, American bittern, and king rail. This project will survey representative freshwater marsh habitats across the state during 2004-2006 to quantify abundance and habitat use of marsh birds, identify focus areas for marsh bird conservation, and develop a long-term monitoring program.
Job 18: Coordinated Comprehensive Bird Monitoring Plan for New York State	Statewide	Comprehensive and coordinated monitoring programs are needed to reliably assess the status of all bird "species of greatest conservation need" in New York State. This project will document details of existing bird monitoring and survey programs in New York and assess their utility for monitoring various species of concern. We will form a bird monitoring partnership, involving agencies, organizations, and individuals, to recommend and help implement new or improved monitoring and survey programs for all bird species in New York State.

Upper Hudson Table 15. (continued)

State Wildlife Grant Study	Location	Description
Job 19: Assessment of Boreal Forest Bird Habitats in the Adirondack Park	Adirondack Park	Boreal forests are recognized as critical breeding grounds for a variety of bird species that occur nowhere else in New York State. Within the state there are two relatively distinct assemblages of bird species found in "low elevation" and "high elevation" boreal forest types, each of which includes a number of New York's "species of greatest conservation need." The overall goal of this project is to better quantify the status and habitat requirements of various low and high elevation boreal forest birds.
Job 20: Status Assessment and Delineation of Essential Habitats of Bald Eagles of the Upper Delaware River	Orange, Sullivan, Ulster, and Delaware counties	The upper Delaware River in New York is one of the most important bald eagle wintering areas in the Eastern U.S., with as many as 200 eagles estimated to use this area. Eagles also breed here, with six pairs confirmed nesting in 2003. While the presence of eagles attracts thousands of visitors to the area, development pressure is increasing also. This project would use field observations and satellite telemetry to identify critical habitats used by breeding and wintering eagles to help guide management and development of the upper Delaware River corridor to ensure its continued importance to this species.
Job 22: Golden-winged Warbler Habitat Restoration Investigation	Sterling Forest State Park, Orange County	The golden-winged warbler (GWWA) has declined at an annual rate of eight percent for the last 35 years in the northeastern U.S. and is a candidate for federal listing as a threatened or endangered species. Possible factors in its decline include loss of habitat due to reforestation and hybridization with the blue-winged warbler. Results of prior SWG-funded research will be used to design and conduct an experimental habitat restoration project in Sterling Forest State Park to assess the feasibility of creating or maintaining suitable habitat for GWWA in southeastern New York.
<b>Mammal Conservation</b>		
Job 7: Determining Winter Roost Selection of <i>M. leibii</i> and summer destination of hibernating <i>M. sodalis</i> and <i>M. leibii</i>	Essex and Ulster counties	The small-footed bat is the least common bat encountered during winter surveys in the eastern U.S., and 75 percent occur in New York. The species may be more common than winter counts suggest because it hibernates in hidden locations (under rocks, in crevices). DEC plans to radio-tag a sample of these bats as they enter a major hibernaculum to determine how many are detected during routine surveys. We also plan to radio-tag Indiana and small-footed bats as they emerge from their hibernacula and follow them by airplane to determine summer distribution and habitat preferences.
Job 8: Feasibility of Implementing a Robust Design Mark-Recapture Study for Indiana Bats	Statewide, where Indiana bats are present	The Indiana bat, a federally endangered species, has declined from roughly 600,000 in the 1960s to about 350,000 today. Population declines in southern portions of its range, primarily Kentucky and Missouri, have far exceeded increases in the north, including New York. We hope to conduct a large scale mark-recapture study to identify causes of the decline and regional differences in population trends. The first step is a feasibility study to determine if we can adequately address assumptions of the study design.
Job 9: Determining the Feasibility of a Statewide Summer Survey of Tree Bats	Statewide, north of NYC and Long Island	Tree bats (red, hoary and silver-haired bats) are among the least understood vertebrates in the state. We do not know the current status or distribution of any of these species, and the most comprehensive surveys were conducted more than 100 years ago. Recent technical innovations have increased the reliability of field sampling while reducing costs. We plan to conduct initial surveys to determine the costs and effectiveness of conducting a statewide status survey for tree bats in New York State.
<b>Reptile &amp; Amphibian Conservation</b>		
Job 10: Assessment of the Status and Abundance of High Priority Reptile and Amphibian Species	Statewide	As a group, a higher proportion of amphibian and reptile species have suffered significant declines than any other vertebrate groups in New York State. To date, much effort has been placed on documenting distribution of these endangered and threatened species. This project will focus on collecting information on the status of known populations, following standard protocols, so that conservation efforts can be prioritized on those in greatest need.
Job 12: Reducing Turtle Mortality During Nesting	Statewide	Certain turtle species experience high mortality of females when they migrate from over-wintering locations to traditional egg-laying sites. This project will investigate methods of reducing this mortality through use of subsurface tunnels for crossing roadways, creation of protected nesting sites, and predator exclusions.
Job 23: Status Assessment and Evaluation of Habitat Quality for Bog Turtles at Bog Brook Unique Area (BBUA)	Bog Brook Unique Area and nearby fens in Putnam and Dutchess counties	The population status of bog turtles is currently unknown, although evidence suggests that the population has declined substantially since the early 1970s. DEC will produce a population assessment of the bog turtles at Bog Brook Unique Area (BBUA) that will include measures of population size, sex ratio and reproductive success. The overall goal for bog turtle management at BBUA is to have a stable or expanding bog turtle population of sufficient size.

Upper Hudson Table 15. (continued)

State Wildlife Grant Study	Location	Description
Job 24: Bog Turtle Dispersal and Population Monitoring	Dutchess County	One of the most significant threats to bog turtles is habitat fragmentation. Isolated turtle populations may suffer from genetic inbreeding and increased susceptibility to random catastrophic events; however, there is a lack of information on the affects and extent of fragmentation. One of the top three bog turtle populations in New York State is found in Dutchess County. This population presents a unique opportunity to study the affects of fragmentation. The goal of this work is to expand annual population surveys and combine the results of this work into a model that will accurately assess how habitat connectivity is related to movements of the bog turtle.
Job 26: Reptile and Amphibian Species Inventory (cont'd from Job 10, Grant T-2-1)	Statewide	Previous studies have identified many reptile and amphibian species in need of conservation, which is the first step in developing baseline information to measure changes in populations. This project will help complete surveys of other reptile and amphibian species that are listed as species of special concern by New York State. Completion of these surveys will produce a mechanism to assure continuity of surveys for this group of species, as gather well as data to determine the status of special concern reptile and amphibian species.
<b>Invertebrate Conservation</b>		
Job 13: Karner Blue Butterfly Monitoring Project	Glacial Lake Albany Recovery Unit (Albany, Schenectday, Saratoga, and Warren counties)	To determine whether populations of Karner blue butterflies are large enough to be considered viable under state and federal recovery criteria, and to be sure that we are accurately detecting population trends, we need a practical and reliable method of counting Karner blue populations. The goal of this project is to evaluate alternative census methods to determine the most cost-effective to use.
Job 14: Determination of Lupine Variability and Implications for Karner Blue Butterfly Management	Glacial Lake Albany Recovery Unit (Albany, Schenectday, Saratoga, and Warren counties)	The only food plant for the larvae of the Karner blue is wild blue lupine ( <i>Lupinus perennis</i> ). Recent declines in Karner blue numbers indicate a need to create larger areas of habitat to halt the loss of this species from the State. Presently, we use only lupine seeds from stock originating in the local vicinity (within the Glacial Lake Albany Recovery Unit stretching from Albany to Warren County) for creation/restoration of habitat; however, research is necessary to determine if lupine from other areas will have the same value to Karner blue for feeding (i.e., will have the same hardiness and phenology as the local lupine) and will not contaminate a possibly distinct local lupine population. If it is biologically feasible to use non-local lupine seed, it will dramatically increase the availability of seed for restoration activities, reduce seed costs, and accelerate the recovery effort.
Job 15: Odonate Inventory	Statewide	There is a need for a comprehensive survey or inventory for odonates (dragonflies and damselflies) statewide. This project will document the current distribution of odonate species in New York State and direct more intensive sampling in selected habitats, areas with expected high odonate diversity, or habitats of rare species. The project will include general surveys conducted by volunteers as well as directed surveys that target specific species, habitats, or poorly known areas of the state.
Job 27: Tiger Beetle Inventory	Statewide	There are 26 species or subspecies of tiger beetle reported from New York State. Of the 26 species, nine are considered globally rare or rare in New York State, while another five are thought to be uncommon in the state (Gordon 1939, New York Natural Heritage Program 2004.) Nearly all of the species of concern are found in habitats that have been heavily impacted by development or other deleterious factors. DEC will conduct status assessments for nine species (including one subspecies) of tiger beetles in New York State that will clarify the need for conservation actions in order to maintain these species.
Job 28: Karner Blue Butterfly Conservation in Glacial Lake Albany: Habitat Viability Assessment and Monitoring	Glacial Lake Albany Recovery Unit (Albany and Saratoga counties)	Over the past 30 years the federal and state endangered Karner blue butterfly has declined in abundance in New York State by over 90%, largely due to habitat degradation/destruction and loss of its obligate larval host plant, the wild blue lupine. DEC will hire one or more contractors to quantitatively assess the current status of Karner blue butterfly habitat patches, identify site-specific habitat restoration needs and measure habitat restoration success at sites throughout Glacial Lake Albany.
<b>Project 2: Implementation of Wildlife Conservation Strategies</b>		
Job 2: Karner Blue Butterfly Conservation in Glacial Lake Albany: Habitat Restoration & Adaptive Mgmt.	Glacial Lake Albany Recovery Unit (Albany and Saratoga counties)	Karner blue butterfly numbers have been sharply declining in the last 5 years. DEC will hire one or more contractors to develop a habitat restoration/management plan in conjunction with DEC Central Office, Regional foresters and wildlife staff to create habitat attributes such as canopy cover and structural heterogeneity. With an increase in suitable habitat, it is expected that Karner blue butterflies will be able to colonize and increase the size of the population.

Upper Hudson Table 15. (continued)

State Wildlife Grant Study	Location	Description
<b>FISH AND MARINE CONSERVATION GRANT</b>		
<b>Project 1: Conservation Planning for Aquatic Resources</b>		
<i>Freshwater Fish Conservation</i>		
Job 1: Adirondack Round Whitefish Investigation	Adirondack Park	Round whitefish are classified as threatened in New York and their recovery plan calls for an investigation of causes for and solutions to their decline. This project will include field studies to develop sampling protocols in Adirondack lakes, evaluate existing stocking efforts, and prioritize historic waters for likelihood of successful reestablishment.
Job 2: Conservation of Lesser Known Species of Fish	Statewide	This project involves review of DEC and New York State Museum fish records to identify information needs about the status of rare species. Findings will be used to plan new surveys that will eventually allow a complete assessment of the status and distribution of these "lesser known" freshwater fish species of New York State.

For more information on these projects visit NYSDEC website at [www.dec.state.ny.us](http://www.dec.state.ny.us)  
or contact NYSDEC at:  
State Wildlife Grants Program Coordinator  
New York Division of Fish, Wildlife and Marine Resources  
625 Broadway  
Albany, NY 12233-4754  
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**Upper Hudson Table 16.** Priority species and groups, associated threats, and data collection efforts to address those threats. They are listed below by species group in bold, with example some of the most critical species within that group in italics. The threat listed applies to the entire species group.

Species Group / Species	Fill Critical Data Gaps	Intraspecific Competition	Direct Human Impacts	Habitat Loss & Fragmentation	Incompatible Agriculture/Silviculture	Invasive Native & Non-Native Biota	Altered Predator/Prey Dynamics	Degraded Water Quality/Altered Hydrology	Recommended Actions
<b>BIRDS</b>									
<b>Barn Owl</b>	X					X			<ul style="list-style-type: none"> <li>* Monitor rodent populations (e.g., meadow vole) to determine relationship between owl breeding and foraging sites and prey abundance and distribution.</li> <li>* Document nesting locations, productivity, and foraging areas.</li> <li>* Investigate feasibility of nest box programs and/or releases of captive-raised owls to restore local populations.</li> </ul>
<b>Boreal Forest Birds</b> <i>Olive-sided flycatcher</i> <i>Spruce grouse</i>	X								<ul style="list-style-type: none"> <li>* Develop a long-term monitoring program to determine population and habitat trends and to determine threats to this group.</li> <li>* Incorporate the results of the 2004 State Wildlife Grant study on boreal forest birds into future monitoring efforts and data analyses.</li> </ul>
<b>Breeding Waterfowl</b> <i>American black duck</i>	X								<ul style="list-style-type: none"> <li>* Conduct more intensive surveys for breeding black ducks and blue-winged teal in the Upper Hudson River Basin and common goldeneye in the Adirondacks to estimate overall abundance, document habitat use, and design a long-term monitoring program (e.g., every 5 years).</li> <li>* Monitor breeding population trends and productivity.</li> <li>* Continue banding &amp; marking birds to determine movement patterns, behavioral ecology, and demography.</li> </ul>
<b>Common Loon</b>	X						X		<ul style="list-style-type: none"> <li>* Monitor migratory trends in distribution and abundance, and investigate wintering distribution and ecology of Adirondack population.</li> <li>* Research energetic requirements of adults and young and juvenile movement patterns and behavior.</li> <li>* Determine the biological consequences of chemical and heavy metal toxicity in adults and eggs, and monitor lake pH levels in lakes within the Adirondack Park, survey forage base, and research the effects of lake acidification on breeding loons.</li> </ul>
<b>Deciduous/Mixed Forest Breeding Birds</b> <i>Cerulean warbler</i> <i>Red-headed woodpecker</i>	X		X	X	X				<ul style="list-style-type: none"> <li>* Conduct targeted monitoring of cerulean warblers to determine precise trends above and beyond the Breeding Bird Survey. Identify critical cerulean warbler focus areas.</li> <li>* Determine the effects of various cutting regimes (partial harvest, clear cut, etc.), and size and shape of the area harvested on "forest interior" birds (e.g., cerulean warbler, worm-eating warbler, wood thrush).</li> <li>* Research the possible area sensitivity and habitat requirements of cerulean warblers.</li> <li>* Determine the population status of Louisiana waterthrush in this Basin.</li> <li>* Investigate factors affecting habitat use and productivity in wood thrush, worm-eating warbler, red-headed woodpecker, and scarlet tanager.</li> <li>* Determine the magnitude of wildlife collisions with human-created structures (e.g., wind towers, cell towers, and power lines) based on land use and development trends (number and distribution of structures), human population distributions, and other characteristics.</li> </ul>
<b>Early Successional Forest/Shrubland Birds</b> <i>Blue-winged warbler</i> <i>Canada warbler</i> <i>Golden-winged warbler</i> <i>Whip-poor-will</i>	X		X	X	X	X			<ul style="list-style-type: none"> <li>* Determine the magnitude of wildlife collisions with human-created structures (e.g., wind towers, cell towers, and power lines) based on land use and development trends (number and distribution of structures), human population distributions, and other characteristics.</li> <li>* Complete an inventory and analysis that identifies core habitats (highest abundance) and geographic areas (where appropriate) for golden-winged and blue-winged warblers, Canada warbler, and whip-poor-will.</li> <li>* Develop a long term monitoring program for golden-winged warblers. In particular, monitor status and trends of golden-winged warblers along the "front" of blue-winged warbler invasion northward. Incorporate the results of the 2003 and 2004 State Wildlife Grant studies on golden-winged warbler population status and habitat needs into future monitoring efforts and data analyses.</li> <li>* Research the possible causes for declines of Canada warbler and the effectiveness of forest management regimes in opening up the canopy and promoting ground growth and thickets beneficial to this species.</li> <li>* Determine effects of viburnum leaf beetle on early successional forest/shrub habitats and</li> <li>* Evaluate which cutting regimes (partial harvest, clear cut, etc.) provide the maximum bene</li> </ul>
<b>Forest Breeding Raptors</b> <i>Long-eared owl</i>	X		X		X				<ul style="list-style-type: none"> <li>* Determine the population status of golden eagles and long-eared owls in this Basin.</li> <li>* Experiment with different timber management techniques in order to find out which are compatible with forest breeding raptors and which methods provide the maximum benefits for forest breeding raptors.</li> <li>* Determine the magnitude of wildlife collisions with human-created structures (e.g., wind towers, cell towers, and power lines) based on land use and development trends (number and distribution of structures), human population distributions, and other characteristics.</li> </ul>

Upper Hudson Table 16. (continued)

Species Group / Species								Recommended Actions
	Fill Critical Data Gaps	Intraspecific Competition	Direct Human Impacts	Habitat Loss & Fragmentation	Incompatible Agriculture/Silviculture	Invasive Native & Non-Native Biota	Altered Predator/Prey Dynamics	
<b>Freshwater Marsh Nesting Birds</b> <i>American bittern</i> <i>King rail</i> <i>Pied-billed grebe</i>	X		X		X	X	X	<ul style="list-style-type: none"> <li>* Conduct demographic studies at selected sites across the species breeding range to identify "source" and "sink" populations.</li> <li>* Initiate baseline population surveys to determine abundance and distribution of high priority species to detect trends.</li> <li>* Conduct controlled experiments to see which management actions are effective in producing habitat suitable for marsh birds.</li> <li>* Identify and prepare a catalog of key breeding sites, migratory, staging, molting areas, and wintering grounds.</li> <li>* Investigate diet and nutrition in relation to breeding habitat quality and prey populations</li> <li>* Periodically monitor the levels of contaminants in marsh birds and their eggs</li> <li>* Identify invasive species (including purple loosestrife and <i>Phragmites australis</i>), quantify the impact on habitat quality, and investigate which control methods (biological vs. chemical vs. mechanical) are the most effective.</li> <li>* Incorporate the results of the 2004 State Wildlife Grant study on marsh birds into future monitoring efforts and data analyses.</li> </ul>
<b>Grassland Birds</b> <i>Northern harrier</i> <i>Sedge wren</i> <i>Upland sandpipers</i>	X		X	X				<ul style="list-style-type: none"> <li>* Develop and implement supplemental monitoring programs for grassland bird species that are not adequately sampled by the Breeding Bird Survey and use long term trend data to determine effectiveness of grassland conservation efforts.</li> <li>* Conduct demographic studies at selected sites across the species breeding range to identify "source" and "sink" populations.</li> <li>* Complete an inventory of potential grassland habitat for species present, distribution, and relative abundance of priority species within this Basin.</li> <li>* Evaluate the effects of specific farming and management practices, such as: timing of mowing, intensity of grazing, frequency of mowing, mowing versus haying versus prescribed fire, and width of buffer strips on productivity of species in this group.</li> <li>* Integrate results into the NYS Grassland Bird Mgmt Plan being developed under the 2003 State Wildlife Grant.</li> </ul>
<b>High Altitude Conifer Forest Birds</b> <i>Bicknell's thrush</i>	X		X					<ul style="list-style-type: none"> <li>* Continue the Mountain Birdwatch monitoring protocol on all Adirondack and Catskill peaks where Bicknell's thrush are known to occur. Implement other long term monitoring if needed to determine population trend and to evaluate the long-term viability of Bicknell's thrush as a part of New York State's breeding avifauna.</li> <li>* Determine if active management (creation of habitat, such as regenerating fir waves) can be an effective management tool for Bicknell's thrush.</li> </ul>
<b>Osprey</b>	X					X		<ul style="list-style-type: none"> <li>* Annually or periodically monitor the population (or certain regions of the population) to determine the number of territorial pairs and reproductive outcome.</li> <li>* Determine the relationship between habitat quality, osprey survivorship, and changes in fisheries populations due to recreational and commercial harvest, changes in water quality, and impacts of wildlife such as cormorants.</li> </ul>
<b>Peregrine Falcon</b>	X						X	<ul style="list-style-type: none"> <li>* Annually monitor and determine the number of territorial peregrine falcons and their reproductive outcome at nest sites in the Hudson River corridor.</li> <li>* Conduct radio-telemetry studies as well as field observations to determine essential peregrine falcon habitat, site-fidelity, turnover, migration and wintering movements, home-ranges, mortality, and longevity.</li> <li>* Periodically monitor the levels of contaminants in carcasses and eggs to assess trends and determine the effects on eggshell thinning, behavioral modification, chick development, nesting success, and juvenile survival.</li> </ul>
<b>FRESHWATER FISH</b>								
<b>Round Whitefish</b>					X		X	<ul style="list-style-type: none"> <li>* Continue on-going studies to determine the impacts of invasive predatory fish on round whitefish.</li> <li>* Continue research from the 2003 State Wildlife Grant to determine the causes of population declines and losses within the Adirondack region, especially the impact of acid rain.</li> </ul>
<b>Heritage-Strain Brook Trout</b>	X							<ul style="list-style-type: none"> <li>* Evaluate population status of brook trout in Nate Pond and Dix Pond.</li> <li>* Identify possible refugia ponds for each strain within the Upper Hudson River Basin.</li> <li>* Nominate waters on State wilderness lands for management of other heritage strains such as Little Tupper, Windfall, and Horn Lake strains if there are insufficient ponds in their own watersheds to continue protecting the strain.</li> </ul>

Upper Hudson Table 16. (continued)

Species Group / Species									Recommended Actions
	Fill Critical Data Gaps	Intraspecific Competition	Direct Human Impacts	Habitat Loss & Fragmentation	Incompatible Agriculture/Silviculture	Invasive Native & Non-Native Biota	Altered Predator/Prey Dynamics	Degraded Water Quality/Altered Hydrology	
<b>AMPHIBIANS AND REPTILES</b>									
<b>Box Turtle</b>	X		X						<ul style="list-style-type: none"> <li>* Document life history parameters including age and sex ratios, longevity, age at sexual maturity, survivorship of young, predator-prey relationships, and wetland/upland habitat requirements.</li> <li>* Develop standardized habitat survey protocols, and implement survey protocols at all known and potentially suitable sites to document the quality of occupied habitat.</li> <li>* Investigate mitigation strategies to manage the adverse effects of habitat fragmentation such as the current investigations into turtle mortality funded by the 2003 State Wildlife Grant.</li> </ul>
<b>Multiple Amphibian &amp; Reptile Groups</b>									<ul style="list-style-type: none"> <li>* Conduct periodic surveys of occupied sites for these species to detect population trends, and to determine whether appropriate E/T/SC status listings are in effect for Northern cricket frogs and long-tailed salamander.</li> <li>* Develop standardized population and habitat survey protocols for these species, and implement survey protocols at all known and potentially suitable sites.</li> <li>* Document life history parameters for these species, including age and sex ratios, longevity, age at sexual maturity, survivorship of young, predator-prey relationships, and habitat requirements.</li> <li>* Identify invasive species (including purple loosestrife and <i>Phragmites australis</i>), quantify the impact on habitat quality, and investigate which control methods (biological vs. chemical vs. mechanical) are the most effective for Freshwater Wetland Amphibians, Lake/River Reptiles, Stream Salamanders, Uncommon Turtles of Wetlands, and Vernal Pool Salamanders.</li> <li>* Incorporate the results of the 2003 and 2004 State Wildlife Grant studies on high priority amphibian species into future monitoring efforts and data analyses.</li> </ul>
<b>Freshwater Wetland Amphibians</b>									
<i>Norther cricket frog</i>									
<i>Fowler's toad</i>									
<b>Lake/River Reptiles</b>									
<i>Eastern ribbon snake</i>									
<i>Wood turtle</i>									
<b>Stream Salamanders</b>									
<i>Long-tailed salamander</i>									
<b>Uncommon Turtles of Wetlands</b>	X				X				
<i>Blanding's turtle</i>									
<i>Bog turtle</i>									
<i>Spotted turtle</i>									
<b>Vernal Pool Salamanders</b>									
<i>Blue-spotted salamander</i>									
<i>Jefferson Salamander</i>									
<b>Woodland/Grassland Snakes</b>									
<i>Eastern hognose snake</i>									
<i>Timber rattlesnake</i>									
<b>INSECTS</b>									
<b>Karner Blue Butterfly</b>	X								<ul style="list-style-type: none"> <li>* Continue to monitor all known Karner blue sites where access is allowed, and pursue access where it is presently denied within the Glacial Lake Albany Recovery Unit.</li> <li>* Research aspects of Karner blue life history that are poorly understood including dispersal dynamics, best configuration of corridors, distribution/abundance of lupine, etc.</li> <li>* Implement habitat viability monitoring protocol (to be developed under the 2004 State Wildlife Grant).</li> </ul>
<b>Odonates</b>									<ul style="list-style-type: none"> <li>* Complete the statewide inventory of odonates and their habitats as outlined in the 2003 State Wildlife Grant. "Hot spots" of odonate diversity within this Basin should be identified and targeted for management action based on species richness, acuteness of threats, and overall value to odonates and other SGCN.</li> </ul>
<i>Common sanddragon</i>									
<i>Extra-striped snaketail</i>	X								
<i>Pygmy snaketail</i>									
<i>Septima's clubtail</i>									
<b>Other Butterflies</b>									<ul style="list-style-type: none"> <li>* Determine the population status and distribution of high priority butterfly species including frosted elfin, persius duskywing, and regal fritillary and best management regimes for species in each locality.</li> <li>* Establish the duration of all life stages, the precise habitat needs of all life stages, important host and food plants, and how this information should be coordinated with management actions.</li> </ul>
<i>Frosted elfin</i>									
<i>Persius duskywing</i>	X								
<i>Regal fritillary</i>									
<b>Other Moths</b>									<ul style="list-style-type: none"> <li>* Determine the population status and distribution of high priority moth species including coastal barrens buckmoth.</li> <li>* Develop standardized measures of habitat parameters, investigate metapopulation dynamics, and develop standard definition of what is needed for "viable" populations of high priority moth species.</li> </ul>
<i>Barrens buckmoth</i>	X								

Upper Hudson Table 16. (continued)

Species Group / Species									Recommended Actions
	Fill Critical Data Gaps	Intraspecific Competition	Direct Human Impacts	Habitat Loss & Fragmentation	Incompatible Agriculture/Silviculture	Invasive Native & Non-Native Biota	Altered Predator/Prey Dynamics	Degraded Water Quality/Altered Hydrology	
<b>Riparian Tiger Beetles</b> <i>Cicindela ancicisconensis</i>	X					X			<ul style="list-style-type: none"> <li>* Determine the population status and distribution of <i>Cicindela ancicisconensis</i> in suitable habitats, with focus on the Hudson River and Esopus Creek.</li> <li>* Determine vegetation density, cobble size, and sand/cobble interspersions of occupied habitats, and determine if there are streams/rivers with existing dams where restoration of more natural flow regimes could result in suitable habitat.</li> <li>* Compile baseline data on existing threats including gravel mine permits, areas of high ATV use, hydrological flow alterations, and invasion by non-native plants such as <i>Polygonum cuspidatum</i> and <i>Lythrum salicaria</i>, in riparian areas.</li> <li>* Identify streams/rivers with existing dams or other physical modifications where restoration of more natural flow and sediment regimes could result in restoration of suitable habitat for this species.</li> <li>* Incorporate results from the 2004 State Wildlife Grant study on tiger beetle distribution and abundance into data analysis, monitoring, and management efforts for this species.</li> </ul>
<b>Stoneflies/Mayflies of Lotic Waters</b> <i>Brachycercus maculatus</i>	X								<ul style="list-style-type: none"> <li>* Survey sites within the historical ranges of <i>Eurylophella bicoloroides</i>, <i>Epeorus suffusus</i>, <i>Heptagenia culacantha</i>, and <i>Brachycercus maculatus</i>, and determine the critical habitat for these species.</li> <li>* Coordinate survey results with NYSDEC Division of Water's 30-year trends in water quality based on macroinvertebrate data.</li> </ul>
<b>MAMMALS</b>									
<b>Game Species of Concern</b> <i>New England cottontail</i>	X								<ul style="list-style-type: none"> <li>* Conduct high intensity surveys of New England cottontails in and around currently occupied sites to better understand their local distribution.</li> <li>* Continue low intensity fecal surveys in suitable habitats from Washington to Westchester County. Where animals are detected, conduct follow-up live trapping for confirmation of identity.</li> <li>* Compare the habitat within extant (Columbia, Dutchess, and Putnam counties) and extirpated (the far eastern border of New York State from Lewis County through Rensselaer County) sites to see if there are significant differences between the two.</li> <li>* Investigate the taxonomic separation of New England cottontail (<i>Sylvilagus transitionalis</i>) and the Appalachian cottontail (<i>Sylvilagus obscurus</i>) and determine if they deserve separate status.</li> </ul>
<b>Indiana Bat</b>	X								<ul style="list-style-type: none"> <li>* Survey new hibernacula, winter populations, and summer habitat requirements using cave counts, vocalization detectors, radio-tracking, and mist netting and tagging.</li> <li>* Investigate the impact of development on Indiana bat abundance and distribution.</li> <li>* Live trap and mark Indiana bats during the fall swarm, fall entry, and spring emergence to determine the arrival and departure periods of the species by age and sex, and to detect differences in mark retention and survival rates for PIT tags and at least two types of wing bands.</li> </ul>
<b>Tree Bats</b> <i>Eastern red bat</i> <i>Hoary bat</i> <i>Silver-haired bat</i>	X		X						<ul style="list-style-type: none"> <li>* Conduct summer surveys of tree bats including capturing individuals and acoustical monitoring.</li> <li>* Conduct surveys of migrants to determine the timing, distribution, species composition and elevation of migrating bats.</li> <li>* Determine the magnitude of wildlife collisions with human-created structures (e.g., wind towers, cell towers, and power lines) based on land use and development trends (number and distribution of structures), human population distributions, and other characteristics.</li> </ul>
<b>MARINE FISH</b>									
<b>Atlantic sturgeon</b>	X		X						<ul style="list-style-type: none"> <li>* Locate spawning and nursery habitat within the Hudson</li> <li>* Develop and implement population monitoring</li> <li>* Develop age-length data to allow age estimates of juvenile fish from length</li> <li>* Determine location and quantity of bycatch losses in existing fisheries</li> </ul>
<b>American shad</b>	X		X	X					<ul style="list-style-type: none"> <li>* Need to know basic biology, develop fecundity at age estimates, and better information on maturity schedules</li> <li>* Develop and implement population monitoring</li> <li>* Determine location and quantity of bycatch losses in existing fisheries</li> </ul>
<b>Alewife</b>	X		X	X					<ul style="list-style-type: none"> <li>* Develop habitat use information</li> <li>* Need more information about basic biology, abundance, life history, and population dynamics</li> </ul>

**Upper Hudson Table 17.** Existing management plans and agreements within the Upper Hudson River Basin. This is an assortment of the major planning efforts within the Basin and is not a comprehensive list. Other planning efforts may exist at both the local and landscape scale and should be consulted before implementing conservation actions.

Plan/Agreement Name	Involved Parties	Information
<b>Hudson River Estuary Action Plan (1996, 1998, 2001)</b>	NYSDEC, Hudson River Estuary Program	Natural resources and ecosystem health; aquatic and upland habitat; recreation and tourism; economy; stewardship; use of river; pollution and other impairments
<b>Hudson River Estuary Action Program - Report Card on the First Five Years (2001)</b>	NYSDEC, Hudson River Estuary Program	Protecting and conserving the river; enjoying the river; cleaning the river
<b>Natural Resource Management Plan for the Wappinger Creek Watershed (2000)</b>	Dutchess County Environmental Management Council	Description of watershed; water quality; sources of pollution; strategies for achieving water quality goals; land use plan/zoning; funding; implementation strategy and schedule
<b>The Battenkill Watershed: An Assessment of its Natural and Man-made Resources and a Survey of its Residents (1997)</b>	Battenkill Watershed Alliance	Hydrology; soils; vegetation; wildlife and habitat; land use and agriculture; the built environment; community involvement
<b>The Great Swamp - A Watershed Conservation Strategy (1999)</b>	The Nature Conservancy	The wetland and its watershed; water resources; plants, animals, and habitats; public use; strategies
<b>Watervliet Reservoir Watershed Protection Study - DRAFT (2003)</b>	Capital District Regional Planning Commission	Reservoir overview; water quality; environmental features; land use; population growth and development; existing policies and regulations; issues, threats, and recommendations
<b>NYSDEC Unit Management Plans</b>	NYSDEC	Assessment of the natural and physical resources present within a unit; opportunities for recreational use and ability of resources and ecosystems to accommodate public use; management objectives for public use
Blue Mountain Wild Forest (1995) Blue Ridge Wilderness (Draft) Dix Mountain Wilderness (Draft) Eminence State Forest (1995) Ferris Lake Wild Forest (Draft) Giant Mountain Wilderness (Draft) Halcott Mountain Wild Forest (2001) Helderberg Area (2001) High Peaks Wilderness (1999) Hoffman Notch Wilderness (Draft) Jessup River Wild Forest (Draft) Kaaterskill/West Mountain Wild Forest (Draft) Lake George Wild Forest (Draft)	Moose River Plains Wild Forest (Draft) Saratoga-Warren State Forests (Draft) Shaker Mountain Wild Forest (Draft) Shandaken Wild Forest (Draft) Siamese Ponds Wilderness (Draft) Silver Lake Wilderness (Draft) Sundown Wild Forest/Vernooykill State Forest (Draft) Vanderwhacker Mountain Wild Forest (Draft) Westkill Mountain Wilderness (Draft) Wilcox Lake Wild Forest (Draft) William C. Whitney Wilderness (1998) Windham High Peak Wild Forest (1994)	
<b>Bird Conservation Area Management Guidance Summaries</b>	NYSDEC, OPRHP, Audubon	A physical description of the site, BCA criteria met, important species & habitat types, guidance for management, op/maintenance, research, education and outreach. Includes local contacts.
Catskill High Peaks (2000) Fahnestock (2000) Constitution Marsh (2001) Schodack Island (2002) Carter's Pond (2001) Helderberg (2004) John Boyd Thacher/Thompson's Lake (2004) Sterling Forest (2001) Bashakill (2001)		
<b>Wildlife Management Area Plans</b>	NYSDEC	Assessment of the wildlife, habitats and physical resources present; history of the property; management, op/maintenance, research, education and outreach objectives; opportunities for recreational use and ability of resources and ecosystems to accommodate public use; management objectives for public use
Baskakill WMA (1982) Tivoli Bay WMA (1999) Capital District WMA (1974) Knox/M. Burke WMA (1975) Partridge Run WMA (1976) Oriskany Flats WMA (1977) Plantation Island WMA (1986) Utica Marsh (1980)		

**Upper Hudson Table 18.** Candidate species for designation as Aquatic Nuisance Species in New York State.

<b>Form</b>	<b>Common name</b>	<b>Scientific name</b>
Freshwater aquatic plant	Curly-leaf pondweed	<i>Potamogeton crispus</i>
Freshwater aquatic plant	Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
Freshwater aquatic plant	European frog's bit	<i>Hydrocharis morsus-ranae</i>
Freshwater aquatic plant	Fanwort	<i>Cabomba caroliniana</i>
Freshwater aquatic plant	Water chestnut	<i>Trapa natans</i>
Freshwater wetland plant	Purple loosestrife	<i>Lythrum salicaria</i>
Freshwater wetland plant	Flowering rush	<i>Butomus umbellatus</i>
Freshwater/estuarine wetland plant	Common reed	<i>Phragmites australis</i>
Freshwater myxosporean parasite	Whirling disease	<i>Myxobolus cerebralis</i>
Freshwater cladoceran	Fishhook water flea	<i>Cercopagis pengoi</i>
Freshwater cladoceran	Spiny water flea	<i>Bythotrephes cederstroemi</i>
Freshwater amphipod	European amphipod	<i>Echinogammarus ischnus</i>
Freshwater decapod	Rusty crayfish	<i>Orconectes rusticus</i>
Freshwater mollusk	Asiatic clam	<i>Corbicula fluminea</i>
Freshwater mollusk	Zebra mussel	<i>Dreissena polymorpha</i>
Freshwater mollusk	Quagga mussel	<i>Dreissena bugensis</i>
Freshwater fish	Sea lamprey	<i>Petromyzon marinus</i>
Freshwater fish	Tench	<i>Tinca tinca</i>
Freshwater fish	European rudd	<i>Scardinius erythrophthalmus</i>
Freshwater fish	Round goby	<i>Neogobius melanostomus</i>
Freshwater waterfowl	Mute swan	<i>Cygnus olor</i>