



**BLenheim-GILBOA PUMPED STORAGE FERC No. 2685
POWER PROJECT RELICENSING**

LAND COVER, LAND USE AND TERRESTRIAL HABITAT ASSESSMENT

JANUARY 2014



**New York Power
Authority**

Generating more than electricity

Provided by:

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EXECUTIVE SUMMARY

The FERC license for the Project was issued to NYPA for a period of 50 years effective May 1, 1969 and the Project entered commercial operation in 1973. The current license expires on April 30, 2019; the Power Authority intends to file an application to relicense the project with FERC before April 30, 2017. As part of the relicensing process NYPA must complete a Notice of Intent and a Pre-Application Document; this study was completed to support the relicensing process.

In 2012, the New York Power Authority (NYPA) undertook a project to map and characterize habitat within the Blenheim-Gilboa Pumped Storage Power Project (Project) boundary so current data were available for the Pre-Application Document (PAD). Data generated from this effort provide current information on the terrestrial vegetation, wildlife, and the ecology within the Project vicinity. The results of this study include a GIS data layer showing the types of plant communities in the study area, with attributes showing cover type, land use type, and dominant plant species.

Based on aerial photo interpretation and field surveys, NYPA completed detailed mapping of land cover types within the Project boundary (2,982 acres) as well as a larger study area (7,978 acres). The vast majority of land within the Project boundary is forested (52%), primarily with northern hardwoods, white pine, and hemlock. The most common cover type is Northern hardwood-coniferous forest, which accounts for approximately 23% (680 acres) of land within the Project boundary. The second most commonly occurring habitat is the reservoirs themselves which account for 22% of the area (642 acres). The larger study area is also dominated by northern hardwood-coniferous forest, which accounts for 36% (2,879 acres) of the entire study area.

Open water and wetlands within the Project boundary total 826 acres, of which 184 acres are vegetated wetlands, including emergent, scrub-shrub, or forested wetlands. The littoral zone of both the Upper and Lower Reservoirs consists primarily of emergent marsh and exposed shoreline (cobble shore/rip-rap/exposed silt and sand). There is a predominance of rocky substrates; these do not provide good submerged aquatic vegetation (SAV) habitat, and as such, SAV is largely absent from both the Upper and Lower Reservoirs as well as in Schoharie Creek and the tributaries. Limited SAV development was observed in occasional small depressions within the emergent zone of the Lower Reservoir as well as the controlled level ponds in the Upper Reservoir.

Shoreline erosion within the Project boundary is limited. Most shoreline areas of both the Upper and Lower Reservoirs are either steeply sloping armored banks (bedrock, cobble, rip-rap) or gently sloping areas with well developed emergent zones. As such, the shorelines of the Upper and Lower Reservoirs, within the influence of Project operations, are stable. However, some erosion occurs in areas outside of the fluctuation zone of the Project, primarily along tributary streams (*e.g.*, Mine Kill), where erosion is the result of high flows within the streams rather than water level fluctuations resulting from Project operations.

Utilizing available resources and results from the field survey, a detailed wildlife matrix was developed which identifies potential species that may occur within the study area. One rare species - the Bald Eagle - has been identified by NY Natural Heritage Program (NYNHP) within the study area and are known to forage within the Lower Reservoir. A Cerulean Warbler (NY Special Concern Species) was identified in 2012, but no other Rare, Threatened or Endangered species were identified within the study area during survey work completed in 2012. A list of potential Rare, Threatened, or Endangered species that may occur within the study area, based on habitat and range, was completed as part of this effort.

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1 INTRODUCTION

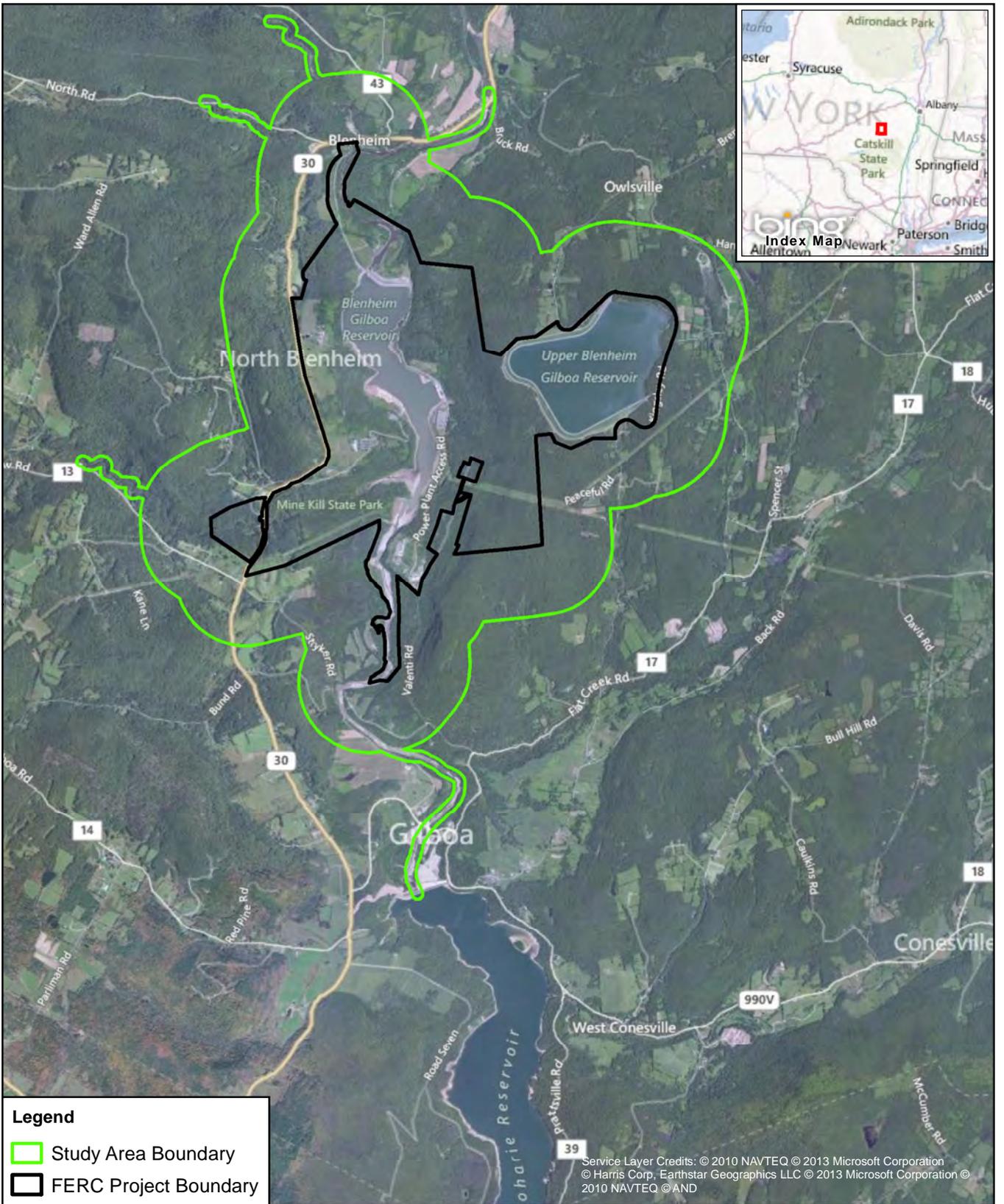
The New York Power Authority's (NYPA) Blenheim-Gilboa Pumped Storage Power Project (B-G or Project) is located on the Schoharie Creek in the Towns of Blenheim and Gilboa, about 40 miles southwest of Albany in Schoharie County, NY. The 1,160 megawatt (MW) Project consists of an Upper Reservoir and Dike, a Lower Reservoir and Dam, conduits connecting the reservoirs and an underground powerhouse, a spillway and related facilities.

The Project helps meet the State's peak power needs by cycling water between two reservoirs – one atop Brown Mountain and the other at its base. Four pump-turbines use energy from other sources to pump water about 1,100 feet to the Upper Reservoir during periods of lower electrical demand, typically at night and on weekends. During periods of higher electricity demand, typically during the day, the motorized pumps are reversed to become turbine-generators. Water released from the Upper Reservoir spins the turbine-generators to produce up to 1,160 MW of electricity before entering the Lower Reservoir.

The Federal Energy Regulatory Commission (FERC) issued an initial 50-year operating license to NYPA for the Project, effective May 1, 1969 and the Project entered commercial operation in 1973. The current license expires on April 30, 2019; therefore, an application for a FERC license for a new term must be filed before April 30, 2017. NYPA must file with FERC its Notice of Intent (NOI) to relicense the Project and a Pre-Application Document (PAD) by April 30, 2014. NYPA conducted this study in 2012 in preparation of the PAD.

No current or comprehensive data on land cover, land use, or associated wildlife and plant habitats were found to be available for the Project. For this report, the area within the Project boundary is defined as those lands within the Federal Energy Regulatory Commission (FERC) Project boundary. The larger study area covered by this investigation includes additional areas adjacent to the Project boundary ([Figure 1.0-1](#)), as defined more specifically in Section 3. Changes to land cover occur over time in response to a variety of biotic and abiotic factors, including succession (*e.g.*, early successional forest to mature forest), natural changes to the landscape (*e.g.*, river dynamics, landslides, plant disease), and anthropogenic activities. Land cover and land use mapping, conducted in conjunction with a field characterization of terrestrial (upland and wetland but not aquatic) plant and wildlife habitat, was conducted in 2012 to provide NYPA with up-to-date data on cover types and land use within the Project boundary and larger study area. This information is intended to be useful for the completion of the Pre-Application Document (PAD) and the ensuing FERC relicensing efforts for the B-G Project. Although the PAD only requires

that “readily available” information be used, NYPA chose to begin some preliminary studies, including this study, to provide more accurate information for the development of the PAD. These data will provide current information on vegetation, wildlife, and the ecology of the general area. Results of this study also include a GIS data layer showing the types of plant communities in the study area, with attributes showing cover type, land use type, and dominant plant species.



Legend

- Study Area Boundary
- FERC Project Boundary

**Blenheim-Gilboa
Pumped Storage Power Project
(FERC No. 2685)**

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0 0.5 1 2
Miles

**Figure 1.0-1
Study Area for Cover Type
and Land Use Mapping**

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2 OBJECTIVES

The objective of this study was to develop a vegetative land use and land cover database, as well as to characterize existing plant and wildlife habitat for the B-G Project relicensing effort. Based on the habitats occurring within the study area a wildlife-habitat matrix was developed for the species present, or with the potential to be present, based on available habitat.

3 METHODS

The land cover/land use mapping was completed in two phases: (1) aerial image interpretation and (2) field confirmation. Prior to the aerial image interpretation, it was necessary to compile data resources in order to assist in the mapping of cover types within the study area. This included, but was not limited to acquisition of aerial imagery ([Table 3.0-1](#)), soils mapping from the Soils Survey Geographic Database (SSURGO), National Wetland Inventory, project data (*i.e.*, boundaries and facilities, hydrography, topography, transportation features, and municipal boundaries).

Table 3.0-1. Aerial Images Used for Photo Interpretation.

Photo Year	Description
1996	Leaf on conditions. Three geo-referenced color aerial images of the northern end of the project, showing the dam, spillway and creek.
2001	Leaf on conditions. Color infrared orthophoto.
2004	Leaf off conditions. Black and white orthophoto.
2009	Leaf off conditions. Black and white orthophotos showing the southern portion of the study area and surroundings.
2010	Leaf on conditions. Microsoft Virtual Earth orthophoto.
2011	Leaf on conditions. Post Hurricane Irene photographs

Leaf-off images allowed photo interpreters to view ground features, and to ascertain the relative sizes of canopy trees more easily than was possible with leaf-on images. Leaf-on images were helpful for assessing canopy cover, species composition (to an extent), and habitat type. Color-infrared images were useful for detecting wetlands, active crop fields, and manicured lawns.

3.1 Land Cover Mapping

Although not required, it is sometimes desirable to map vegetation beyond project boundaries because wildlife use habitat at a landscape scale. As such, a larger mapping area may help define overall habitat, and resulting potential use by wildlife species and communities, within the Project boundary. Therefore,

vegetation was mapped within an area extending ½ mile beyond the B-G Project boundary; tributary streams that extended beyond the aforementioned mapping area were mapped for an additional ½ mile within a 200-foot wide buffer. The B-G Project boundary covers 2,982 acres; extending the Project boundary ½ mile more and including the stream buffers encompasses a study area of approximately 7,978 acres ([Figure 1.0-1](#)). The study area refers to the larger area (7,978 acres) which includes the land within the Project boundary and the extended boundary (project vicinity).

Vegetation within the study area was initially mapped in ArcGIS. Mapping of land cover types was completed using a supervised image classification tool within ArcGIS to help classify land cover types based on signatures (*e.g.*, texture, pattern, color). Color infrared imagery from 2001 was used for the training samples and initial automated mapping. Simplified land cover types, including agriculture, coniferous forest, hardwood forest, transportation, and water were mapped within the GIS using user-defined training samples based on raster imagery. Further, detailed mapping of more specific cover types (*e.g.*, specific type of forest) was completed by delineating plant community boundaries as they were observed using the aerial imagery signatures and GIS data sets listed above. Where obvious breaks between cover types occurred, boundaries were drawn. Cover was classified using a modified system developed by Edinger *et al.* (2002). Edinger's classification is a revision of the original classification of communities in New York based on Reschke (1990) ([Table 3.0-2](#)). A detailed description of representative vegetation observed within each mapped cover type (based on the 2012 field work) and a representative photo (in most cases) of each mapped cover-type in [Table 3.0-2](#) are included in Section 4.4.

Table 3.0-2. Land Cover Types and Land Uses Mapped within the Study Area.

System	Sub-System	Land Cover Type ¹	Land Use ²
Riverine	Natural Stream	Stream or River	Streams and Canals
Lacustrine	Lacustrine Cultural	Artificial Pond or Reservoir	Reservoir
Palustrine	Open Mineral Soil Wetlands	Control Level Ponds	Non-Forested Wetland
		Emergent Marsh	Non-Forested Wetland
		Shrub Swamp	Non-Forested Wetland
	Forested Mineral Soil Wetlands	Floodplain Forest	Forested Wetland
		Forested Wetland	Forested Wetland
Terrestrial	Open Uplands	Exposed Shoreline (mud/silt)	Transitional Areas
		Cobble Shore	Transitional Areas
		Scoured Shoreline	Transitional Areas
		Grass land	Grass Land
		Successional Old Field/Shrub land	Brush-land
	Barrens & Woodlands	Rock-outcrop	Bare Exposed Rock
	Forested Uplands	Northern Hardwoods	Hardwood Forest
		Northern Hardwood-Coniferous Forest	Mixed Forest
		Eastern Hemlock	Evergreen Forest
		Eastern White Pine	Evergreen Forest
	Terrestrial Cultural	Cropland	Crop Land & Pasture
		Manicured Lawn	Residential
		Transportation	Transportation
		Development	Development

The minimum mapping unit depended upon the community type. In general, wetlands were mapped using polygons approximately 0.25 acres or larger. Wetlands mapped during the aerial image interpretation were classified using Classification of Wetlands and Deep Water Habitats of the United States ([Cowardin, et al., 1979](#)). Forested plant communities and others (agriculture, transportation, development, etc.) were

¹ ([Edinger, et al., 2002](#))

² ([Anderson, et al., 1976](#))

mapped at a resolution of at least 10 acres, but due to the high resolution of the imagery available, the vast majority of all mapped cover types is accurate to within 1 acre.

In addition to being assigned a dominant cover type, each polygon was assigned a dominant land use type. A Land Use and Land Cover Classification System for Use with Remote Sensor Data ([Anderson, et al., 1976](#)) were used to assign land use categories. Land use was classified to Level 2; which are broad categories that separate major types of land uses (*e.g.*, Forest is separated into Deciduous, Evergreen, and Mixed types). Wetlands were separated into Forested and Non-forested types ([Table 3.0-2](#)).

3.2 Field Verification

Field verification activities were conducted from July 9-13, 2012, using the aerial photo interpretation GIS data on a tablet computer running a field-ready GIS. A team of biologists from NYPA, Kleinschmidt, and Amy S. Greene Environmental Consultants, Inc. completed the following: 1) a qualitative search for Rare, Threatened and Endangered (RTE) species and their habitats (or lack thereof) within the Project boundary and larger study area; 2) field verification of desktop cover type mapping units; and 3) a qualitative inventory of habitat characteristics such as dominant plants, exposed outcroppings, and generalized soil types within the study area. During the field survey, a comprehensive list of observed vegetation was maintained to provide a list of dominant vegetation present within the study area.

The field verification data were added to the original GIS data set. Field staff corrected any classifications or boundaries that appeared to differ in the field from the photo-interpreted boundaries. A minimum of 25% of the mapped polygons were field-verified to determine the accuracy of the classifications developed during the photo-interpretation task. Staff also determined the dominant species in each land cover type. Up to four dominant species in the major stratum (*i.e.*, canopy trees for forest) were recorded in field notebooks. A field computer was also used to record observations regarding specific cover type characteristics (*e.g.*, dominant vegetation) in the polygon, and was also used to adjust cover type boundaries as needed.

3.3 Wildlife Habitat Matrix

A comprehensive wildlife matrix was developed that identified the potential for wildlife species occurrence and usage within mapped habitat ([Appendix A](#)). Wildlife species were included in the matrix if: 1) the species was observed during field surveys; 2) the existing data compilation task identified a reliable record for the species; or 3) general range maps/descriptions for the species included the investigation area. Occurrences were based on a variety of source information, including: identification

during field surveys, documented habitat requirements in literature (*e.g.*, [DeGraaf & Yamasaki, 2001](#)), collection records, NY Natural Heritage Program (NYNHP) records, or other acceptable data sources. The species matrix includes the wildlife species known or expected to inhabit the study area and summarizes their habitat preferences. Habitat assignments were made using professional experience and reliable habitat preference literature ([DeGraaf & Yamasaki, 2001](#)). Habitats used by a given species, based on its typical life history, were shaded and those that are preferred were marked with an “X.” The matrix includes the species name (common and scientific), whether the species was documented within the survey area, and documentation of the occurrence (*i.e.*, during field work, or based on literature). The matrix also presents information regarding phenology, relative abundance (*i.e.*, abundant, common, uncommon, occasional, rare), breeding status (birds only), and threatened and endangered listing status for each species. In particular, potential habitat for timber rattlesnake and Bald Eagle is important as both species have been identified as potentially occurring at, or within the vicinity of the Project by the NYNHP ([Pietrusiak, 2011](#)).

4 RESULTS AND DISCUSSION

Habitat within the study area is diverse and includes a variety of forested, non-forested, and wetland habitats. Overall, the study area and Project boundary had similar land cover. The vast majority of land is forested, primarily by northern hardwoods, white pine, and hemlock. Fifty-two percent (1,495 acres) of land within the Project boundary has a forested cover type (northern hardwood-coniferous, eastern hemlock, eastern white pine, floodplain forest, and northern hardwood). Northern hardwood-coniferous forest accounts for approximately 23% (680 acres) of land within the Project boundary. The last most commonly occurring habitat is the reservoirs themselves, which account for 22% of the Project boundary area (642 acres). The larger study area is also dominated by northern hardwood-coniferous forest, which accounts for 36% (2,879 acres) of the entire study area. In general, forests within the study area appear to be successional forests which have developed on reverting farmland. Overall, most forests appeared to be 50-60 years of age, based on general tree diameter (16-24" diameter at breast height), presence of rock walls, and overall landscape position. [Table 4.0-1](#) contains area totals for each mapped habitat cover type within the Project boundary and entire study area. [Appendix B](#) contains the habitat mapping for the entire study area.

Table 4.0-1. Mapped Habitat and Dominant Species within the Project Boundary and Study Area.

Cover Type	Dominant Species	Project Boundary (Acres)	Study Area (Acres)
Artificial Pond or Reservoir	N/A	641.9	673.6
Cobble Shore	three-square, beggar's ticks, pimpernel	18.2	19.1
Control Level Ponds	<i>Potamogeton</i> spp.	3.3	3.3
Cropland	managed crops	12.5	387.6
Development	N/A	85.1	95.6
Eastern Hemlock	hemlock, white pine, wild sarsaparilla	175.6	467.3
Eastern White Pine	white pine, barberry, honeysuckle, bracken fern	186.8	436.1
Emergent Marsh	wool grass, soft rush, white boneset, blue vervain, smartweeds	108.4	146.8
Northern Hardwood-Coniferous Forest	red maple, basswood, birch, American beech, white pine, hemlock	680.0	2,878.5
Exposed Shoreline (mud/silt)	occasional lesser forget-me-not, Japanese knotweed, beggars ticks, smartweeds	10.6	10.6
Floodplain Forest	sycamore, cottonwood, green ash	14.2	22.5
Forested Wetland	red maple, green ash, cottonwood, willow	4.4	54.1

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Cover Type	Dominant Species	Project Boundary (Acres)	Study Area (Acres)
Grassland	milkweed, grasses, and occasional red cedar, honeysuckle, and hawthorn	108.2	135.0
Manicured Lawn	Kentucky bluegrass-actively mowed	120.8	315.1
Northern Hardwoods	basswood, sugar maple, red maple, American beech, white birch, red oak, black locust	437.9	1,530.1
Rock-outcrop	N/A	0.6	0.6
Scoured Shoreline	occasional saplings (red maple, cottonwood, etc.)	10.0	81.5
Shrub Swamp	speckled alder, red osier dogwood, silky dogwood	12.4	34.7
Stream or River	N/A	41.2	105.2
Successional Old Field/Shrubland	milkweed, grasses, honeysuckle, hawthorn, red maple saplings	173.6	459.8
Transportation	N/A	46.9	120.8
Total		2,892	7,978

4.1 Habitat Mapping

Section 4.1 summarizes habitats and habitat characteristics within the study area, as this was the primary focus of the field survey. Based on aerial imagery, “windshield” level surveys from public roads, and visual observations made from within the edge of the Project boundary, the dominant vegetation and habitat characteristics within the larger study area generally appear to be similar to those found within the Project boundary. More detailed field observation of the area outside of the Project boundary to verify dominant vegetation and habitat characteristics was limited by private land access constraints.

4.1.1 Upland Habitat

Upland habitat within the study area is predominantly forested; exceptions are a narrow strip of open habitat along the Upper Dike that is dominated by mowed meadows and un-vegetated rip-rap ([Photo 4.1.1-1](#)) and the routinely mowed and maintained areas surrounding the Mine Kill State Park facilities, the Visitors Center, and the Project facilities around the Lower Dam. Forested uplands dominate the remaining portions of the study area, and include mixed hardwoods, pine-dominated, and hemlock-dominated forest. Small areas of xeric (dry) woodlands occur along the tops of cliffs and ridges where there is little to no contributing watershed. Shear cliffs of exposed sedimentary bedrock occur along portions of the Lower Reservoir, particularly along the southern (or upstream) shoreline.



Photo 4.1.1-1. View of mowed meadow on Upper Dike (meadow is in the photo foreground).

A diversity of upland plant species occur within the study area ([Table 4.1.1-2](#)). Higher elevations within the study area, including the eastern edge of the Upper Reservoir and the sloping hillside between the two reservoirs (locally known as Brown Mountain), are dominated by areas of mixed hardwood, pine, and hemlock forest. Mixed hardwoods are generally dominated by sugar maple, red maple, red oak, white ash, black cherry, birches (white and yellow), basswood, white pine, and hemlock. Shrub-layer vegetation is dominated by beech, maple, hemlock, and ash saplings. Herbaceous vegetation within these mixed forests includes bracken fern, bluebead, twisted stalk, false Solomon's seal, and wild sarsaparilla. White pine and hemlock dominated forests have a canopy comprised primarily of white pine and/or hemlock, with a shade-limited shrub layer. Hemlock stands may contain an occasional beech, or other hemlock saplings. Herbaceous-layer vegetation within the coniferous forests are also limited, and may include Christmas fern, wood fern, Virginia creeper, starflower, Canada mayflower, poison ivy, and white avens. The routinely mowed outer slope of the Upper Dike is dominated by species such as red fescue, timothy, ragweed, Queen Anne's lace, spotted knapweed, and white sweet clover; the inside slope is largely unvegetated rip-rap.

Lower elevations of the study area (including the shore of the Lower Reservoir, forested areas along Schoharie Creek, and Mine Kill State Park) are dominated by mixed northern hardwoods. Low ravines (e.g., along the Mine Kill and other tributaries) and portions of the Lower Reservoir shoreline are dominated by hemlock ([Photo 4.1.1-2](#)). Stands of white pine are also present, sometimes in nearly pure

plantations (based on field observations these were likely planted during efforts to reforest historic agricultural lands or pasture). Mixed forests surrounding the Lower Reservoir are characterized by species similar to the Upper Reservoir area, yet also contain a few additional species more typical of lower elevations. These species include white oak, black locust, shagbark hickory, and ironwood in the tree stratum; honeysuckles, multiflora rose and European barberry in the shrub/sapling stratum; and jack-in-the-pulpit, New York fern, and mayapple in the herbaceous stratum.



Photo 4.1.1-2: Interior of an eastern hemlock dominated stand within the Mine Kill State Park.

Rich forests associated with stream banks along tributaries to the Lower Reservoir are generally dominated by sycamore, cottonwood and green ash with some areas, primarily sloping banks, dominated by hemlock. Shrub layer vegetation in these areas is primarily saplings (ash, sycamore, or hemlock), honeysuckle, and *Spiraea* spp. (meadowsweet and steplebush). Herbaceous vegetation is primarily comprised of bloodroot, Jack-in-the-pulpit, twisted stalk, goldthread, starflower, wild sarsaparilla, coltsfoot, and virgin's bower. Poison ivy and Virginia creeper are dominant vines in these riparian forests.

Non-forested locations within the study area include upland meadow and xeric habitat (*i.e.*, rock outcrops and sparsely wooded areas of ridge tops). Within upland meadows, occasional shrubs such as honeysuckle, staghorn sumac, and red cedar occur. Herbaceous vegetation includes mullein, milkweed, yarrow, black and red raspberry, and white sweet clover. Xeric areas are dominated by an open forest (*i.e.*, with breaks in the canopy) of red cedar and white pine, saplings of red oak and bur oak, and

honeysuckle shrubs Herbaceous vegetation includes wild columbine, panicled hawkweed, bluestem, yarrow, and lowbush blueberry. Areas without herbaceous cover were often dominated by lichen.

The sedimentary bedrock and calcareous till within the study area influence the plant community. During the study, several indicator species of rich, basic soils were observed in the mixed northern hardwood and riparian forests. These include herb Robert, blue cohosh, bloodroot, mayapple, and Solomon's seal in the herbaceous stratum, European (or common) barberry in the shrub stratum, and basswood in the tree stratum. The forests with a strong white pine component lacked these indicator species because the accumulated litter layer lowers the soil pH.

Table 4.1.1-2. Representative Upland Botanical Species Identified within the Study Area.

Common Name	Scientific Name
sugar maple	<i>Acer saccharum</i>
yarrow	<i>Achillea millefolium</i>
garlic mustard	<i>Alliaria petiolata</i> *
ragweed	<i>Ambrosia spp.</i>
blue stem	<i>Andropogon gerardii</i>
wild columbine	<i>Aquilegia canadensis</i>
wild sarsaparilla	<i>Aralia nudicaulis</i>
Jack in the pulpit	<i>Arisaema triphyllum</i>
milkweed	<i>Asclepias sp.</i>
Japanese barberry	<i>Berberis thunbergii</i> *
European barberry	<i>Berberis vulgais</i> *
yellow birch	<i>Betula alleghaniensis</i>
black birch	<i>Betula lenta</i>
paper birch	<i>Betula papyrifera</i>
iron wood (American hornbeam)	<i>Carpinus caroliniana</i>
shagbark hickory	<i>Carya ovata</i>
blue cohosh	<i>Caulophyllum thalictroides</i>
spotted knapweed	<i>Centaurea stoebe</i> *
virgin's bower	<i>Clematis occidentalis</i>
bluebead	<i>Clintonia borealis</i>
goldthread	<i>Coptis trifolia</i>
wood fern	<i>Dryopteris carthusiana</i>
Japanese knotweed	<i>Fallopia japonica</i> *
American beech	<i>Fagus grandifolia</i>
red fescue	<i>Festuca rubra</i>
white ash	<i>Fraxinus americana</i>
green ash	<i>Fraxinus pennsylvanica</i>
wintergreen	<i>Gaultheria procumbens</i>
herb Robert	<i>Geranium robertianum</i>
white avens	<i>Geum canadense</i>
common hawkweed	<i>Hieracium iachenalii</i>
panicled hawkweed	<i>Hieracium paniculatum</i>
eastern red cedar	<i>Juniperus virginiana</i>
Japanese honeysuckle	<i>Lonicera japonica</i> *
tartarian honeysuckle	<i>Lonicera tatarica</i> *
Canada mayflower	<i>Maianthemum canadense</i>
false Solomon's seal	<i>Smilacina racemosum</i>
white sweet clover	<i>Melilotus officinalis</i> *
Japanese stiltgrass	<i>Microstegium vimineum</i> *

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Common Name	Scientific Name
partridge berry	<i>Mitchella repens</i>
hop hornbeam	<i>Ostrya virginiana</i>
mountain sorrel	<i>Oxalis Montana</i>
Virginia creeper	<i>Parthenocissus quinquefolia</i>
Timothy	<i>Phleum pretense</i>
red pine	<i>Pinus resinosa</i>
white pine	<i>Pinus strobus</i>
mayapple	<i>Podophyllum peltatum</i>
Solomon's seal	<i>Polygonatum pubescens</i>
Christmas fern	<i>Polystichum acrostichoides</i>
cottonwood	<i>Populus deltoids</i>
black cherry	<i>Prunus serotina</i>
bracken fern	<i>Pteridium aquilinum</i>
white oak	<i>Quercus alba</i>
bur oak	<i>Quercus macrocarpa</i>
red oak	<i>Quercus rubra</i>
sumac	<i>Rhus spp.</i>
red raspberry	<i>Rubus idaeus</i>
black raspberry	<i>Rubus occidentalis</i>
purple flowering raspberry	<i>Rubus odoratus</i>
bloodroot	<i>Sanguinaria canadensis</i>
goldenrod	<i>Solidago spp.</i>
meadow sweet	<i>Spiraea alba</i>
steepleshub	<i>Spiraea tomentosa</i>
twisted stalk	<i>Streptopus lanceolatus</i>
American basswood	<i>Tilia Americana</i>
poison ivy	<i>Toxicodendron radicans</i>
starflower	<i>Trientalis borealis</i>
hemlock	<i>Tsuga Canadensis</i>
coltsfoot	<i>Tussilago farfara</i>
lowbush blueberry	<i>Vaccinium angustifolium</i>
common mullein	<i>Verbascum Thapsus</i>

*Invasive Species (as identified by the NYSDEC)

4.1.2 Wetland, Riparian, and Littoral Habitat

A total of 826 acres of open water and wetland were mapped within the study area ([Table 4.1.2-1](#)). Of this, 184 acres consisted of vegetated wetlands such as emergent, scrub-shrub, or forested wetlands. The remaining acreage is open water such as streams, ponds, and reservoirs. The treeline along the shoreline

of the Upper and Lower Reservoirs readily indicates the high-water line. Shoreline wetland development down gradient from the tree-line, within the zone of reservoir fluctuation, is dictated by topography and substrate, as described below. [Table 4.1.2-2](#) contains a list of wetland plant species identified within the study area.



Photo 4.1.2-1. Emergent Wetland Delta at the Mouth of the Mine Kill.

Table 4.1.2-1. Area and Classification of Wetlands and Open Water Mapped within the Project Boundary.

Cover Type	Cowardin Class	Acres
Control Level Ponds	PUB3/4H	3.3
Forested Wetland	PFO1B/PFO2B	4.4
Shrub Swamp	PSS1B	12.4
Floodplain Forest	PFO1C	14.2
Stream or River	R3UB1/R2UB2/3	41.2
Emergent Marsh	PEM1B/PEM2H	108.4
Artificial Pond or Reservoir	LOWHh	641.9
Total		826

The shoreline of the Upper and Lower Reservoirs consists primarily of well-armored banks (bedrock, cobbles, or rip-rap) and well-established broad emergent wetlands. Topography dictates the location of wetland features along the shoreline, with steep banks devoid of wetlands while areas of level topography and fine sediments (sand and silt) support broad emergent wetlands. [Photo 4.1.2-1](#) shows an example of a

broad delta associated with the mouth of the Mine Kill where extensive emergent wetlands dominated by valuable native plant species (*i.e.*, *Potamogeton spp.*) have developed. More detailed information on each of the reservoir shorelines is presented in subsections of Section 4.1.2 below.

Significant shoreline erosion was not observed along either the Upper or Lower Reservoir shorelines. Banks were either steep, well-armed slopes (bedrock, cobbles, or rip-rap) or more gently sloping areas with a stable, well vegetated, emergent zone. Most erosional features (undercutting, slumping, etc.) were observed along tributary streams (*e.g.*, the Mine Kill) and outside of the zone of fluctuation associated with the Project. Any erosion occurring along these tributary streams is a result of high flows within the tributary streams rather than a result of Project operation (erosion was observed above rather than below the influence of impoundment water levels). It is also important to note that Hurricane Irene, which occurred in 2011, resulted in record setting high flows within streams of the region. [Photo 4.1.2-2](#) below shows an example of under cutting along the Mine Kill following Hurricane Irene; [photo 4.1.2-3](#) is a representative view along the Lower Reservoir shoreline.



Photo 4.1.2-2: Streambank Erosion along the Mine Kill.



Photo 4.1.2-3: Representative Lower Reservoir Shoreline.

Lower Reservoir Wetland, Littoral, and Riparian Habitat

Wetlands adjacent to the Lower Reservoir and Schoharie Creek are primarily emergent wetlands. Forested floodplains are not extensive due to the steep topography. Most of the shoreline upstream from the confluence with Mine Kill consists of steep bedrock cliffs with little or no riparian vegetation. Emergent areas tend to be associated with silty and sandy terraces (*e.g.*, near the boat launch) or deltas resulting from sediment settling at tributary mouths (most notably at the mouth of the Mine Kill).

Upper emergent marsh terraces (higher elevation - [Photo 4.1.2-4](#)) and lower emergent marsh terraces (lower elevation - [Photo 4.1.2-5](#)) were observed along the Lower Reservoir shoreline. Upper emergent areas are found on slightly higher terraces and deltas within the Lower Reservoir, and are, therefore, inundated less frequently. These areas are dominated by marsh purslane, ladies thumb, spotted and marsh St. Johnswort, moneywort, wool grass, tear thumb, Joe-pye weed, white boneset, fringed loosestrife, blue and white vervain, false nettle, and various goldenrods. In wetter microsites within the upper terraces, spikerushes, three-square and soft stem bulrush become more prevalent. Lower emergent wetlands, which are exposed to more regular water level fluctuations during the growing season, occurred in a few locations along the Lower Reservoir. The largest examples of these lower emergent wetlands are found on either side of the boat launch on the western shore of the Lower Reservoir, and at the mouth of the Mine Kill. Lower emergent areas are dominated by smartweeds, with occasional inclusions of lesser forget-me-not, spike rush, and Indian hemp; these species are commonly found along rivers and streams

and are adapted to rapid changes in water level. Areas dominated by smartweeds are particularly valuable as seasonal forage for waterfowl ([USDA, 2001](#)).



Photo 4.1.2-4: Upper Emergent Marsh Adjacent to the Lower Reservoirs.



Photo 4.1.2-5: Lower Emergent Marsh Adjacent to the Lower Reservoir.

Forested floodplains occur in isolated locations, primarily near the mouth of the Mine Kill and adjacent to Schoharie Creek downstream of the Lower Dam. These wetlands are dominated by sycamore, black willow, green ash and cottonwood in the overstory, and deer tongue grass, sensitive fern, whorled loosestrife, tussock sedge, Joe-pye weed, reed canary grass, stinging nettle, and Canada bluejoint in the herbaceous stratum. The shrub/sapling stratum is typically very sparse in these forested floodplains. In drier locations within some forested floodplains, small patches of the invasive plants garlic mustard and Japanese knotweed were observed (primarily at the upstream extent of the Lower Reservoir).

The primary habitat within the littoral zone of the Lower Reservoir is emergent marsh and exposed shoreline (cobble shore/exposed shoreline). Rocky substrates do not provide good SAV habitat, and as such, the SAV zone is largely absent from the Lower Reservoir as well as in Schoharie Creek and the tributaries. Limited SAV development was observed in occasional small depressions within the emergent zone of the Lower Reservoir.

The riparian zone along the Lower Reservoir shoreline is vegetated with mixed or coniferous (white pine and hemlock) forests, and occasionally meadows or shrublands. However, in many locations, upland forest transitions abruptly to the Lower Reservoir shoreline (*e.g.*, where there are steep cliffs and hillsides). In these areas, there is limited riparian vegetation within the influence of the Project waters. The tributaries to the Lower Reservoir pass through forests dominated by hemlock. In most cases, Lower Reservoir riparian vegetation includes sycamore, green ash, basswood, hemlock, and white pine. Understory vegetation includes beech, ash, or hemlock saplings with herbaceous species including coltsfoot, bloodroot, starflower, twisted stalk, goldthread, wild sarsaparilla, and virgin's bower. Microhabitat features important to wildlife such as large woody debris, snags, and overhanging cliffs are prevalent within the riparian zone.

Upper Reservoir Wetland, Littoral, and Riparian Habitat

Most of the Upper Reservoir shoreline consists of angular rip-rap with little or no vegetation. Wetlands within this portion of the study area occur only along the eastern and northeastern shoreline and contain primarily emergent vegetation. Vegetation in emergent areas is dominated by three square, white boneset, Joe-pye weed, dark green bulrush, deer-tongue grass, smartweeds, and willows. There are also willow-dominated scrub-shrub sections below the tree line. Embedded within the shoreline wetlands of the Upper Reservoir are several control level ponds ([Photo 4.1.2-6](#)) that are connected to the Upper Reservoir only during high water; they are only partially hydrologically connected, through a small channel, during periods of low water. These ponds were constructed by the Power Authority in 1979 as a habitat

improvement project, as a way to create pockets of stable water for warm-water fish, wetland vegetation, and wildlife.



Photo 4.1.2-6: View of a Control Level Pond at the Upper Reservoir.

Similar to the Lower Reservoir littoral zone, the primary habitat within the Upper Reservoir is emergent marsh (to the east) and exposed shoreline (cobble shore/rip-rap). Rocky substrates do not provide suitable SAV habitat, and as such, the SAV zone is largely absent from the Upper Reservoir as well. Limited SAV development was observed in the control level ponds along the Upper Reservoir; these areas were dominated by pondweed (*Potamogeton spp.*) species.

Surrounding the Upper Reservoir, riparian habitat and vegetation is limited to the eastern shoreline since the remainder of the shoreline consists of angular rip-rap with little vegetation. Land adjacent to the eastern shore is dominated by upland forest with primarily hemlock and mixed hardwoods occurring in the overstory. In areas dominated by hemlock, understory vegetation includes beech and hemlock saplings; herbaceous species include twisted stalk, starflower, goldthread, and sarsaparilla.

Mitigation Wetlands

In September 2000, the U.S. Army Corps of Engineers (USACE) issued NYPA a permit for remediation of a landslide that occurred at the Project. Requirements of the permit called for the creation of 6.19 acres of freshwater wetlands to compensate for unavoidable impacts to hillside wetlands in the landslide area ([EDR, 2003](#)). In order to fulfill the requirements of the permit conditions, NYPA constructed mitigation wetlands at three sites. These wetlands, which are set back from the Project reservoirs outside the influence of Project operations, are clustered to the south of the Visitors Center and just northwest of the Lower Dam. These wetlands exhibit wetland plant communities, hydric soils, and wetland hydrology as determined by the 2012 field surveys. They are mostly emergent and scrub-shrub communities dominated by cattail, water parsnip, wool grass, dark green bulrush, white boneset, willow and speckled alder, as well as a variety of other hydrophytic plant species that were either planted during the construction of these features or colonized on their own from nearby wetlands in subsequent years.

Table 4.1.2-2. Representative Wetland Botanical Species Identified within the Study Area in 2012.

Common Name	Scientific Name
sweetflag	<i>Acorus americanus</i>
northern water plantain	<i>Alisma triviale</i>
speckled alder	<i>Alnus incanna</i>
pimpernel	<i>Anagallis arvensis</i>
Indian hemp	<i>Apocynum cannabinum</i>
dogbane	<i>Apocynum spp.</i>
swamp milkweed	<i>Asclepias incarnata</i>
beggar's tick	<i>Bidens spp.</i>
false nettle	<i>Boehmeria cylindrica</i>
Canada bluejoint	<i>Calamagrostis canadensis</i>
hedge bindweed	<i>Calystegia sepium</i>
bladder sedge	<i>Carex crinita</i>
yellow sedge	<i>Carex flava</i>
greater bladder sedge	<i>Carex intumescens</i>
hop sedge	<i>Carex lupulina</i>
broom sedge	<i>Carex scoparia</i>
tussock sedge	<i>Carex stricta</i>
fox sedge	<i>Carex vulpinoidea</i>
button bush	<i>Cephalanthus occidentalis</i>
water hemlock	<i>Cicuta maculata</i>
silky dogwood	<i>Cornus amomum</i>
smooth bedstraw	<i>Cruciata laevipes</i>
deer tongue grass	<i>Dichanthelium clandestinum</i>

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Common Name	Scientific Name
American waterwort	<i>Elatine americana</i>
spike rush	<i>Eleocharis spp.</i>
hairy willow-herb	<i>Epilobium hirsutum</i>
water horsetail	<i>Equisetum fluviatile</i>
Joe-pye weed	<i>Eupatoriadelphus maculatus</i>
white boneset	<i>Eupatorium album</i>
white snakeroot	<i>Eupatorium rugosum</i>
flat-top goldenrod	<i>Euthamia graminifolia</i>
green ash	<i>Fraxinus pennsylvanica</i>
bedstraw	<i>Galium spp.</i>
white geum	<i>Geum canadense</i>
purple geum	<i>Geum rivale</i>
winterberry	<i>Ilex verticillata</i>
jewelweed	<i>Impatiens capensis</i>
yellow flag iris	<i>Iris pseudacorus*</i>
blue flag iris	<i>Iris versicolor</i>
Canada rush	<i>Juncus canadensis</i>
soft rush	<i>Juncus effusus</i>
water willow	<i>Justica americana</i>
marsh purslane	<i>Ludwigia palustris</i>
American water horehound	<i>Lycopus americanus</i>
fringed loosestrife	<i>Lysimachia ciliata</i>
moneywort	<i>Lysimachia nummularia*</i>
swamp candle	<i>Lysimachia terrestris</i>
purple loosestrife	<i>Lythrum salicaria*</i>
wild mint	<i>Mentha arvensis</i>
monkeyflower	<i>Mimulus ringens</i>
lesser forget-me-not	<i>Myosotis laxa</i>
sweetgale	<i>Myrica gale</i>
evening primrose	<i>Oenothera biennis</i>
small sundrop	<i>Oenothera perennis</i>
sensitive fern	<i>Onoclea sensibilis</i>
switchgrass	<i>Panicum virgatum</i>
wild parsnip	<i>Pastinaca sativa</i>
reed canary grass	<i>Phalaris arundinacea*</i>
common reed	<i>Phragmites australis*</i>
bracted plantain	<i>Plantago aristata</i>
sycamore	<i>Platanus occidentalis</i>
arrow leaved tearthumb	<i>Polygonum sagittatum</i>
smartweed spp.	<i>Polygonum spp.</i>
pickerelweed	<i>Pontederia cordata</i>

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Common Name	Scientific Name
heal-all	<i>Prunella vulgaris</i>
creeping yellow cress	<i>Rorippa sylvestris</i>
swamp rose	<i>Rosa palustris</i>
curly dock	<i>Rumex crispus</i>
arrowhead	<i>Sagittaria latifolia</i>
black willow	<i>Salix nigra</i>
willow spp.	<i>Salix spp.</i>
common elderberry	<i>Sambucus canadensis</i>
three square	<i>Schoenoplectus pungens</i>
soft stem bulrush	<i>Schoenoplectus tabernaemontani</i>
dark green bulrush	<i>Scirpus atrovirens</i>
woolgrass	<i>Scirpus cyperinus</i>
barberpole sedge	<i>Scirpus microcarpus</i>
water parsnip	<i>Sium suave</i>
goldenrod spp.	<i>Solidago Spp.</i>
burreed	<i>Sparganium americanum</i>
New York aster	<i>Symphotrichum novi-belgii</i>
tall meadow rue	<i>Thalictrum pubescens</i>
New York fern	<i>Thelypteris noveboracensis</i>
marsh fern	<i>Thelypteris palustris</i>
marsh St. Johnswort	<i>Triadenum virginicum</i>
narrow-leaved cattail	<i>Typha angustifolia</i>
broad-leaved cattail	<i>Typha latifolia</i>
hybrid cattail	<i>Typha x glauca</i>
blue vervain	<i>Verbena hastata</i>
white vervain	<i>Verbena urticifolia</i>
vetch spp.	<i>Vicia spp.</i>

**Invasive Species (as identified by the NYSDEC)*

4.1.3 Invasives

Invasive species are exotic plants and wildlife that out-compete native flora and fauna, and in most cases do not offer significant value (e.g., vegetation as wildlife forage) to native wildlife or ecosystems. In some cases, invasive species may also preclude establishment of native species through biochemical means (e.g., garlic mustard).

Plants

Upland invasive and exotic plant species occasionally occur within the Project vicinity; however large stands are not widespread. In most cases, invasive plants occur as small discontinuous patches across the

landscape. Invasive shrub honeysuckles (Morrow's and Tartarian) and barberry (primarily European) were the most common invasive species found throughout the Project, where they primarily occupy the understory of northern mixed hardwood stands and occasionally white pine dominated forests. Japanese knotweed occurs in several stands within a large area of recent alluvium at the upstream limit of the study area. Garlic mustard and white sweet clover are dominant herbaceous invasive species within upland forest edges and roadsides of the study area. Other species, such as hawkweed, spotted knapweed, and Japanese stiltgrass are present but not as commonly observed.

Invasive wetland plants within the study area are also not wide spread. Purple loosestrife occurs along both the Upper and Lower Reservoirs, but not in dense mono-cultures, rather as isolated stems or small patches. Common reed occurs primarily near the maintenance area which is located adjacent to the Lower Reservoir. A second smaller stand of common reed occurs along the fence line of the Upper Reservoir. Similar to purple loosestrife, common reed does not appear to be widespread within the Project area and occurs in only a few isolated stands. Reed canary grass occurs as a component of several wetlands within the study area, but is co-dominant with native vegetation. Moneywort is present in small dense patches, primarily near the Mine Kill. The wetland mitigation area near the Visitors Center contains several stems of invasive yellow iris, but this species was not observed anywhere else in the study area during the survey.

Insects

The hemlock woolly adelgid (*Adelges tsugae*), a destructive pest that kills eastern hemlock trees, has been discovered throughout Mine Kill State Park ([John Lowe, Mine Kill State Park, personal communication, July 11, 2012](#)). Occasional dead hemlock trees and infested live branches were observed to the north of the State Park along the northwest shore of the Lower Reservoir. The adelgid came to North America from Asia and continues to spread northward across New York from southeastern New York where it first appeared more than two decades ago ([NYSDEC, 2012a](#)). Infestation is usually fatal to the host after several years. This newly discovered infestation is noteworthy because hemlock is a dominant canopy tree in the Mine Kill State Park and the study area. Field observations also indicated that most of the hemlock within the study area occurs in forests where hemlock is <50% of the canopy, which were mapped as other dominant forest types.

The emerald ash borer (EAB) (*Agrilus planipennis*) was first discovered in the U.S. in 2002 in southeastern Michigan ([NYSDEC, 2012b](#)). The beetle is of Asian origin and infests and kills North American ash (*Fraxinus*) species. Although a specific search was not conducted for EAB it was not identified within the study area during field surveys; however, several EAB traps were observed within

the Mine Kill State Park. According to maps from the NYSDEC, as of September 2012, EAB infestations were documented in Albany and Greene Counties, which are adjacent counties to Schoharie County ([NYSDEC, 2012b](#)).

4.2 Wildlife

The study area includes a variety of habitats ranging from aquatic to terrestrial and including both forested and non-forested ecosystems. In addition to natural habitats within the study area, NYPA has developed several management areas to improve wildlife habitat. These projects include bluebird nesting boxes, deer forage areas, and spring salamander habitat features. A general description of wildlife that was identified within the study area during the 2012 field work follows. Additional information is contained within the wildlife habitat matrix ([Appendix A](#)).

4.2.1 Birds

The study area includes open meadow and shrublands as well as areas of un-fragmented forest. This combination provides habitat for species that require open grasslands (*e.g.*, Bobolink) and interior forest species (*e.g.*, Ovenbirds and Wood Thrush). [Table 4.2.1-1](#) contains a list of 36 bird species observed during field work in 2012 by sight, sign, or vocalizations. Additional species occurrences or potential occurrences based on past surveys or identification within literature are included in [Appendix A](#).

Table 4.2.1-1. Birds Observed within the Study Area In 2012.

Common Name	Scientific Name
Spotted Sandpiper	<i>Actitis macularius</i>
Red-Winged Blackbird	<i>Agelaius phoeniceus</i>
Mallard	<i>Anas platyrhynchos</i>
American Black Duck	<i>Anas rubripes</i>
Ruffed Grouse	<i>Bonasa umbellus</i>
Canada Goose	<i>Branta canadensis</i>
Red Tailed Hawk	<i>Buteo jamaicensis</i>
Canada Warbler	<i>Cardellina canadensis</i>
Turkey Vulture	<i>Cathartes aura</i>
Veery	<i>Catharus fuscescens</i>
American Crow	<i>Corvus brachyrhynchos</i>
Blue Jay	<i>Cyanocitta cristata</i>
Gray Catbird	<i>Dumetella carolinensis</i>
Bald Eagle	<i>Haliaeetus leucocephalus</i>
Wood Thrush	<i>Hylocichla mustelina</i>
Belted Kingfisher	<i>Megaceryle alcyon</i>
Wild Turkey	<i>Meleagris gallopavo</i>
Song Sparrow	<i>Melospiza melodia</i>
Northern Waterthrush	<i>Parkesia noveboracens</i>
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>
Hairy Woodpecker	<i>Picoides villosus</i>
Scarlet Tanager	<i>Piranga olivacea</i>
Black Capped Chickadee	<i>Poecile atricapillus</i>
Ovenbird	<i>Seiurus aurocapilla</i>
Cerulean Warbler	<i>Setophaga cerulea</i>
Chestnut Sided Warbler	<i>Setophaga pensylvanica</i>
Black Throated Green Warbler	<i>Setophaga virens</i>
Bluebird	<i>Sialia sialis</i>
Field Sparrow	<i>Spizella pusilla</i>
Tree Swallow	<i>Tachycineta bicolor</i>
Winter wren	<i>Toxostoma rufum</i>
Brown Thrasher	<i>Troglodytes roglodytes</i>
American Robin	<i>Turdus migratorius</i>
Eastern Kingbird	<i>Tyrannus tyrannus</i>
Red-Eyed Vireo	<i>Vireo olivaceus</i>
Mourning Dove	<i>Zenaida macroura</i>
White Throated Sparrow	<i>Zonotrichia albicollis</i>

4.2.2 Mammals

Terrestrial habitat within the study area is primarily upland forest with some areas of upland meadow and shrubland. When combined with the aquatic habitats in the study area, the resulting habitat mosaic supports a wide variety of mammals.

Mixed hardwood-coniferous forest is the dominant cover type within the study area. These forests provide important wildlife food sources associated with mast-crop producing species such as oak and beech. In addition, hemlock and white pine stands interspersed with occasional open fields and shrublands, make the habitat within the study area ideal for a number of mammal species. Small mammals such as masked shrew, deer mouse, white footed mouse, woodland jumping mouse, meadow jumping mouse, woodchuck, gray squirrel, chipmunk, and red squirrel use this habitat mosaic for foraging and shelter ([Table 4.2.2-1](#)). In general, areas of mixed hardwoods have good canopy closure and relatively open understory which may provide good habitat for bats, including little brown, big brown, eastern red, and hoary bats ([Degraaf and Yamasaki, 2001](#)).

Larger mammals such as eastern cottontail and snowshoe hare use the habitat mosaic within the study area, especially areas with denser understory vegetation for improved cover. The tributary streams and intermittent drainages are used by generalist species (*e.g.*, porcupine, weasel, mink, skunk, opossum and raccoon) that feed on a variety of food sources. With an adequate prey base, predators such as coyote, red fox, grey fox, fisher, and bobcat have the potential to occur within these forests. Large mammals including white tail deer and black bear were documented within the study area during the field work in 2012. Additional species occurrences based on past surveys or identification within literature are included in the wildlife habitat matrix ([Appendix A](#)).

Table 4.2.2-1. Mammal Species Identified within the Study Area in 2012.

Common Name	Scientific Name
coyote	<i>Canis latrans</i>
beaver	<i>Castor canadensis</i>
porcupine	<i>Erethizon dorsatum</i>
white tailed deer	<i>Odocoileus virginianus</i>
muskrat	<i>Ondatra zibethicus</i>
raccoon	<i>Procyon lotor</i>
grey squirrel	<i>Sciurus carolinensis</i>
chipmunk	<i>Tamias striatus</i>
red squirrel	<i>Tamiasciurus hudsonicus</i>
black bear	<i>Ursus americanus</i>

Common Name	Scientific Name
red fox	<i>Vulpes vulpes</i>

4.2.3 Herptiles

Amphibians and reptiles (herptiles) utilize the study area habitats including the wetlands, littoral zone, and forests. Several species utilize both aquatic and terrestrial environments as part of their life history. [Table 4.2.3-1](#) contains species identified within the study area during the 2012 field work. Green frogs were commonly observed along the Lower Reservoir shoreline, wetlands, larger tributaries as well as the constant-level ponds along the shoreline of the Upper Reservoir. Several of the small intermittent and permanent tributaries to the Lower Reservoir contained northern dusky and Allegheny mountain dusky salamanders. Additional species occurrences based on past surveys or identification within literature are included in the wildlife habitat matrix ([Appendix A](#)).

Table 4.2.3-1. Herptile Species Identified within the Study Area in 2012.

Common Name	Scientific Name
green frog	<i>Lithobates clamitans</i>
red newt	<i>Notophthalmus viridescens</i>
redback salamander	<i>Plethodon cinereus</i>
northern two-lined salamander	<i>Eurycea bislineata</i>
northern dusky salamander	<i>Desmognathus fuscus</i>
Allegheny mountain dusky salamander	<i>Desmognathus ochrophaeus</i>
American toad	<i>Bufo americanus</i>
gray treefrog	<i>Hyla versicolor</i>
common garter snake	<i>Thamnophis sirtalis</i>
wood frog	<i>Lithobates sylvaticus</i>
pickerel frog	<i>Lithobates palustris</i>

4.3 Rare, Threatened and Endangered Species

Prior to completing field work, a routine letter of inquiry was sent to the NYNHP asking for information on RTE species that occur or may have the potential to occur within or in the vicinity of the study area. Bald Eagle and timber rattlesnake were identified as potentially occurring based on current and historic records ([Pietrusiak, 2011](#)). During the field work, special consideration was given to searching for sign, habitat, or visual identification of both Bald Eagle and timber rattlesnake. Historically, Bald Eagles have been observed utilizing the Project impoundment, but no active nests were observed within the study area in 2012. Several Bald Eagle feathers ([Photo 4.4-1](#)) were observed below a white pine near the Mine Kill confluence, and there was a significant amount of “white-wash” (urates) observed below the perch. A

timber rattlesnake expert that participated in the 2012 field effort surveyed the most likely areas for potential rattlesnake habitat, and no rattlesnakes or viable den habitat were observed. Viable den areas for overwintering are a critical component of timber rattlesnake habitat.



Photo 4.4-1: Bald Eagle Feathers Identified near the Mine Kill.

Bald Eagle, a New York State-Threatened species, occurs in and uses the waters in the study area, including both Project reservoirs and Schoharie Creek, for feeding ([S. Van Arsdale, NYSDEC, personal communication, August 3, 2012](#)). This species has nested within the vicinity of the Lower Reservoir since approximately 1995, with as many as two active nests in any given year. Between 1995 and 2009 there was one nest; since that time two nests have been observed within the study area. Over the years, these nests have produced from 0-3 chicks total per year ([S. Van Arsdale, NYSDEC, personal communication, August 3, 2012](#)).

Although no nests occurred within the study area in 2012, two nests occurred nearby. One of the two nest locations has moved over the years and is sometimes within and sometimes just outside of the study area; the second nest has remained just outside of the study area ([S. Van Arsdale, NYSDEC, personal communication, August 3, 2012](#)). Regardless of nest location, Bald Eagles use the Project waters to feed. During the winter, Schoharie Creek, particularly above and below the Lower Reservoir, is an important feeding area for transient Bald Eagles when there is open water and no ice cover. Transient, non-breeding Bald Eagles (*e.g.*, sub-adults) can use the study area during all seasons of the year.

Timber rattlesnake, a New York State-Threatened species that occurs in the Catskill region, was noted by the NYNHP as potentially occurring in the vicinity of the Project. Although there have been three documented historic occurrences of this species within the vicinity of the Project ([1979, 1981, and 1983; N. Heaslip, NYSDEC, personal communication, August 15, 2012](#)), no documented occurrences of this species exist within the study area itself. As noted above, no rattlesnakes or viable den habitats were observed within the study area during the 2012 survey.

Additional rare species may occur within the study area. Species listed in [Table 4.4-1](#) have the potential to occur based on habitat, range, and historic observation, but were not identified by the NYNHP as occurring within the study area. (Only Bald Eagle and timber rattlesnake were identified by the NYNHP response). Both the Cerulean Warbler and the Eastern Small-footed Myotis were within the study area during 2012.

Table 4.4-1. Potential RTE Species That May Occur within the Project Area.

Common Name	Scientific Name	Status ¹
Indiana Bat ²	<i>Myotis sodalis</i>	E
Bald Eagle	<i>Haliaeetus leucocephalus</i>	T
Timber Rattlesnake	<i>Crotalus horridus</i>	T
Blue-Spotted Salamander	<i>Ambystoma laterale</i>	SC
Jefferson Salamander	<i>Ambystoma jeffersonianum</i>	SC
Wood Turtle	<i>Clemmys insculpta</i>	SC
Osprey	<i>Pandion haliaetus</i>	SC
Cooper's Hawk	<i>Accipiter cooperii</i>	SC
Cerulean Warbler	<i>Dendroica cerulea</i>	SC
Eastern Small-footed Myotis	<i>Myotis leibii</i>	SC

¹ E= State and Federally Endangered, T= State Threatened, SC= State Special Concern.

² Based on the current decline in bat populations, it is likely that this species no longer exists within Schoharie Co, though it did historically.

4.4 Habitats and Associated Wildlife

Habitat types identified within the study area are described below, with each having particular importance to different species of wildlife. In general, the land within the Project boundary and the larger study area are dominated by hemlock forests (near the Mine Kill) and northern hardwood-coniferous forests. Photo 4.4-1 is representative of the extensive forest in the study area. The stream valley in this photo is upstream of the Lower Reservoir and shows Schoharie Creek upstream (south) of the area influenced by

Project operations (the exposed streambed is representative of the flashy nature of the stream above the Project).



Photo 4.4-1. Representative Photo of Study Area Landscape.

4.4.1 Tributary Stream or River

The Tributary Stream or River community includes small to moderately-sized rocky, coldwater streams with moderate to steep gradients that flow over eroded bedrock in headwater areas ([Reschke, 1990](#)). Primary sources of energy to the stream are terrestrial leaf litter and organic material. In addition to small fish, these habitats generally support populations of reptiles (wood turtle, ribbon snake) and amphibians (northern two-lined, dusky salamanders and Allegheny mountain dusky salamander), terrestrial species (raccoons, mink, bats, shrews, and mice), or avian species (Northern Waterthrush, Belted Kingfisher, Downy Woodpecker, Tree Swallow) that utilize the riparian area or forage within the stream. Within the study area, the Mine Kill and the small tributary south of the Mine Kill are the primary headwater streams which flow into Schoharie Creek. [Photo 4.4.1-1](#), taken on the Mine Kill, is representative of the tributary streams observed within the study area.



Photo 4.4.1-1: Representative View of the Mine Kill.

Riverine habitat includes natural river habitat as well as communities that are either created or modified by human influence. Schoharie Creek is the primary riverine habitat mapped within the study area. Despite being a modified environment, this system provides habitat for a number of aquatic and semi-aquatic species including frogs, painted turtles, snapping turtles, beaver and river otter. Waterfowl (Mallards, Black Ducks, mergansers, and others) often utilize these habitats for forage or for resting during migration. [Photo 4.4.1-2](#) is representative of the Schoharie Creek upstream of the Project impoundment.



Photo 4.4.1-2: View of the Schoharie Creek at the Upstream End of the Project.

4.4.2 *Artificial Pond*

The artificial pond community is either created or modified by human influence ([Reschke, 1990](#)). Within the study area, the primary artificial ponds are the Lower Reservoir and the Upper Reservoir. The Lower Reservoir extends approximately 3 miles upstream from the dam and covers approximately 430 acres. The Upper Reservoir, which is created by an earthen berm, is approximately 390 acres in size when filled to capacity.

Artificial ponds in the study area offer open-water habitats during the spring, summer, and fall. These habitats are used by various amphibians and reptiles such as the red-spotted newt, bullfrog, painted turtle, and northern water snake. Large populations of insects attract aerial foragers to these habitats. Examples include the Tree Swallow and little brown bat. Waterfowl that occur in pond habitats during the breeding season are typically restricted to Canada Geese and Mallard. A more diverse mix of species uses these habitats during spring and fall migration periods. These habitats are used occasionally by muskrat and beaver. [Photo 4.4.2-1](#), a representative view of impoundments within the study area, was taken at the Lower Reservoir (Note: debris within the reservoir stems from high flows and flooding in August 2011).



Photo 4.4.2-1: View Across the Lower Reservoir, Looking Easterly.

4.4.3 Controlled Level Ponds

These systems, in general, are characterized by shallow, nutrient-rich aquatic habitats within the study area. These are engineered artificial features (except those near the Lower Reservoir boat launch). Waters are usually green with algae and the bottom is generally mucky. These ponds are too shallow to become stratified in the summer. Characteristic vegetation includes coontail, duckweeds, waterweed, pondweeds, yellow pond lily, and white pond lily. The control level ponds provide habitat for a variety of amphibians and reptiles including green frogs, bull frogs, painted turtles, and snapping turtles. In addition, these systems attract waterfowl including Mallards and Canada Geese and mammals such as muskrat and beaver. [Photo 4.4.3-1](#) is a representative view of one of the controlled level ponds at the eastern shore of the Upper Reservoir.



Photo 4.4.3-1: Representative View of a Control-Level Pond

4.4.4 Emergent Marsh

Emergent marsh systems occur on mineral soils or fine grained organic soils (muck). Water depths range from 6 inches to 3.3 feet in shallower habitats and up to 6 feet in deeper emergent wetlands. Shallow emergent areas are usually exposed by mid-late summer while deep emergent marsh may remain wetted year round. Herbaceous vegetation dominates emergent marsh wetlands in the study area. Shallow marsh areas are generally dominated by reed canary grass, sedges (*Carex spp.*), three-way sedge, wool grass, soft rush, and blue vervain. Areas of deeper marsh are dominated by smartweeds and lesser forget-me-not. Wildlife within emergent marsh includes a variety of reptiles and amphibians, including green frogs, leopard frogs, pickerel frogs, painted turtles and snapping turtles. In deeper wetlands, seeds of smartweeds and other plants offer excellent forage for Mallards and other dabbling ducks. More terrestrial species, such as raccoons, utilize these areas for forage as well. [Photo 4.4.4-1](#) is a representative view of emergent marsh within the study area; the photo was taken at the mitigation area near the Visitors Center.



Photo 4.4.4-1: Emergent Marsh (Mitigation Area), Located Near the Visitors Center.

4.4.5 *Shrub Swamp*

The shrub swamp is an inland shrub-dominated wetland system normally found along lake or river shorelines, in depressions, or as a transition zone between emergent and upland communities. Substrates in these habitats range from mineral to mucky. Within the study area, shrub swamps are generally dominated by speckled alder, red osier dog wood, and willow. Other species such as meadow-sweet, steeple-bush, button bush, and arrow-wood also may occur. A large number of birds including Common Snipe, Yellow-Bellied Flycatcher, Common Yellowthroat, and Swamp Sparrows (among others) utilize these habitats for forage and shelter. The saturated nature of these wetlands also supports leopard frogs, wood frogs, and salamanders.

4.4.6 *Floodplain Forest*

The floodplain forest system is a hardwood forest that occurs on mineral soils on low terraces adjacent to rivers and in deltas. Sites are characterized by annual flooding in the spring and are often quite dry during late summer. Within the study area, floodplains are primarily associated with the Mine Kill and are dominated primarily by cottonwood and willow. Herbaceous vegetation included sensitive fern, jewel weed, and honeysuckle. Characteristic species of these systems are the Yellow-Throated Vireo, Tufted Titmouse, Red-Bellied Woodpecker, and Pileated Woodpecker. Wood turtles are also potentially found

within these riparian areas. [Photo 4.4.6-1](#) is a representative view of a forested floodplain along the Mine Kill.



Photo 4.4.6-1: View across the Interior of a Forested Floodplain along the Mine Kill.

4.4.7 Forested Wetland

Forested wetlands within the study area are primarily hardwood dominated. Representative tree species include red maple, cottonwood, and willow. Shrubs include red osier dogwood, winterberry, arrow-wood, and wild raisin. Cinnamon fern, sensitive fern, jewel weed, and sedge species dominate the herbaceous layer. Common wildlife includes marbled salamander, blue spotted salamanders, Black-Crowned Night Heron, and Red-Bellied Woodpeckers. Species composition is slightly different in some locations, primarily along tributary streams, where forested wetlands also contain a large proportion of hemlocks. Typically these areas have a closed canopy with hemlock, yellow birch, and red maple dominating. Shrub and herbaceous vegetation in these areas is generally sparse, consisting largely of cinnamon fern or sensitive fern. Wildlife in these hemlock wetlands may include the Golden-Crowned Kinglet. [Photo 4.4.7-1](#) is a representative view of a forested wetland; this photo was taken east of the Visitors Center.



Photo 4.4.7-1: Interior View of a Forested Wetland near the Lower Reservoir.

4.4.8 Exposed Shoreline

Some shoreline areas of the Project impoundment support little to no vegetation. Often, these areas are dominated by mud, silt and sand that are only exposed for short periods, or have rocky substrate that inhibit vegetation growth. These areas occur predominantly along the Lower and Upper Reservoir shorelines. Wildlife will often use these areas, when exposed. Representative species include Spotted Sand Pipers and other generalists foraging for macroinvertebrates. [Photo 4.4.8-1](#) is of a representative exposed shoreline within the upper reaches of the Lower Reservoir, where water levels are influenced by stream inflow.



Photo 4.4.8-1: View of Exposed Shoreline along the Lower Reservoir.

4.4.9 Scoured Shoreline

In August 2011, Hurricane Irene resulted in dramatic flooding along Schoharie Creek. As a result of the flooding, large areas of topsoil and vegetation were lost to streambank erosion. The scour changed Schoharie Creek in riverine sections above and below the Lower Reservoir, however the Lower Reservoir was depositional since it is quieter and wider. The riverine scour areas, mapped using aerial imagery taken right after the 2011 flooding, are now primarily dominated by sparse vegetation (only occasional saplings) or consist of bare cobble and gravel. These areas are transitional and will change over time as vegetation returns. [Photo 4.4.9-1](#) shows scoured shoreline along Schoharie Creek, upstream of the study area. Similar erosion was not observed along the shorelines of the Lower Reservoir because this was a relatively quiet section during the flood that made it less susceptible to erosion as a result of being several-times wider than the stream itself.



Photo 4.4.9-1: Area of Scoured Shoreline, Upstream of the Lower Reservoir.

4.4.10 Cobble Shore

This habitat and associated community occurs along lake and stream shorelines where seepage or intermittent flooding provides adequate soil moisture for vegetation. Generally, these habitats have a mixture of sand and cobble, with drier microsites occurring at higher elevations which are flooded less frequently. Vegetation is generally sparse, and includes characteristic species such as beggar's tick, spike rushes, Indian hemp, white boneset, and three square. Wildlife usage of cobble shore habitats is variable, and may include spotted sand pipers, raccoons, skunk, or other generalist species. [Photo 4.4.10-1](#) is a representative view of cobble shoreline along the Lower Reservoir.



Photo 4.4.10-1: View of Cobble Shore Located Along the Lower Reservoir.

4.4.11 Rock-Outcrop

The rock-outcrop community typically occurs along shorelines of lakes and streams, and on very steep forested hillsides, where bedrock is exposed. Within the study area, this community is associated with calcareous bedrock found primarily along the shore of the Lower Reservoir, as well as upstream of the Lower Reservoir along Schoharie Creek. This habitat is sparse with vegetation, which only grows within rock crevices. Characteristic species include wild columbine, sedges, silky dogwood, red osier dogwood, and meadow rue. Although wildlife usage is limited due to the lack of vegetation and steepness of these habitats, some areas may provide good cover or basking habitat. The field survey documented a porcupine den beneath a ledge outcrop adjacent to a hemlock ravine. [Photo 4.4.11-1](#) shows a rock outcrop located east of the Visitors Center, near the Lower Reservoir shoreline.



Photo 4.4.11-1: Area of Exposed Bedrock Outcropping near the Lower Reservoir

4.4.12 Grassland

In general, this community consists of areas formerly used for agriculture that are now dominated by forbs and grasses. Herbaceous plants within these habitats are diverse, and may include golden rods, bluegrasses, calico aster, New England aster, wild strawberry, Queen-Anne's lace, ragweed, hawkweeds, dandelion, and oxeye daisy. Shrubs within this habitat are limited, but when they occur, tend to be gray dogwood, silky dogwood, arrow-wood, raspberries, sumac, or eastern red cedar. Field Sparrows and Blue Birds utilize these habitats as well as several species of rodents. This habitat is transitional and without occasional clearing will succeed to shrub land or woodland. [Photo 4.4.12-1](#) shows a view of grassland surrounding white tail deer forage near the Visitors Center.



Photo 4.4.12-1: View of Grassland near the Visitors Center (Emergent Wetland in the Foreground).

4.4.13 Successional Old Field/Shrubland

This habitat is similar to the grassland community as it occurs on sites that have been historically cleared and then abandoned. However, unlike grasslands, this community has at least 50% shrub cover. Characteristic species include gray dogwood, eastern red cedar, raspberries, hawthorn, service berries, choke cherry, sumac, arrow-wood, and multiflora rose. Representative wildlife includes American Robin, Willow Flycatcher, Blue-Winged Warbler, and rat snakes, in addition to a wide variety of habitat generalists. [Photo 4.4.13-1](#) shows a representative view of sapling growth within a successional old field.



Photo 4.4.13-1: View of Sapling Regeneration within the Study Area.

4.4.14 Northern Hardwood Forest

This habitat community is predominantly hardwood forest that has established on historically cleared sites (*e.g.*, farming or logging). Within the study area, dominant trees usually include some combination of quaking aspen, big tooth aspen, balsam poplar, pin cherry, black cherry, red maple, white pine, paper birch, gray birch, white ash, green ash, or American elm. This community is variable but is generally dominated by shade-intolerant species adapted to establishment following disturbance. In addition to a variety of mammals that may utilize these habitats, Chestnut-sided Warblers, Nashville Warblers, and Yellow-bellied Sapsuckers are common. Northern red bellied snakes and ring neck snakes are commonly found in these habitats. A large variety of mammals utilize this habitat, including black bear, white tail deer, coyote, and various bats, voles, and shrews. [Photo 4.4.14-1](#) shows a representative view of a northern hardwood forest interior from Brown Mountain, between the Lower and Upper Reservoirs.



Photo 4.4.14-1: View of Northern Hardwood Forest Interior (also Headwater Stream).

4.4.15 Northern Hardwood-Coniferous Forest

This habitat community is a mixed forest occurring on middle-to-lower slopes and ravines, and on moist wetland margins. The primary coniferous species within this habitat community is hemlock, which is co-dominant with beech, sugar maple, red maple, black cherry, white pine, yellow birch, red oak, and basswood. The relative cover of hemlock may vary within this habitat community. Often slopes and ravines maintain a much higher cover of hemlock. Shrub layer vegetation may be sparse, but may include hobblebush, maple-leaf viburnum, and raspberries. Depending on the coverage of hemlock, light penetration to the forest floor may be limited, and therefore herbaceous vegetation may be sparse. Ground layer vegetation often includes Indian cucumber, Canada mayflower, wood fern, Christmas fern, star flower, common wood sorrel, foam flower, twisted stalk, and purple trillium. Birds utilizing this habitat include Wild Turkey, Pileated Woodpecker, Golden-Crowned Kinglet, and Black-Throated Green Warbler. A large variety of mammals use this habitat, which includes black bear, white tail deer, coyote, various bats, and several species of voles and shrews.

4.4.16 Eastern Hemlock Forest

This habitat community is a hemlock-dominated forest occurring on middle-to-lower slopes and ravines, and on moist wetland margins. In areas of dense hemlock coverage, limited light penetration to the forest floor may result in sparse herbaceous and shrub layer vegetation. Shrubs may include hobblebush,

maple-leaf viburnum, and raspberries. Ground layer vegetation often includes Indian cucumber, Canada mayflower, wood fern, Christmas fern, star flower, common wood sorrel, foam flower, twisted stalk, and purple trillium. Birds utilizing this habitat include Wild Turkey, Pileated Woodpecker, Golden-Crowned Kinglet, and Black-Throated Green Warbler. White tail deer, porcupine, red squirrels, and deer mice are often associated with these forests. Within the study area, hemlock forests are dominant within the Mine Kill State Park, which is adjacent to the Lower Reservoir. [Photo 4.4.16-1](#) is a representative view of the interior of an eastern hemlock stand near the Lower Reservoir shoreline.



Photo 4.4.16-1: View of Interior of a Hemlock Forest Adjacent to the Lower Reservoir.

4.4.17 Eastern White Pine Forest

This is a habitat community in which white pine dominates; in some stands, it is co-dominant with a mixture of northern hardwoods including yellow birch, red maple, and balsam fir. Shrubs include lowbush blueberry, maple-leaf viburnum, barberry, and honeysuckle. Herbaceous vegetation includes bracken fern, wintergreen, Canada mayflower, bunchberry, blue-bead lily, and trilliums. In well spaced

white pine stands, Pileated Woodpeckers are common. Within the study area, several white pine stands appear to be historic plantings with trees spaced evenly in rows. Most white pine dominated forests were observed in areas around the Lower Reservoir. Birds commonly utilizing this habitat include Turkey Vulture, Long Eared Owl, Pileated Woodpecker, and Red Breasted Nuthatch. Other common species include the northern red-bellied snake, red squirrels, and deer mice.

4.4.18 Manicured Lawn

This community is maintained by human activity and is primarily associated with residential or commercial property and consists primarily of grasses that are mowed regularly throughout the growing season. Due to the disturbance regime and proximity to human habitation, this community offers little wildlife habitat or value.

4.4.19 Transportation

Transportation coverage includes roads or paths, with roads being paved, gravel, or dirt. This coverage generally offers little habitat value for wildlife, but road shoulders may provide some usable forage for species including woodchucks.

4.4.20 Development

Development includes all landscape feature of human origin and may include: structures, pools, parking areas, dams, or dikes. In some cases (*i.e.*, placed rip-rap or old structures) development may provide habitat for species accustomed to human activity.

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Appendix A – Wildlife Habitat Matrix

**LAND COVER, LAND USE AND TERRESTRIAL HABITAT
CHARACTERIZATION
APPENDIX A - SPECIES/HABITAT MATRIX**



**New York Power
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permission of the New York Power Authority.*

**LAND COVER, LAND USE AND TERRESTRIAL HABITAT
CHARACTERIZATION
MATRIX CODE LIST**

Column 1. SPECIES NUMBER:

Species Number for Applicable Wildlife Class

Column 2. COMMON NAME:

Common Name for Wildlife Species

Column 3. SCIENTIFIC NAME:

Genus species for Wildlife Species

Column 4. DOCUMENTED IN SURVEY AREA? (Y/N):

Y Yes - Reliable Occurrence Record(s) Documented

N No - No Reliable Occurrence Record Documented (Likely Occurrence Based on Range Map)

Column 5. OCCURRENCE REFERENCE NUMBER:

- 1 Breeding Bird Atlas, 2000-2005 (NYSDEC, 2000-2005)
- 2 NYSOPRHP Rare species inquiry results
- 3 Available Habitat (Degraaf and Yamasaki, 2001)
- 4 NYSDEC New York State Amphibian & Reptile Atlas, 1990-1999
- 5 Identified during NYPA Cover Type Mapping Field Work (2012)
- 6 Species Documented in 1977-78 (Burt et al., 1978)
- 7 Range map coverage (Natureserve)

Column 6. SEASONAL OCCURRENCE:

Y Year-round Resident

M Migrant

S Summer Resident

W Winter Visitant

E Erratic Visitant



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LAND COVER, LAND USE AND TERRESTRIAL HABITAT CHARACTERIZATION

Column 7. BREEDING STATUS (AVES ONLY):

PO Breeding Bird Atlas “Possible” Record
 PR Breeding Bird Atlas “Probable” Record
 C Breeding Bird Atlas “Confirmed” Record

Column 8. RELATIVE ABUNDANCE:

A Abundant: Very Numerous in Suitable Habitat
 C Common: Likely To Be Seen or Heard in Suitable Habitat
 U Uncommon: Present, But Not Certain to be Observed
 O Occasional: Typically Observed Only a Few Times During a Season
 R Rare: May Be Present But Not Every Year or Only in Very Small Numbers

Columns 9 & 10. STATE AND FEDERAL STATUS CODES:

E Endangered species
 T Threatened species
 PE Proposed Endangered (Federal Status Only)
 PT Proposed Threatened (Federal Status Only)
 SC Special Concern species (State Status Only)
 MB Migratory bird protected under the Migratory Bird Treaty Act of 1918
 P Protected wildlife (NYS Environmental Conservation Law)
 GS Game species
 UN Unprotected species

Column 11. HABITAT REQUIREMENTS:

Description of habitat requirements (Primary source = DeGraaf Yamasaki, 2001)

Column 12. HABITAT:

Habitat occurrences by ecological community (Based on Reschke, 1990)

- Shading identifies all habitats that may be utilized by species
- X indicates preferred habitats for a species
- Cover types included within the Habitat Types are as follows:

Habitat Type	Included Cover Type
Stream or River	Stream or River
Artificial Pond or River	Artificial Pond or Reservoir
	Control Level Ponds
Emergent Marsh	Emergent Marsh
Forested and Shrub Mineral Soil Wetlands	Shrub Swamp
	Floodplain Forest
	Forested Wetland
Open Uplands	Rock-outcrop
	Grass Land
Successional Old Field	Rock-outcrop



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**LAND COVER, LAND USE AND TERRESTRIAL HABITAT
CHARACTERIZATION**

Habitat Type	Included Cover Type
Forested Uplands	Northern Hardwoods
	Evergreen-Northern Hardwood Forest
	Eastern Hemlock
	Eastern White Pine
Terrestrial Cultural	Cropland
	Manicured Lawn
	Transportation
	Development
Exposed Shoreline	Cobble Shore
	Scoured Shoreline
	Exposed Shoreline (mud/silt/sand)

LAND COVER, LAND USE AND TERRESTRIAL HABITAT CHARACTERIZATION

AMPHIBIA/REPTILIA MATRIX

LAND COVER, LAND USE AND TERRESTRIAL HABITAT CHARACTERIZATION

SPECIES NUMBER	COMMON NAME	SCIENTIFIC NAME	DOCUMENTED IN SURVEY AREA? (Y/N)	REFERENCE NUMBER	SEASONAL OCCURRENCE	RELATIVE ABUNDANCE	STATE STATUS	FEDERAL STATUS	HABITAT REQUIREMENTS	STREAM OR RIVER	ARTIFICIAL POND OR RESERVOIR	EMERGENT MARSH	FORESTED AND SHRUB MINERAL SOIL WETLANDS	OPEN UPLANDS	SUCCESSIONAL OLD FIELD	FORESTED UPLANDS	TERRESTRIAL CULTURAL	EXPOSED SHORELINE
1	Common Mudpuppy	<i>Necturus maculosus</i>	N	4,7	Y	U	UN	UN	Flowing water at least 3 ft deep for breeding.	X								
2	Jefferson Salamander	<i>Ambystoma jeffersonianum</i>	N	4,7	Y	O	SC	UN	Temporary pools for breeding.				X			X		
3	Jefferson Complex	<i>Ambystoma jeff. X laterale</i>	N	4,7	Y	O	SC	UN	Temporary pools for breeding.				X			X		
4	Blue-spotted Salamander	<i>Ambystoma laterale</i>	N	4,7	Y	O	SC	UN	Ponds or semi-permanent water for breeding.				X		X	X		
5	Spotted Salamander	<i>Ambystoma maculatum</i>	N	4,7	Y	O	UN	UN	Mesic woods, semi-permanent water (pH 7-9) for breeding.				X			X		
6	Red-spotted Newt	<i>Notophthalmus v. viridescens</i>	N	4,7	Y	U	UN	UN	Water with aquatic vegetation for adult newt.		X		X			X		
7	Northern Dusky Salamander	<i>Desmognathus fuscus</i>	Y	4,5,7	Y	C	UN	UN	Permanent woodland streams or seeps.	X					X	X		
8	Mountain Dusky Salamander	<i>Desmognathus ochrophaeus</i>	Y	4,5,7	Y	C	UN	UN	Woodland seeps, springs or streams.	X					X	X		
9	Redback Salamander	<i>Plethodon c. cinereus</i>	Y	4,5,7	Y	C	UN	UN	Logs, stumps, rocks, etc.						X	X		
10	Slimy Salamander	<i>Plethodon glutinosus</i>	N	1,2,7	Y	O	UN	UN	Rock outcroppings, logs within wooded areas.						X	X		
11	Four-toed Salamander	<i>Hemidactylium scutatum</i>	N	7	Y	U	UN	UN	Wet woodlands.				X			X		
12	Northern Spring Salamander	<i>Gyrinophilus p. porphyriticus</i>	N	7	Y	U	UN	UN	Streams, seeps or springs.	X								
13	Northern Two-lined Salamander	<i>Eurycea bislineata</i>	N	7	Y	U	UN	UN	Streams for breeding.	X								
14	Eastern American Toad	<i>Bufo a. americanus</i>	Y	4,7	Y	C	UN	UN	Open woodlands, forest edges, prairies, marshes, meadows, yards and parks, and agricultural areas.			X	X			X	X	
15	Northern Spring Peeper	<i>Pseudacris c. crucifer</i>	Y	4,7	Y	C	UN	UN	Pools for breeding.			X	X					
16	Gray Treefrog	<i>Hyla versicolor</i>	Y	4,7	Y	C	UN	UN	Seeps, aquatic sites for breeding.				X			X		
17	Bullfrog	<i>Rana catesbeiana</i>	Y	4,5,7	Y	C	UN	UN	Deep permanent water with floating and emergent vegetation.		X	X						
18	Green Frog	<i>Rana clamitans melanota</i>	Y	4,5,7	Y	C	UN	UN	Lakes, rivers, ponds, stream, marshes	X	X	X						
19	Wood Frog	<i>Rana sylvatica</i>	Y	4,7	Y	O	UN	UN	Vernal woodland pools, backwaters of slow-moving streams.				X					
20	Northern Leopard Frog	<i>Rana pipiens</i>	Y	4,5,7	Y	C	UN	UN	Wet meadows.		X	X						



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LAND COVER, LAND USE AND TERRESTRIAL HABITAT CHARACTERIZATION

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21	Pickerel Frog	<i>Rana palustris</i>	Y	4.7	Y	O	UN	UN	Shallow, clear water of bogs or woodland streams.	X			X					
22	Common Snapping Turtle	<i>Chelydra s. serpentina</i>	Y	4.7	Y	C	UN	UN	Aquatic habitat, sandy or gravelly soil or banks.	X	X	X						
23	Common Musk Turtle	<i>Sternotherus odoratus</i>	N	4.7	Y	U	UN	UN	Permanent water bodies, entirely aquatic except when laying eggs.	X	X	X						
24	Wood Turtle	<i>Clemmys insculpta</i>	N	4.7	Y	U	SC	UN	Forested rivers, streams within 200m of well drained sandy or gravelly substrates for nesting.	X						X		
25	Northern Water Snake	<i>Nerodia s. sipedon</i>	Y	4.7	Y	O	UN	UN	Branches, logs overhanging water, or boulders of dams and causeways in reservoirs.	X		X	X					
26	Northern Brown Snake	<i>Storeria d. dekayi</i>	Y	4.7	Y	U	UN	UN	Dense woods and shrublands to open prairies, meadows, and marshes.			X	X	X				
27	Northern Redbelly Snake	<i>Storeria o. occipitamaculata</i>	Y	4.7	Y	U	UN	UN	Deciduous & mixed woodlands, fields, pastures, road embankments, marshes, and sphagnum bogs.			X	X	X				
28	Eastern Garter Snake	<i>Thamnophis sirtalis</i>	Y	4.7	Y	C	UN	UN	Moist grassy places along the edges of ponds, lakes, ditches, and streams.			X		X	X	X	X	
29	Eastern Ribbon Snake	<i>Thamnophis sauritus</i>	Y	4.7	Y	U	UN	UN	Mesic woodlands with aquatic habitat.	X		X	X			X		
30	Northern Ringneck Snake	<i>Diadophis punctatus edwardsi</i>	N	4.7	Y	U	UN	UN	Mesic areas with abundant cover.							X		
31	Northern Black Racer	<i>Coluber c. constrictor</i>	N	4.7	Y	U	UN	UN	Old fields, hedgerows, shrubby fence lines, thickets, open woodlands, and forest edges.					X	X	X		
32	Smooth Green Snake	<i>Liochlorophis vernalis</i>	N	4.7	Y	U	UN	UN	Upland grassy opening.					X				
33	Black Rat Snake	<i>Elaphe o. obsoleta</i>	N	4.7	Y	U	UN	UN	Woodlands, shrubby fields, pastures, hedgerows, and marsh and bog edges.					X	X	X	X	
34	Eastern Milk Snake	<i>Lampropeltis t. triangulum</i>	Y	4.7	Y	U	UN	UN	Slash, woodpiles, debris or loose soil for egg laying.					X			X	

LAND COVER, LAND USE AND TERRESTRIAL HABITAT CHARACTERIZATION

AVES MATRIX

LAND COVER, LAND USE AND TERRESTRIAL HABITAT CHARACTERIZATION

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1	Horned Grebe	<i>Podiceps auritus</i>	Y	6,7	M	--	R	P	MB	Marshes, ponds, and lakes, occasionally along sluggish streams.				X					
2	Double-crested Cormorant	<i>Phalacrocorax auritus</i>	Y	6,7	M	PO	A	P	MB	Lakes, rivers, swamps, seacoasts, along coastal cliffs.	X	X							
3	Great Blue Heron	<i>Ardea herodias</i>	Y	1,6,7	S	C	C	P	MB	Freshwater and brackish marshes, swamps, lakes, rivers, mangroves.	X	X	X	X					
4	Green Heron	<i>Butorides virescens</i>	Y	6,7	S	PO	O	P	MB	Forested margins of ponds, rivers, lakes, marshes, swamps, mangroves.				X	X				
5	Snow Goose	<i>Anser caerulescens</i>	Y	6,7	M	--	O	GS	MB	Usually near water on open tundra or on ridge.		X		X					
6	Brant	<i>Branta bernicla</i>	Y	6,7	M	--	O	GS	MB	Low arctic tundra, river deltas, water-pocketed sandy areas and shallows.	X	X							
7	Canada Goose	<i>Branta canadensis</i>	Y	1,6,7	M	C	C	GS	MB	Freshwater and brackish marshes, meadows, small islands.	X	X	X	X					
8	Wood Duck	<i>Aix sponsa</i>	Y	1,6,7	S	C	U	GS	MB	Wooded swamp, bottomland slough, flooded forest, pond, marsh.		X		X	X				
9	Green-winged Teal	<i>Anas crecca</i>	Y	6,7	M	--	O	GS	MB	Densely vegetated inland freshwater lake, marsh, pond, pool, shallow stream.				X					
10	American Black Duck	<i>Anas rubripes</i>	Y	5,6,7	S	C	C	GS	MB	Wooded wetlands, stream banks (inland)		X		X	X				
11	Mallard	<i>Anas platyrhynchos</i>	Y	1,5,6,7	S	C	A	GS	MB	Shallow pond, lake, marsh, flooded field.	X	X	X	X	X				
12	Northern Pintail	<i>Anas acuta</i>	Y	6,7	M	--	O	GS	MB	Drakes need mud banks or exposed shorelines.		X		X					
13	Blue-winged Teal	<i>Anas discors</i>	Y	6,7	S	PO	O	GS	MB	Prairie potholes of Northern Plains, marsh, also pond, slough, lake, sluggish stream.		X		X					
14	Gadwall	<i>Anas strepera</i>	Y	6,7	M	PO	U	GS	MB	Moderate to large bodies of water, with submerged aquatic plants.	X			X					
15	Canvasback	<i>Aythya valisineria</i>	Y	6,7	W	--	C	GS	MB	Stretches of open water and emergent vegetation.	X			X					



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16	Ring-necked Duck	<i>Aythya collaris</i>	Y	6.7	M	--	C	GS	MB	Freshwater marsh, slough, bog, wooded lake, swamp, rivers, bays, and rarely saline habitats.			X	X					
17	Black Scoter	<i>Melanitta nigra</i>	Y	6.7	W	--	O	GS	MB	Grassy or shrubby tundra with freshwater lakes and pools.	X								
18	Surf Scoter	<i>Melanitta perspicillata</i>	Y	6.7	W	--	O	GS	MB	Bogs, ponds or sluggish streams in brushy or forested habitats.	X								
19	White-winged Scoter	<i>Melanitta fusca</i>	Y	6.7	M	--	O	GS	MB	Open tundra or prairie with ponds, lakes, sluggish streams, islands in large lakes, occasionally mixed tundra-taiga.	X								
20	Common Goldeneye	<i>Bucephala clangula</i>	Y	6.7	W	--	C	GS	MB	Cavity trees with minimum dbh of 20"; clear, cold, shallow water.	X	X							
21	Bufflehead	<i>Bucephala albeola</i>	Y	6.7	M	--	C	GS	MB	Lakes, ponds, and rivers.	X			X					
22	Hooded Merganser	<i>Lophodytes cucullatus</i>	Y	6.7	M	--	C	GS	MB	Undisturbed wooded areas with cavity trees (15" dbh min.); clear fresh water.	X			X	X				
23	Red-breasted Merganser	<i>Mergus serrator</i>	Y	6.7	M	--	C	GS	MB	Rivers, ponds, lakes, coasts, usually on small islands of inland waters with low shrubby vegetation.	X	X							
24	Common Merganser	<i>Mergus merganser</i>	Y	5,6,7	W	--	C	GS	MB	Large cavity trees at water's edge.	X	X							
25	Ruddy Duck	<i>Oxyura jamaicensis</i>	Y	6.7	M	--	O	GS	MB	Usually densely vegetated freshwater marsh, occasionally lake, pond.	X								
26	Turkey Vulture	<i>Cathartes aura</i>	Y	1,5,6,7	S	PR	C	P	MB	Forest openings, fields, large stubs of dead tree trunks.					X				
27	Osprey	<i>Pandion haliaetus</i>	Y	1,6,7	S	PO	O	SC	MB	Clear lakes, rivers containing fish.	X	X		X					
28	Bald Eagle	<i>Haliaeetus leucocephalus</i>	Y	1,2,5,6,7	S	--	O	T	T	Large, undisturbed water bodies containing fish, large living trees near shore.	X	X		X					
29	Cooper's Hawk	<i>Accipiter cooperii</i>	Y	6.7	Y	C	U	SC	MB	Usually deciduous, occasionally coniferous, forest, woodland, especially riparian.					X		X	X	



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30	Broad-winged Hawk	<i>Buteo platypterus</i>	Y	1,6,7	S	PO	U	P	MB	Extensive woodlands with roads or clearings.					X		X	X	
31	Red-tailed Hawk	<i>Buteo jamaicensis</i>	Y	1,5,6,7	Y	C	C	P	MB	Mature forest-field ecotone.						X	X	X	X
32	Rough-legged Hawk	<i>Buteo lagopus</i>	Y	1,3,6,9,7	S	--	O	P	MB	Open country.						X			
33	American Kestrel	<i>Falco sparverius</i>	Y	1,6,7	Y	PO	C	P	MB	Tall trees with cavities (dbh at least 12"); open country with low elevation.						X			
34	Ruffed Grouse	<i>Bonasa umbellus</i>	Y	1,5,6,7	Y	--	O	GS	UN	Fallen logs amidst dense saplings.							X	X	
35	Wild Turkey	<i>Meleagris gallopavo</i>	Y	1,5,6,7	Y	PO	C	GS	UN	Open, mast-producing woodlands, large conifers for roosting, woodland clearings.						X	X	X	
36	American Coot	<i>Fulica americana</i>	Y	6,7	S	--	C	GS	MB	Emergent vegetation in water 1 to 4 ft deep.	X			X					
37	Black-bellied Plover	<i>Pluvialis squatarola</i>	Y	6,7	M	--	O	GS	MB	Tundra, low-lying coast.	X			X					
38	Semipalmated Plover	<i>Charadrius semipalmatus</i>	Y	6,7	M	--	O	GS	MB	Sandy habitat, grassy or mossy tundra.									
39	Killdeer	<i>Charadrius vociferus</i>	Y	6,7	S	PO	C	GS	MB	Bare ground, sparse vegetation.	X			X		X			X
40	Greater Yellowlegs	<i>Tringa melanoleuca</i>	Y	6,7	M	--	O	GS	MB	Muskeg, tundra.	X			X					
41	Lesser Yellowlegs	<i>Tringa flavipes</i>	Y	6,7	M	--	U	GS	MB	Tundra, muskeg, woodland clearings, burned areas.	X			X					
42	Solitary Sandpiper	<i>Tringa solitaria</i>	Y	6,7	M	--	U	GS	MB	Taiga, muskeg.	X			X					X
43	Spotted Sandpiper	<i>Actitis macularia</i>	Y	5,6,7	S	C	C	GS	MB	Wide variety of habitats: semi-open vegetation from sea level to alpine near water.	X			X					X
44	Sanderling	<i>Calidris alba</i>	Y	6,7	M	--	O	GS	MB	Dry sedge, barren or stony tundra.	X			X					X

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45	Least Sandpiper	<i>Calidris minutilla</i>	Y	6,7	M	--	O	GS	MB	Mossy or wet grassy tundra, occasionally in drier habitats with scattered shrubs.	X			X					
46	Baird's Sandpiper	<i>Calidris bairdii</i>	Y	6,7	M	--	O	GS	MB	Dry coastal and alpine tundra.	X			X					
47	Pectoral Sandpiper	<i>Calidris melanotos</i>	Y	6,7	M	--	O	GS	MB	Wet coastal or drier upland tundra.	X			X					
48	Ring-billed Gull	<i>Larus delawarensis</i>	Y	6,7	E	--	A	P	MB	Rocky islets or isolated coasts, occasionally marshes.	X	X							
49	Herring Gull	<i>Larus argentatus</i>	Y	6,7	E	--	C	P	MB	Rocky terraces, grassy hummocks on sandy coasts, tundra, lakeside cliffs, grassy islands, salt marsh.	X	X						X	
50	American Woodcock	<i>Scolopax minor</i>	Y	1,6,7	S	PO	C	GS	MB	Fertile moist soil containing earthworms, small clearings and dense swales.	X			X	X	X			
51	Mourning Dove	<i>Zenaida macroura</i>	Y	6,7	S	PO	A	P	MB	Open land with bare ground.						X		X	
52	Rock Dove	<i>Columba livia</i>	Y	1,7	Y	C	A	U	UN	Cities, towns, rural areas, but always near human habitations.						X			
53	Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	Y	6,7	S	--	U	P	MB	Low, dense, thickets.				X		X			
54	Common Barn-Owl	<i>Tyto alba</i>	N	7	Y	--	R	P	MB	Barns, silos, deserted buildings, tree cavities.						X			
55	Eastern Screech-Owl	<i>Otus asio</i>	N	1,7	Y	PO	C	P	MB	Cavity trees (12" dbh minimum)					X		X	X	
56	Great Horned Owl	<i>Bubo virginianus</i>	Y	1,6,7	Y	PO	C	P	MB	Large abandoned hawk nests, large tree cavities.						X	X	X	
57	Barred Owl	<i>Strix varia</i>	Y	1,6,7	Y	--	O	P	MB	Cool, damp lowlands; cavity trees with minimum dbh of 20"					X		X	X	
58	Chimney Swift	<i>Chaetura pelagica</i>	N	7	S	C	C	P	MB	Open sky over cities and towns.	X					X			
59	Ruby-throated Hummingbird	<i>Archilochus colubris</i>	N	1,7	S	C	C	P	MB	Flowers, gardens, and wood edges.									



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60	Belted Kingfisher	<i>Ceryle alcyon</i>	Y	1,5,6,7	S	C	C	P	MB	Perches over streams, ponds; banks for nest sites.	X			X					
61	Hairy Woodpecker	<i>Picoides villosus</i>	Y	1,5,7	Y	C	C	P	MB	Trees, limbs with decay column (minimum dbh 10").					X		X	X	
62	Northern Flicker	<i>Colaptes auratus</i>	N	1,7	S	C	C	P	MB	Open areas; trees with column of decayed wood (minimum dbh 12"); forest edges.					X	X	X	X	
63	Pileated Woodpecker	<i>Dryocopus pileatus</i>	N	1,7	Y	PO	U	P	MB	Mature forest; trees with column of decayed wood at least 20" dbh.					X		X	X	
64	Eastern Wood-Pewee	<i>Contopus virens</i>	N	1,7	S	C	C	P	MB	Forest edge or open woods.					X		X	X	
65	Alder Flycatcher	<i>Empidonax alnorum</i>	N	1,7	S	C	O	P	MB	Thickets, low shrubs and clearings.				X					
66	Least Flycatcher	<i>Empidonax minimus</i>	N	7	S	C	U	P	MB	Open deciduous or mixed forest, edges.					X		X	X	
67	Eastern Phoebe	<i>Sayornis phoebe</i>	N	1,7	S	C	C	P	MB	Exposed perches; cliffs or ledges in streamside clearings, woodland edges.	X	X				X		X	
68	Eastern Kingbird	<i>Tyrannus tyrannus</i>	Y	1,5,7	S	C	C	P	MB	Clearings, fields, orchards.				X		X			
69	Tree Swallow	<i>Tachycineta bicolor</i>	Y	1,5,7	S	C	C	P	MB	Cavity trees (minimum dbh 10"); open areas, especially near water.	X		X	X		X			
70	Cliff Swallow	<i>Hirundo pyrrhonota</i>	Y	1,5,7	S	C	O	P	MB	Open areas; mud; vertical wall with an overhang.						X			
71	Barn Swallow	<i>Hirundo rustica</i>	Y	1,7	S	C	C	P	MB	Abandoned or little-used buildings.	X	X				X			
72	Blue Jay	<i>Cyanocitta cristata</i>	Y	1,7	Y	C	A	GS	MB	Deciduous and mixed coniferous-deciduous forest, open woodland, parks, residential areas.					X		X	X	
73	American Crow	<i>Corvus brachyrhynchos</i>	Y	1,7	Y	C	A	GS	MB	Woodland, farmland, orchards, riparian woodland, developed areas.						X	X	X	

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74	Black-capped Chickadee	<i>Parus atricapillus</i>	Y	1,5,7	Y	C	A	P	MB	Cavity trees or stubs in small woodlands; clearings or open woodlands.					X		X	X	
75	Tufted Titmouse	<i>Parus bicolor</i>	Y	1,7	Y	C	C	P	MB	Cavity trees at least 8" dbh.					X		X	X	
76	Red-breasted Nuthatch	<i>Sitta canadensis</i>	Y	1,7	M	PO	U	P	MB	Cavity trees in mixed or coniferous woods (minimum dbh 12").								X	
77	White-breasted Nuthatch	<i>Sitta carolinensis</i>	Y	1,7	Y	C	C	P	MB	Cavity trees in hardwoods or mixed woods (minimum dbh 12").					X		X	X	
78	Brown Creeper	<i>Certhia americana</i>	Y	1,7	M	PR	U	P	MB	Woodlands containing trees with sloughing or loose bark.					X		X	X	
79	House Wren	<i>Troglodytes aedon</i>	Y	1,7	S	C	C	P	MB	Cavity trees, shrubs.						X			
80	Winter Wren	<i>Troglodytes troglodytes</i>	Y	5,7	S	PO	O	P	MB	Moist, mixed or coniferous woodlands with down logs; low woody vegetation.					X		X	X	
81	Golden-crowned Kinglet	<i>Regulus satrapa</i>	N	3,7	M	PR	C	P	MB	Dense conifer thickets or stands, especially spruce.					X			X	
82	Blue-gray Gnatcatcher	<i>Poliptila caerulea</i>	Y	1,7	S	PR	U	P	MB	Open deciduous woodland.					X		X	X	
83	Northern Wheatear	<i>Oenanthe oenanthe</i>	N	3,7	E	--	R	P	MB	Arctic tundra and mountains, especially on rocky slopes.						X			
84	Eastern Bluebird	<i>Sialia sialis</i>	Y	1,5,,7	S	C	C	P	MB	Low cavities, open country.						X			
85	Veery	<i>Catharus fuscescens</i>	Y	1,5,7	S	PR	U	P	MB	Moist woodlands with understory of low trees and shrubs.					X				
86	Hermit Thrush	<i>Catharus guttatus</i>	Y	1,7	S	PO	U	P	MB	Coniferous or mixed woodlands with dense undergrowth.					X		X	X	
87	Wood Thrush	<i>Hylocichla mustelina</i>	Y	1,5,7	S	PO	C	P	MB	Cool, moist, mature deciduous or mixed forest.					X		X	X	



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LAND COVER, LAND USE AND TERRESTRIAL HABITAT CHARACTERIZATION

SPECIES NUMBER	COMMON NAME	SCIENTIFIC NAME	DOCUMENTED IN SURVEY AREA? (Y/N)	REFERENCE NUMBER	SEASONAL OCCURRENCE	BREEDING STATUS	RELATIVE ABUNDANCE	STATE STATUS	FEDERAL STATUS	HABITAT REQUIREMENTS	STREAM OR RIVER	ARTIFICIAL POND OR RESERVOIR	EMERGENT MARSH	FORESTED AND SHRUB MINERAL SOIL WETLANDS	OPEN UPLANDS	SUCCESSIONAL OLD FIELD	FORESTED UPLANDS	TERRESTRIAL CULTURAL	EXPOSED SHORELINE
88	American Robin	<i>Turdus migratorius</i>	Y	1,5,7	S	C	A	P	MB	Habitat generalist: forest, woodland, gardens, parks.		X			X		X	X	
89	Gray Catbird	<i>Dumetella carolinensis</i>	Y	1,5,7	S	C	C	P	MB	Shrubs, thickets in open country or forest understory.				X		X			
90	Northern Mockingbird	<i>Mimus polyglottos</i>	N	3,7	Y	C	C	P	MB	Low thickets; high perches; persistent fruits.						X			
91	Brown Thrasher	<i>Toxostoma rufum</i>	Y	5,7	S	C	C	P	MB	Hardwood forest-field ecotone.						X	X	X	
92	Cedar Waxwing	<i>Bombycilla cedrorum</i>	Y	1,7	S	C	C	P	MB	Open country with scattered trees, thickets with persistent fruits (winter).				X		X			
93	European Starling	<i>Sturnus vulgaris</i>	Y	1,7	Y	C	A	U	UN	Cavity trees with 10" minimum dbh.						X	X	X	
94	Blue-headed Vireo	<i>Vireo solitarius</i>	Y	1,7	M	--	U	P	MB	Mixed or predominantly coniferous woodland.					X		X	X	
95	Yellow-throated Vireo	<i>Vireo flavifrons</i>	N	3,7	S	PO	U	P	MB	Mature deciduous forest.					X		X	X	
96	Red-eyed Vireo	<i>Vireo olivaceus</i>	Y	1,5,7	S	C	A	P	MB	Deciduous forest and woodland, well-planted suburbs, occasionally coniferous forest.					X		X	X	
97	Blue-winged Warbler	<i>Vermivora pinus</i>	Y	1,7	S	PR	C	P	MB	Old fields with scattered shrubs and small trees.				X		X			
98	Nashville Warbler	<i>Vermivora ruficapilla</i>	Y	1,7	S	PR	U	P	MB	Scattered trees interspersed with brush, thickets, slash.					X		X	X	
99	Yellow Warbler	<i>Dendroica petechia</i>	Y	1,7	S	C	C	P	MB	Scattered small trees or dense shrubs, especially near water.		X		X		X			
100	Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>	Y	1,5,7	S	PR	U	P	MB	Sprouts and brush at wood margins; hardwood seedling stands.						X	X	X	
101	Magnolia Warbler	<i>Dendroica magnolia</i>	Y	1,7	S	PR	U	P	MB	Young stands of spruce or fir, sometimes of hemlock.				X		X			
102	Black-throated Blue Warbler	<i>Dendroica caerulescens</i>	Y	1,7	S	--	C	P	MB	Hardwood or mixed woodlands with well-developed understory.					X		X	X	
103	Yellow-rumped Warbler	<i>Dendroica coronata</i>	Y	1,7	M	PR	C	P	MB	Coniferous trees (summer), bayberry thickets					X		X	X	



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										(winter).									
104	Black-throated Green Warbler	<i>Dendroica virens</i>	Y	1,5,7	S	--	C	P	MB	Coniferous or mixed woodlands.					X		X	X	
105	Blackburnian Warbler	<i>Dendroica fusca</i>	Y	1,7	S	--	U	P	MB	Coniferous forest, mixed woodlands.					X		X	X	
106	Black-and-white Warbler	<i>Mniotilta varia</i>	Y	1,7	S	--	U	P	MB	Deciduous and deciduous-coniferous forests, especially on hillsides and in ravines.					X		X	X	
107	American Redstart	<i>Setophaga ruticilla</i>	Y	1,7	S	C	C	P	MB	Open deciduous and deciduous-coniferous woodland, forest edge, second growth.					X		X	X	
108	Ovenbird	<i>Seiurus aurocapillus</i>	Y	1,5,7	S	PR	C	P	MB	Deciduous, rarely pine forests.					X		X	X	
109	Common Yellowthroat	<i>Geothlypis trichas</i>	Y	1,7	S	C	C	P	MB	Overgrown fields, hedgerow, woodland margin, freshwater and salt marshes.				X		X			
110	Scarlet Tanager	<i>Piranga olivacea</i>	Y	1,5,7	S	C	U	P	MB	Deciduous forest and woodland, mixed deciduous-coniferous forest.					X		X	X	
111	Northern Cardinal	<i>Cardinalis cardinalis</i>	N	3,7	Y	C	A	P	MB	Thickets, vines.						X	X	X	
112	Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	Y	1,7	S	C	C	P	MB	Forest-field ecotone, thickets, sapling stands of hardwoods.					X		X	X	
113	Indigo Bunting	<i>Passerina cyanea</i>	Y	1,7	S	C	C	P	MB	Forest-field ecotones.					X		X	X	
114	Eastern Towhee	<i>Pipilo erythrophthalmus</i>	Y	1,7	S	PR	U	P	MB	Dense, brushy understory, well-drained soils.						X			
115	Chipping Sparrow	<i>Spizella passerina</i>	Y	1,7	S	C	C	P	MB	Clearings with bare ground, conifers or thorny shrubs.						X			
116	Field Sparrow	<i>Spizella pusilla</i>	Y	1,7	S	C	C	P	MB	Old fields.						X			
117	Song Sparrow	<i>Melospiza melodia</i>	Y	1,5,7	S	C	A	P	MB	Dense vegetation along watercourses and coasts, marshes, and, mostly in n and e, forest edge, clearings, bogs, gardens.						X		X	



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LAND COVER, LAND USE AND TERRESTRIAL HABITAT CHARACTERIZATION

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118	White-throated Sparrow	<i>Zonotrichia albicollis</i>	Y	1,5,7	M	PO	C	P	MB	Coniferous and mixed coniferous-deciduous forest, edge and clearings, thickets, open woodland.					X	X	X		
119	Dark-eyed Junco	<i>Junco hyemalis</i>	Y	1,7	S	C	C	P	MB	Woods roads with cut bank, uprooted tree, etc. for nest site.					X	X	X		
120	Bobolink	<i>Dolichonyx oryzivorus</i>	N	3,7	S	C	C	P	MB	Wide expanses of grassland.					X				
121	Red-winged Blackbird	<i>Agelaius phoeniceus</i>	Y	1,5,7	S	C	A	P	MB	Grasslands, marshes.	X		X		X				
122	Eastern Meadowlark	<i>Sturnella magna</i>	Y	1,5,7	S	C	C	P	MB	Grasslands, elevated perches.					X				
123	Common Grackle	<i>Quiscalus quiscula</i>	Y	1,7	S	C	A	P	MB	Wet, open country, shrub swamps, pond edges.			X	X					
124	Brown-headed Cowbird	<i>Molothrus ater</i>	Y	1,7	S	C	A	P	MB	Woodland, forest (especially deciduous), forest edge, grassland.					X	X	X	X	
125	Purple Finch	<i>Carpodacus purpureus</i>	Y	1,7	S	C	O	P	MB	Coniferous trees.									
126	House Finch	<i>Carpodacus mexicanus</i>	Y	1,7	Y	C	A	P	MB	Open ground with low seed-producing plants.									
127	American Goldfinch	<i>Carduelis tristis</i>	Y	1,7	S	C	A	P	MB	Open, weedy fields with scattered small trees.						X			
128	House Sparrow	<i>Passer domesticus</i>	Y	1,5,7	Y	C	A	U	UN	Cultivated lands, woodland and edge, around human habitation.									

LAND COVER, LAND USE AND TERRESTRIAL HABITAT CHARACTERIZATION

MAMMALIA MATRIX

LAND COVER, LAND USE AND TERRESTRIAL HABITAT CHARACTERIZATION

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1	Virginia Opossum	<i>Didelphis virginiana</i>	Y	3,7	Y	C	GS	UN	Log or tree cavity.				X		X	X		
2	Masked Shrew	<i>Sorex cinereus</i>	Y	3,7	Y	U	UN	UN	Damp woodlands, ground cover.			X	X					
3	Water Shrew	<i>Sorex palustris</i>	N	3,7	Y	U	UN	UN	Herbaceous cover, cold-water wetlands.	X		X	X					
4	Smoky Shrew	<i>Sorex fumeus</i>	Y	3,7	Y	U	UN	UN	Loose damp leaf litter.				X			X		
5	Pygmy Shrew	<i>Sorex hoyi</i>	N	3,7	Y	U	UN	UN	Moist leaf mold near water.			X	X			X		
6	Northern Short-tailed Shrew	<i>Blarina brevicauda</i>	Y	3,7	Y	C	UN	UN	Low vegetation, damp, loose leaf litter.		X			X	X	X		
7	Least Shrew	<i>Cryptotis parva</i>	N	3,7	Y	U	UN	UN	Loose soil.					X				
8	Hairy-tailed Mole	<i>Parascalops breweri</i>	N	3,7	Y	O	UN	UN	Loose, moist, well-drained soil.							X		
9	Star-nosed Mole	<i>Condylura cristata</i>	N	3,7	Y	U	UN	UN	Wet muck, humus.			X	X					
10	Indiana Bat	<i>Myotis sodalis</i>	N	3,7	Y	R	E	E	Tree				X			X		
11	Little Brown Myotis	<i>Myotis lucifugus</i>	N	3,7	Y	C	UN	UN	Females: dark, warm sites for maternity colonies. Forest openings for feeding.	X	X						X	
12	Northern Long-eared Bat	<i>Myotis septentrionalis</i>	N	3,7	Y	U	UN	UN	Caves, mine shafts with temperatures near 7°C; high relative humidity and calm air.				X		X	X		
13	Small-footed Myotis	<i>Myotis leibii</i>	N	3,7	Y	R	SC	UN	Mine tunnels or caves at temperatures <4°C			X		X				
14	Silver-haired Bat	<i>Lasionycteris noctivagans</i>	N	3,7	S	U	UN	UN	Dead trees with loose bark or cavities; streams.	X					X	X		
15	Eastern Pipistrelle	<i>Pipistrellus subflavus</i>	Y	3,7	Y	U	UN	UN	Warm, draft-free, damp sites for hibernation, open woods.	X	X			X				
16	Big Brown Bat	<i>Eptesicus fuscus</i>	N	3,7	Y	C	UN	UN	Cold, dry areas of caves or buildings for hibernation.			X		X			X	



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LAND COVER, LAND USE AND TERRESTRIAL HABITAT CHARACTERIZATION

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17	Red Bat	<i>Lasiurus borealis</i>	N	3,7	S	U	UN	UN	Deciduous trees on forest edges for roosting.	X		X		X				
18	Hoary Bat	<i>Lasiurus cinereus</i>	N	3,7	S	O	UN	UN	Edges of coniferous forests.	X		X		X				
19	Eastern Cottontail	<i>Sylvilagus floridanus</i>	Y	6,7	Y	C	GS	UN	Brush piles, stone walls, dens or burrows; herbaceous and shrubby cover.					X			X	
20	European europaeus	<i>Lepus capensis</i>	N	3,7	Y	U	GS	UN	Fields, meadows.					X				
21	Eastern Chipmunk	<i>Tamias striatus</i>	Y	5,6,7	Y	A	UN	UN	Forest edge or shrub cover, elevated perches, logs.						X	X		
22	Woodchuck	<i>Marmota monax</i>	N	3,7	Y	C	UN	UN	Open land.					X				
23	Gray Squirrel	<i>Sciurus carolinensis</i>	Y	5,6,7	Y	A	GS	UN	Tall trees for dens or leaf nests.				X		X	X	X	
24	Eastern Fox Squirrel	<i>Sciurus niger</i>	N	3,7	Y	U	GS	UN	Deciduous trees with undeveloped understory; open woodlots, forest/field edges, and urbanized areas						X	X	X	
25	Red Squirrel	<i>Tamiasciurus hudsonicus</i>	Y	5,6,7	Y	C	UN	UN	Woodlands with mature trees, conifers preferred.							X	X	
26	Southern Flying Squirrel	<i>Glaucomys volans</i>	N	3,7	Y	U	UN	UN	Mature open deciduous woodlands with cavity trees; favors cavities with entrance diameters of 1.6 to 2 in.						X	X		
27	Northern Flying Squirrel	<i>Glaucomys sabrinus</i>	N	3,7	Y	U	UN	UN	Primarily mixed deciduous/coniferous forests. Mature trees, cavities for winter dens; arboreal lichens.						X	X		
28	Beaver	<i>Castor canadensis</i>	Y	5,6,7	Y	C	GS	UN	Woodland streams, lack of disturbance.	X	X	X						



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29	Deer Mouse	<i>Peromyscus maniculatus</i>	Y	3,7	Y	C	UN	UN	Northern hardwoods or northern coniferous forests.				X		X	X	X	
30	White-footed Mouse	<i>Peromyscus leucopus</i>	Y	3,7	Y	C	UN	UN	Deciduous woodlands with abundant rocks and logs, and a moderate herbaceous cover				X		X	X	X	
31	Southern Red-backed Vole	<i>Clethrionomys gapperi</i>	N	3,7	Y	U	UN	UN	Springs, brooks, seeps, bogs; debris or slash cover.				X			X	X	
32	Meadow Vole	<i>Microtus pennsylvanicus</i>	Y	3,7	Y	A	UN	UN	Herbaceous vegetation, loose organic soils.		X	X		X				X
33	Woodland Vole	<i>Microtus pinetorum</i>	N	3,7	Y	U	UN	UN	Ground cover of leaves or grass; moist, well-drained soils.						X	X	X	
34	Muskrat	<i>Ondatra zibethica</i>	Y	6,7	Y	C	GS	UN	Slow moving streams, lakes, ponds, and marshes	X		X						
35	Southern Bog Lemming	<i>Synaptomys cooperi</i>	N	3,7	Y	U	UN	UN	Moist soils.				X	X			X	
36	Meadow Jumping Mouse	<i>Zapus hudsonius</i>	N	3,7	Y	U	UN	UN	Herbaceous groundcover, loose soils.			X		X				
37	Woodland Jumping Mouse	<i>Napaeozapus insignis</i>	N	3,7	Y	U	UN	UN	Moist, cool woodland, loose soils, herbaceous cover. Hibernates.				X		X	X		
38	Norway Rat	<i>Rattus norvegicus</i>	N	3,7	Y	C	UN	UN	Buildings, dumps, or loose soil for digging burrows.									X
39	House Mouse	<i>Mus musculus</i>	N	3,7	Y	C	UN	UN	Buildings in winter.					X				X
40	Porcupine	<i>Erethizon dorsatum</i>	Y	5,6,7	Y	U	UN	UN	Deciduous and coniferous woodlands. Rock ledges or den trees.						X	X		
41	Coyote	<i>Canis latrans</i>	Y	5,6,7	Y	C	GS	UN	Prairies, bushy areas, and wooded edges			X		X				



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LAND COVER, LAND USE AND TERRESTRIAL HABITAT CHARACTERIZATION

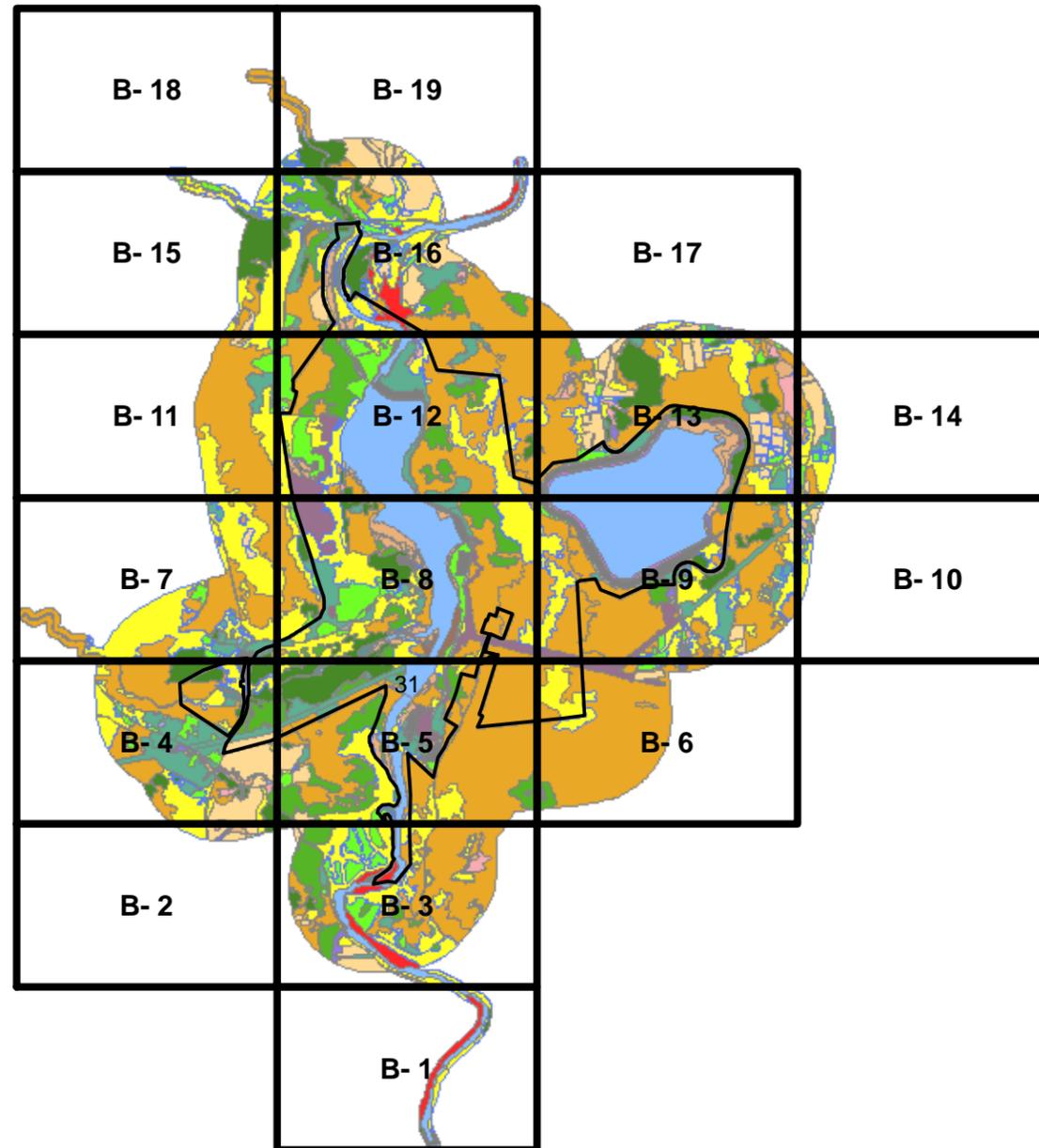
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42	Red Fox	<i>Vulpes vulpes</i>	Y	6.7	Y	C	GS	UN	Open areas with cover, forest/field edges, brushy fence lines, and riparian habitat along stream and lake edges					X			X	
43	Gray Fox	<i>Urocyon cinereoargenteus</i>	N	7	Y	U	GS	UN	Well mixed woodland and farm fields, wooded swamps, and bottomland forests.				X		X	X		
44	Raccoon	<i>Procyon lotor</i>	Y	5.7	Y	C	GS	UN	Hollow trees, dens usually located 10 ft or more above ground.	X	X		X		X	X	X	
45	Ermine	<i>Mustela erminea</i>	N	3.7	Y	U	GS	UN	Dense brushy cover, slash.						X	X		
46	Long-tailed Weasel	<i>Mustela frenata</i>	N	3.7	Y	U	GS	UN	Usually near water within forest/field edges, brushy fence lines, and wooded areas with cover; also marsh borders and spruce sphagnum bogs					X	X	X		
47	Mink	<i>Mustela vison</i>	N	3.7	Y	C	GS	UN	Hollow logs, natural cavities, under tree roots, riparian habitat.	X		X	X					
48	Striped Skunk	<i>Mephitis mephitis</i>	N	3.7	Y	C	GS	UN	Mix of forest, fields, wooded ravines, and suburbs					X	X	X	X	
49	River Otter	<i>Lutra canadensis</i>	N	3.7	Y	U	GS	UN	Body of water such as stream, pond, lake, river.	X		X						
50	White-tailed Deer	<i>Odocoileus virginianus</i>	Y	5,6,7	Y	C	GS	UN	Open forest interspersed with meadows, clearings, farmland.			X	X	X	X	X		



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Appendix B – Mapped Habitat

- Legend**
- STATUS**
-  FERC Project Boundary
 -  Artificial Pond or Reservoir
 -  Stream or River
 -  Exposed Shoreline (mud/silt)
 -  Cobble Shore
 -  Scoured Shoreline
 -  Eastern Hemlock
 -  Eastern White Pine
 -  Northern Hardwood-Coniferous Forest
 -  Northern Hardwoods; Northern Hardwoods
 -  Rock-outcrop
 -  Grass Land
 -  Successional Old Field/Shrubland
 -  Control Level Ponds
 -  Emergent Marsh
 -  Shrub Swamp
 -  Floodplain Forest
 -  Forested Wetland
 -  Cropland
 -  Manicured Lawn
 -  Transportation
 -  Development

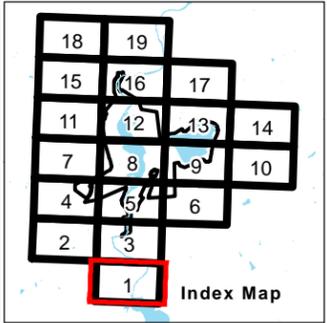
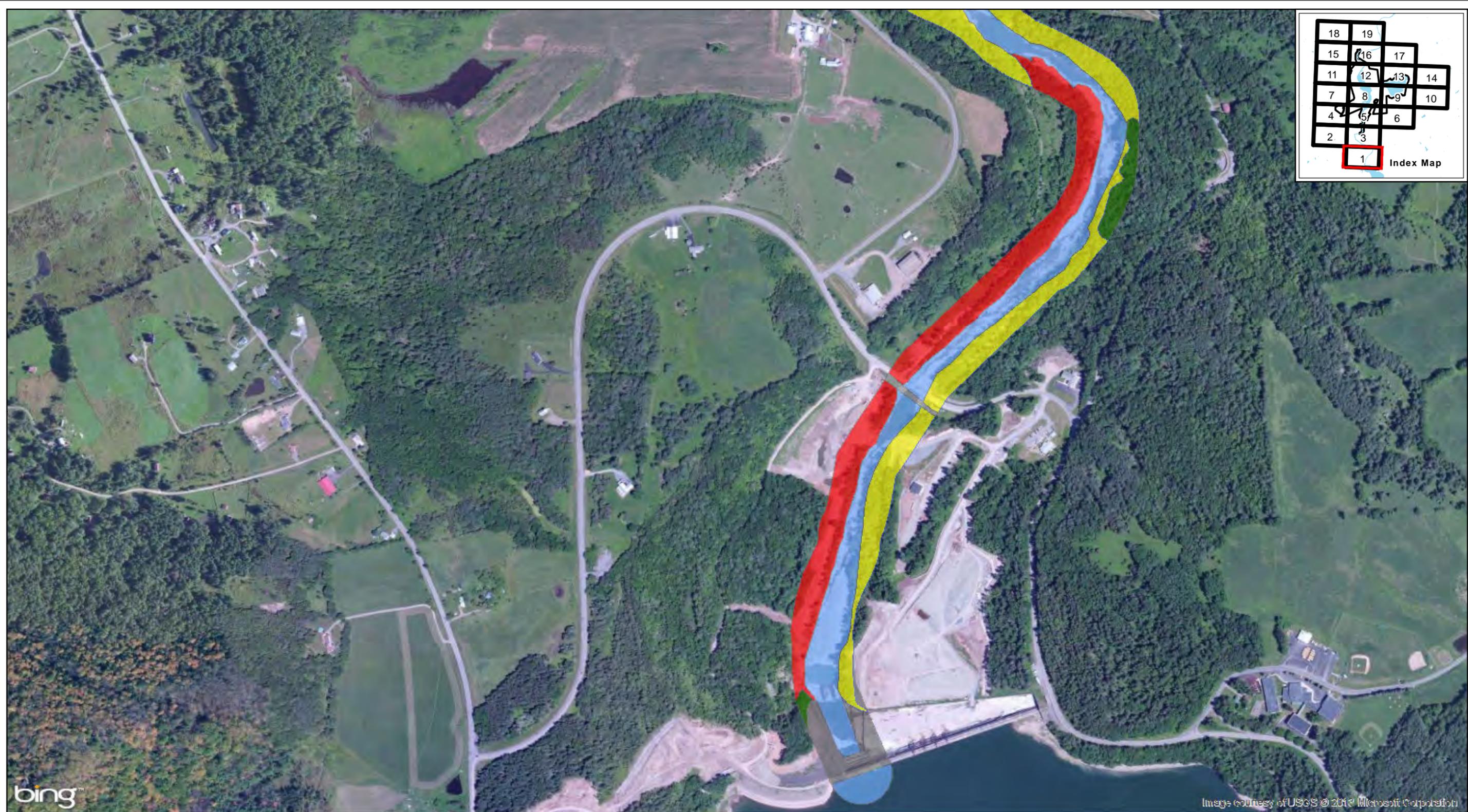


**Blenheim-Gilboa Pumped Storage Power Project
(FERC No. 2685)**

**LAND COVER, LAND USE AND
TERRESTRIAL HABITAT ASSESSMENT**



FIGURE B-0 INDEX MAP



Legend

Artificial Pond or Reservoir	Northern Hardwood-Coniferous Forest	Shrub Swamp	FERC Project Boundary
Stream or River	Northern Hardwoods; Northern Hardwoods	Floodplain Forest	
Exposed Shoreline (mud/silt)	Rock-outcrop	Forested Wetland	
Cobble Shore	Grass Land	Cropland	
Scoured Shoreline	Successional Old Field/Shrubland	Manicured Lawn	
Eastern Hemlock	Control Level Ponds	Transportation	
Eastern White Pine	Emergent Marsh	Development	

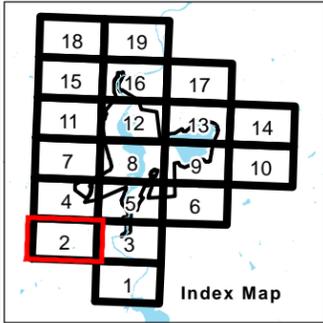
**Blenheim-Gilboa Pumped Storage Power Project
(FERC No. 2685)
LAND COVER, LAND USE AND
TERRESTRIAL HABITAT ASSESSMENT**



**Appendix B
Figure B-1**

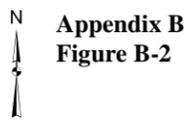
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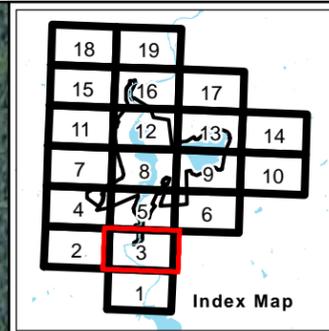
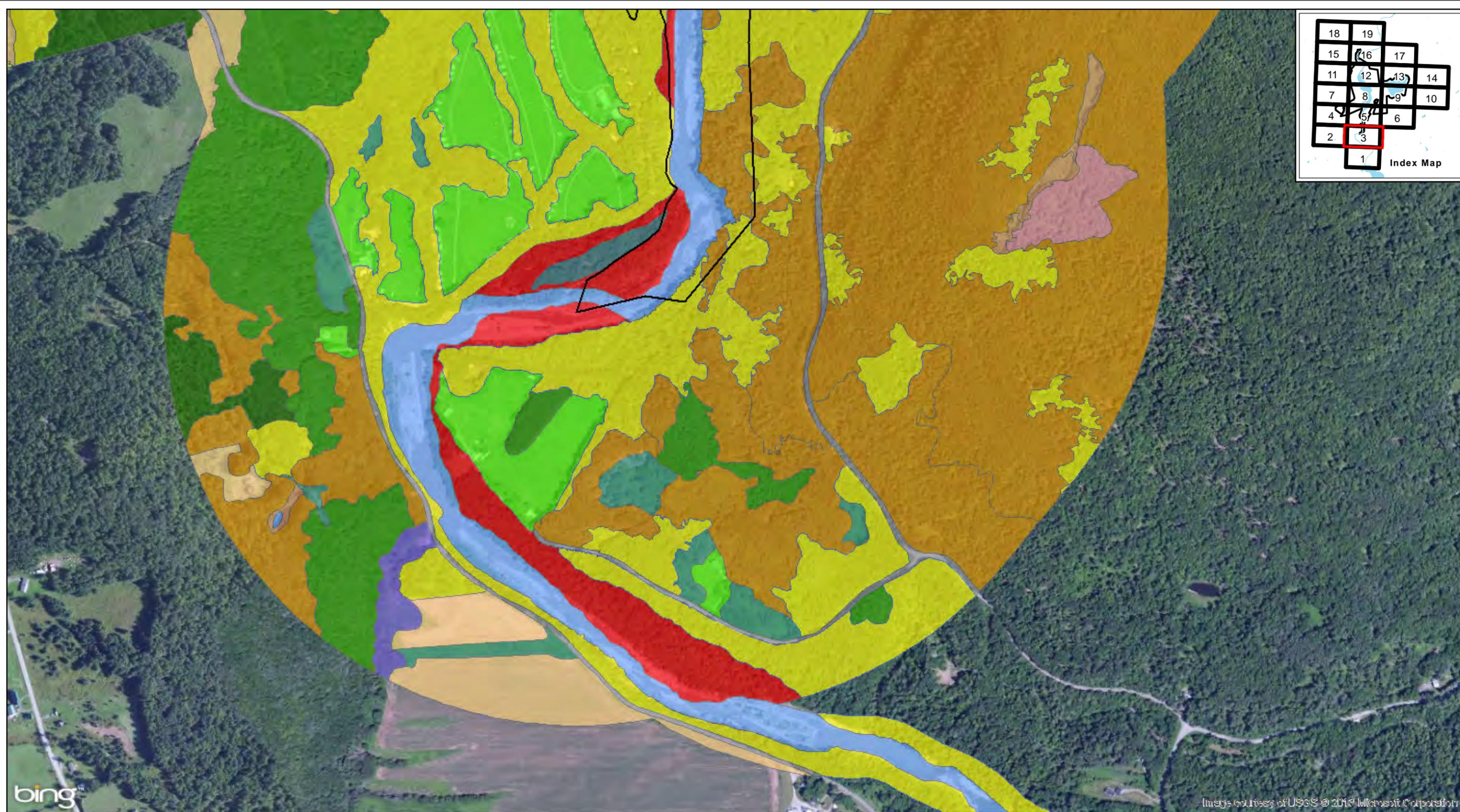


Legend			
Artificial Pond or Reservoir	Northern Hardwood-Coniferous Forest	Shrub Swamp	FERC Project Boundary
Stream or River	Northern Hardwoods; Northern Hardwoods	Floodplain Forest	
Exposed Shoreline (mud/silt)	Rock-outcrop	Forested Wetland	
Cobble Shore	Grass Land	Cropland	
Scoured Shoreline	Successional Old Field/Shrubland	Manicured Lawn	
Eastern Hemlock	Control Level Ponds	Transportation	
Eastern White Pine	Emergent Marsh	Development	

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**Appendix B
Figure B-2**



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Artificial Pond or Reservoir	Northern Hardwood-Coniferous Forest	Shrub Swamp	FERC Project Boundary
Stream or River	Northern Hardwoods; Northern Hardwoods	Floodplain Forest	
Exposed Shoreline (mud/silt)	Rock-outcrop	Forested Wetland	
Cobble Shore	Grass Land	Cropland	
Scoured Shoreline	Successional Old Field/Shrubland	Manicured Lawn	
Eastern Hemlock	Control Level Ponds	Transportation	
Eastern White Pine	Emergent Marsh	Development	

**Blenheim-Gilboa Pumped Storage Power Project
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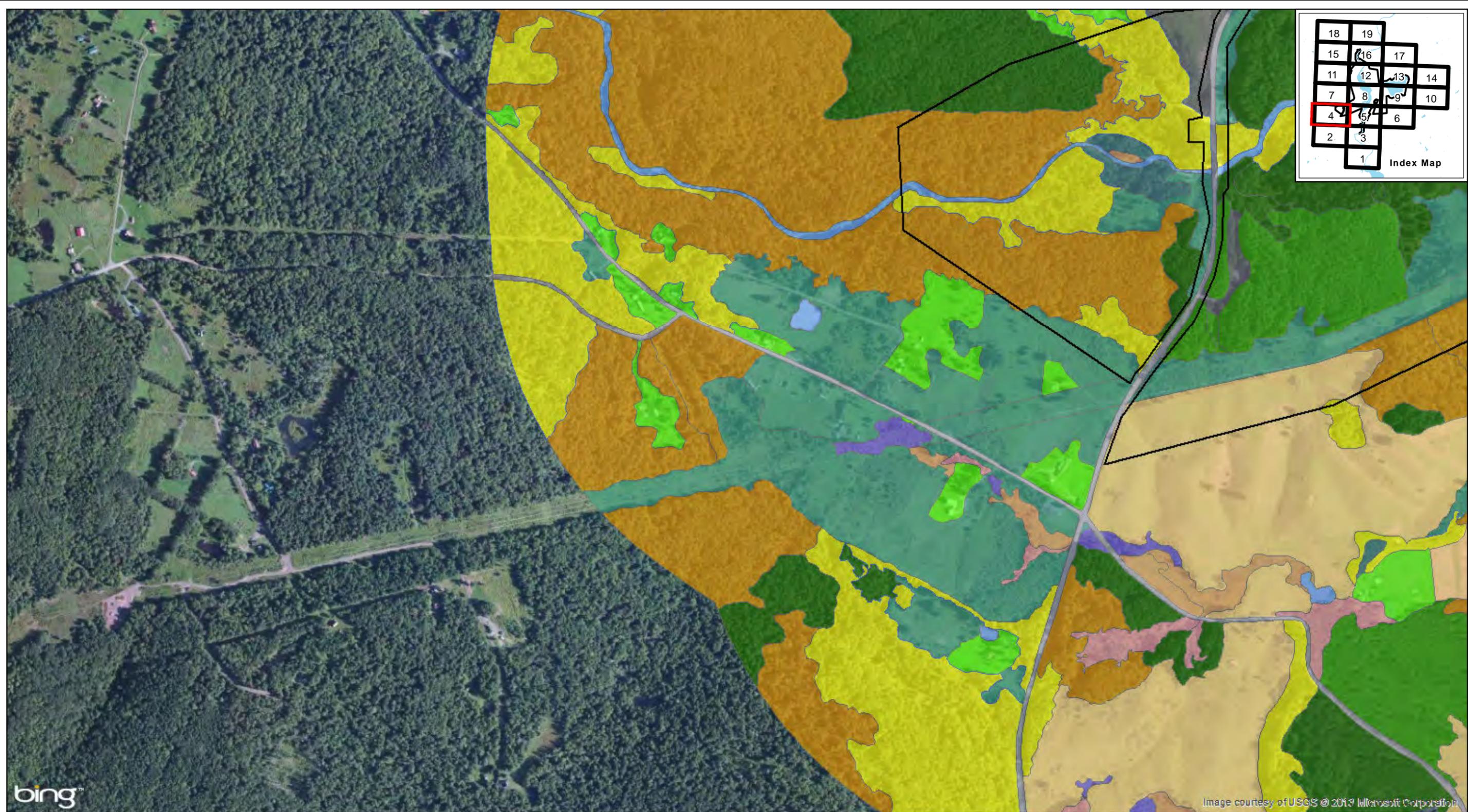
**LAND COVER, LAND USE AND
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**Appendix B
Figure B-3**

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- Legend**
- | | | | |
|------------------------------|--|-------------------|-----------------------|
| Artificial Pond or Reservoir | Northern Hardwood-Coniferous Forest | Shrub Swamp | FERC Project Boundary |
| Stream or River | Northern Hardwoods; Northern Hardwoods | Floodplain Forest | |
| Exposed Shoreline (mud/silt) | Rock-outcrop | Forested Wetland | |
| Cobble Shore | Grass Land | Cropland | |
| Scoured Shoreline | Successional Old Field/Shrubland | Manicured Lawn | |
| Eastern Hemlock | Control Level Ponds | Transportation | |
| Eastern White Pine | Emergent Marsh | Development | |

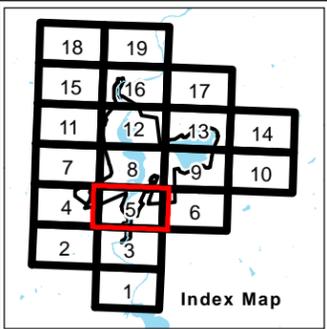
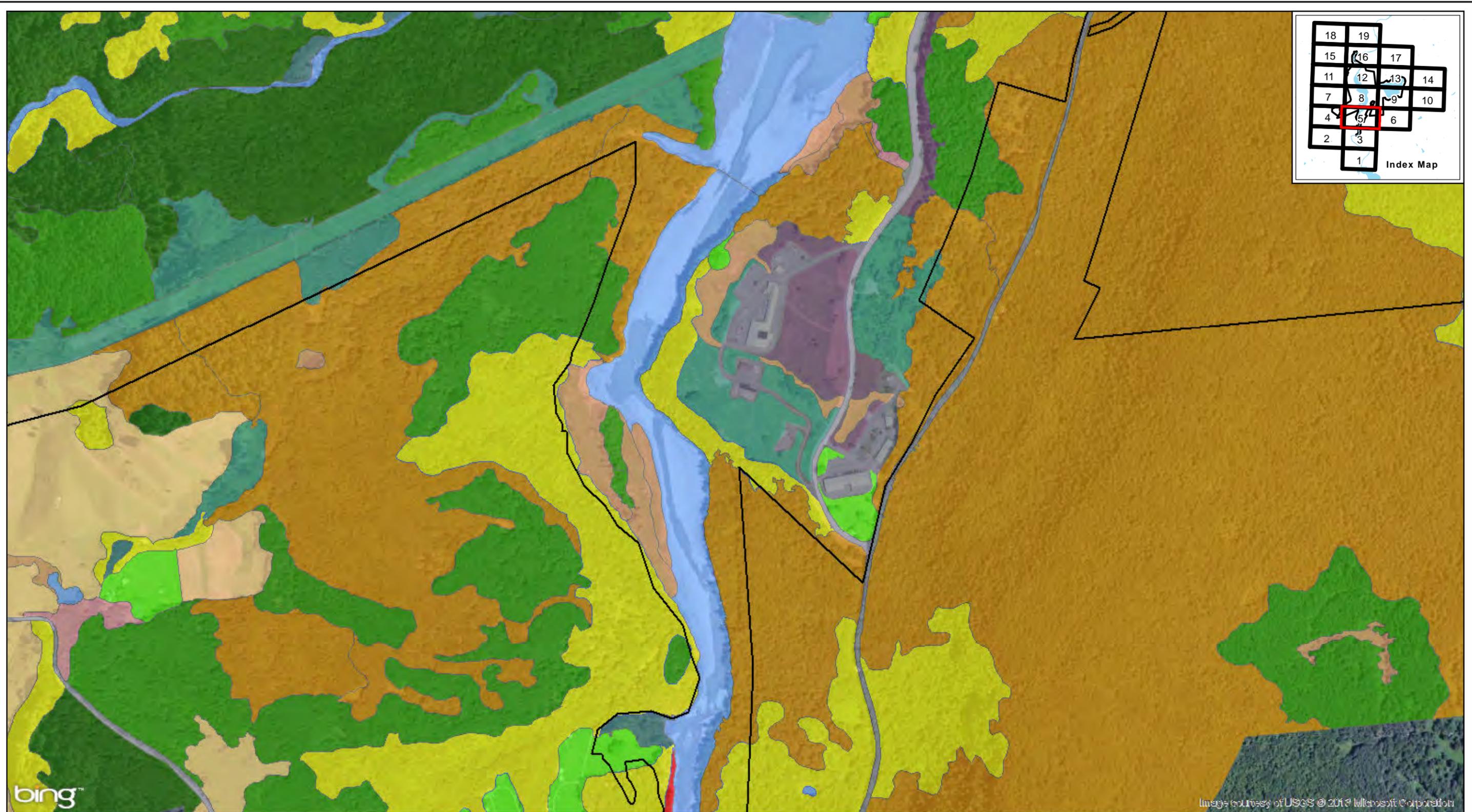
**Blenheim-Gilboa Pumped Storage Power Project
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**Appendix B
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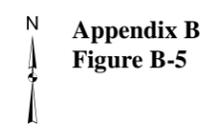
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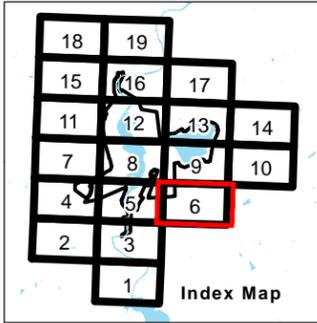
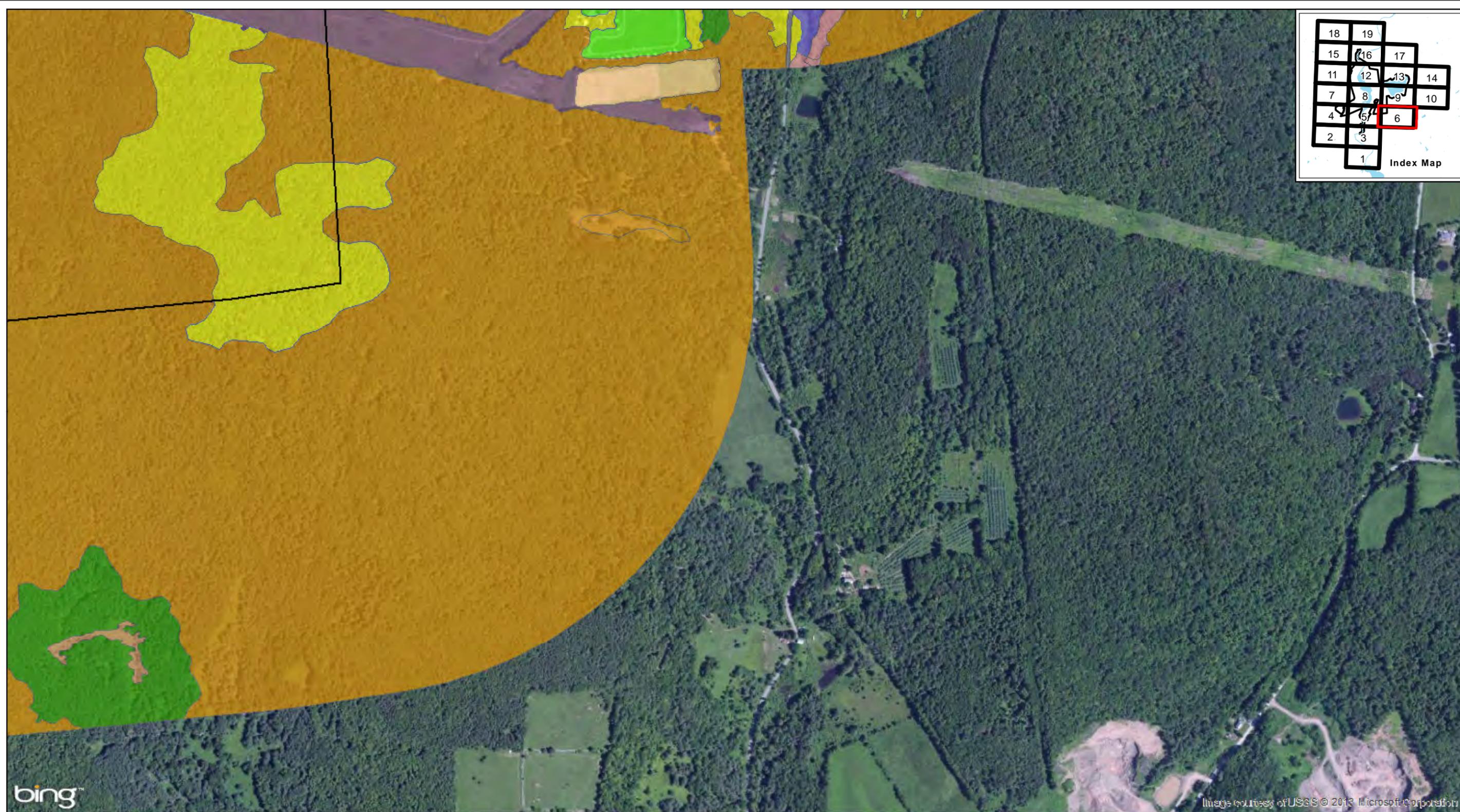
Legend		
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Stream or River	Northern Hardwoods; Northern Hardwoods	Floodplain Forest
Exposed Shoreline (mud/silt)	Rock-outcrop	Forested Wetland
Cobble Shore	Grass Land	Cropland
Scoured Shoreline	Successional Old Field/Shrubland	Manicured Lawn
Eastern Hemlock	Control Level Ponds	Transportation
Eastern White Pine	Emergent Marsh	Development
		FERC Project Boundary

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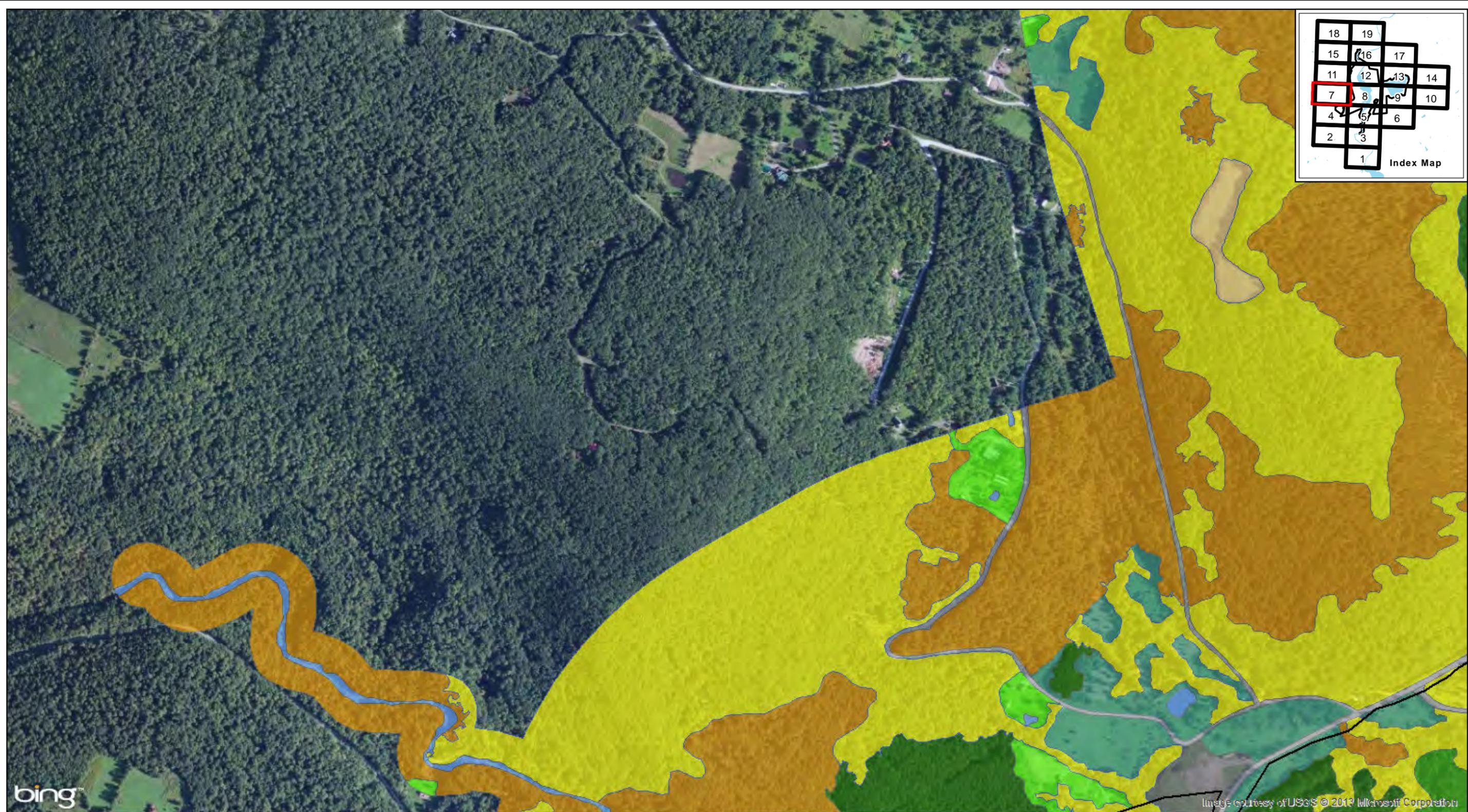
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Stream or River	Northern Hardwoods; Northern Hardwoods	Floodplain Forest	
Exposed Shoreline (mud/silt)	Rock-outcrop	Forested Wetland	
Cobble Shore	Grass Land	Cropland	
Scoured Shoreline	Successional Old Field/Shrubland	Manicured Lawn	
Eastern Hemlock	Control Level Ponds	Transportation	
Eastern White Pine	Emergent Marsh	Development	

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**Appendix B
Figure B-6**



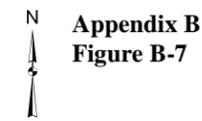
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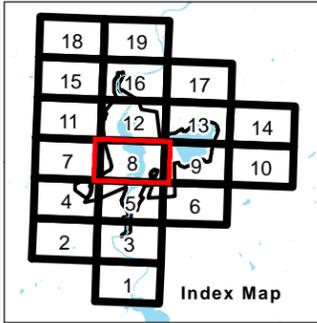
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	Stream or River		Northern Hardwoods; Northern Hardwoods		Floodplain Forest		
	Exposed Shoreline (mud/silt)		Rock-outcrop		Forested Wetland		
	Cobble Shore		Grass Land		Cropland		
	Scoured Shoreline		Successional Old Field/Shrubland		Manicured Lawn		
	Eastern Hemlock		Control Level Ponds		Transportation		
	Eastern White Pine		Emergent Marsh		Development		

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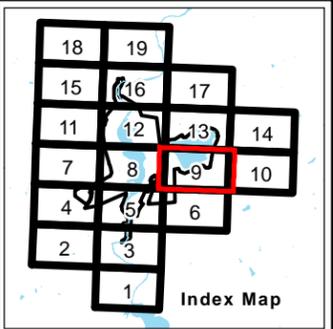
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|------------------------------|--|-------------------|-----------------------|
| Artificial Pond or Reservoir | Northern Hardwood-Coniferous Forest | Shrub Swamp | FERC Project Boundary |
| Stream or River | Northern Hardwoods; Northern Hardwoods | Floodplain Forest | |
| Exposed Shoreline (mud/silt) | Rock-outcrop | Forested Wetland | |
| Cobble Shore | Grass Land | Cropland | |
| Scoured Shoreline | Successional Old Field/Shrubland | Manicured Lawn | |
| Eastern Hemlock | Control Level Ponds | Transportation | |
| Eastern White Pine | Emergent Marsh | Development | |

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**Appendix B
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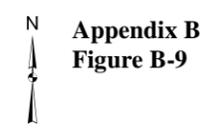
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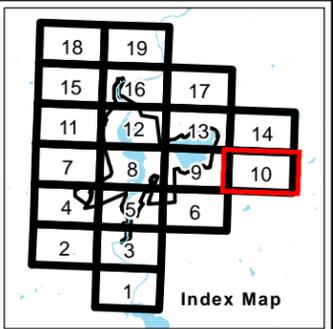
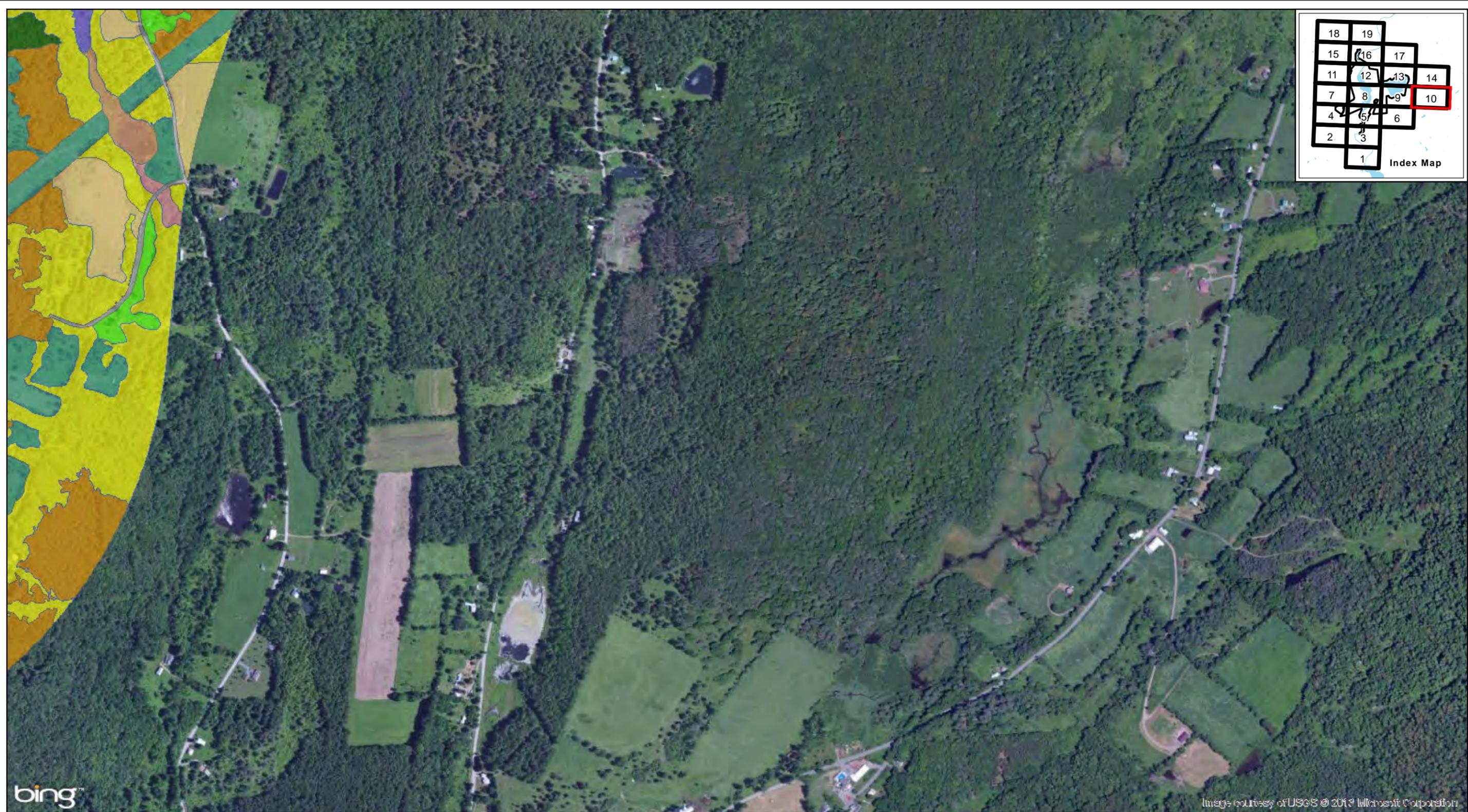
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Stream or River	Northern Hardwoods; Northern Hardwoods	Floodplain Forest	
Exposed Shoreline (mud/silt)	Rock-outcrop	Forested Wetland	
Cobble Shore	Grass Land	Cropland	
Scoured Shoreline	Successional Old Field/Shrubland	Manicured Lawn	
Eastern Hemlock	Control Level Ponds	Transportation	
Eastern White Pine	Emergent Marsh	Development	

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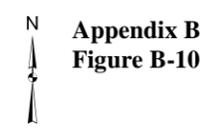
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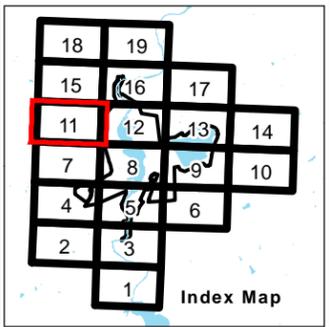
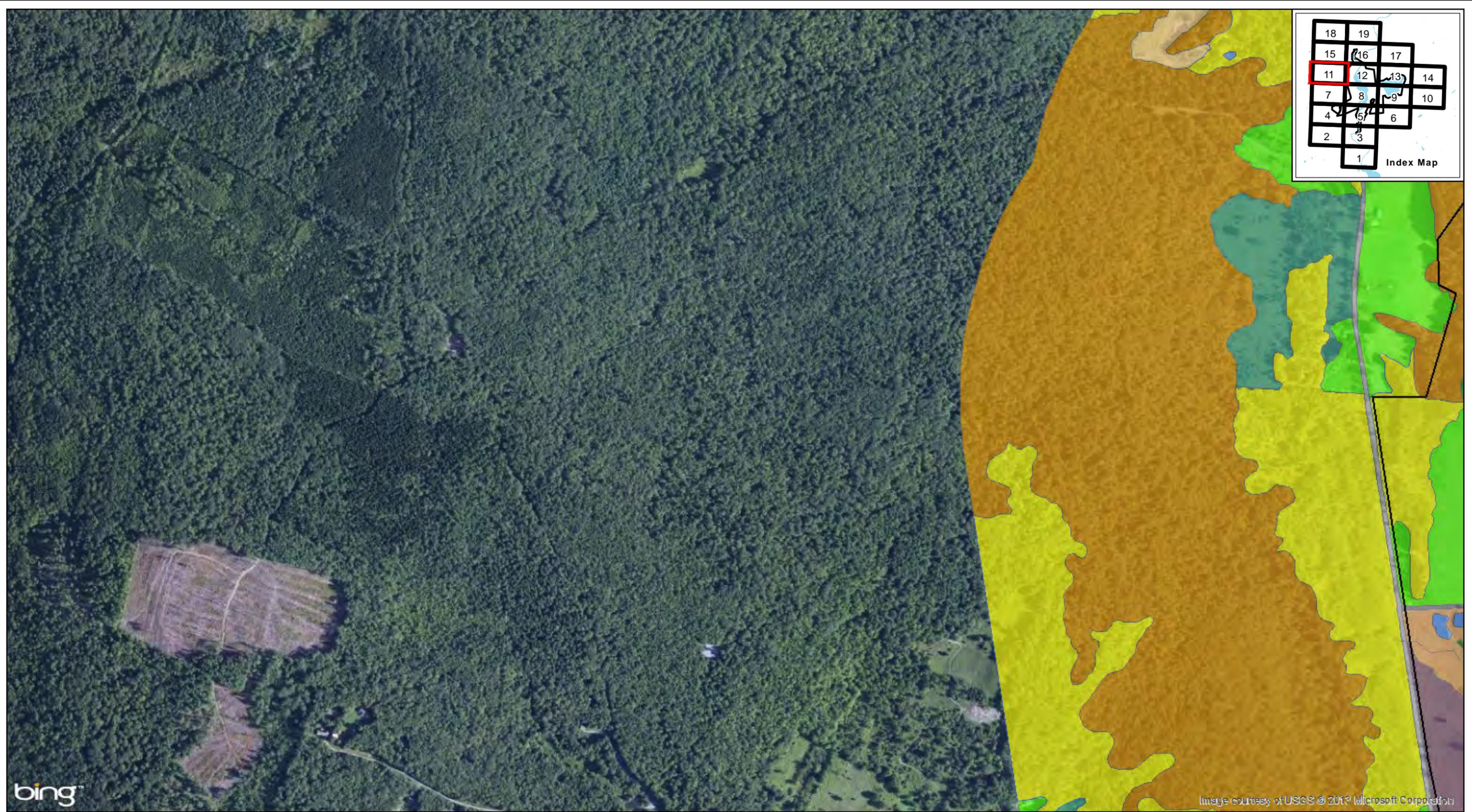
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Stream or River	Northern Hardwoods; Northern Hardwoods	Floodplain Forest	
Exposed Shoreline (mud/silt)	Rock-outcrop	Forested Wetland	
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Eastern White Pine	Emergent Marsh	Development	

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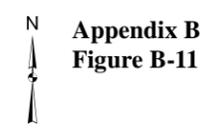
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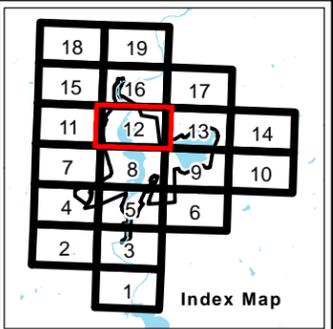
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Artificial Pond or Reservoir	Northern Hardwood-Coniferous Forest	Shrub Swamp	FERC Project Boundary
Stream or River	Northern Hardwoods; Northern Hardwoods	Floodplain Forest	
Exposed Shoreline (mud/silt)	Rock-outcrop	Forested Wetland	
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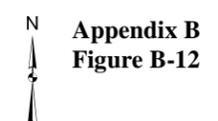
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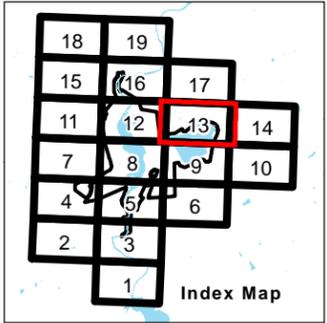
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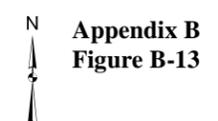
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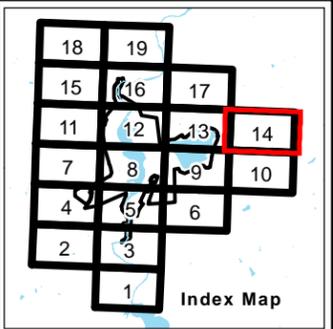
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Stream or River	Northern Hardwoods; Northern Hardwoods	Floodplain Forest	
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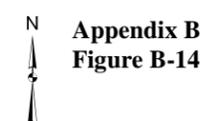
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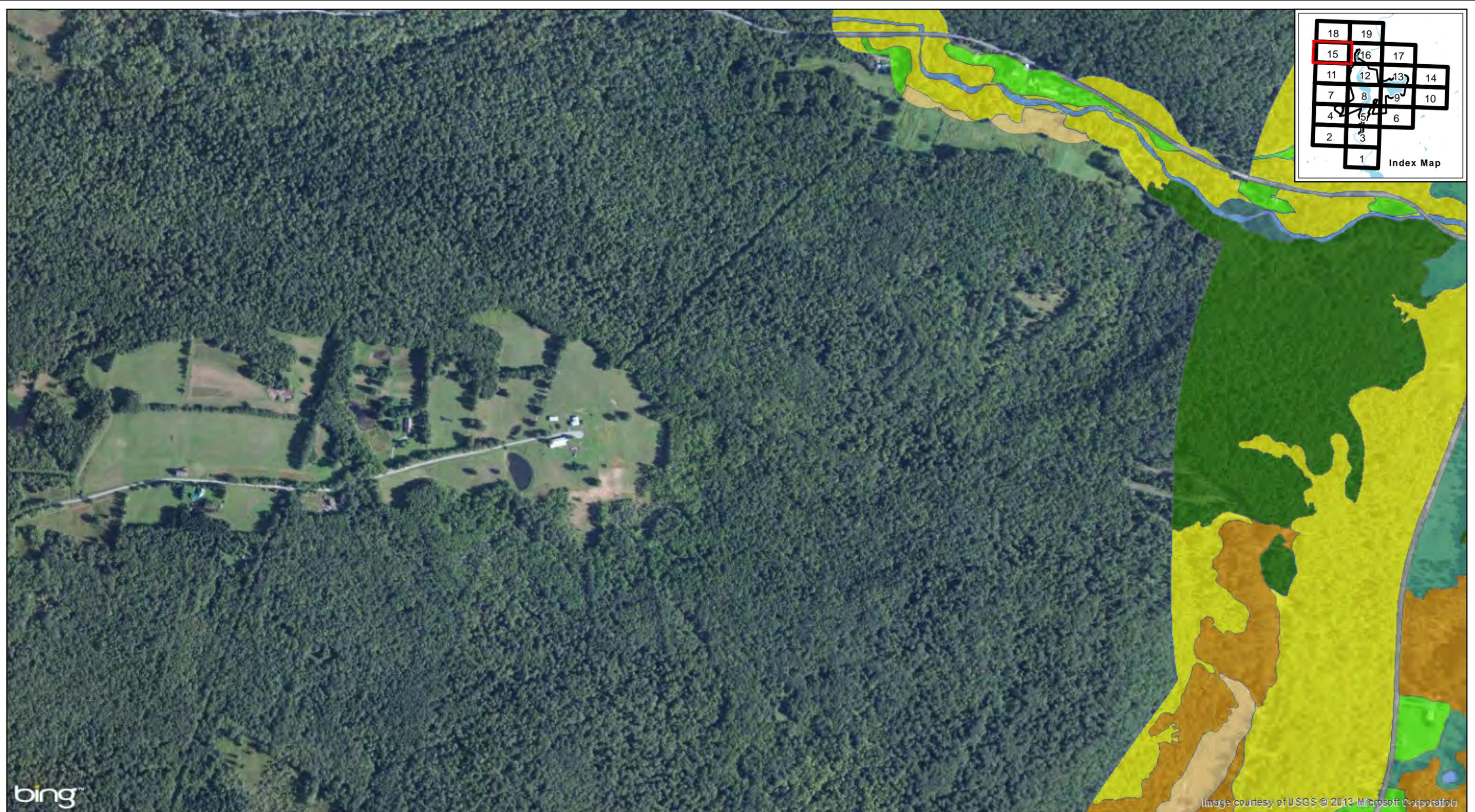
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Stream or River	Northern Hardwoods; Northern Hardwoods	Floodplain Forest	
Exposed Shoreline (mud/silt)	Rock-outcrop	Forested Wetland	
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Legend							
	Artificial Pond or Reservoir		Northern Hardwood-Coniferous Forest		Shrub Swamp		FERC Project Boundary
	Stream or River		Northern Hardwoods; Northern Hardwoods		Floodplain Forest		
	Exposed Shoreline (mud/silt)		Rock-outcrop		Forested Wetland		
	Cobble Shore		Grass Land		Cropland		
	Scoured Shoreline		Successional Old Field/Shrubland		Manicured Lawn		
	Eastern Hemlock		Control Level Ponds		Transportation		
	Eastern White Pine		Emergent Marsh		Development		

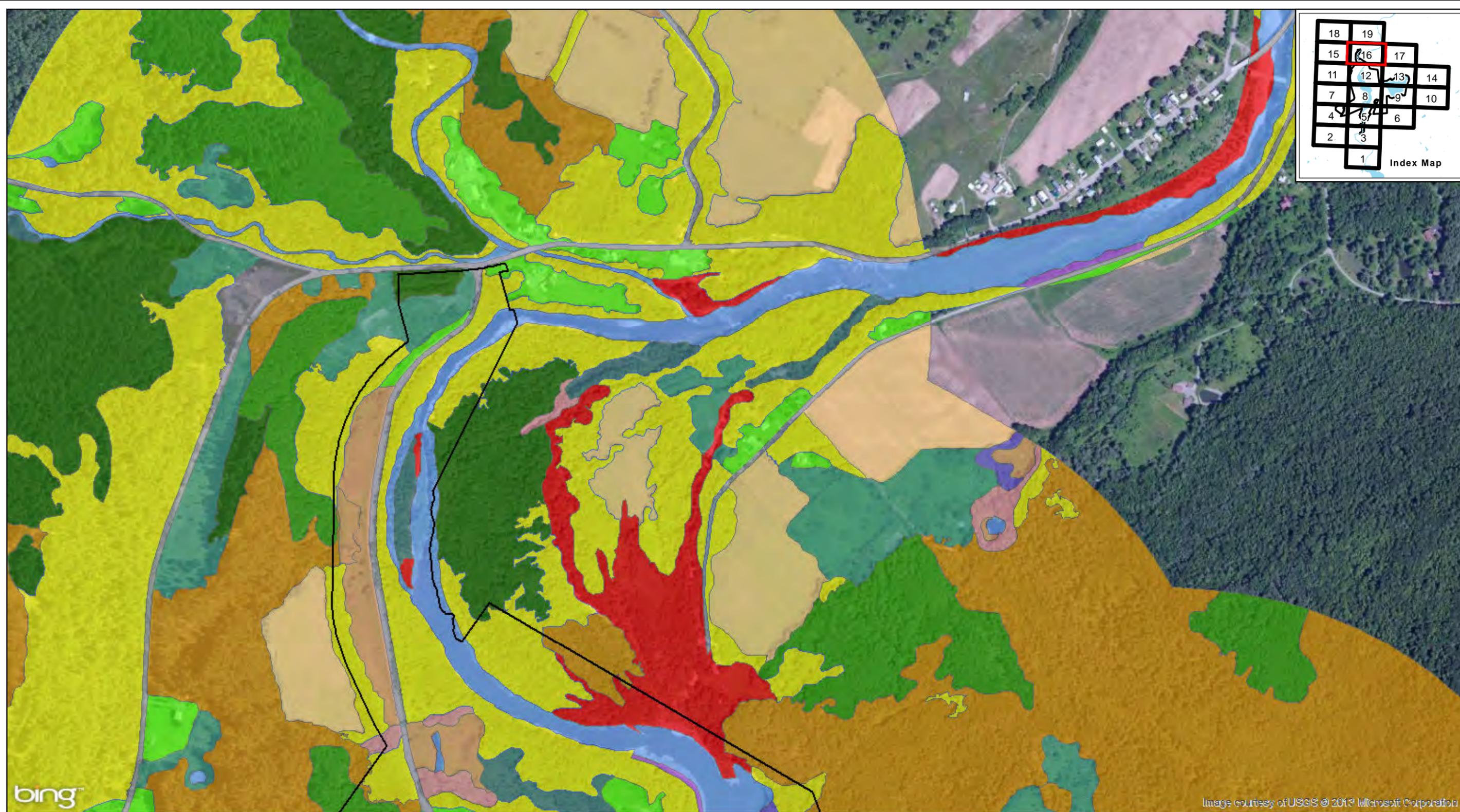
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**Appendix B
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- Legend**
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| Artificial Pond or Reservoir | Northern Hardwood-Coniferous Forest | Shrub Swamp | FERC Project Boundary |
| Stream or River | Northern Hardwoods; Northern Hardwoods | Floodplain Forest | |
| Exposed Shoreline (mud/silt) | Rock-outcrop | Forested Wetland | |
| Cobble Shore | Grass Land | Cropland | |
| Scoured Shoreline | Successional Old Field/Shrubland | Manicured Lawn | |
| Eastern Hemlock | Control Level Ponds | Transportation | |
| Eastern White Pine | Emergent Marsh | Development | |

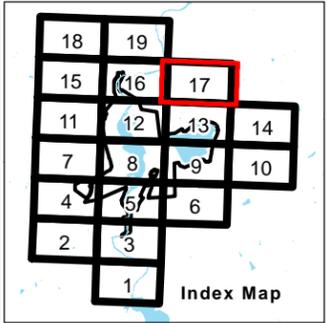
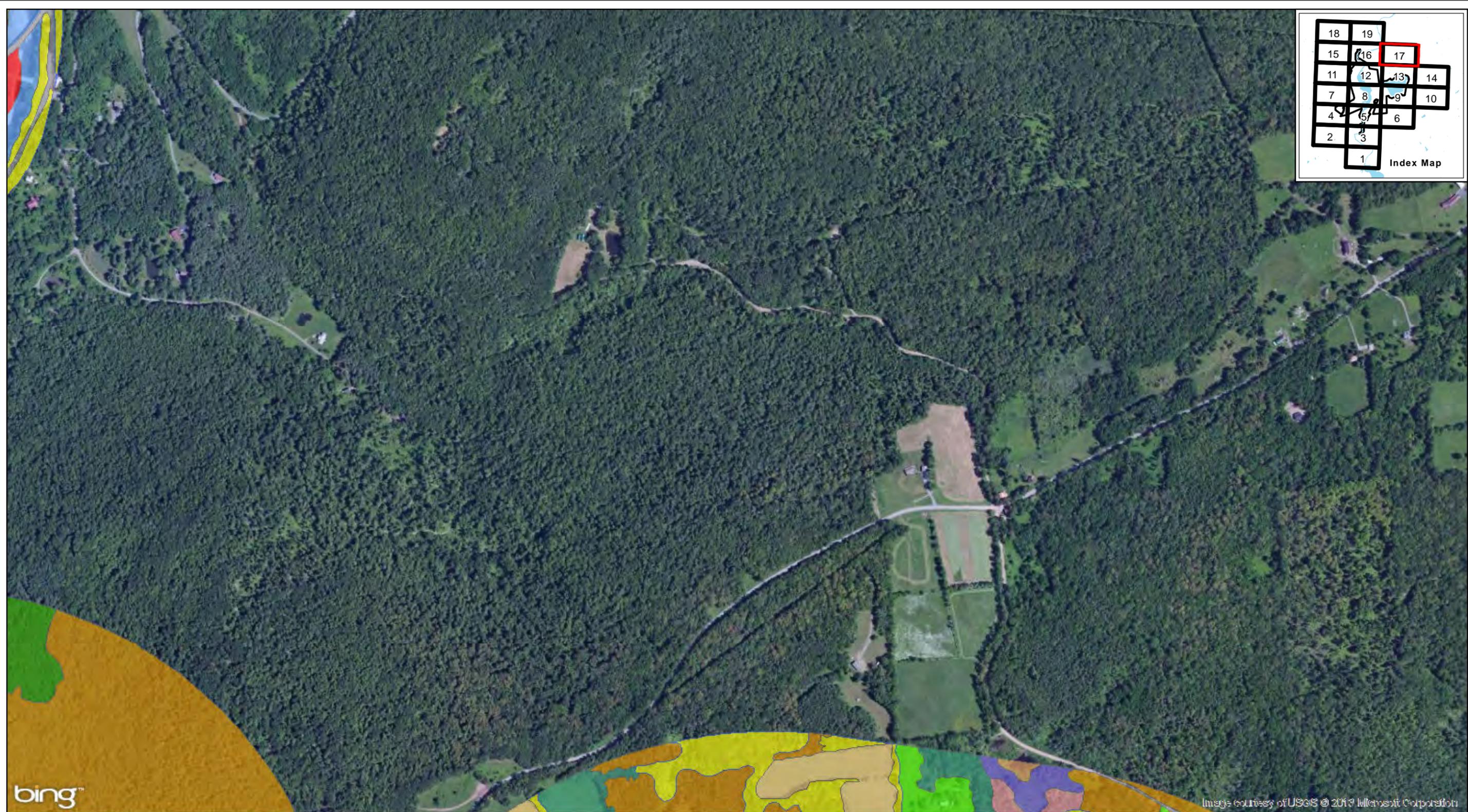
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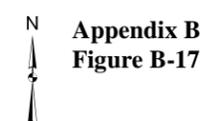
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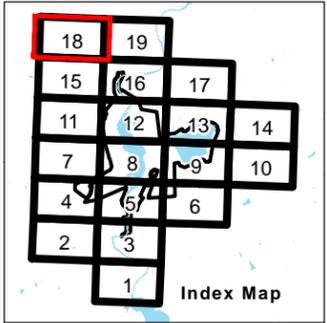
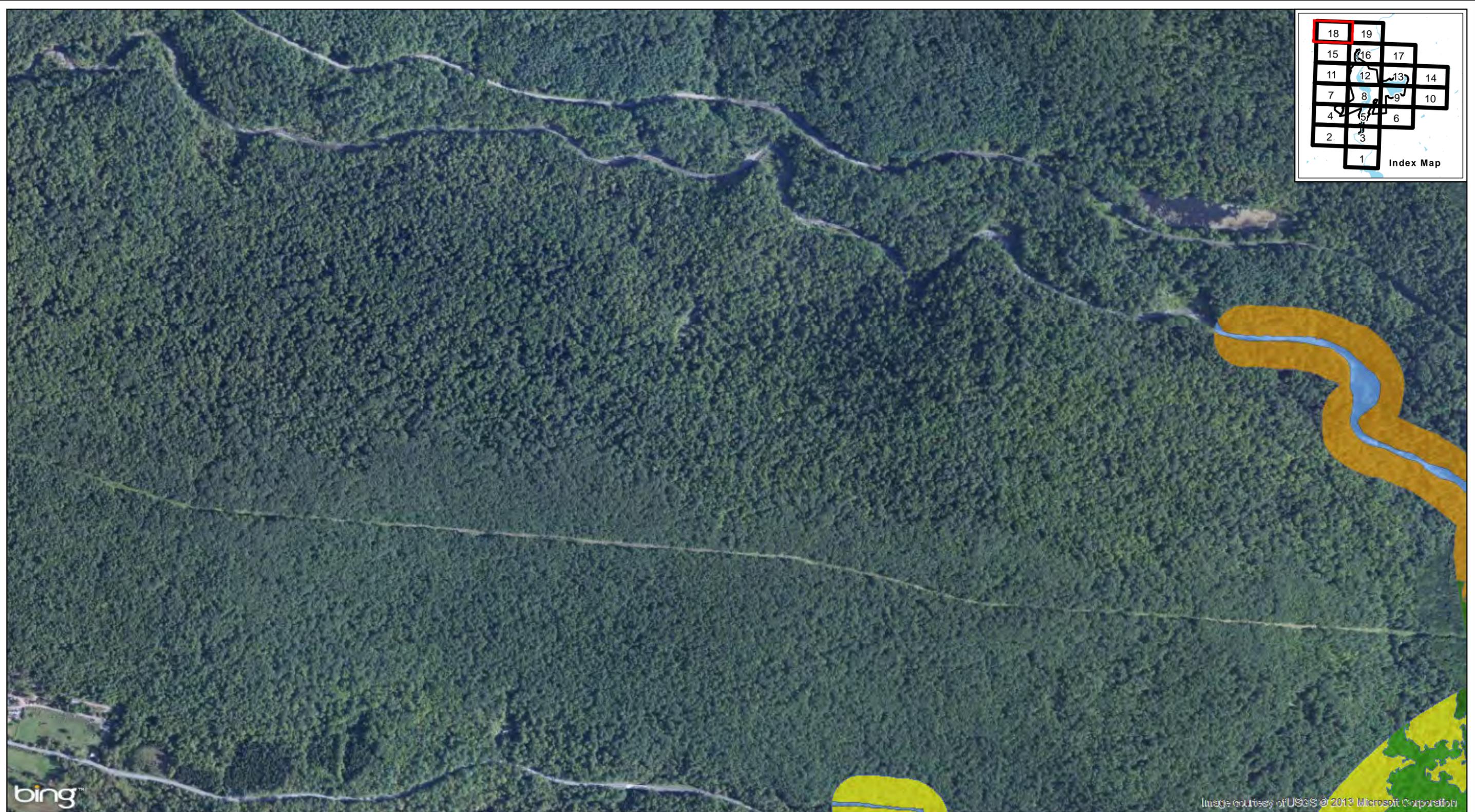
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| Artificial Pond or Reservoir | Northern Hardwood-Coniferous Forest | Shrub Swamp | FERC Project Boundary |
| Stream or River | Northern Hardwoods; Northern Hardwoods | Floodplain Forest | |
| Exposed Shoreline (mud/silt) | Rock-outcrop | Forested Wetland | |
| Cobble Shore | Grass Land | Cropland | |
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Legend			
Artificial Pond or Reservoir	Northern Hardwood-Coniferous Forest	Shrub Swamp	FERC Project Boundary
Stream or River	Northern Hardwoods; Northern Hardwoods	Floodplain Forest	
Exposed Shoreline (mud/silt)	Rock-outcrop	Forested Wetland	
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Scoured Shoreline	Successional Old Field/Shrubland	Manicured Lawn	
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Eastern White Pine	Emergent Marsh	Development	

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Legend		
Artificial Pond or Reservoir	Northern Hardwood-Coniferous Forest	Shrub Swamp
Stream or River	Northern Hardwoods; Northern Hardwoods	Floodplain Forest
Exposed Shoreline (mud/silt)	Rock-outcrop	Forested Wetland
Cobble Shore	Grass Land	Cropland
Scoured Shoreline	Successional Old Field/Shrubland	Manicured Lawn
Eastern Hemlock	Control Level Ponds	Transportation
Eastern White Pine	Emergent Marsh	Development
		FERC Project Boundary

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