Belleayre Mountain Ski Center UMP-DEIS

Appendix AA
Wetland and Waterbodies Report

December 2010
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List of Abbreviations and Acronyms

amsl	above mean sea level
BMP	best management practices
CFR	Code of Federal Regulations
cm	centimeters
CWA	Clean Water Act
dbh	diameter at breast height
DEIS	Draft Environmental Impact Statement
E & E	Ecology and Environment, Inc.
ECL	(New York State) Environmental Conservation Law
ESA	Endangered Species Act
GIS	geographic information system
GPS	global positioning system
HUC	hydrological unit code
km	kilometers
kV	kilovolt
MW	megawatt
NRCS	Natural Resources Conservation Service
NWI	National Wetland Inventory
NYNHP	New York Natural Heritage Program

List of Abbreviations and Acronyms (cont.)

NYSDEC	New York State Department of Environmental Conservation
PEM	palustrine emergent wetland
PFO	palustrine forested wetland
PSS	palustrine scrub-shrub wetland
RHA	Rivers and Harbors Act
ROW	right-of-way
SEQRA	New York State Environmental Quality Review Act
SWPPP	storm water pollution prevention plan
TNW	traditional navigable waterway
UMP	Unit Management Plan
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

1 Introduction

The New York State Department of Environmental Conservation (NYSDEC) is proposing to expand the Belleayre Mountain Ski Center as part of an amended Unit Management Plan (UMP). This report has been written to support the Draft Environmental Impact Statement (DEIS) portion of the Belleayre Mountain Ski Center (BMSC) Expansion UMP. The DEIS was prepared in accordance with the State Environmental Quality Review Act (SEQRA).

Belleayre is a state-owned recreation facility, operated by NYSDEC, located in the Catskill Forest Preserve in Ulster County in the town of Shandaken, New York (Figure 1-1). The expansion of the ski center could affect wetlands and waterbodies located within or adjacent to the proposed natural resources study area. As part of the environmental review of the project, Ecology and Environment, Inc. (E & E) delineated and evaluated the wetlands and other aquatic habitats within the proposed natural resources study area in August 2008. This report documents the boundaries of the wetlands and other aquatic resources found during various field surveys and provides a detailed description of these features.

The BMSC Expansion Project (the *project* or *ski center expansion*) refers to all activities and components of the proposed activities (e.g., improving and expanding ski trails, expanding existing lodges, constructing new lodges, etc.).

The *natural resources study area* is the general geographic area in which the expansion will take place. Figure 1-1 shows this area.

The *natural resources study area* (Figure 1-2) refers to the various areas within the BMSC property where construction would occur that could be permanently or temporarily disturbed because of construction or operation of the project.

Project Description

The Belleayre Mountain Ski Center is located on 2,178 acres of state lands acquired as Forest Preserve, special use (15 acres), and approximately 43 acres of Non-Forest Preserve. The Belleayre property comprises 52 ski slopes, 5 miles of cross-country ski trails, 5 aerial lifts, 3 surface lifts, 6.4 kilometers of cross-country ski trails, 23.7 miles of hiking trails, and undeveloped forest area. Belleayre Mountain has a summit elevation of 3,429 feet above mean sea level (amsl), a base elevation of 2,541 feet, and a lower base elevation of 2,025 feet. The ski center provides recreation for about 176,000 people and employment for more than 450 people during the course of the year.

Belleayre Mountain has seen a tremendous increase in skier visits since the approval of the 1998 UMP, with annual attendance numbers doubling in the past ten years. Out of a total of 1,884.6 forested acres of the natural resources study area, 100.8 acres (96.1 on the Belleayre property and 4.7 in the Highmount property) of the natural resources study area will be developed as part of the Belleayre expansion (Figure 1-2). The ski center expansion project consists of the following developments:

- Acquisition of portions of the former Highmount Ski Center (+/- 78 acres) located next to and west of the Belleayre Mountain Ski Center.
- Acquisition of permanent easements on other lands (+/-21 acres) close to the Belleayre Ski Center property.
- Construction of five ski lifts and eleven ski trails.
- Replacement of three chairlifts.
- Expansion of the KidsCamp Teaching Area and four new conveyance lifts.
- Construction of a 3,000 square foot lodge at the base of Tomahawk run.
- Expansion of two lodges—Discovery Lodge (40,000 square foot addition) and Sunset Lodge (40 feet by 40 feet expansion).
- Construction of an 850-square foot welcome and information center at State Highway 28.
- Construction of a 200-square foot lift-attendant shelter located at the base of lift #9 at the Bonnie View property boundary.
- Replacement of a bridge that crosses a creek to access the Bonnie View property.
- Construction of a pedestrian ski-way at the Tomahawk base lift.

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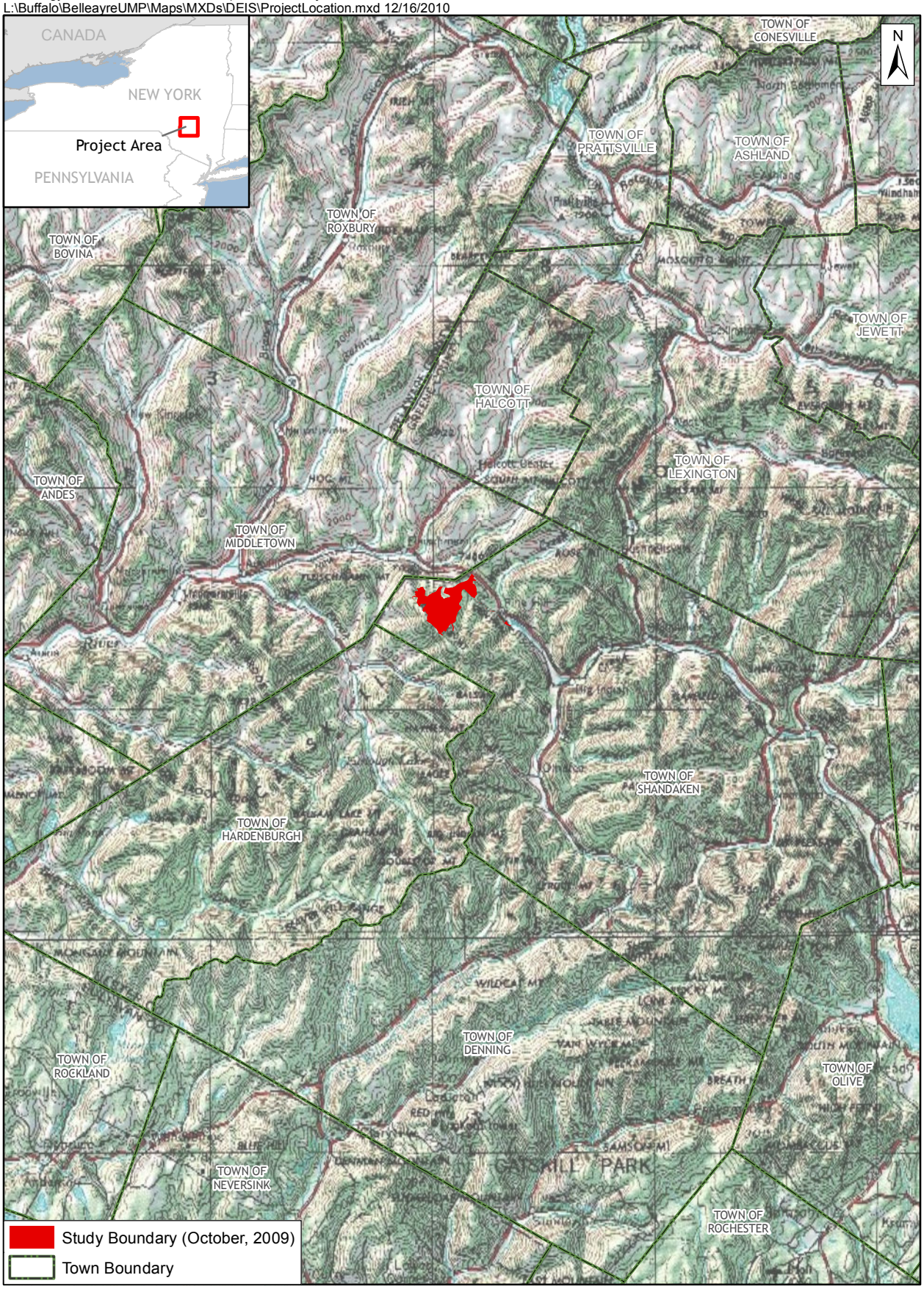

Source: ESRI 2010; NYSDEC 2009

Figure 1-1: Belleayre Mountain Ski Center Expansion
Natural Resources Study Area

0 1.25 2.5 5
Miles

0 1,000 Feet

Belleayre Mountain Ski Center
Catskill State Park

Project Area, NYS Orthoimagery, 2004

- Proposed Ski Lift Centerline (July, 2009)
- Proposed Tree Cutting Area
- Proposed Trail Clearing (July, 2009)
- Study Boundary (October, 2009)
- Proposed Snow Making Pond (July 2009)
- Parking Lot

Figure 1-2: Belleayre Mountain Ski Center Project Facilities

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Date: December 21, 2010

- Rehabilitation of trails.
- Construction of a new ten-car parking lot and a trailhead located on the Bonnie View property near the base of lift #9.
- Construction of a parking lot at the existing maintenance garage, which will be demolished upon completion of the new garage; the parking lot will accommodate up to 250 cars.
- Construction of four new overflow parking lots and a bus and group lot, which will provide parking for 1,200 cars and 60 buses. Lots will be located below the current lots for novices, below the cross-country parking lot in the triangle of land that is formed by the U & D turnpike, and along Route 49A.
- Construction of bathrooms at the maintenance garage site to provide restroom facilities for visitors parking in the new lots in the area.
- Establishment of a salt dome at the maintenance garage.
- Installation of septic holding tanks underneath the KidsCamp Teaching Area.
- Upgrade of the primary electrical system.
- Expansion of the snowmaking system including construction of a new pond behind the new maintenance building for all slopes.
- Designation of a mountain bike trail system incorporating existing cross-country ski trails and new single-track trails, located primarily on the lower portion of the mountain.

Tree-cutting would be necessary to complete trail expansion, chairlift construction, new lodges, parking lots, and other components needed for the expansion such as roads, a ski lodge, etc. The design of ski lifts limits clearing to a 60-foot trail width under each lift. New trails for skier and bikers would require little or no cutting of trees more than 3 inches in diameter and would be created by simply raking a path on the forest floor and removing dead tree limbs that hang into the trail. The design and construction of ski trails would ensure that vegetative cover on buffers between trails and lifts is maintained, except where trails and lifts intersect. However, the outer edges that do not intersect will be buffered.

Out of 1,884.6 total acres of forest within the study area, approximately 100.8 acres (96.1 on the Belleayre property and 4.7 in the Highmount property) of forest within the natural resource study area would be cleared for new ski slopes and approximately 19.9 acres of reclaimed land on the Highmount property would be

cleared to build new ski slopes. The reclaimed areas, located in the former Highmount ski area, an active ski trail 15 years ago, are early successional forests.

Primary impacts on vegetation would include removing existing vegetation by clearing forest and herbaceous vegetation during construction activities, grading, seeding, and mulching. Four species make up nearly 90% of the trees in the area to be cleared: sugar maple, 39.6%; red maple (*Acer rubrum*), 19.8%; black cherry (*Prunus serotina*), 16.5%; and white ash (*Fraxinus americana*), 13.7%. (The volume by species may not be the same as the percentage of stems for each species.) Secondary impacts from clearing and grading may include increased soil erosion and a decrease in the available habitat for wildlife. Soil erosion could be problematic on the ski and mountain slopes, but best management practices (BMPs) will be used to re-vegetate and stabilize cleared slopes. These potential impacts would most likely occur in conjunction with the construction of ski lifts, ski trails, and lodges. All of these project facilities are located along the slopes of Belleayre Mountain.

The following sections describe the regulatory framework that governs activities in wetlands and water bodies (Section 2); the natural resources study area and general environmental setting (Section 3); preliminary data review and the methods used to conduct field surveys (Section 4); on-site conditions and wetland characteristics (Section 5); information on the waterbodies found during field investigations (Section 6); and the ecosystem functions and values of the wetlands delineated within the natural resources study area (Section 7).

2 Regulatory Review and Permit Requirements

Projects such as the proposed Belleayre Mountain Ski Center Expansion, which may impact water resources, are subject to jurisdictional determinations and the regulatory authority of the U.S. Army Corps of Engineers (USACE) and NYSDEC under the requirements of Section 10 of the Rivers and Harbors Act of 1899; the Clean Water Act of 1977; New York State Environmental Conservation Law (ECL) Article 15, Title 5; and New York State ECL Article 24. These statutes and ski center site-specific information pertinent to the proposed expansion of the Belleayre Mountain Ski Center are discussed below.

2.1 Rivers and Harbors Act of 1899

The Rivers of Harbor Act of 1899 (RHA) is the oldest federal environmental law that is administered by the USACE. The act states that building any obstruction to the navigable waters or their tributaries of the United States, discharging refuse matter of any kind into the navigable waters of the United States or their tributaries, and excavating or filling or in any manner altering or modifying the course, location, condition, or capacity of any port, roadstead, haven, harbor, canal, lake, harbor of refuge, or enclosure within the limits of any breakwater or of the channel of any navigable water and their tributaries of the United States is prohibited without Congressional approval.

2.2 Clean Water Act

The Clean Water Act (CWA) was implemented to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Under Sections 401 and 404 of the CWA, permits must be issued for certain activities that may impact wetlands and other waterways. Section 401 of the CWA requires state approval for any federally permitted action impacting waters of the United States to ensure that the permitted action would not violate the state's water quality standards or impair designated uses. The New York State agency responsible for administering the Section 401 program is NYSDEC. Section 404 of the CWA requires that a permit be obtained for the discharge of dredged or fill material into waters of the United States, including wetlands and streams. Waters of the United States are defined under 33 Code of Federal Regulations (CFR), and wetlands are

specifically defined under 33 CFR Part 328.3(b). The permitting agency for Section 404 permits is the USACE. The natural resources study area is in the jurisdiction of the USACE New York District.

Wetlands that have a greater than insignificant effect on the chemical, biological, or physical properties of the closest traditional navigable waterway (TNW) are in the jurisdiction of the USACE. There are many jurisdictional wetlands delineated within the natural resources study area; however, some are also likely to be non-jurisdictional or isolated wetlands. Isolated wetlands are non-tidal waters of the United States that have no clearly defined nexus to a surface tributary in interstate or navigable waters and are not adjacent to such tributary waterbodies (33 CFR 330.2(e)).

Every effort has been made to avoid or minimize impacts on jurisdictional and non-jurisdictional wetlands within the natural resources study area. All isolated wetlands that would be potentially affected by the project were thoroughly scrutinized to verify there is no surface connection to waters of the United States. Further documentation of non-jurisdictional wetlands potentially impacted by the project can be found in Section 5.3 of this report. After receiving the wetland delineation report, field visits by representatives of the USACE and NYSDEC are scheduled to verify all wetland determinations and non-jurisdictional wetlands.

2.3 New York State Environmental Conservation Law, Article 15, Title 5, Protection of Waters Program

These regulations, also known as the "Protection of Waters" program, are designed to regulate any activities that could impact protected watercourses within New York State. Protected waters include all waters classified as C(T), B, or A, as well as all navigable waters. Article 15 covers disturbances of streambeds and banks, disposal of fill material, and excavation in protected waterbodies. Under Article 15, a permit must be obtained prior to undertaking any of these activities in protected waters. An application for a permit under Article 15 is completed jointly with the USACE permit application.

Several streams in the natural resources study area have been designated as Class B(T), B(TS), and B or C waters. Class B waters are best used for swimming and other contact recreation but not for drinking water. Streams designated (T)—trout—also include those more specifically designated as (TS)—trout spawning. Crystal Spring Brook, a class B(T) stream, runs northeast and then southeast into Birch Creek, which is classified as B(TS). One unnamed tributary of Emory Brook Class B stream originates in the abandoned Highmount ski area of the northwest section of the natural resources study area, and continues north. This stream was not found during field investigations in the area where a ski trail is proposed to cross it.. Waters designated as Class C are waters supporting fisheries and are suitable for non-contact activities (NYSDEC website, http://www.dec.ny.gov/regs/4592.html). There are two Class C streams,

Cathedral Glen Brook and Woodchuck Hollow Brook, which originate in the southeast portion of the natural resources study area and run northeast toward State Highway 28, joining with Crystal Spring Brook. The classification of these streams and their ecological characteristics are discussed further in Section 6 of this report.

The remaining mapped streams in the natural resources study area as well as other minor intermittent tributaries have not been assigned specific classifications by NYSDEC. See Section 6 for further detail.

2.4 New York State Environmental Conservation Law Article 24, New York Freshwater Wetland Act

Article 24 of the New York State ECL is the New York Freshwater Wetland Act. This law and the regulations developed pursuant to it regulate certain activities that could adversely affect wetlands of 12.4 acres (5 hectares) or more and smaller wetlands identified as having an unusually significant local value. Activities that occur within 100 feet (30.5 meters) of the wetland boundary are also regulated to prevent encroachment on the resource. Application for a permit under Article 24 is completed jointly with the USACE permit application.

NYSDEC maintains a database identifying regulated state wetland complexes. While the NYSDEC database provides the basis for state regulation of wetland complexes, the actual extent of field jurisdiction is based on the actual boundaries of the wetlands, which can be expanded or modified based on in-field review and delineation of existing wetland boundaries.

NYSDEC designates wetlands as Class I, II, III, or IV. Class I wetlands merit the highest level of protection. Class II wetlands provide important wetland benefits, the loss of which is acceptable only in very limited circumstances. Class III wetlands supply wetland benefits, the loss of which is acceptable only after the exercise of caution and discernment. Class II and III wetlands act as pollutant and flood buffers and may provide habitat for endangered, threatened, or vulnerable species. A Class IV wetland does not have any of the characteristics listed as criteria for Class I, II or III wetlands.

A review of the NYSDEC Wetland Maps indicates there are no state-designated wetlands present within the natural resources study area.

3 Natural Resources Study Area Description and Environmental Setting

The Belleayre Mountain state-owned recreation facility is located in Highmount, New York, predominantly on Forest Preserve land that has been classified as an "Intensive Use Area" in the *Catskill Park State Land Master Plan* (NYSDEC 2003). The natural resources study area is bounded by the Ulster/Greene county line to the north and State Highway 28 to the east (see Section 1, Figure 1-2). More specifically, the Belleayre Mountain Ski Center is located on 2,178 acres of state lands acquired as Forest Preserve (2,120 acres), special use (15 acres), and approximately 43 acres of Non-Forest Preserve (see Figure 3-1). The topography is a steep scarp on the eastern side of Belleayre Mountain and the west side has a gentle slope that grades more gradually into the Allegheny Plateau.

The natural resources study area is located within the Mid-Hudson watershed (hydrologic unit code [HUC] 02020006) and the East Branch Delaware River Watershed (HUC 02040102) (see Figure 3-2) (U.S. Environmental Protection Agency n.d.). There are no large water bodies within the natural resources study area. The closest traditional navigable water, the East Branch Delaware River, is located approximately 5 aerial miles and 8.0 river miles west of the site, and the Esopus Creek is located approximately 3.5 aerial miles and 17.7 river miles to the east of the site.

The Mid-Hudson watershed encompasses 1,531,913 acres of land in Ulster, Greene, Columbia, Albany, and Rensselaer Counties. The East Branch Delaware River watershed encompasses 537,724 acres of land with 644.4 total stream miles in Delaware, Greene, Sullivan, Ulster, and Wayne Counties. The watershed includes land within eleven townships and five counties. While the majority of the watershed is contained within Delaware County, sections of the headwaters are found in the western Catskill mountains in Ulster and Greene County.

Both the Mid-Hudson and the East Branch Delaware River watersheds have been designated as Category I watersheds by the New York Unified Watershed Assessment Program. Category I watersheds are defined as watersheds in need of restoration. These watersheds do not meet, or face imminent threat of not meeting, clean water and other natural resources goals (New York State Department of

Environmental Conservation 2008). No waters within the immediate natural resources study area have been identified as Section 303(d) Impaired Waters or as waters not meeting state water quality standards (New York State Department of Environmental Conservation 2008).

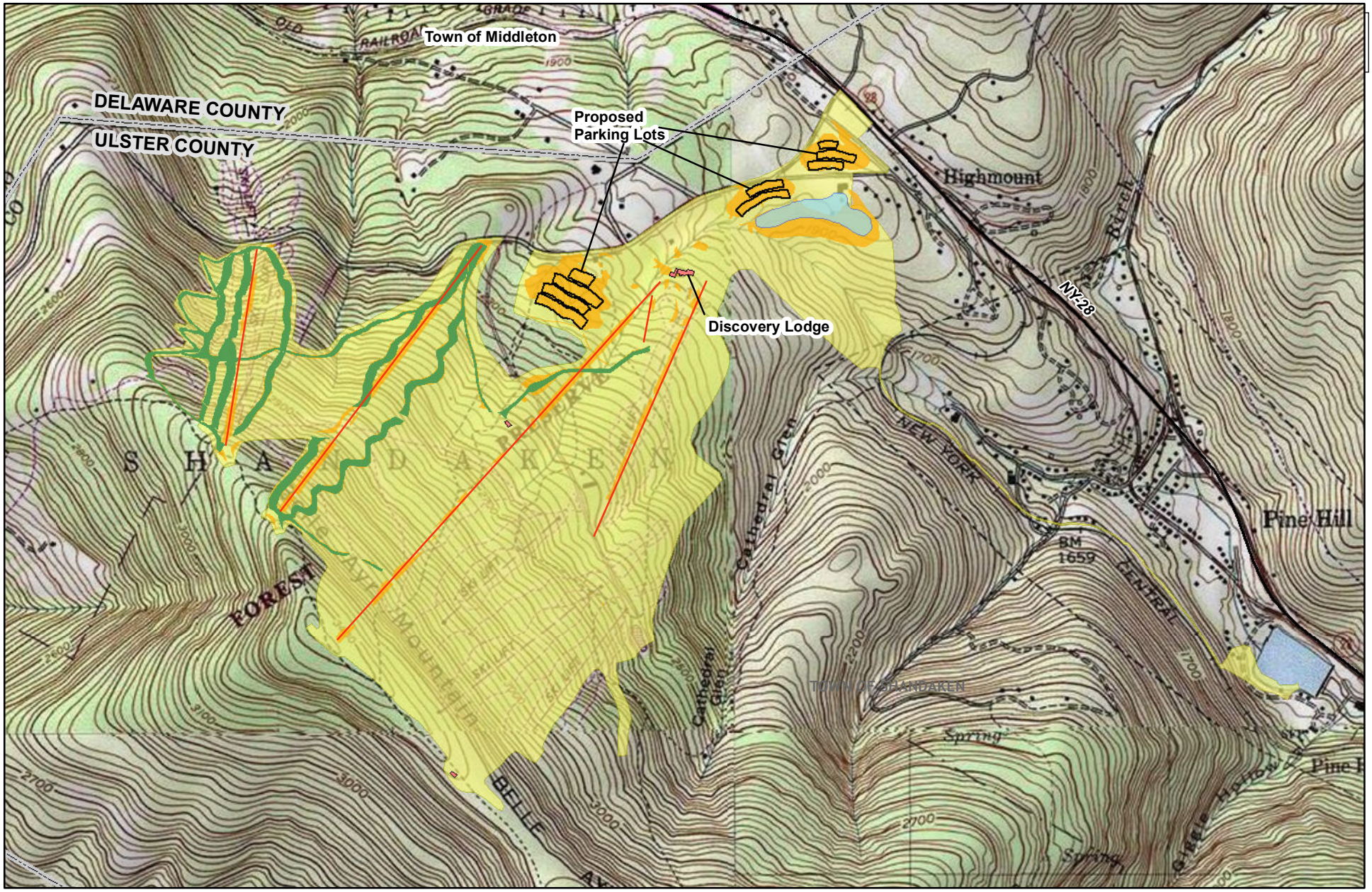
The predominant land use in the natural resources study area is recreational—mainly the Belleayre Mountain Ski Center and various hiking trails. Other common land uses include residential and forestland in various stages of succession. The general character of the landscape is a mosaic of mostly secondary northern hardwood and coniferous forests, some mid-successional reverting fields, and some early succession open grassy areas used as ski slopes in the winter months. Only the forested lands and reverting mid-successional lands are discussed in detail here because they support the majority of the natural habitats available in the natural resources study area. Detailed discussions of the wetlands and waterbodies in the natural resources study area are provided in Sections 5 and 6 of this report.

3.1 Geological Setting

The Catskill region is bounded on its east side by the Hudson River Valley. The Catskills are not true mountains in the geologic sense because they were not formed by subterranean mountain-building processes but, rather, were formed as an uplifted plateau dissected by streams. The gray sandstones of the area formed some 360 to 400 million years ago when the Catskill region was a shallow sea filling up with clay and silt washing off the high mountains to the east. The sandstones were subsequently uplifted high above sea level. Streams have eroded deep valleys into this high plateau, forming the Catskill Mountains.

From the eastern Catskills escarpment, the mountains grade west into the Alleghany Plateau, which stretches across the southern tier of New York State; the Catskill Mountains are the highest portion of that plateau. The Catskills do not appear flat like some plateaus because streams have been cutting deep valleys down through the land for millions of years. Before the last ice age, Catskill valleys were much deeper and steeper than they are today; however, now those sharp ravines are less pronounced because thick deposits of glacial till have smoothed out the topography of the valleys.

The majority of the surficial geology of the Catskills was determined during the last 1.6 million years. Continental and valley glaciers repeatedly covered the Catskills from 10,000 to two million years ago. Four ice ages have inundated this area, most recently the Wisconsin advance. The Wisconsin glaciers probably reached maximum thickness about 17,000 years ago and finished retreating from this area about 14,000 years ago. The majority of the region is composed of glacial till, which generally acts as an aquifer, holding large amounts of groundwater.



0 1,000 Feet

Belleayre Mountain Ski Center
Catskill State Park

Project Area, USGS Topographic Map

- Proposed Ski Lift Centerline (July, 2009)
- Proposed Tree Cutting Area
- Proposed Trail Clearing (July, 2009)
- Study Boundary (October, 2009)
- Proposed Snow Making Pond (July 2009)
- Parking Lot

Sheet No. 1

Figure 3-1 Belleayre Mountain Ski Center USGS Topo Map

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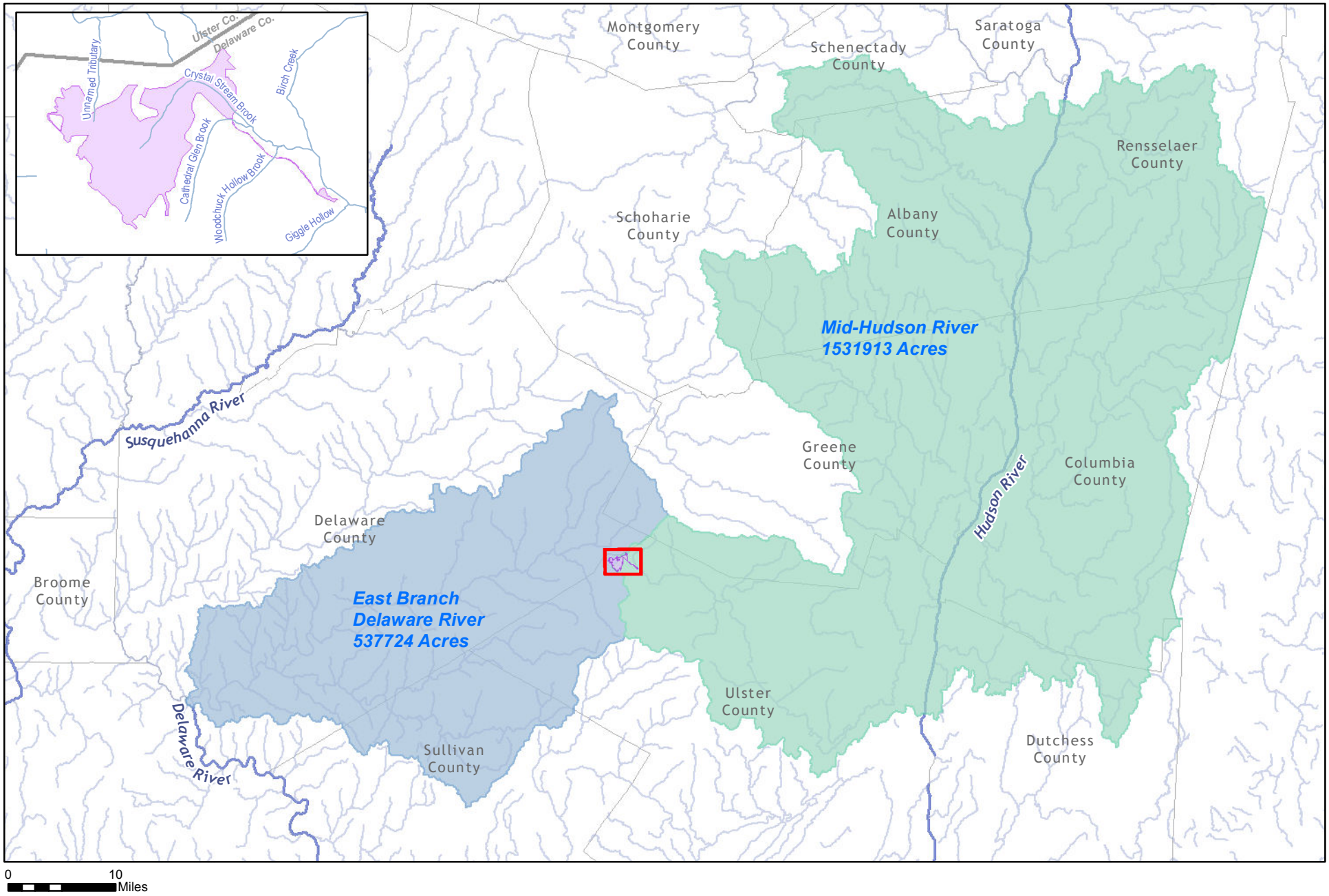

0 10 Miles

Belleayre Mountain Ski Center
Catskill State Park

Watershed Map

Study Boundary (October, 2009)
8-Digit Hydrologic Unit Boundary
East Branch Delaware River
Mid-Hudson River
County Boundary

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Figure 3-2: Belleayre Mountain Ski Center Watershed Map

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Date: December 16, 2010

The Upper Devonian shale and sandstone bedrock are underlain by a limestone layer that formed in a shallow marine environment. The shale and sandstone bedrock are overlain by marine shale, followed by terrestrial shales, sandstones, and conglomerates. All of these formations have gentle inclinations towards the west and northwest. The sedimentary deposits that formed these layers eroded from the once-great Acadian Mountains to the east. They washed into and eventually displaced a shallow inland sea, resulting in the formation of the "Catskill Delta." Millions of years of pressure and cementation turned these sea-floor deposits into our present-day bedrock.

The high peak regions of the Catskills, including Belleayre Mountain, are entirely composed of bedrock. These sandstone and conglomerate mountaintops were scoured and scraped by glaciers moving around and over their summits, leaving virtually no loose material.

Most soils on the site formed directly in glacial deposits after the recession of the Wisconsin ice sheet. The greater part of till is derived from the underlying bedrock; hence, most of the soil series on the site are closely related to bedrock type.

The surficial geology of the natural resources study area is composed of till derived from reddish colored sandstone, siltstone, and shale on steep and fairly level topography. The U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) maps six soil units on the natural resources study area. A soils map is included as Figure 3-3.

A brief description of each unit was obtained from the USDA NRCS Official Soil Series Descriptions (http://soils.usda.gov/technical/classifcation/osd/inddx.html :

- WLB = Wellsboro and Wurtsboro very bouldery soils, gently sloping

  The Wellsboro Series consists of very deep, moderately well and somewhat poorly drained soils. The slope ranges from 0 to 50 percent. Permeability is moderate in the surface and upper subsoil layers and slow or very slow in the lower subsoil and substratum. Taxonomic Class: Coarse-loamy, mixed, active, mesic Typic Fragiudepts.

  The Wurtsboro series consists of very deep, moderately well-drained and somewhat poorly drained soils formed in till derived from quarzite, conglomerate, and sandstone. The slope ranges from 0 to 25 percent. The saturated hydraulic conductivity is moderately low to high in the mineral soil above the fragipan and moderately high to low in the fragipan. Taxonomic Class: Coarse-loamy, mixed, active, mesic Typic Fragiudepts.

- VAB = Valois very bouldery soils, gently sloping

  This soil is very deep and well-drained. Slopes range from 3 to 8 percent. The parent material consists of loamy till derived mainly from sandstone, siltstone, and shale. The slope ranges from 0 to 60 percent. Taxonomic Class: Coarse-loamy, mixed, superactive, mesic Typic Dystrudepts.

- LCD = Lackawanna and Swartswood very bouldery soils, moderately steep

  The Lackawanna series consists of very deep, well-drained soils on uplands. They formed in till derived from reddish colored sandstone, siltstone, and shale. A dense fragipan is present starting at a depth of 17 to 36 inches below the soil surface. The slope ranges from 0 to 55 percent. Taxonomic Class: Coarse-loamy, mixed, active, mesic Typic Fragiudepts.

  The Swartswood series consists of deep and very deep, well-drained and moderately well-drained soils formed in till derived primarily from gray and brown quartzite, conglomerate, and sandstone. The slope ranges from 0 to 35 percent. Saturated hydraulic conductivity is moderately high or high in the mineral soil above the fragipan and moderately low or moderately high in the fragipan. Taxonomic Class: Coarse-loamy, mixed, active, mesic Typic Fragiudepts.

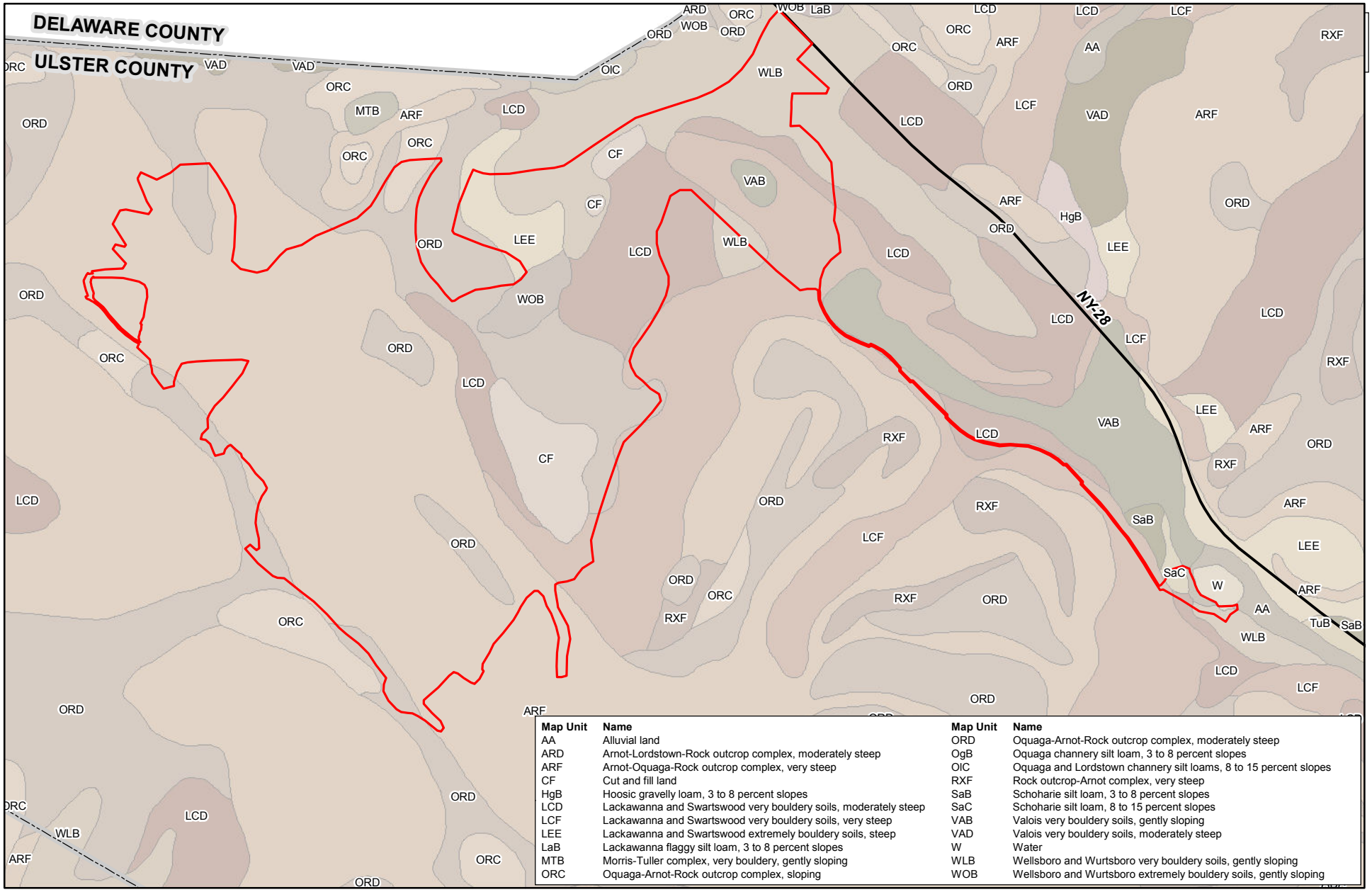
- ORD = Oquaga-Arnot-Rock outcrop complex, moderately steep

  The Arnot series consists of shallow, somewhat excessively to moderately well-drained soils formed in loamy till. The bedrock is at depths of 10 to 20 inches. The slope ranges from 0 to 70 percent. The saturated hydraulic conductivity in the mineral soil is moderately high or high. Taxonomic Class: Loamy-skeletal, mixed, active, mesic Lithic Dystrudepts.

  The Oquaga series consists of moderately deep, somewhat excessively drained soils formed in a thin mantle of till over sandstone, siltstone, and shale bedrock on nearly level to very steep uplands. Slope ranges from 0 to 70 percent. Permeability is moderate. Taxonomic Class: Loamy-skeletal, mixed, superactive, mesic Typic Dystrudepts.

- SaC = Schoharie silt loam, 8 to 15 percent slopes

  The Schoharie series consists of very deep, moderately well-drained soils formed in clayey lacustrine sediments. They are on glacial lake plains and uplands mantled with lake sediments. Saturated hydraulic conductivity is moderately high or high in the mineral surface and subsurface and low to moderately high in the subsoil and substratum. Slope ranges from 8 to 15 percent. Taxonomic Class: fine, illitic, mesic Oxyaquic Hapludalfs.



Map Unit	Name	Map Unit	Name
AA	Alluvial land	ORD	Oquaga-Arnot-Rock outcrop complex, moderately steep
ARD	Arnot-Lordstown-Rock outcrop complex, moderately steep	OgB	Oquaga channery silt loam, 3 to 8 percent slopes
ARF	Arnot-Oquaga-Rock outcrop complex, very steep	OIC	Oquaga and Lordstown channery silt loams, 8 to 15 percent slopes
CF	Cut and fill land	RXF	Rock outcrop-Arnot complex, very steep
HgB	Hoosic gravelly loam, 3 to 8 percent slopes	SaB	Schoharie silt loam, 3 to 8 percent slopes
LCD	Lackawanna and Swartswood very bouldery soils, moderately steep	SaC	Schoharie silt loam, 8 to 15 percent slopes
LCF	Lackawanna and Swartswood very bouldery soils, very steep	VAB	Valois very bouldery soils, gently sloping
LEE	Lackawanna and Swartswood extremely bouldery soils, steep	VAD	Valois very bouldery soils, moderately steep
LaB	Lackawanna flaggy silt loam, 3 to 8 percent slopes	W	Water
MTB	Morris-Tuller complex, very bouldery, gently sloping	WLB	Wellsboro and Wurtsboro very bouldery soils, gently sloping
ORC	Oquaga-Arnot-Rock outcrop complex, sloping	WOB	Wellsboro and Wurtsboro extremely bouldery soils, gently sloping

0 1,000 Feet

Belleayre Mountain Ski Center
Catskill State Park

Project Area, USDA SSURGO Soils

Study Boundary (October, 2009)

Sheet No. 1

Figure 3-3: Belleayre Mountain Ski Center Ulster County Soil Map

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Date: December 16, 2010

- AA = Alluvial land. Fluvaquents

  This soil is very deep and poorly drained. Slopes range from 0 to 3 percent. The parent material consists of alluvium with highly variable texture. Depth to the top of a seasonal high water table is 0 inches.

The Arnot series is found in the higher elevations of the natural resources study area (i.e., ski slopes). The Lackawanna and Wellsboro series are found in the lower elevation areas and are associated with wetlands within the natural resources study area. The alluvial land is associated with wetlands and is located around Pine Hill Lake, which is in the natural resources study area. Field investigations within the natural resources study area, consisting of an extensive series of both wetland and upland soil pits, were consistent with soils mapping provided by NRCS.

3.2 Ecological Communities

The natural resources study area is a patchwork of vegetative cover types. It is primarily successional northern hardwoods with a large area of maintained ski slope and attendant features. The Highmount ski area in the northwest quadrant of the site was last used in the early 1990s and is now dominated by brushy cleared land. Nine vegetative communities were identified in the natural resources study area during field visits (Figure 3-4).

At one time the land had been cleared for agriculture but was eventually abandoned because of its excessive stoniness and slopes. Thus, the dominant woodland community generally is a successional northern hardwood forest. Areas that were undergoing cultivation were most likely logged during the 19th century timber boom across New York State. Logging has continued throughout the area. As a result, forested areas are in varied stages of maturity, stem density, canopy cover, and structure.

Vegetative communities identified in the natural resources study area were categorized according to Edinger et al. (2002), which was developed with the support of the New York Natural Heritage Program (NYNHP) to provide a standard classification system for natural resource inventories in the state. The Edinger system incorporates the global (G) and state (S) rarity ranking system developed by the Nature Conservancy. The state rank reflects the rarity of the community within New York State (Table 3-1). The system is based on a scale of 1 to 5. Global ranks for communities are not currently standardized by the Nature Conservancy; thus, the ranks listed in the community descriptions below are estimated global ranks (Edinger et al. 2002).

Table 3-1 New York State Ecological Community Ranking System

Rank	Description
S1	Typically five or fewer occurrences; very few remaining individuals, acres, or miles of stream, or some factor of its biology making it especially vulnerable in New York State.
S2	Typically 6 to 20 occurrences; few remaining individuals, acres, or miles of stream, or factors demonstrably making it very vulnerable in New York State.
S3	Typically 21 to 100 occurrences; limited acreage or miles of stream in New York State.
S4	Apparently secure in New York State.
S5	Demonstrably secure in New York State.

A detailed description of vegetation associated with each community type, as observed during field surveys, is provided below. (Wetland habitats and waterbodies are described in Section 5.)

The most commonly observed tree species within the natural resources study area are a mixture of deciduous and evergreen species that include sugar maple (*Acer saccharum*), American beech (*Fagus grandifolia*), eastern hemlock (*Tsuga canadensis*), and red spruce (*Picea rubens*). Additional species observed in the woodlots included quaking aspen (*Populus tremuloides*), paper birch (*Betula papyrifera*), gray birch (*B. populifolia*), yellow birch (*Betula alleghaniensis*), and black cherry (*Prunus serotina*). Commonly observed species in the understory included partridgeberry (*Mitchella repens*), New York fern (*Thelypteris novae*), spinulose wood fern (*Dryopteris carthusiana*), brambles (*Rubus_idaeus, R. allegheniensis, R. occidentalis*), and rough stem goldenrod (*Solidago rugosa*).

Successional Northern Hardwood Forest

Rank: (G5) (S5)
Status: Secure

- **Description.** A broadly defined community consisting of deciduous hardwoods or mixed deciduous and coniferous forests. Forest structure is evenly aged with tree sizes ranging from sapling (< 6-inch diameter at breast height [dbh]) to 12 inches dbh. Tree species present are moderately shade-tolerant to shade-intolerant, typically propagate through wind dispersed seeds, and are well adapted to colonizing disturbed areas.

- **Distribution.** Found within the natural resources study area where clearing and logging activities have impacted forest communities.

0 1,000 Feet

Belleayre Mountain Ski Center
Catskill State Park

Project Area, NYS Orthoimagery, 2004

Study Boundary (October, 2009)

Ecological Communities

- Brushy Cleared Land
- Developed
- Hemlock - Northern Hardwood Forest
- Maintained Ski Slope and Attendant Features
- Mowed Lawn
- Railroad
- Red Maple - Hardwood Swamp
- Shallow Emergent Marsh
- Successional Northern Hardwoods

N

Sheet No. 1

Figure 3-4: Belleayre Mountain Ski Center Ecological Communities

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Date: December 21, 2010

- **Vegetation.**

  - **Overstory:** The canopy is usually dominated by any variation of quaking aspen (*Populus tremuloides*), red maple (*Acer rubrum*), pin cherry (*Prunus pensylvanica*), black cherry (*Prunus serotina*), green ash (*Fraxinus pennsylvanica*), and American elm (*Ulmus americana*).

  - **Understory/Shrub Layers:** A very mixed and diverse layer typically consisting of seedlings of the overstory and usually thick patches of meadowsweet (*Spiraea* var. *latifolia*) and viburnums (*Viburnum trilobum*; *V. lentago*; *V. recognitum*).

  - **Herbaceous Layers:** Vegetation occurring in this community is sparse and can include goldenrods (*Solidago canadensis*; *S. rugosa*.), timothy (*Phleum pretense*), bluegrasses (*Poa pratense*; *P. compressa*), orchard grass *(Dactylis glomerata*), assorted asters (*Aster* spp.), ragweed (*Ambrosia artemisiifolia*), and hawkweeds (*Hieracium* spp.).

Hemlock-Northern Hardwood Forest

Rank: (G4/G5) (S4)
Status: Secure

- **Description.** These mixed forests are usually found on moist, well-drained soil associated with mid-elevation slopes of ravines or margins of swamps. The forest structure can be evenly or unevenly aged depending on silvicultural practices. The majority of the trees are mature, and typically the canopy is closed.

  - **Distribution.** Found along the steep slopes in the central portion of the site.

  - **Vegetation.**

  - **Overstory:** The canopy is dominated by hemlock (*Tsuga canadensis*) and may have sparse representatives of yellow birch (*Betula alleghaniensis*), sugar maple (*Acer saccharum*), American beech (*Fagus grandifolia*), red maple (*Acer rubrum*), black cherry (*Prunus serotina*), and basswood (*Tilia americana*).

  - **Understory/Shrub Layers:** Typically the canopy is thick, thus allowing only a sparse shrub layer typically comprising raspberries (*Rubus* spp.).

  - **Herbaceous Layers:** This layer commonly consists of wood ferns and shining clubmoss.

Brushy Cleared Land

Rank: (G5) (S5)
Status: Secure

- **Description**: Lands previously used as ski slopes with attendant features for the Highmount ski area. Vegetation is patchy, with scattered herbs, shrubs, and tree saplings. The amount of vegetative cover depends on slope, soil fertility, and the length of time since the land was cleared for active use.

Mowed Lawn

Rank: (G5) (S5)
Status: Secure

- **Description:** The mowed land on the site is a small area adjacent to Route 28 in which the groundcover is dominated by clipped grasses and there is less than 30% tree cover. The groundcover is maintained by mowing.

3.3 Threatened and Endangered Plant Species and Communities

The U.S. Fish and Wildlife Service (USFWS) and NYNHP were consulted to determine the potential occurrence of federally and state-listed endangered and threatened species and significant natural communities and habitats within the natural resources study area. Federally listed threatened and endangered plant and animal species are protected by the Endangered Species Act (ESA) of 1973, which is administered by the USFWS. State-listed threatened and endangered plant and animal species are protected by the New York State Environmental Conservation Law, Article 9 and Article 11, which is administered by NYSDEC.

The USFWS and NYNHP provided data detailing the known occurrences of threatened, endangered, and rare species within the natural resources study area and its vicinity. In combination, these species are considered "species of concern." Existing databases track species that are protected by law as well as unprotected species that are identified as species of concern. The existing databases also track significant community assemblages. Although not specifically protected by law, these areas are recognized for their rare/unique features as well as their greater likelihood of providing habitat for protected species.

According to the USFWS there are two federally listed threatened plant species known to occur in Ulster County, the northern wild monkshood (*Aconitum noveboracense*) and the small whorled pogonia (*Isotria medeoloides*) (Stilwel 2008). No federally designated or proposed "critical habitat" exists within the natural resources study area (Appendix A).

Correspondence with the NYNHP indicates that no state-listed or proposed endangered or threatened plant species or plant communities are known to occur in the natural resources study area (Appendix A).

No rare or endangered plants were observed during field investigations within the natural resources study area. Observed plant communities were composed of species typical of northern New York State.

3.4 Wildlife

The natural resources study area of 2,178 acres is composed almost entirely of upland wildlife habitat ranging in elevation from approximately 2,000 to 3,400 feet. The steep north-northeast slope precludes the area from being a deer-wintering area, and no deer-wintering areas are known to be in the natural resources study area.

The community structure in the natural resources study area is typical of other northern New York areas in Catskill Park. Wildlife associated with these communities is typical of what would be found throughout the park. Table 3-2 identifies fauna common to each of the vegetative communities and habitats described above. Several of these species live next to wetlands and use their resources, while other species are typical wetland inhabitants whose survival depends upon the wetland communities.

Table 3-2 Wildlife Species Associated with Vegetative Communities

Common Name	Scientific Name
Successional Northern Hardwood Forest	
Eastern chipmunk	*Tamias striatus*
White-tailed deer	*Odocoileus virginianus*
Eastern cottontail	*Syvilagus floridanus*
Gray fox	*Urocyon cinereoargenteus*
Gray squirrel	*Sciurus carolinensis*
Virginia opossum	*Didelphis virginiana*
Porcupine	*Erethizon dorsatum*
Red bat	*Lasiurus borealis*
Red squirrel	*Tamiasciurus hudsonicus*
Deer mouse	*Peromyscus maniculatus*
White-footed mouse	Peromyscus *leucopus*
Coyote	*Canis latrans*
Striped skunk	*Mephitis mephitis*
Northern redback salamander	*Plethodon cinereus*
Northern slimy salamander	*Plethodon glutinosis*
Northern spring salamander	*Gyrinophilus porphyriticus porphyriticus*

Table 3-2 Wildlife Species Associated with Vegetative Communities

Common Name	Scientific Name
Hemlock-Northern Hardwood Forest	
Bat species	
Gray fox	*Urocyon cinereoargenteus*
Gray squirrel	*Sciurus carolinensis*
Virginia opossum	*Didelphis virginiana*
Porcupine	*Erethizon dorsatum*
Eastern chipmunk	*Tamias striatus*
Red squirrel	*Tamiasciurus hudsonicus*
Raccoon	*Procyon lotor*
White-tailed deer	*Odocoileus virginianus*
Fisher	*Martes pennanti*
Northern flying squirrel	*Glauchomys sabrinus*
Coyote	*Canis latrans*
American toad	*Bufo americanus*
Red-spotted newt	*Notopthalmus viridescens*
Woodland salamander species	*Plethodon spp.*
Wetland Vegetative Communities	
Beaver	*Castor canadensis*
Muskrat	*Ondatra zibethicas*
River otter	*Lutra canadensis*
Star-nosed mole	*Condylura ristata*
Water shrew	*Sorex palustris*
Northern water snake	*Nerodia sipedon*
Various salamander, frog, toad, and turtle species	
Aquatic Habitats	
River otter	*Lutra canadensis*
Mink	*Mustela vison*
Mudpuppy	*Necturus maculosus*
Painted turtle	*Chrysemys picta*
Red-spotted newt	
Blacknose dace	*Rhinichthys atratulus*
Creek chub	*Semotilus atromaculatus*
Darters	*Etheostoma* spp.
Fathead minnow	*Pimephales promelas*
Brook trout	*Salvelinus fontinalis*
Brown trout	*Salmo trutta*
Rainbow trout	*Oncorhynchus mykiss*
Various frog and toad species	

Source: New York State Department of Environmental Conservation 2006; DeGraaf and Yamasaki 2001

In addition, trout species may occur in some portions of the natural resources study area. Class C(T) streams have the potential to contain cold water fish species such as brook trout (*Salvelinus fontinalis*), brown trout (*Salmo trutta*), and rainbow trout (*Oncorhynchus mykiss*).

3.5 Threatened and Endangered Animal Species

The USFWS database indicated that four federally listed or proposed endangered or threatened animal species are known to occur in Ulster County (see Attachment 1. These species are the bald eagle (*Haliaeetus leucocephalus*), bog turtle (*Clemmys [=Glyptemys] muhlenbergii*), Indiana bat (*Myotis sodalis*), and shortnose sturgeon (*Acipenser brevirostrum*). However, the USFWS stated in its response to the consultation letter that there are no federally listed or proposed endangered or threatened animal species located in the natural resources study area itself (Stilwel 2008) although, according to the USFWS, bald eagles are known to nest 18 miles from the natural resources study area (Stilwell 2008). Bald eagles are often found near aquatic systems such as lakes, reservoirs, and major rivers and tend to nest in large trees near these waterways but no federally designated or proposed critical habitat is within the natural resources study area (Appendix A).

No federally designated or proposed critical habitat exists within the natural resources study area.

The Indiana bat, which is federally protected, also has not been identified in the natural resources study area. According to a NYSDEC representative, there are roughly 27,000 Indiana bats near the 5th Binnewater Lake, north of Rosendale, New York, which is approximately 28 miles from the natural resources study area. NYSDEC has confirmed females at summer colonies on the shore of Ashokan Reservoir, which is 20 miles from the natural resources study area. Upland areas like Belleayre Mountain are less likely than lowland area to include Indiana bats. If Indiana bats are present in the natural resources study area, they would most likely be males or non-reproductive females (Hicks August 20, 2008).

Correspondence with the NYNHP indicates there are no state-listed endangered or threatened animal species and no significant communities are known to occur within the natural resources study area.

4 Methodology

This section describes the methods and materials used for field surveys and activities related to the environmental investigation of the natural resources study area.

4.1 Preliminary Data Review

Prior to performing fieldwork, background information was reviewed to assist in the initial identification of sensitive resources. Information sources included 2001 color-infrared aerial photographs of the natural resources study area (Figure 4-1), 2004 panchromatic aerial photographs, United States Geological Survey (USGS) 7.5-minute series topographic maps (see Section 3, Figure 3-1), USFWS National Wetland Inventory (NWI) maps and NYSDEC Freshwater Wetlands maps (Figure 4-2), and Ulster County soil survey mapping (see Section 3, Figure 3-3). NYSDEC stream classification data were reviewed to determine the presence of streams protected by New York State under ECL Article 15 (see Figure 4-3.1 [back pocket]).

USGS topographic maps and aerial photos indicate the possible presence of a few wetlands in the natural resources study area. The NWI maps depict one wetland—a freshwater pond—in the natural resources study area. A second NWI-mapped freshwater pond located in the southern part of the natural resources study area actually is located just outside of the project boundaries. These maps are used primarily for preliminary evaluation because they are based on desktop analysis with little or no field verification. NYSDEC freshwater wetlands maps identify state-designated wetlands within the natural resources study area that are under NYSDEC jurisdiction. Review of existing data indicated that there are no mapped state wetlands within the natural resources study area (see Figure 4-2).

To supplement the existing wetland mapping, existing USDA soils maps and aerial photographs were also reviewed to further assess the extent of potential wetlands within the natural resources study area. The USDA Ulster County soil survey identified somewhat excessively drained, well-drained, and moderately drained soils within the natural resources study area. The only poorly drained soils within the natural resources study area are located around Pine Hill Lake, east of the Belleayre Ski Center (see Section 3, Figure 3-3). An analysis of aerial

photographs indicated the likely presence of wetlands at the base of the Ski Center, along Route 28, and around Pine Hill Lake. A comparison of the existing wetland mapping with the USDA Ulster County soils mapping indicates a general correlation between the locations of poorly drained soils or soils with the potential for hydric inclusions and the locations of NYSDEC-mapped wetlands and streams. However, the mapped NWI wetlands also incorporate areas underlain by mapped non-hydric soils. In addition, a majority of the soils corresponding to the mapped wetlands only have the potential for hydric inclusions, indicating the potential for upland inclusions and deviations from mapped wetland boundaries. Field surveys identified significant variations between the mapped and actual boundaries of NYSDEC- and NWI- designated wetlands (see Section 5).

Maps depicting watercourses were also consulted. Three streams were identified as Class B, Class B(T), and Class B(TS) on the USGS topographic map of the natural resources study area. The Class B(T) stream flows into Birch Creek, a Class B(TS) watercourse that flows into Pine Hill Lake. The Class B stream that runs north through the northwest portion of the natural resources study area was not identified in the field (see Figure 4-2). A few streams were identified in the field that were not depicted on the NYSDEC stream maps (see Section 6 for a more thorough discussion of the streams delineated).

Based on the results of the desktop review, it was determined that field verification would be required to determine the presence and extent of wetlands and waterbodies in the natural resources study area.

4.2 Field Surveys

Initial field investigations included exclusion mapping conducted in August 2008 to obtain a general understanding of the topography and to identify any large contiguous areas that would not be suitable for use in the project. Following review of the exclusion mapping data, a preliminary layout for the project was created.

Surveys for wetland and waterbody resources then were conducted using a study area corridor that varied in width around the proposed natural resources study areas. (Figure 1-2 in Section 1 shows the proposed natural resources study areas in which the surveys were conducted.) Field surveys were also conducted within the Highmount Ski Area by the LA Group in September 1999 to evaluate water resources within the adjacent Belleayre Resort at Catskills Park Project Area; wetlands identified during this effort that were also located within the E & E survey boundary are also included in this document. Detailed delineations of these wetlands are shown on Figure 4.3-2.

Because of the potential for utility conduits to cross wetlands, the location of proposed utility lines in the study area is shown in Figure 4.3-3

0 1,000 Feet

Belleayre Mountain Ski Center
Catskill State Park

Project Area, NYS Orthoimagery Program, 2004

- Proposed Ski Lift Centerline (July, 2009)
- Proposed Tree Cutting Area
- Proposed Trail Clearing (July, 2009)
- Study Boundary (October, 2009)
- Proposed Snow Making Pond (July 2009)
- Parking Lot

Figure 4-1: Belleayre Mountain Ski Center Aerial Photograph

Sheet No. 1

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Date: December 16, 2010

0 1,000 Feet

Belleayre Mountain Ski Center
Catskill State Park

Project Area, NYSDEC Streams and USFWS NWI Wetlands

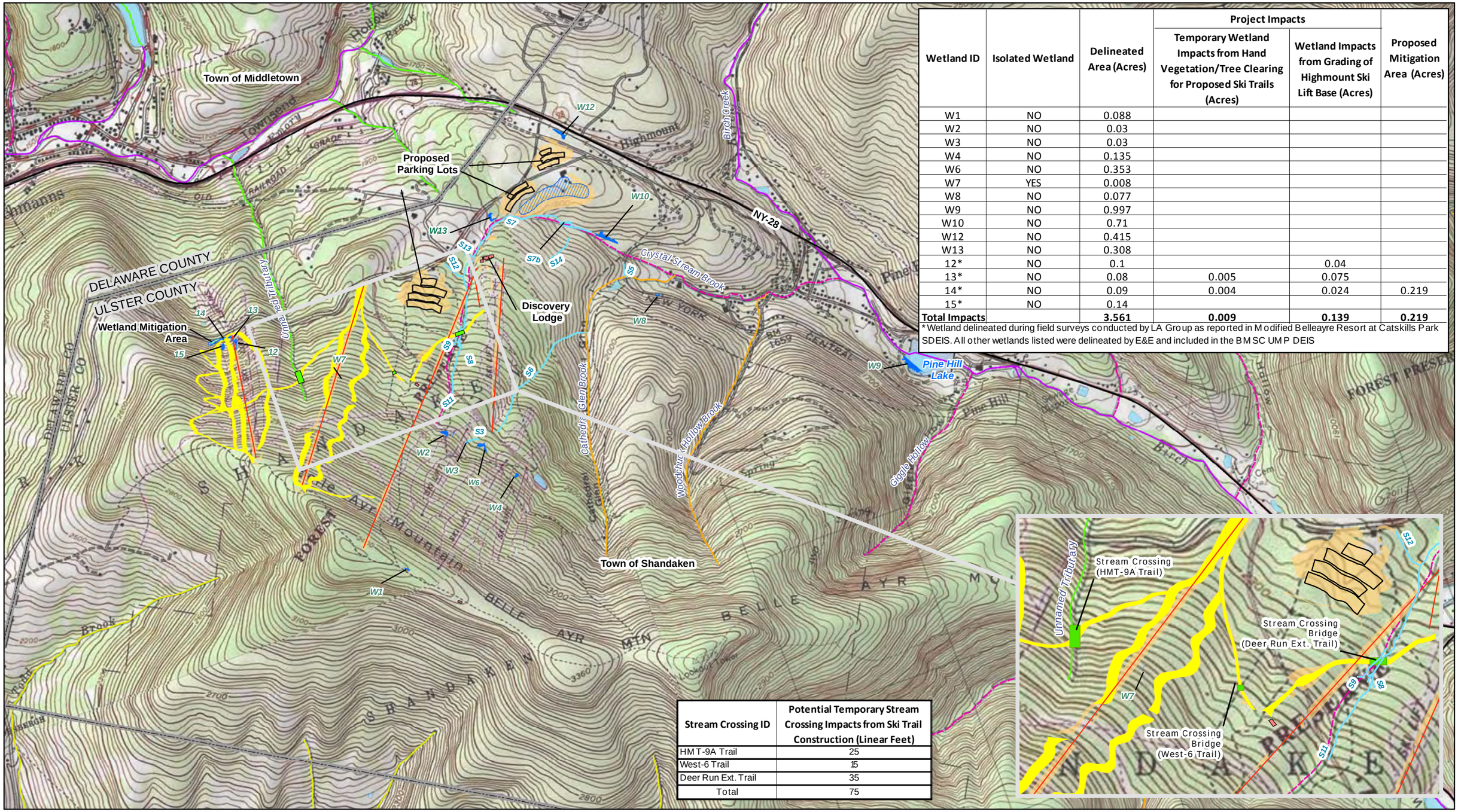
Study Boundary (October, 2009)
NYSDEC Stream
USFWS NWI Wetland

Figure 4-2: Belleayre Mountain Ski Center NWI and NYSDEC-Mapped Wetlands and Streams

Sheet No. 1

File: L:\Buffalo\BelleayreUMP\Maps\MXDs\DEIS\NYSDEC_Str_NWI_Wet.mxd

Date: December 16, 2010



Wetland ID	Isolated Wetland	Delineated Area (Acres)	Project Impacts		Proposed Mitigation Area (Acres)
			Temporary Wetland Impacts from Hand Vegetation/Tree Clearing for Proposed Ski Trails (Acres)	Wetland Impacts from Grading of Highmount Ski Lift Base (Acres)	
W1	NO	0.088			
W2	NO	0.03			
W3	NO	0.03			
W4	NO	0.135			
W6	NO	0.353			
W7	YES	0.008			
W8	NO	0.077			
W9	NO	0.997			
W10	NO	0.71			
W12	NO	0.415			
W13	NO	0.308			
12*	NO	0.1		0.04	
13*	NO	0.08	0.005	0.075	
14*	NO	0.09	0.004	0.024	0.219
15*	NO	0.14			
Total Impacts		**3.561**	**0.009**	**0.139**	**0.219**

* Wetland delineated during field surveys conducted by LA Group as reported in Modified Belleayre Resort at Catskills Park SDEIS. All other wetlands listed were delineated by E&E and included in the BMSC UMP DEIS

Stream Crossing ID	Potential Temporary Stream Crossing Impacts from Ski Trail Construction (Linear Feet)
HMT-9A Trail	25
West-6 Trail	15
Deer Run Ext. Trail	35
Total	75

0 2,000 Feet

Belleayre Mountain Ski Center
Catskill State Park

Project Area, USGS Topographic Imagery

- Proposed Ski Lift
- Proposed Trail Clearing
- Proposed Tree Cutting Area
- Proposed Snow Making Pond
- Parking Lot
- DiscoveryLodge
- Delineated Wetland Area
- Township Boundary

NYSDEC Stream Class
- B
- B(T)
- B(TS)
- C
- C(T)

- Proposed Stream Crossing Bridge
- Wetland Mitigation Area

Figure 4.3-1 Belleayre Mountain Ski Center Field-Delineated Wetlands and Streams

Sheet No. 1

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Date: February 19, 2013