

Chapter 3 - Environmental Setting

Description of the Preserve

Minnewaska State Park Preserve is located on a beautiful site on the Shawangunk Ridge. It is an area of diverse natural and cultural qualities, capable of providing a wide range of recreational activities. Minnewaska State Park Preserve (Preserve) is the site of two significant 19th century resort hotels, the Wildmere and the Cliffhouse, which attracted visitors from around the world. The existing carriage roads, footpaths, Lake Minnewaska entrance road and ruins of a hydro-electric power house are the primary remnants of this resort past. The history as a 19th century resort complex around Lake Minnewaska, in contrast with the larger, undeveloped parkland to the west, essentially defines present usage.

The recreational activities currently permitted in the Preserve take advantage of its spectacular lakes, topography, and overall wilderness character. The most common recreational pursuits include swimming, bicycling, hiking, hunting, snowshoeing and cross-country skiing. Row boating, canoeing, kayaking, and scuba diving are allowed in Lake Minnewaska. Other activities include horseback riding, picnicking, snow-shoeing and rock climbing. The dramatic precipices and rock formations found at the Peter's Kill Climbing area represent a resource for some of the best rock climbing in the northeastern United States.

To provide visitors with the best possible experience, parking and restroom facilities are provided at the Lake Minnewaska and Lake Awosting swimming areas as well as at the Awosting and Wildmere parking areas. The amount of parking, currently 500 spaces, limits the number of people who can use the Preserve. Parking is distributed between lots near Routes 44/55 (the Awosting lot) and near Lake Minnewaska. On a peak day, the maximum number of people in the Preserve totals approximately 1,750 visitors, although others are commonly turned away due to lack of parking. During a typical summer weekend, the swimming area in Lake Minnewaska is full, as are the parking lots.

The Preserve office, located in the Peter's Kill area in a small frame building, also serves as a temporary visitor center. The manager works out of this office building. Nature interpretation and education programming is managed from the Nature Center and the Peter's Kill Office.

Preserve maintenance operates from a large concrete building in the Lake Minnewaska area, built in the early 1950s, situated off of the main access road. Current maintenance activities primarily involve clearing and maintenance of carriageways, and maintaining the activity areas. Shale is mined from on-site quarries on the property to re-surface carriageways. See Figure 6 - Area Location Map.

The remnants of a power house are located at the base of Peter's Kill Falls, north of Route 44/55. This abandoned hydro-electric power plant, built during the first quarter of the 20th Century, provided electricity for the two Minnewaska hotels for most of that century. Remains of turbine generators may be seen in the building shell.

Physical Resources

Geology

The northern Shawangunks are a part of the Folded Appalachian Province. This is a separate geologic formation from the nearby Catskills. The topography of the region is dominated by the Shawangunk Mountain Ridge, where the Martinsburg Shale Formation, a thick sequence of dark shale and graywackes are overlain by a highly resistant quartz conglomerate formation, Shawangunk

Conglomerate. The Shawangunk Conglomerate is a resistant elastic formation that includes various conglomerate, sandstone, and red shale members. The Shawangunk Conglomerate formed from partly-fused quartz and pebbles about 420 million years ago. The conglomerate is generally white. The great resistance of the conglomerate has preserved the high points and rugged topography of the Shawangunk Ridge. The ridge broadens near the Preserve into a plateau that has a maximum width of approximately six miles. The dramatic escarpment found along the southern edge of the Ridge was formed when the eastern limb of the folded conglomerate was removed by faulting and glaciation, leaving the tier of southeast facing cliffs that are the most visually distinctive feature in the landscape.

The Shawangunk conglomerate contains iron pyrite and other minerals that leach and contribute to the acid nature of the surface waters. Mineralized fractures in the Shawangunk formation contain lead and zinc deposits that were once mined and served as a part of the area's economic base. Talus slopes are found in many locations where breakage and steepening of the cliffs have occurred, such as through the erosion of the softer shale, undermining the harder conglomerate cap rock. (NYSM 2008)

Shale has been mined from the Preserve beginning early in the resort era for carriage road surfacing. Several remnant shale mines are located around the Preserve. Currently, the Preserve extracts shale from the Lyons Road shale pit. Staff is researching the use of other existing shale mines to provide convenient carriage road maintenance and restoration. The shale mine locations are provided on Figure 8 - Surface Geology Map.

Recreational opportunities relating to the geologic conditions include rock climbing; hiking; appreciation of the waterfalls, rapids, streams, and scenic vistas which result from the underlying geology; and ice caves, which are large fractures configured so that ice deposits usually remain all or most of the year. The climbing areas on the escarpments within the adjacent Mohonk Preserve are internationally renowned.

Topography

Elevations along the Shawangunk Ridge reach a maximum height of 2,289 feet in the vicinity of the Preserve near Sam's Point and descend to below 400 feet on its southeastern side and below 300 feet on its northwestern side. Topography plays a significant role in the attractiveness of the area. Distant scenic vistas are visible from many locations in the Preserve

The topography is a significant limiting factor to development with over 60% of the Preserve being greater than a 10% grade. The steep grade, in conjunction with the shallow and highly resistant bedrock below, deters development, a requirement within a preserve.

Soils

Soils in the Preserve are generally acidic, shallow, nutrient poor, and contain pebbles and boulders of quartzite conglomerate. Soils in the Preserve provide very little buffering capacity for ground water storage, and erode easily. These characteristics affect the ecology of the area and render it sensitive to disturbance. There are few areas with highly fertile organic soils. Where fertile soils exist, they tend to be so thin that the nutrients available for plant growth are highly restricted. The area around Mud Pond (Lake Haseco) has a thicker, nutrient-rich organic soft soil, unlike other areas in the Preserve. (OPRHP 1993) The soils are highly susceptible to erosion, particularly in cleared and steeply sloped areas. The Peter's Kill and Dickie Barre areas are erosion-prone, as are other areas along stream courses.

Water

Lakes

There are three high-elevation water bodies (“sky lakes”) within the Preserve: Lake Minnewaska, Lake Awosting, and Mud Pond (Haseco Lake). Lake Maratanza is along the ridge in Sam’s Point Preserve at the southwestern edge of the Preserve and is a water supply for the village of Ellenville. This fourth sky lake was significantly enlarged by human activity. These lakes are all highly acidic, resulting in water with extreme clarity and little aquatic life and giving rise to specialized and rare aquatic ecosystems. Lake Minnewaska is 36 acres and provides swimming, scuba diving, non-motorized boating and distance swimming opportunities. The shore has undergone some artificial beach augmentation with the addition of sand and shale. Water quality testing by the Daniel Smiley Research center indicates that the rise in pH over time with recent measurements reaching 5.97. Lake Awosting is more acidic than Lake Minnewaska and much larger at 97 acres. Swimming is allowed from a bedrock covered beach area. Discharge from Lake Awosting is controlled by a man-made structure at the Peter’s Kill headwater. Both Lake Minnewaska and Lake Awosting Mud Pond is only 11 acres and very shallow in comparison with the others, with a maximum depth of four feet. Discharge from Mud Pond is controlled by beaver dams. (OPRHP 1993)

Tillson Lake, created by damming the Palmaghatt Kill below the southeastern side of the Ridge, is part of the former Awosting Reserve area that was added to the Preserve in 2006. Tillson Lake is 24 acres and located to the southeast of the Preserve and provides fishing and boating with only electric motors. .

Streams

Four major streams flow northward down the ridge and into the Rondout Creek: Peter’s Kill, Stony Kill, Sanders Kill, and Coxing Kill. Lake Minnewaska drains into the Coxing Kill. The outlets of Lake Awosting and Mud Pond drain into the Peter’s Kill.

The Palmaghatt Kill flows southward down the ridge and then eastward into Tillson Lake and the Shawangunk Kill. The Verkeerder Kill also flows southward down the ridge, receiving water from the outlet of Lake Maratanza.

Groundwater

The groundwater hydrology of the ridge-top is complex. Since there is negligible pore space in the conglomerate rock that would allow infiltration, groundwater flows through faults and fractures with a very site-specific pattern. A fracture trace analysis would be required to identify conditions at specific areas of concern. Aquifers in the shale tend to be localized and bounded by faults. Water withdrawn from the shale frequently contains sulfur. There can be considerable groundwater flow along the contact area between the shale and the conglomerate rock. "Sun Ray Spring" in the "Spanish Mine" is a location in Ellenville where there is significant flow along the conglomerate/shale interface. (OPRHP 1993)

Delaware Aqueduct

The Delaware Aqueduct is part of the New York City water supply system, bringing water from the Catskill Mountains through Minnewaska State Park Preserve, to connect with the Catskill Aqueduct. Delaware Aqueduct construction commenced in 1937 and the 85 mile long, 13.5’ diameter tunnel was completed in 1944. The entire aqueduct system provides 350 to 400 million gallons of water per day to New York City or about 40% of their water supply. Shaft 2A, located near Stony Kill Falls within the Preserve, is one of 67 access shafts along the aqueduct. An easement agreement between

OPRHP/PIPC and the New York City Water Authority allows for authorized access by the Authority to Shaft 2A from Shaft 2A Road in Minnewaska.

Wetlands

Due to thin soils and the impermeable nature of conglomerate rock, drainage can be poor where the surface is not pitched, resulting in many bogs, vernal pools, and other wetlands. There are several freshwater wetlands mapped by the DEC and the National Wetland Inventory (NWI) within the Preserve. Wetlands mapped by DEC are protected under the NYS Freshwater Wetlands Act. This law also includes protection of a 100 feet buffer around the wetland. The Freshwater Wetlands Act identifies wetlands based on vegetation, including wetland trees and shrubs, emergent plants such as cattails and sedges, aquatic plants, and bog mat vegetation such as sphagnum moss. Most wetland bogs and vernal pools in the Preserve are in a natural state with little or no impacts. The wetland system west of the Lower Awosting causeway was created as a result of the causeway construction in the 1950’s.

Air

The air quality in Ulster County is considered to be in attainment of meeting all of air quality requirements. All of the measured pollutant levels were significantly lower than those required by the National Ambient Air Quality Standard, and fall under the Pollutant Standards Index category of having "good" health effects. (DEC 2009)

Natural Resources

The 1993 Master Plan identified the significant natural resources found in the Preserve. Since the adoption of that plan, the New York Natural Heritage Program (NHP) has surveyed the Preserve and published two reports on the rare species and ecological communities in the Preserve. The first report was completed in 2002 (Evans, 2002). In 2008, as part of the development of this master plan, NHP staff conducted additional surveys of Preserve lands to inventory all the new properties acquired since 2002. The following information is taken from the updated NHP report “Rare Species and Ecological Communities of Minnewaska State Park Preserve” (Smith and Lundgren, 2009).

The Preserve is located within the Shawangunk Mountains, which are the northeastern portion of a ridge that runs from Pennsylvania through to southeast New York. The majority of the Preserve is located on a section of the ridge that forms a broad plateau just east of Sam’s Point. The composition and pattern of the natural areas of the Preserve are driven largely by the physical land forms such as the extensive areas of exposed bedrock and cliff formations.

Ecological Communities

The NHP report identified 32 distinct ecological community types representing five classification systems and twelve subsystems. Figure 12 - Ecological Communities Map shows the location and extent of each of the community types listed in Table 2 below.

Table 2 - Ecological Communities of Minnewaska State Park Preserve

System	Subsystem	Community Type	Acres
Terrestrial	Forested Uplands	Beech maple-mesic forest	65
		<i>Chestnut oak forest</i>	10611
		<i>Hemlock-northern hardwood forest</i>	1735
		Pitch pine-oak forest	171
		Successional southern hardwoods	209
	Barrens and Woodlands	<i>Dwarf pine ridges</i>	1395

		<i>Ice cave talus community</i>	5
		<i>Pitch pine-oak-heath rocky summit</i>	5537
	Open Uplands	<i>Acidic talus slope woodland</i>	37
		<i>Cliff community(acres of vertical surface is much greater)</i>	9
		Successional old field	71
		Successional shrubland	120
	Terrestrial Cultural	Developed	58
		Gravel Mine	19
Subterranean	Subterranean Cultural	Mine/Artificial cave community	1
Palustrine	Forested Mineral Soil	Hemlock-hardwood swamp	51
	Wetlands	Red maple-hardwood swamp	30
		<i>Vernal pool</i>	2
	Open Mineral Soil Wetlands	<i>Perched bog</i>	4
		Sedge meadow//shallow emergent marsh	7
	Forested Peatlands	<i>Pitch pine-blueberry peat swamp</i>	24
	Open Peatlands	<i>Dwarf shrub bog</i>	76
		<i>Highbush blueberry bog thicket</i>	29
		<i>Highbush blueberry bog thicket//Shrub swamp</i>	6
Lacustrine	Natural Lakes and Ponds	Oligotrophic dimictic lake	132
		Oligotrophic pond	12
	Lacustrine Cultural	Farm pond/Artificial pond	<1
		Reservoir/Artificial impoundment	26
Riverine	Natural Streams	Rocky headwater stream	n/a
		Intermittent stream	n/a
		Main channel stream	3
Total	(Total less than Preserve acreage due to rounding errors)		20,451

The 58 acres of land within the Preserve is considered developed and includes all artificially maintained and extensively disturbed areas. These areas include the picnic areas, openings that are repeatedly mowed during the course of the summer, paved roads, parking areas, and buildings. There are several types of communities such as intermittent stream, vernal pools, and cliffs that are too small or too difficult to map using the methods and aerial photography resources available.

Significant Natural Communities

Within the Preserve, 12 different significant natural communities have been documented which cover nearly the entire Preserve. “Significant natural communities” as defined by NHP are known locations of rare natural community types (such as dwarf pine ridges) as well as the best known examples of common community types. These are listed in italics in Table 2. Acreage listed for each significant natural community represents the total acres of that community type within the entire Preserve and thus does not necessarily represent the acreage of the significant community occurrence. Documented significant communities in Minnewaska include dwarf pine ridge, cliff community, ice cave talus community; a variety of wetlands including perched bog, pitch pine-blueberry peat swamp, dwarf shrub bog, highbush blueberry bog thicket, and vernal pool; and wooded communities including acidic talus slope woodland, pitch pine-oak-heath rocky summit, hemlock northern hardwood forest, and chestnut oak forest.

The chestnut oak forest community forms the matrix or backdrop of all of the other communities in the Preserve and is one of the largest examples in the state, covering roughly 40,000 acres from the Preserve and across the Shawangunk Ridge south to the New York State border. In addition, the pitch pine-oak-heath rocky summit is the largest example in the state, at over 5,000 acres (extending

beyond the Preserve boundaries). The dwarf pine ridge, ice cave talus communities, and some sections of cliff communities are found on the recently acquired Sam’s Point parcel. The dwarf pine ridges have been identified as globally rare (G1, NatureServe 2009) and Sam’s Point is the only known location for this community type in New York State. Significant cliff communities include the cliffs at Sam’s Point, Gertrude’s Nose, and Millbrook Mountain and north to the well-known Near Trapps and Trapps cliffs within Mohonk Preserve. The old-growth forest in the Palmaghatt Kill Ravine is the only officially documented example of old growth in southeastern New York State, outside of the Catskills.

Plants

Rare Plants

The 2009 NHP report for the Preserve identified 47 rare plant populations representing 18 species (Table 3).

Table 3 - Rare Plants of Minnewaska State Park Preserve

Common Name	Scientific Name
mountain spleenwort	<i>Asplenium montanum</i>
narrow-leaved sedge	<i>Carex amphibola</i>
clustered sedge	<i>Carex cumulate</i>
black-edge sedge	<i>Carex nigromarginata</i>
reflexed sedge	<i>Carex retroflexa</i>
broom crowberry	<i>Corema conradii</i>
mock-pennyroyal	<i>Hedeoma hispida</i>
woodland rush	<i>Juncus subcaudatus</i>
arctic rush	<i>Juncus trifidus</i>
Appalachian sandwort	<i>Minuartia glabra</i>
Carey’s smartweed	<i>Persicaria careyi</i>
riverweed	<i>Podostemum ceratophyllum</i>
two-ranked moss	<i>Pseudotaxiphyllum distichaceum</i>
rhodora	<i>Rhododendron canadense</i>
Anderson’s peat moss	<i>Sphagnum andersonianum</i>
Angerman’s peat moss	<i>Sphagnum angermanicum</i>
flat-leaved peat moss	<i>Sphagnum platyphyllum</i>
soft-leaved peat moss	<i>Sphagnum tenellum</i>
Trinidad peat moss	<i>Sphagnum trinitense</i>

With the acquisition of the Sam’s Point parcel in 2006, three vascular plants and one non-vascular plant have been added to the rare plant list for the Preserve. These plants are reflexed sedge, mock-pennyroyal, arctic rush, and two-ranked moss. Surveys conducted in 2008 discovered two new rare plant species, black-edge sedge and narrow-leaved sedge; both are state endangered. Three new occurrences of Appalachian sandwort and one new occurrence of rhodora were documented within the Preserve. The discovery of additional rare plant locations during the surveys also resulted in the revision and re-mapping of twelve known occurrences of three rare plant species, mountain spleenwort, Appalachian sandwort, and rhodora. In addition, a rare plant species previously known only historically from the Preserve, Carey’s smartweed, was rediscovered in the Preserve in 2007 and documented in 2008 (Smith/Lundgren 2009).

Animals

The Preserve contains a wide variety of animal species both common and rare. Common species such as squirrels, deer, and black bear are found along with rare mammals, amphibians, birds, insects, and moths. As noted above, significant natural communities cover nearly the entire Preserve and provide significant wildlife habitat.

Birds

As described earlier, in 2006 the Preserve was designated a Bird Conservation Area (BCA), recognizing its importance as habitat for forest dwelling birds and as an important migratory corridor that exists along the entire upland plateau of the Northern Shawangunks. The common and rare species are described in the Management Guidance Summary prepared for the BCA in 2006 (Appendix G). The Management Guidance Summary identifies the criteria for designation, operation and management, education, outreach and research considerations for the BCA.

The original New York State Breeding Bird Atlas (1980-1985) includes records of confirmed breeding for two state special concern species, the common nighthawk (*Chordeiles minor*) and golden-winged warbler (*Vermivora chrysoptera*) within the northern Shawangunk Ridge. Records of possible breeding were reported for two state special concern species, sharp-shinned hawk (*Accipiter striatus*), and whip-poor-will (*Caprimulgus vociferus*).

The second New York State Breeding Bird Atlas (2000-2005) includes records of both confirmed and probable breeding for three state special concern species, the cerulean warbler (*Dendroica cerulea*), whip-poor-will, and red-headed woodpecker (*Melanerpes erythrocephalus*), for the northern Shawangunk area. Records of possible breeding were also recorded for seven state special concern species, sharp shinned hawk, Cooper's hawk (*Accipter cooperii*) Acadian flycatcher (*Empidonax virescens*), osprey (*Pandion haliaetus*), Northern goshawk (*Accipiter gentilis*), grasshopper sparrow (*Ammodramus savannarum*), and red-shouldered hawk (*Buteo lineatus*).

Fish

As noted in the 1993 plan, little or no fish life occurs in the sky lakes or streams. Acidification of the lakes, due to the acidic properties of the Shawangunk Conglomerate, affects the number of fish species found on the ridge top. In the past, a number of fish species had been found on the ridge top, however, most, if not all were introduced to encourage use of the lakes for fishing. In the recent past, the lakes have not supported fish. In 2008, several small fish, identified as golden shiners, were found in Lake Minnewaska. It is assumed that these were introduced by someone attempting to fish in the lake.

Rare Animals

The 2009 NHP report identified that the Preserve harbors at least twenty-eight populations of nine rare animals (Table 4).

Table 4 - Rare Animals of Minnewaska State Park Preserve

Toothed apharetra	<i>Apharetra dentate</i>
Northern barrens tiger beetle	<i>Cicindela patruela patruela</i>
Arrowhead spiketail	<i>Cordulegaster oblique</i>
Timber rattlesnake	<i>Crotalus horridus</i>
Peregrine falcon	<i>Falco peregrinus</i>
Blueberry gray	<i>Glena cognataria</i>
Small footed bat	<i>Myotis leibii</i>
Noctuid moth	<i>Zale curema</i>
Pine barrens zanclognatha	<i>Polypogon martha</i> formerly <i>Zanclognatha martha</i>

New York Natural Heritage “Watch List” species that have been reported in the northern Shawangunk Ridge and documented through the NYS DEC Amphibian and Reptile Atlas Project include three state special concern species, marbled salamander (*Ambystoma opacum*), spotted turtle (*Clemmys guttata*), and wood turtle (*Clemmys insculpta*). Two additional “Watch List” species recorded include the northern copperhead (*Agkistrodon contortrix*) and five-lined skink (*Eumeces fasciatus*).

Bat surveys have been conducted by NHP and have been documented in past research. (Evans et al. 2003). Surveys identified a small-footed bat, a state Species of Special Concern, and little brown bats (*Myotis lucifugus*), big brown bats (*Eptesicus fuscus*), and northern long-eared bats (*Myotis septentrionalis*).

Surveys of rare moths were also conducted in 2008. Of the four rare moths known to be in the Preserve, only two were detected: the noctuid moth and the toothed apharetra. Pine barrens zanclognatha and blueberry grey were not found despite an abundance of suitable habitat (Smith/Lundgren 2009).

Cultural Resources

The historical resources located within the Preserve include homestead sites, farmstead sites, historic cemeteries, commercial and industrial sites and recreational sites. The significance of the cultural resource can only be assessed by detailed studies. Each resource has the potential to yield significant information about the development and use of the land over time, as well as address issues specific to the resource. A description of the most significant cultural resources located within the Preserve is provided below.

Historic Roads and Trails

The historic landscape of Lake Minnewaska and vicinity was laced with an extensive network of horse-drawn carriageways and pedestrian paths. Typically, they measured 8 - 12 feet in width and were paved with crushed shale. Traditionally, they provided the means for vehicular (i.e. carriage) touring, and the linking of Lake Minnewaska with other places such as Lake Awosting, local communities, scenic escarpments and the Mohonk Mountain House. Many of these historical routes remain in use today. They provide a very important means of touring the Minnewaska landscape for a variety of users including hikers, cyclists, equestrians, snowshoe users and cross-country skiers. The Preserve landscape was also crisscrossed by a network of footpaths. These routes led to scenic viewpoints and other more remote areas of the landscape. Like the carriageways, many of these historic routes still remain in use today.

Historic Viewing Points

Visitors to Lake Minnewaska during the resort era were treated to a number of spectacular views from a series of viewing points and overlooks. Typically these observation points were of two different kinds. Most impressive among these were the spectacular long distance vistas and easterly, 180 degree panoramas over the Wallkill and Hudson Valley landscapes toward the Taconic and Berkshire Mountains beyond. These views were obtained from observation points on top of the escarpments lining the Palmaghatt Ravine and the eastern front of the Shawangunks. The easterly view from some of these points was further enhanced by equally dramatic views of the Catskill Mountains to the west.

The large scales and long distance views from many of these observation points are still available to the Preserve visitor today. Because of their location on precarious precipices well above the tree tops of the foreground woodlands, these views have not been intruded upon or closed off by woodland growth. See Figure 14 - Scenic Resources Map.

The views from another type of historic viewing points tend to be less grand and more intimate. Included among these are striking views over somewhat limited areas of the landscape such as those over Lake Awosting from Overlook Point. Many of the views from these observation points have been adversely affected, if not wholly eliminated, by the growth of woodland vegetation in recent years. Similarly, spectacular close-up views of waterfalls, like Awosting Falls, or other comparable landscape features may have been diminished by vegetation that has grown into the viewshed. See Figure 14 - Scenic Resources map.

Power House

The historic resorts that were once located on Lake Minnewaska were served by a hydroelectric power house located on the Peter's Kill. Construction was finished on the power house in 1921. The power house is a stone structure that is not secured and is open to visitor exploration. The walls, entrance bridge and interior equipment are largely intact; the roof collapsed many years ago. A wooden and metal sluiceway runs from a concrete dam at the top of the Peter's Kill Falls to the power house. The sluiceway is largely intact with only a few missing sections. The concrete dam at the top of the Falls and visible from State highway 44/55 is in disrepair. During times of heavy rainfall, the dam overtops creating a potential hazard in the event the dam was to fail. See Figure 18 - Building Inventory map for the location of the power house.

Aumick Farmstead

The Aumick farmstead, located on Aumick Road, is comprised of several structures. The main house, stone piers, barn and outbuildings were constructed in the later 19th century. The main house, while having a very rustic appearance that appears to date from the early 20th century, has at its core an early to mid 19th-century farmhouse. The house is secured and all windows and doorways are boarded up. The barn, while having later materials on its exterior, has a highly intact interior structure and is a very good example of the English threshing barn, a form that was predominant in early 19th century America and in the Hudson Valley. While the structure is largely intact, it does have some deterioration at the sills, in a corner wall and in the roof. The barn is currently secured and in need of stabilization. Little is known of this site and further investigation is needed. See Figure 18 - Building Inventory map for the location of the Aumick Farmstead structures.

The Stable

The stable is a large structure located near Lake Minnewaska that is historically significant and National Register eligible as part of the historic carriage roads system. The stable was constructed in

the 1930's after a fire destroyed the original stable. (Lewit, Sam 2009) Currently it is highly intact however, holes in the roof allow water in and some spots of deterioration are forming. The stable is used for storage of equipment and supplies used for Preserve operations.

The Resort Era Hotel Sites

There are two areas adjacent to Lake Minnewaska that include the remnant hotel sites. The Cliff House was completed in 1879 and The Wildmere hotel was completed in 1887. The Cliff House was destroyed by fire in 1978 and the Wildmere was destroyed by fire in 1986. The Cliff House site is a grassy picnic area and the Wildmere site is a picnic area and parking lot for the Lake Minnewaska area. Very few visible clues remain in these areas that hint at the significant development that once stood at the two sites.

Pre-historic and Archeological

Prehistoric sites likely to be found within the boundaries of Minnewaska State Park Preserve include: rock shelters, open-air sites, and village and camp sites. Potential resources could date from the Paleo Indian period (12,000 - 9,500 years ago), up through and including the Contact period (500 - 300 years ago). Figure 13 - Sensitive Archeological Areas and Cultural Resources Map shows the areas of prehistoric sensitivity. As part of the 1993 Master Plan, a Phase 1A cultural study was conducted of approximately 12,000 acres of the Preserve. A Phase 1A study has not been conducted on the more recent acquisitions; however, one shall be conducted in the future. Disturbance to the land may require archeological investigations by OPRHP. As part of previous planning efforts and a Draft Environmental Impact Statement (DEIS) by the Marriot Corporation in the late 1970's, the Wildmere and the Cliff House sites have been assessed by OPRHP. Because of the significant disturbance during the resort era, it had been determined that disruption to these sites was significant and any further pre-historic disturbance would be minimal.

Scenic Resources

The grand and dramatic views available in the Preserve are contrasted and complemented by other smaller and more intimate visual displays of nature. Prominent among these are views of the various water bodies which are located within the Preserve such as panoramic views of Lake Minnewaska and Lake Awosting, to more diminutive views of other smaller, unnamed ponds.

Instead of the broad and distant vistas associated with the scenic viewpoints, these smaller-scale features focus the eye on the strikingly colored water body contrasted with the surrounding terrain. Typically, they form a serene landscape setting enunciated by small waves and reflected sunlight on the water surface, rock formations along the shoreline and vegetation associated with the water body.

In 2006 the Shawangunk Mountain Scenic Byway (SMSB) was designated. The SMSB is an 88-mile byway passing through the Preserve along Route 44/55 traveling through the Wallkill and the Rondout Valleys. This State designation was based on the significant scenic attributes of this area as well as the many other natural, cultural and recreational resources the Shawangunk Mountain area has to offer. (SMSB, 2005)

Lakes

The most prominent visual features, the sky lakes, are found within the upland areas along the broad central ridge of the Preserve. The most familiar water body, Lake Minnewaska, lies just a short drive up the hill from the main entrance to the Preserve. Lake Awosting, located further into the Preserve, is accessible by carriageway or footpaths. Mud Pond (Haseco Lake), located on the outermost western edge of the Preserve, is accessible only by a footpath. A fourth water body, known as Lake

Maratanza, can be found within Sam's Point Preserve, and is accessible only by carriageway from the Preserve, or by a neighboring public road outside the Preserve. Minnewaska properties, having recently been expanded via the purchase of the Awosting Reserve parcel, gained another water body known as Tillson Lake, which lies below the southeastern side of the ridge.

Other smaller water bodies, such as the bog ponds near the trail to the Ellenville Ice Caves are located in upland areas in the northwestern portion of the Preserve and the Sam's Point Tract. Similar to the sky lakes, these features provide a detailed and water-oriented visual focus within the overall woodland matrix of the Preserve. Unlike the sky lakes, these diminutive features are typically not accessible by existing trails and carriageways.

Streams

Streams flowing within the Preserve form another example of small and intimate visual resource to be experienced. In visual terms, there are three basic kinds of streams within the study area. There are streams such as the Palmaghatt Kill and Coxing Kill, which flow through a rather wide valley. Other streams, such as the Peter's Kill, Sanders Kill, and Stony Kill, are incised within a relatively deep and narrow channel. Thirdly, there exist many smaller streams such as those in the Sam's Point and Awosting tracts, which flow in shallow draws and gullies and form the headwaters of a larger stream system.

Waterfalls

Waterfalls of significant height are important viewpoints within the Preserve. These include: Stony Kill Falls on the Stony Kill near the Preserve's northern edge; the Rainbow, Awosting, Peter's Kill, and Sheldon Falls found along the Peter's Kill; and an unnamed falls which is located near the Sanders Kill in the northeastern corner of the Preserve. Verkeerder Kill Falls lies immediately adjacent to the southern edge of the Preserve along the Verkeerder Kill Falls Trail. A smaller secondary waterfall, situated along the Sanders Kill, just south of Routes 44/55, is visible from vehicles traveling west along that route. These falls are scenic features characteristic of the Preserve.

Wilderness Areas

Most of the Preserve appears as a native, uninhabited, pristine natural landscape. Except for the trail being followed, generally there is little or no evidence of human activity. Rather, the visitor is presented with a wilderness composed of relatively untouched, often picturesque woodlands and rugged, equally picturesque rock formations. These native areas are found in the form of expansive plains, large and deep ravines like the Palmaghatt Ravine, and in isolated, remote, and secluded spaces like Mud Pond (Haseco Lake).

This wilderness character is enhanced by the scale of certain aspects of the landscape, particularly the expansive pine barrens and pine plains which characterize much of the Preserve along the Shawangunk Ridge. In this combination, the dwarfed woodland cover exaggerates the visual scale and reveals what can seem a limitless horizon.

Rock Ledges, Escarpments and Extremely Steep Slopes

Rock ledges, escarpments, and extremely steep slopes are among the most prominent visual features in the Preserve. Especially prominent is the exposed conglomerate cap rock, which is found in the otherwise wooded terrain in areas of higher elevation along the Shawangunk Ridge. This cap rock is highly visible not only because of its location, but also because of its dramatic vertical orientation, light color (contrasting strongly with the surrounding vegetation) and rugged, picturesque shapes and patterns which are inherent in the exposed rock itself.

Typically, these features are located along the southern edge of the ridge within the Preserve in the vicinity of the Palmaghatt Ravine and to the south of Lake Awosting, as well as in the vicinity of Sam's Point, Gertrude's Nose, and Millbrook Mountain. Similar features may be found in the northwestern portion of the Preserve within the Sam's Point tract and at Napanoch Point, and in the northeastern part of the Preserve at Dickie Barre.

Smaller but comparably dramatic occurrences of rock ledges and sheer cliffs may be found along the shores of Lake Minnewaska and Lake Awosting. These features play a significant role in animating and defining the rugged and dramatic character of views over these water bodies. Other prominent, though less dramatic, features of the Preserve include the steep slopes that define the sides of several deeply incised stream valleys.

Vegetative Communities

The diversity and richness of woodland communities within the Preserve make a substantial contribution to its visual character. Because of the particular characteristics of the underlying soils, geology, and geographical position of the Shawangunk Ridge at the interface of northern and southern ecological zones, the Preserve includes a wide range of vegetative communities, each with its own distinctive visual characteristics.

The pine plains area is characterized by expansive views across a low, dense canopy composed largely of pitch pine, dramatically dwarfed and gnarled trees of high visual interest reminiscent of Japanese bonsai. These picturesque pines also play a role in establishing the special visual character of the pine barrens, which differ from the pine plains, in that the component trees are typically of greater stature. Old growth stands of trees of full stature add to the special character and experience of the Preserve as well. Mature hemlocks, found predominantly in sheltered, moist ravines, have an especially distinctive character and visual quality that contrasts dramatically with mature stands of dwarf pitch pine.

Other Visual Resources

The Preserve also includes a number of other small-scaled and intimate visual resources, such as the Ice Caves, Spruce Glen and Wolf Jaw. These resources are of visual interest due to the unique color and form of the geological formations and vegetative communities. These features tend to be most significant when experienced close at hand.

Recreational Activities

The recreational resources and activities at Minnewaska State Park Preserve are based primarily on the natural beauty within the Preserve. Visitors come to the Preserve to experience this natural beauty while maintaining a healthy and active lifestyle. The Preserve's recreational use capacity is in direct correlation with the limited parking capacity.

The following recreational activities are allowed at Minnewaska State Park Preserve:

Hiking

Hiking is allowed on all carriage roads and designated foot paths and is a significant recreational use of the Preserve. The most significant volume of hikers occurs around Lake Minnewaska due to its proximity to the parking lots.

Biking

Biking is allowed on maintained carriage roads and is also a significant recreational use within the Preserve. The volume of biking is somewhat consistent along the carriage roads.

Horseback Riding

Horseback riding is allowed on maintained carriage roads by permit. Equestrian trailer parking is permitted in the Awosting parking lot. Equestrian use is not significant within the Preserve.

Rock Climbing

Rock climbing is allowed in the Peter's Kill climbing area by permit. Rock climbing is a popular recreational activity at both Minnewaska and at the Mohonk Preserve.

Swimming

Two small swimming beaches are located at Minnewaska State Park Preserve. A gravel beach is located on Lake Minnewaska and a bedrock beach is located on Lake Awosting. Both beaches provide swimming opportunities and are open approximately the third weekend in June to the first weekend in September. The beaches are staffed with certified life guards per Department of Health regulations and agency water safety regulations.

Distance Swimming

Distance swimming is allowed by permit only through an agreement with the Minnewaska Distance Swimmers Association (MDSA). The designated area in Lake Minnewaska is accessed from the east side of the Lake. Distance swimming is permitted during the same hours of operation and season as the Lake Minnewaska swimming beach.

Scuba Diving

Scuba diving is allowed by permit only in Lake Minnewaska. Diver certification is required.

Boating

Non-motorized boats are allowed in Lake Minnewaska upon purchase of a PIPC boating permit and safety inspection. Boating is also allowed in Tillson Lake where visitors are allowed to use trolling motors. Lake access is provided from the parking lot. Boating is not allowed in Lake Awosting, Mud Pond or streams.

Picnicking

Picnic areas are provided at the former Wildmere and the Cliffhouse sites. People wishing to picnic at other points within the Preserve are allowed to do so. Barbequing is only allowed in the Wildmere picnic area.

Cross Country Skiing

Cross country skiing is allowed on carriage roads and significant grooming operations are carried out by Preserve staff.

Snowshoeing

Snowshoeing is allowed on ungroomed carriage roads and foot paths.

Fishing

Fishing is allowed in Lake Minnewaska, Lake Awosting and Tillson Lake. The acidic nature of Lake Minnewaska and Awosting does not provide habitat that supports many fish. Tillson Lake is not stocked, but it provides a suitable habitat for bullfish.

Hunting

Deer hunting is allowed during the State regulated season in specified locations throughout the Preserve.

Visitation

The Preserve received 210,000 visitors in the 2007-08 fiscal year. These visitors come to enjoy the numerous recreational opportunities and scenic resources. While the majority of patrons use the Preserve in the warm seasons, visitors use the Preserve year round. The Preserve attracts visitors from around the world. The majority of visitors reside within Ulster County, New Jersey and the New York City metropolitan area.

Access Points and Parking

Visitors have twelve potential access points onto Preserve property. The entrance to the Peter's Kill Area and Preserve office is accessed from Highway 44/55 and provides one hundred parking spaces. The Peter's Kill parking lot is used by visitors accessing the Peter's Kill climbing area, by hikers heading for the Peter's Kill Creek and High Peter's Kill Trail and by visitors wishing to talk with staff. See Figure 17 – Peter's Kill Area – Existing Conditions map. The main entrance to the Preserve is also located off of Highway 44/55 approximately one half mile west of the Peter's Kill entrance. This entrance leads to the Lake Minnewaska area and provides two hundred parking spaces. The entrance is also used to access the Awosting parking lot, which offers an additional two hundred parking spaces. This lot is used by visitors heading to the Lake Awosting area and is also typically used when the parking lots in the Lake Minnewaska area are filled to capacity. See Figure 16 – Existing Main Entrance and Awosting Lot. The Berme Road Park, owned and managed by the Village of Ellenville, provides approximately 50 parking spaces and allows visitors to access the Preserve along the Smiley Carriage Road. The Preserve can be accessed through adjacent properties along carriage roads. Sam's Point Preserve has a parking capacity of 64 cars and 2 buses and the Mohonk Preserve has a parking capacity for 450 cars. There are several other trail access points; each provide a few spaces for parking. During heavy uses days, considerable staff time is required to direct vehicles and maximize parking capacity as the parking lots do not have designated parking spaces. Traffic congestion at the main entrance to the Preserve occurs during periods of high visitation. A traffic count (NYS DOT 2008) was conducted by the New York State Department of Transportation and Preserve staff to determine the relationship between visitors to the Preserve and the overall highway traffic.

Table 5 - Parking Capacity at Minnewaska State Park Preserve

<i>Parking Lot</i>	<i>Quantity</i>
Lake Minnewaska	200
Awosting	200
Peter’s Kill	100
Jenny Lane	6 - Gate opened for additional hunter access
Parking Capacity Sub Total	506
Fordmore Road	3
Awosting Reserve	6
Tillson Lake	10
Minnewaska Trail	3
Stony Kill Falls	4
Parking Capacity Total	<u>532</u>

While the Preserve has limited access based on the carrying capacity of the land, other external parking areas provide convenient access to the more remote locations of the Preserve. Access from external parking lots does not significantly impact the carrying capacity of the Preserve due to their geographic location and distance from the most heavily used areas.

Table 6 - Adjacent Municipal and Not-for-Profit Parking

<i>Parking Lot</i>	<i>Quantity</i>
Sam’s Point Preserve	64 Cars, 2 Buses
The Mohonk Preserve	450
Berme Road Park	50

Structures

There are thirty-six structures located throughout the Preserve, ranging from fully operational facilities to dilapidated sheds. Some vacant structures could serve operational needs but will require investment to become useable facilities. The adaptive reuse of these existing structures promotes sustainability and is a cost effective approach to providing the visitor services. Many other abandoned structures serve no operational or functional purpose and should be removed. Below is a list of all existing structures within the Preserve. Two composting restroom facilities are under construction and will be open in 2009. One is located near the Lake Minnewaska beach and the other near the Awosting Parking lot. See Figure 18 – Building Inventory map.

Existing Structures

- The Peter's Kill office
- The Peter's Kill gate house
- The Rangers Cabin
- The Lake Awosting restroom
- The Nature Center
- Cottage 1 at Tillson Lake
- Cottage 4 at Tillson Lake
- The Beecher Hill House
- The old Preserve office
- The old white residence beside the old Preserve office
- The Music House
- Camp Laurel Cabins
- Phillip's Cabin
- The shed on Lake Ave
- The old concession stand near Tillson Lake parking area
- Shed off Lake Rd on Tillson Lake at hiker & fisherman access point
- The shed at old saw mill site in Awosting Reserve
- The old gatehouse at main entrance to Awosting Reserve
- Tilson Lake Cottage 1
- Tillson Lake Cottage 2
- Shed next to the Lake House
- Warming Yurt
- Lake Minnewaska gate house
- Lake Awosting gate house
- Former Phillips House
- The Old Barn
- The existing gazebo
- Maintenance Facility
- The Club House
- The Lake House
- The Aumick farmhouse
- The Aumick farmhouse shed
- The Aumick threshing barn
- The Aumick shed
- The green house on Aumick Road
- The Power House

Solid Waste Management

Solid waste management at the Preserve includes the collection and disposal of both hazardous and non-hazardous materials from facility operation, including litter resulting from use of the facility by visitors. Preserve generated waste is emptied into dumpsters and removal is contracted with a waste hauler.

Previous disposal practices during operation of the privately-held resorts at Lake Minnewaska did not necessarily conform to current management practices required by the DEC. A landfill developed during the period of private ownership remains covered. It has not been formally closed. This inactive landfill from the resort era needs reclaiming and formal closure in accordance with New York State Solid Waste Management and DEC regulations.

Emergency Plans and Services

Preserve Safety and Security

To ensure the safety and security of Preserve employees and patrons, a detailed schedule is designed to maintain adequate staffing to support operational needs with available permanent and seasonal staff. During peak usage, high volume areas are routinely patrolled by staff who provide directions, information, assist patrons, and enforce rules and regulations. Preserve rangers are assigned to different zones and carry portable radios or cell phones to maintain communications with the Preserve office and supervisors. Additionally, volunteers are utilized to patrol backcountry areas and carriage roads, reporting emergencies or situations which arise to the Preserve office. Buildings are checked for signs of break-ins or vandalism and reported accordingly. NYS Park Police are assigned to the area and assist with traffic control, enforce park rules and regulations, and enforce parking regulations on the shoulder of Rt. 44/55. They also assist with securing the facility at closing time.

The gate house/contact station is staffed on a daily basis. The attendants are required to handle fee collection, provide information and directions and relay any radio communication that is unable to reach the Preserve office. Visitors are not allowed to enter the Preserve after the posted closing time.

All accidents, crimes and emergency situations are reported to the NYS Park Police, and appropriate procedures in the emergency action plan are followed according to the specific type of incident.

Fire

The area surrounding the Preserve is served by a number of volunteer fire departments and rescue squads. The 21,000 acres of the Preserve fall into four different towns; Rochester, Wawarsing, Gardiner, and Shawangunk which are located in eight fire districts. These fire districts include Accord, Cragmoor, Ellenville, Kerhonkson, Gardiner, Napanoch, Shawangunk Valley, and Walker Valley. These services are contacted by using the 911 emergency response system. In all cases the NY State Park Police will be notified and appropriate incident reports are completed, and additional manpower is dispatched depending on incident requirements.

Police

The Preserve is under the jurisdiction of the Palisades Region State Park Police, headquartered at Bear Mountain State Park. Patrols by the State Park Police originate from the regional headquarters in Bear Mountain State Park, which is a considerable distance from the Preserve. The existing facilities at Minnewaska do not provide suitable space for a designated Park Police officer at the Preserve. If situations arise that need additional service, or immediate response is not possible by Park Police officers, assistance may be requested from the New York State Police and Ulster County Sheriff.

Ambulance/Rescue

Minnewaska State Park Preserve experiences numerous emergency situations, some of which require providing assistance to injured patrons. Incidents include patron accidents, forest fires, automobile accidents, and search and rescue situations. The Preserve is served by several volunteer rescue squads and paramedics with STAT Flight or State Police Helicopter called upon when injuries require their assistance. A comprehensive emergency action plan is on site which includes procedures to be followed during various incidents. Numerous rescue supplies are on site to assist Preserve staff and volunteer organizations in responding to emergencies.

Emergency Response

Numerous staff members have various levels of medical training from basic first aid and CPR, to EMT and Wilderness First Responders certification. These medical skills assist Preserve staff in performing efficient and safe incident responses. In addition to these certifications, Preserve staff are committed to other trainings which should be offered to Preserve staff. Training sessions in technical rescue, forest fire suppression, search and rescue, medical certifications, and incident command are continuously needed for Preserve staff.

Evacuation Plan

In the event of an evacuation of the Preserve, the Incident Command System, a standardized, on-scene, all-hazard incident management process, is utilized with assignments originating from the Preserve manager to Preserve staff. Command and control of the evacuation of patrons from within the Preserve boundaries is immediately assigned to Preserve staff. Park Police are contacted and assistance is requested from regional Park headquarters. Regional State Police and Ulster County Sheriffs may also be called upon for assistance at access points.

Infrastructure

Roadways and Bridges

The Preserve is served by several paved access roads and parking lots at Lake Minnewaska, the lower Awosting parking area, and Tillson Lake. These roads are generally in good repair but require ongoing maintenance.

Most of the buildings on top of the mountain were constructed during the hotel era. The majority of structures in the Tillson Lake area were constructed in the 1950's. Some that existed prior to the 1950's are historic structures in either a stabilized condition or in disrepair. A comprehensive building inventory has been prepared for this Master Plan.

Electric

Electric service includes single phase electric service to the Peter's Kill area and a separate single phase power line to the top of the hill.

Water

A well provides potable water at the Peter's Kill area. No potable water supply is currently provided in the Lake Minnewaska area.

Restrooms

Restrooms in the Peter's Kill area consist of a self composting toilet. As part of the ongoing effort by OPRHP to implement sustainable practices, two self composting toilets were constructed in the Winter/Spring of 2009 at the Awosting parking lot and the Lake Minnewaska beach area. Portable toilets are provided at the top of the hill near the nature center.

Telephone

Telephone service is provided to the Peter's Kill area. A separate service is provided to the top of the hill. Phone lines and poles are deteriorating due to age, and suffer constant interference especially during inclement weather. CB radios are used by staff, however, due to the vast size of the Preserve

and the relatively low location of the Peter’s Kill office, radio reception is not guaranteed at all locations within the Preserve. Cell phone service is variable throughout the Preserve.

Petroleum Storage

Petroleum storage consists of one 2,000 gallon gasoline tank and one 1,000 gallon diesel tank located in the terrace lot below the maintenance garage.

Carriage Roads

The historic carriage road network within the Preserve consists of more than 32 miles of carriage roads, many of which are in need of major rehabilitation. Currently, OPRHP and the Mohonk Preserve have embarked on a carriage road restoration project. The restoration project is considered a long term plan with significant funding needed to complete the project. The carriage roads require extensive maintenance and restoration on an annual basis. Carriage road maintenance takes place throughout the year with the majority of improvements being accomplished from spring to fall. Carriage road maintenance includes ditch cleaning, drainage improvements, culvert replacement, shoulder support, hauling shale and base materials to improve crown of carriage road, brush and tree removal. Maintenance is completed by staff while volunteers assist Preserve staff with patrolling carriage roads during peak use days. See Appendix B - Minnewaska State Park Preserve Trails Plan.

The following table identifies carriage roads and their mileage.

Table 7 - Preserve Carriageways and Mileage

Maintained Carriageways	17.36 mi
Awosting Falls	1.30 mi
Beacon Hill	0.66 mi
Castle Point	3.90 mi
Lake Minnewaska	1.90 mi
Lake Awosting	3.50 mi
Lower Awosting	2.70 mi
Upper Awosting	3.10 mi
Millbrook Mountain	2.20 mi
Sunset	0.80 mi
Unmaintained Carriageways	15.50 mi
Hamilton Point	3.70 mi
Stony Kill	1.50 mi
Smiley	7.40 mi
High Point	2.90 mi

Operations

Management

Management of the Preserve is based from the Peter's Kill Office which serves as the Preserve office and headquarters for all administrative and management actions. Due to its separation from the most actively used portion of the Preserve, management and communication can require additional labor and provide operational constraints. The Peter's Kill office was not designed to function as the Preserve office and significant constraints exist with the structure in supporting the operational and administrative requirements of the Preserve.

Maintenance

Maintenance operations are based from the maintenance facility located in the Lake Minnewaska area. Maintenance throughout the Preserve is performed by a mix of full time and seasonal personnel.

Hours of Operation

The Preserve opens daily at 9:00 AM, seven days a week, barring unsafe weather conditions. The closing hours vary throughout the year and are dependent on sunset times.

Fees

Entrance fees are collected from vehicles entering the Preserve. Special use fees are also collected for those desiring to rock climb, ride their horse, scuba dive or ski during the winter season. The general policies guiding the implementation and collection of fees are established by OPRHP on a statewide basis.