

**DRAFT**

# Sam's Point Preserve Master Plan

May 30, 2009



The Nature Conservancy  
Protecting nature. Preserving life.

Open Space Institute



OFFICE OF PARKS · RECREATION · HISTORIC PRESERVATION  
NEW YORK STATE

Draft  
Master Plan  
Sam's Point Preserve

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Cragsmoor, New York

Prepared by:

The Nature Conservancy  
Open Space Institute  
Sam's Point Advisory Council

Completed: (May 30, 2009)

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## Acknowledgments

The first Master Plan for Sam's Point Preserve was written by Jeff Lougee of The Nature Conservancy (TNC) in 2001, and was based on the input of many individuals. Jeff was assisted by the Sam's Point Advisory Council, which continues to meet today, to review and provide advice on the management of the Preserve. The commitment to Sam's Point Preserve of individuals who have served on the Council over the years (see Appendix I) has always been a touchstone and inspiration to the staff who work to manage the Preserve.

Current Council members include:

Hank Alicandri – Director of Stewardship and Head Ranger, Mohonk Preserve

Paul Elconin – Land Steward, the Open Space Institute, Inc.

Iris Friedman, the Village of Ellenville

Jack Grifo – Cragsmoor resident and recording secretary

Wendy Harris – Register of Professional Archaeologists

Liana Hoodes, Town of Shawangunk Environmental Management Council

Eric Humphrey – Park Superintendent, Minnewaska State Park Preserve

Paula Medley – The Cragsmoor Association

Eric Meyer – New York-New Jersey Trail Conference

Maureen Radl – Friends of the Shawangunks

Robert Anderberg, General Counsel for the Open Space Institute, and Paul Elconin, Land Steward for OSI have provided partnership support and much sound advice. Wendy Harris made a substantial contribution to this plan in writing the Cultural Resources Management section and Jack Grifo has always supported the Council as the secretary.

Dr. Glenn Haas from Colorado State University and Tamara Pokorny from the National Outdoor Leadership School (NOLS) provided support with VERP, the National Park Service's Visitor Experience and Resource Protection framework for recreational use planning.

## Executive Summary

### Introduction

In 1999, The Nature Conservancy (TNC) and the Open Space Institute (OSI) convened the Sam's Point Advisory Council to help develop a Master Plan for Sam's Point Preserve. The Council continues to advise TNC and OSI and consists of representatives from the Cragmoor Association, Friends of the Shawangunks, Minnewaska State Park Preserve, Mohonk Preserve, New York-New Jersey Trail Conference, the Town of Shawangunk Environmental Management Council and the Village of Ellenville. In preparing the first plan, the Council helped identify and analyze issues facing the Preserve and review management strategies devised for these issues. The purpose of the plan was to identify steps for protecting the unique natural resources of the Preserve while providing appropriate and managed public use. The plan was intended to be consistent with the ridgeward management guidelines developed by the Shawangunk Ridge Biodiversity Partnership, which were being developed at the same time.

In 2009, the plan is being updated to acknowledge transfer of almost 3,800 acres to the Palisades Interstate Park Commission, the improvements that have been made at the Preserve, and to reflect what has been learned in the intervening years about protection of the biodiversity of the Shawangunk Ridge. The plan identifies additional steps that can now be taken at the Preserve to further ecological management. The Council continues to play an advisory role in the management of the Preserve and the preparation of this update. Once the draft is complete, a public meeting will be held to provide a forum for public review and comment.

### Environmental Setting

**Location and Setting:** Sam's Point Preserve lies within Ulster County, in the Town of Wawarsing and the Village of Ellenville. The almost 5,000 acre Preserve is comprised of 3,799 acres owned by the Palisades Interstate Park Commission (PIPC) which are adjacent to and part of Minnewaska State Park Preserve. The remaining 1,080 acres at the entrance of the Preserve are owned by the Open Space Conservancy (OSC), the land acquisition affiliate organization of the Open Space Institute (formerly known as Beaverkill Conservancy), and include Lake Maratanza, Sam's Point and numerous trails including the Ice Caves Trail. Both portions of the Preserve are currently managed by The Nature Conservancy (TNC), under a management agreement with OSC and PIPC. The Preserve is accessed through the community of Cragmoor, off Route 52, and at Berme Road Park in Ellenville, at the entrance to the Smiley Carriageway. In 2005, The Nature Conservancy opened the Meg Stewart Conservation Center at the entrance of the Preserve, to provide visitor orientation and services, and to serve as home to science, stewardship and education activities.

Sam's Point Preserve is at the highest point of the Shawangunk Ridge, with an elevation of 2,255 feet. The quartzite cliffs running northwest and northeast from Sam's Point delineate the edge of a broad plateau. The northeastern portion of this elevated area runs into Minnewaska State Park Preserve, where it gradually loses elevation approaching Lake Awosting. The Preserve was



designated a National Natural Landmark in 1967 by the National Park Service due to its distinctive geologic features and rare plant populations.

## Vision and Goals

**Sam's Point Preserve Mission and Master Plan** – In 2001, the Sam's Point Advisory Council adopted the following mission statement for the Preserve:

*Sam's Point Preserve is home to an abundance of rare species and natural communities, including the globally rare ridgetop dwarf pine barrens. The mission of the Preserve is to use a science driven approach to protect:*

- *The biological diversity of the landscape, along with*
- *The wilderness character and spiritual quality it embodies, and*
- *The record of the relationship between these resources and human beings.*

To accomplish the mission, a Master Plan was developed in 2001 to guide protection and public use of the Preserve, as well as to define ecological management, research and educational programs to actively engage the public in conserving the area's unique resources. The Plan is reviewed regularly by the Advisory Council to monitor progress, and if necessary, modify strategies to better accomplish the Preserve's mission. The Plan is being formally updated in 2009 to reflect management accomplishments and new initiatives to protect the resources of the Preserve.

The plan was based on a review of the ecological resources of the Shawangunk prepared by the Shawangunk Ridge Biodiversity Partnership. The Partnership is a consortium of public and private organizations actively working to protect and conserve the biological resources of the Shawangunks. Since its inception in 1994, the Partnership has delineated and documented natural communities and rare species populations and has evaluated the impacts of various land uses and activities on these resources, providing the foundation for sound decision-making by land managers along the ridge.

In 1999, the Partnership initiated landscape level planning for the 153,000 acres Shawangunk study area, identifying conservation "targets" that warrant protection, identifying threats to those resources and strategies to abate those threats. Components of each of the six systems identified as targets are found at Sam's Point Preserve. These systems include:

- Chestnut Oak Forest
- Dwarf Pitch Pine
- Pitch Pine-Oak-Heath Rocky Summit
- Cliff and Talus
- Hemlock-Northern Hardwood Forest
- Lakes, Wetlands and Rivers

The Master Plan for Sam's Point Preserve is designed to support the ecological goals the Shawangunk Ridge Biodiversity Partnership developed for the entire ridge. To that end, the

primary conservation goal for the Sam's Point Master Plan is to help protect the ecological systems identified. Management actions at the Preserve are based on the strategies in the Biodiversity Partnership's ridgewide plan. These include:

- Protecting additional lands surrounding the Preserve to ensure adequate buffer and to protect important natural and cultural resources not currently on protected land, and to provide linkages between protected lands;
- Developing an ecological management and research program, including the use of prescribed fire, invasives species management and control of deer herbivory;
- Using a VERP framework (Visitor Experience and Resource Protection) to monitor and manage public use of the Preserve.

### **The Master Plan (A summary of major updates, on-going policies and future management priorities)**

In the years since the first Sam's Point Preserve Master Plan was adopted, a number of management actions have been accomplished and many are on-going. This section summarizes major updates, policies that remain in place and priority management actions anticipated in the future.

**Land Ownership, Management and Preserve Identity**– In 2006, 3,799 acres within the Preserve were transferred to the Palisades Interstate Park Commission. This portion of the Preserve, as well as the 1,081 acres retained by the Open Space Conservancy, is subject to a Management Agreement with TNC. PIPC, OSC and TNC have agreed to maintain the identity of Sam's Point Preserve, due to its unique resources and distinct management. One of the benefits of the transfer is that it allows for payments to be made by PIPC in lieu of taxes (PILOT) to the local community.

**Public Use Policies:** Public use of the Preserve continues to be guided by several “leave no trace” guidelines. Visitors are required to carry out all garbage, leash and clean up after their pets and refrain from bringing glass containers or radios into the Preserve.

- **Recreation Management Zones** – Management of the Preserve is based on established recreation management zones that provide guidance on levels of use. These zones are to remain the same and with the exception of the Backcountry Zone, visitors are required to stay on designated trails.
- **Permitted Uses** – Permitted uses include hiking, hunting, skiing, snow-shoeing, environmental education and research.
- **Non-Permitted Uses** – Non-permitted uses include camping, hang-gliding, mountain biking, rock and ice climbing, swimming and trapping. Unauthorized off-road vehicles, snowmobiles and horses are not permitted.

**Infrastructure:** Infrastructure has a profound impact upon the public's perception of the property, and every effort is made to make infrastructure choices that represent a desirable conservation ethic. Environmental sensitivity and concern for potential impacts on cultural resources is a high priority when considering changes or additions in infrastructure.

- **Carriage Roads/Roads** - Maintaining the wilderness character of the Preserve is a high priority. However, it is important to maintain the existing roadways to meet the needs of the public, cell/radio tower owners and lessees and ecological management practices, including fire management. Priorities for restoration are provided in the plan.
- **Trails** – Two new trails have been added in the Preserve. The addition of a trail from Route 52 to the Loop Road to provide an off-road route for the Long Path, and the refurbishment of the Berry Picker Trail provides an additional connection to Minnewaska State Park Preserve. With the addition of these two trails, the trail system at Sam’s Point is complete, and emphasis can now focus on maintenance of the existing trails.
- **Buildings** – With the completion of the Meg Stewart Conservation Center in 2005 and rehabilitation of the Gatehouse to house a live-in caretaker, most building needs have been met. As the Preserve’s programs continue to evolve, additional work and storage space may be needed to accommodate fire management equipment and a seasonal fire crew. Locations for a facility to meet these needs should be investigated over the next two years in anticipation of expanded ecological management activities, and may ultimately be located at Sam’s Point Preserve or on other conservation lands held by partners, such as Minnewaska State Park Preserve or the Open Space Conservancy.

**Ecological Management** - Fire suppression, deer herbivory and invasive species are key threats to the ecological integrity of the natural communities at Sam’s Point Preserve, as they are across the extent of the Shawangunk Ridge. These threats are inter-related - management strategies will be implemented to reduce the impacts of these influences. Monitoring will be designed to evaluate the effectiveness of these strategies.

- **Fire Management** – Fire management efforts at Sam’s Point Preserve will focus on reducing the risk of high intensity wildfire that may threaten human life, cause damage to neighboring property or any facilities at Sam’s Point Preserve (e.g. cell/radio towers, Conservation Center) or adversely affect ecological or cultural resources; restoring and maintaining the long term ecological viability of fire dependent pitch pine and oak dominated ecosystems at Sam’s Point Preserve and adjacent managed lands; and creating the conditions necessary to carry out fire management activities (including wildfire suppression and prescribed fire) in the safest and most ecologically appropriate manner.
- **Invasives**: While the majority of Sam’s Point Preserve is relatively free of invasive species, control of non-native invasive plants and animals are a major ecological management issue for the Hudson Valley region and the Shawangunks. Non-native species can outcompete native species and reduce biodiversity. Mapping of invasive-prone areas, treatment and control and volunteer monitoring to evaluate effectiveness of control efforts will be on-going.
- **Deer Management** - Throughout the Shawangunks, deer overabundance has significantly impacted oak forest regeneration and understory species composition.

Activities to better understand and manage deer impacts on biodiversity at Sam's Point Preserve will include data collection on deer impacts (browse surveys), and continuation of a managed hunting program to help control the deer herd.

**Education** - The education and outreach program includes public programs and volunteer opportunities that emphasize the unique biological diversity and cultural resources of the Preserve and the importance of conservation in the Shawangunks. Education and outreach will continue to engage people in research activities and stewardship of the Preserve. Long-term partnerships will be pursued with local school districts to engage students in these activities and, ultimately, monitoring programs. The Meg Stewart Conservation Center is home to the education and outreach program.

**Cultural Resources** - Both Prehistoric and Historic Period Cultural Resources will be protected. In particular, potential Native American rockshelter sites associated with east, west and south facing cliffs and the former blueberry pickers shacks have been identified as areas of concern. These resources will be protected by minimizing potential disturbances from construction, road and trail maintenance, landscaping, fire management and expanded public access.

**Restoration** - There are a variety of large disturbances on the Preserve left over from various commercial endeavors and speculations. In large part, these areas will be restored to their natural conditions. Many of these areas will be restored through natural succession, while others will require more intensive restoration techniques.

**Conclusion** - Sam's Point Preserve is a unique site, with abundant natural, recreational, scenic and cultural resources and is truly "One of Earth's Last Great Places". Its long-term health will depend on science-based planning, resources to implement essential preserve programs, and a well-informed public.

*Note: Some of the material included in the Plan is repeated in multiple sections. Our aim in providing the content in this manner is to facilitate the use of the Plan and ensure that those readers who wish to refer only to specific sections of the Plan have complete information.*

## I. Introduction

### A. The Northern Shawangunk Mountains

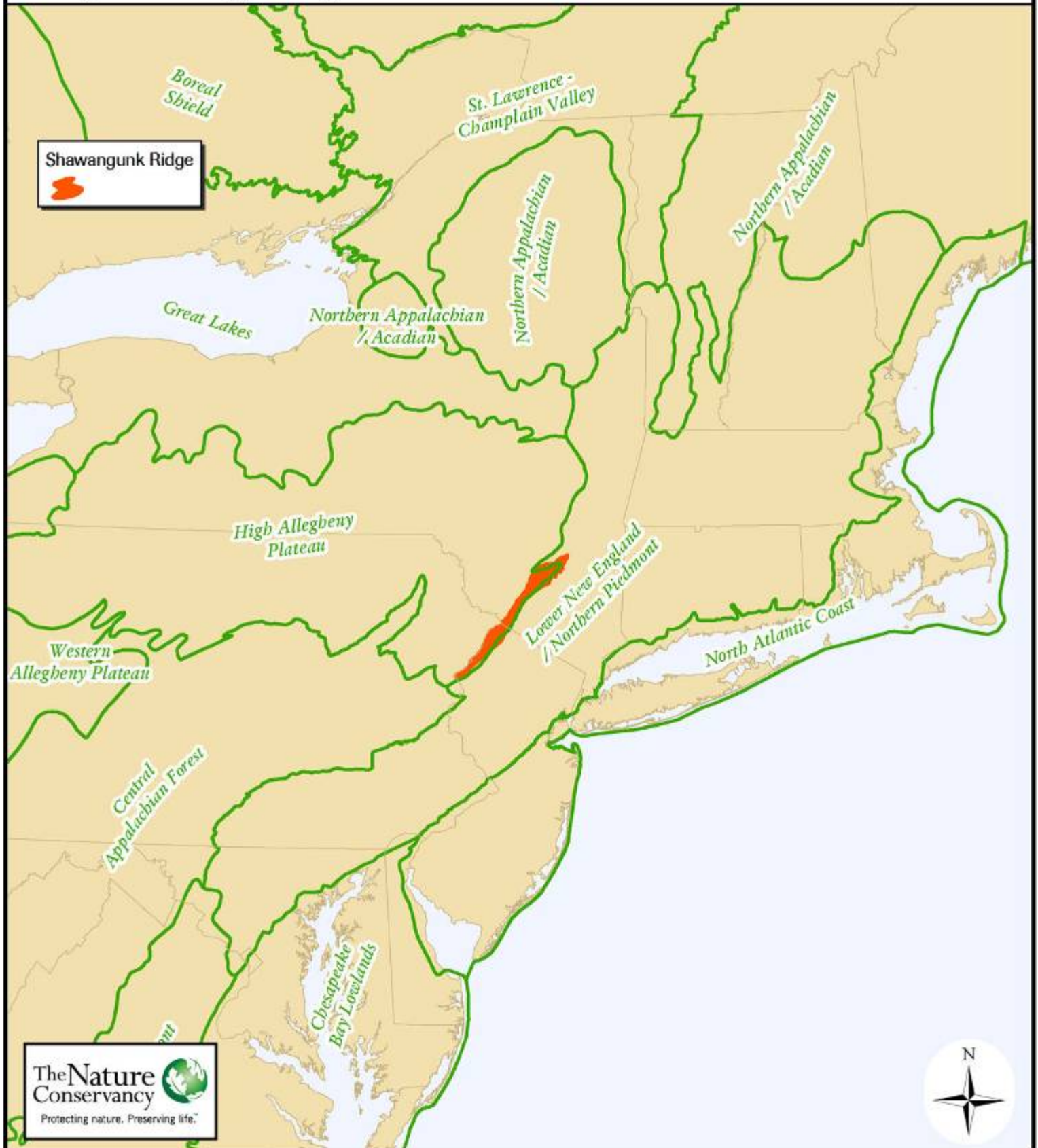
The Shawangunk Mountains form a long, narrow ridge system, which extends south from Rosendale, New York through New Jersey at Port Jervis to the Susquehanna River in Pennsylvania (see Maps 1 & 2). Although the present day shape and form of the ridge is the result of many factors, including the immense forces of continental glaciers that scoured the ridge during the Pleistocene epoch, it was initially uplifted and folded about 450 million years ago during the Taconian Orogeny. This mountain building episode was the first of three events that eventually formed the Appalachian Mountains and in due course the Shawangunks.

While the ridge is known as the Shawangunks in New York, in New Jersey it is referred to as the Kittatinny Ridge and in Pennsylvania the Blue Mountains. In total, the ridge comprises some 250,000 acres, approximately 150,000 of which lie in New York. The ridge is a subsection of the High Allegheny Plateau ecoregion (see Map 1), a biological province with distinct natural community alliances. Nearly all of the land on the ridge is protected from development and subdivision in New Jersey and Pennsylvania; most of the unprotected land on the ridge is in the Shawangunks of New York, particularly south of Sam's Point to the New Jersey line. The Shawangunk Ridge in New York is roughly divided into the northern and southern Shawangunks. The northern Shawangunks comprise a thirty-mile section of the ridge, which extends from Route 52 to the northern terminus near Rosendale.

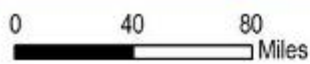
The northern Shawangunks are widely recognized as one of the most important sites for biodiversity conservation in the northeastern United States. The unique combination of location, climate, geology and soils of the Shawangunk landscape give rise to a remarkable diversity of species adapted to these conditions. The Shawangunks are home to more than 35 natural communities with five that are considered globally rare. Plant and animal surveys have revealed more than 1,400 species including 57 that are rare and imperiled. Much of the ridge's higher elevations are covered with rare pine-barrens communities that contain uncommon wetlands, such as the pitch pine-blueberry peat swamp (G3 S1) and the perched bog (G3G4 S1S2). See Appendix I for a description of state and global ranks. There are over 3,500 acres of pine-barrens communities on the ridge, and the globally rare community known as "dwarf pine ridges" (G1G2 S1) is unique to Sam's Point in New York State (Reschke, 1990). The slopes of the ridge support New York's second largest chestnut oak forest, which is roughly 28,000 acres in size. Interspersed through all of these communities are a multitude of rare plant and animal species, such as mountain spleenwort (*Asplenium montanum*) (G5 S1) and the timber rattlesnake (*Crotalus horridus*) (G5 S1). (For more information on natural resources, see Section II.) The Nature Conservancy designated the ridge as one of its original 75 "Last Great Places" for landscape level biodiversity conservation in the Western Hemisphere.

# Sam's Point Master Plan

Map 1. Ecoregions of the Northeast



Shawangunk Ridge



The northern Shawangunks are one of few remaining areas in close proximity to New York City where there are large, undisturbed forestlands, making the ridge a popular destination for many different types of outdoor recreation. Visitors come to picnic, walk on the historic network of carriage roads, mountain bike, hike, visit one of several dramatic waterfalls, or rock climb on the quartzite escarpment lining the eastern side of the ridge. It is estimated that approximately 500,000 people visit the ridge annually.

Sam's Point Preserve is located in the southwestern portion of the northern Shawangunks and comprises nearly 5,000 acres (see Map 3). The site represents the most biologically unique area of the entire ridge. It is home to the rarest natural community in the northern Shawangunks, the globally unique "dwarf pine ridges" community. This community is ranked G1 S1 by the New York Natural Heritage Program, which indicates the highest level of global and state rarity. The Preserve is also home to seven other rare natural communities, eight rare plants and three rare animals (see Table 1 for a list of rare species and natural communities found on the Preserve). Of all the protected natural areas on the ridge, the Sam's Point Preserve is perhaps the most intact and unfragmented, having only a few maintained hiking trails and carriage roads bisecting it.

Steps for protecting the unique natural resources of the Preserve, with appropriate and managed public use, is the focus of this plan. To this end, the plan seeks to provide guidance towards protecting the property's biodiversity, as well as its educational, scenic, cultural and recreational value.

Section I of the plan includes a brief history of the Preserve, covering some of the principal human uses of the property over the past one hundred and fifty years, and a brief discussion of surrounding communities and land use patterns in adjacent areas. Section II provides an overview of the natural and cultural resources of the Preserve and the greater Shawangunk Ridge. Building upon the resource information, Section III describes the visions and goals for the property, based upon the resources targeted for protection at the Preserve. Section IV covers management of the Preserve's infrastructure, while Section V discusses ecological management of the property, including invasive species control, deer management and fire management.

Section VI describes the Preserve's visitor management program, designed using the National Park Service's Visitor Experience Resource Protection (VERP) framework (National Park Service 1997). Because unmanaged recreational use is a leading threat to the fragile areas at the Preserve and across the Ridge, successful implementation of the VERP framework is also critical to accomplishing the mission and goals outlined in Section III. Section VI also includes recreational user policies and an education and outreach plan directed at engaging the public in research and stewardship activities at the Preserve. Section VII addresses cultural resource management.

Section IX, provides a consolidated list of management actions drawn from the previous sections of the plan. It is intended that this table will aid future science and stewardship staff of the Preserve in developing timelines and identifying priority management areas.

## B. A Community-Based-Conservation Approach

In February of 1999, the Sam's Point Advisory Council was formed to help guide the development of this plan. The Advisory Council consists of local residents, business people, planning experts and several partners active in management of the ridge. It is with their input that the following policies and management objectives have been determined for the Preserve.

In developing this plan, The Sam's Point Advisory Council utilized information developed by the Shawangunk Ridge Biodiversity Partnership. The Partnership was created in 1994 and is a consortium of 10 public and private entities involved with conservation and research across the Ridge (see Appendix II for a list of members and information about the Partnership). The mission of the Partnership is to actively protect the elements of biological diversity and other natural, cultural and scenic resources of the Shawangunks by sharing information and expertise. This plan therefore strives to integrate the policies and management practices for the Preserve with other conservation actions being implemented elsewhere on the ridge. This goal stems from recognizing that the Preserve's nearly 5,000 acres are part of a larger ecosystem, which requires a landscape scale approach to management to successfully protect its resources.

Protecting the property's unique resources and open space values will not be possible without the cooperation and support of local communities and other people who visit the Preserve and the other conserved land on the ridge. Human beings have been and continue to be an important component of the ridge's ecosystems. For example, Preserve visitors have influenced (and continue to influence) the composition, structure and distribution of plant populations in sensitive areas such as cliff ledges, talus communities, the bottoms of deep crevices and fire effected/dependent communities (Lougee pers. obs.; Russell 1999). Weedy and alien species invasion clearly reflects human use patterns along trails and the impact of development in surrounding areas. Other anthropogenic influences include arson, fire suppression, hydrologic alteration and recreational use development. Recognizing the implications of these human influences on the land is an important component of this plan.

## C. History of Sam's Point Preserve

The history of human use at Sam's Point dates back 8,000 years to the presence of Native Americans (see cultural resources under Section VII). Contemporary use of the property by European settlers has been concentrated over the last 150 years. During this time, the Preserve has been home to three hotels, a fire tower, several commercial endeavors, a glider port and a migrant colony of berry pickers.

In 1858, Thomas Botsford settled at Sam's Point and erected several structures on the property, including two separate hotels. After losing his original hotel to fire, Botsford later built a second hotel pinned against the cliffs below Sam's Point (Hakman and Houghtaling 1983). This hotel was also destroyed by fire and remains of it can be clearly seen today when walking below these cliffs. Metal pins and other anchoring devices are still attached to the cliff, and the numerous burn scars attest to the intense fire that scorched most of the vegetation from these



walls when the structure burned. Sam's Point and Botsford's hotels were promoted in the Ellenville newspaper for offering recreational and leisure opportunities, including fine dining, swimming, fishing, boating, and photography and walking. An advertisement from the Ellenville Journal in 1906 promoting these activities was entitled "the Famous Sam's Point Park."

Around the same time, roads were first constructed on the property. A road to a hotel on the shore of Lake Maratanza, which was built by Botsford's son LeGrand Botsford, was constructed around the turn of the century. The road circling Lake Maratanza and the fire tower road (now called the High Point Carriageway) were built later. Also during this time (from around the 1870s up until the middle 1960s) migrant workers and local people would take up seasonal residence at the Preserve to pursue a livelihood harvesting blueberries and huckleberries (Smiley and Huth 1986)<sup>1</sup>. To improve their berry harvest, the pickers often set fires, thereby promoting and enhancing a key ecological process of the landscape (see Sections II and IV for more information on fire ecology). It is believed they lit some of the largest fires to burn the property over the last century. Remains of their seasonal residences can be found today along the Loop Road from the parking areas to the tower farm (see Map 4.)

There have been a variety of commercial speculations and uses of the Preserve's lands over the past fifty years. In the mid-1950s the Village of Ellenville dredged and doubled the size of Lake Maratanza to improve its capacity as a water source for the town. The original water tunnel was constructed around 1924-25. A pile of glacial till remains on the eastern shore of the lake from this effort and the village continues to draw on the Lake as a back-up water supply.

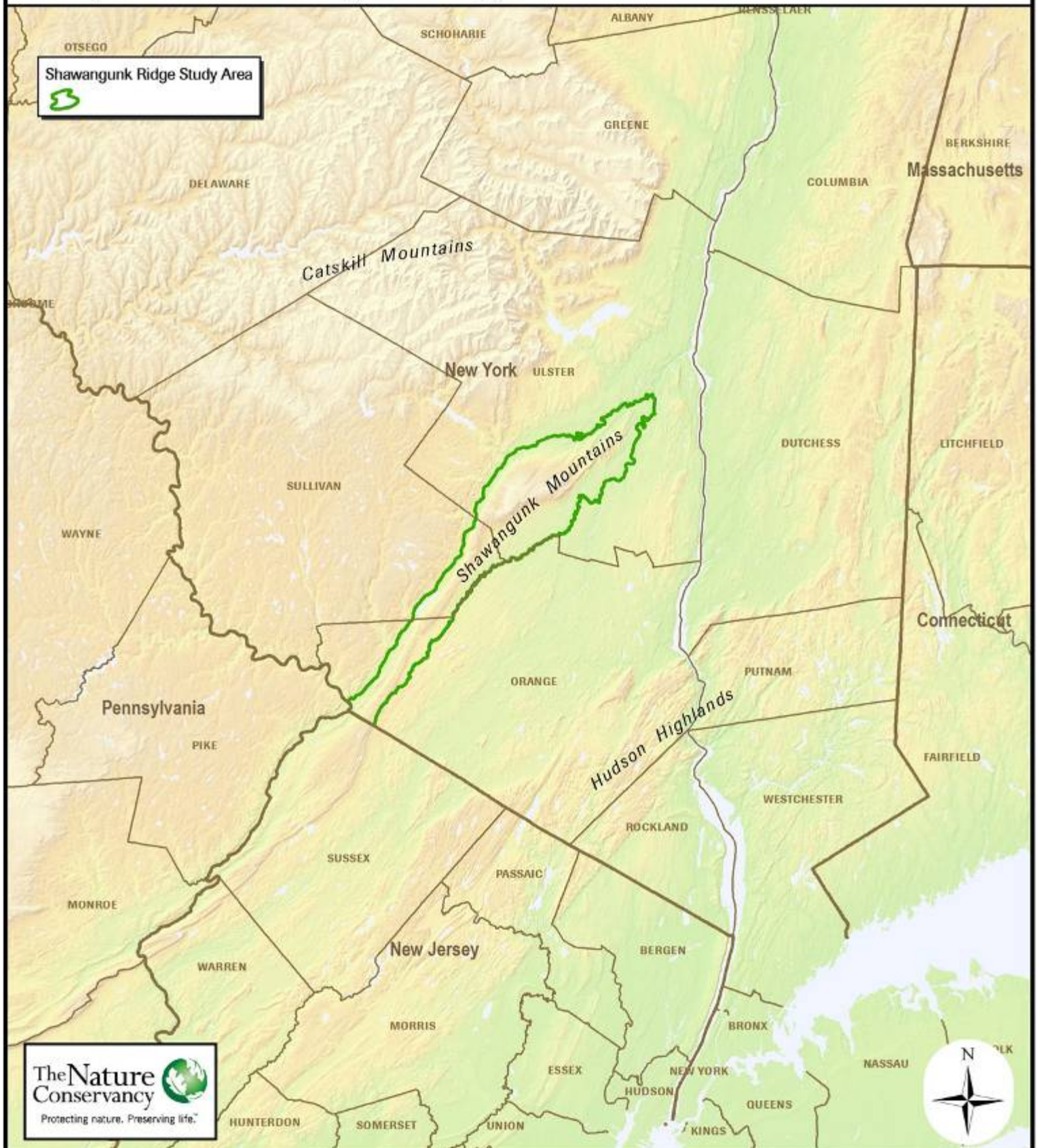
In the 1960's the Preserve was leased to a local entrepreneur who established "Ice Caves Mountain" as a tourist venue in 1967. Mini golf, a gift shop, recorded trail guides and the ever popular ice caves destination resulted in a steady stream of visitors, who for the most part drove to destinations including Sam's Point and the Ice Caves trail, created on the eastern side of the Preserve through an ice caves talus community. For more than twenty years, thousands of visitors came to the property to visit Ice Caves Mountain, and the Preserve was designated by the National Park Service as a "National Natural Landmark". Recreational pursuits on the property were restricted during these years, as visitors were not permitted to venture beyond the Loop Road and the Ice Caves.

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<sup>1</sup> For more information on the berry pickers, see cultural resources under Section VII.

# Sam's Point Master Plan

## Map 2. The Shawangunk Ridge in New York



0 10 20  
Miles

Although public use was concentrated in one area during the Ice Caves Mountain era, resource exploration, which impacted the property, did take place elsewhere. In 1968, prospecting began in the midst of the dwarf pine barrens for natural gas storage. Approximately three acres of pitch pines were cleared halfway out the High Point Carriageway where a 131-foot-high drill was set up to mine for natural gas or gas-storage potential. After drilling nearly 10,000 feet down into the ridge and not discovering gas or storage space, the project was abandoned. The clearing from this venture still exists today, and it is one of the priority sites for restoration on the Preserve (see restoration under Section V for more information).

In the mid 1980s, pressure to develop portions of the property surfaced once again when negotiations commenced between the Village of Ellenville and Genro Energy Systems to develop a wind energy generating facility. The proposal entailed a plan to erect 666 windmills across the dwarf pine barrens for energy production. Public dissent of the proposal surfaced from the nearby Hamlet of Cragmoor and culminated in a legal battle led by the Cragmoor Association. In August of 1986, the proposal was withdrawn as a result of several economic factors (Smiley and Huth 1986).

In December 1996, The Open Space Institute (OSI) acquired Ice Caves Mountain Incorporated with assistance from The Nature Conservancy. With the purchase of the Ice Caves Mountain Corporation, OSI obtained an option to acquire fee ownership of the property from the Village of Ellenville. In the fall of 1997, OSC (OSI's land acquisition affiliate) purchased the nearly 4,100-acre tract for \$3.8 million with funding from the Lila Acheson and Dewitt Wallace Fund for the Hudson Highlands. In doing so, OSI ended nearly 25 years of negotiations to protect the property. OSI and TNC signed an agreement in 1996 authorizing TNC to manage the property.

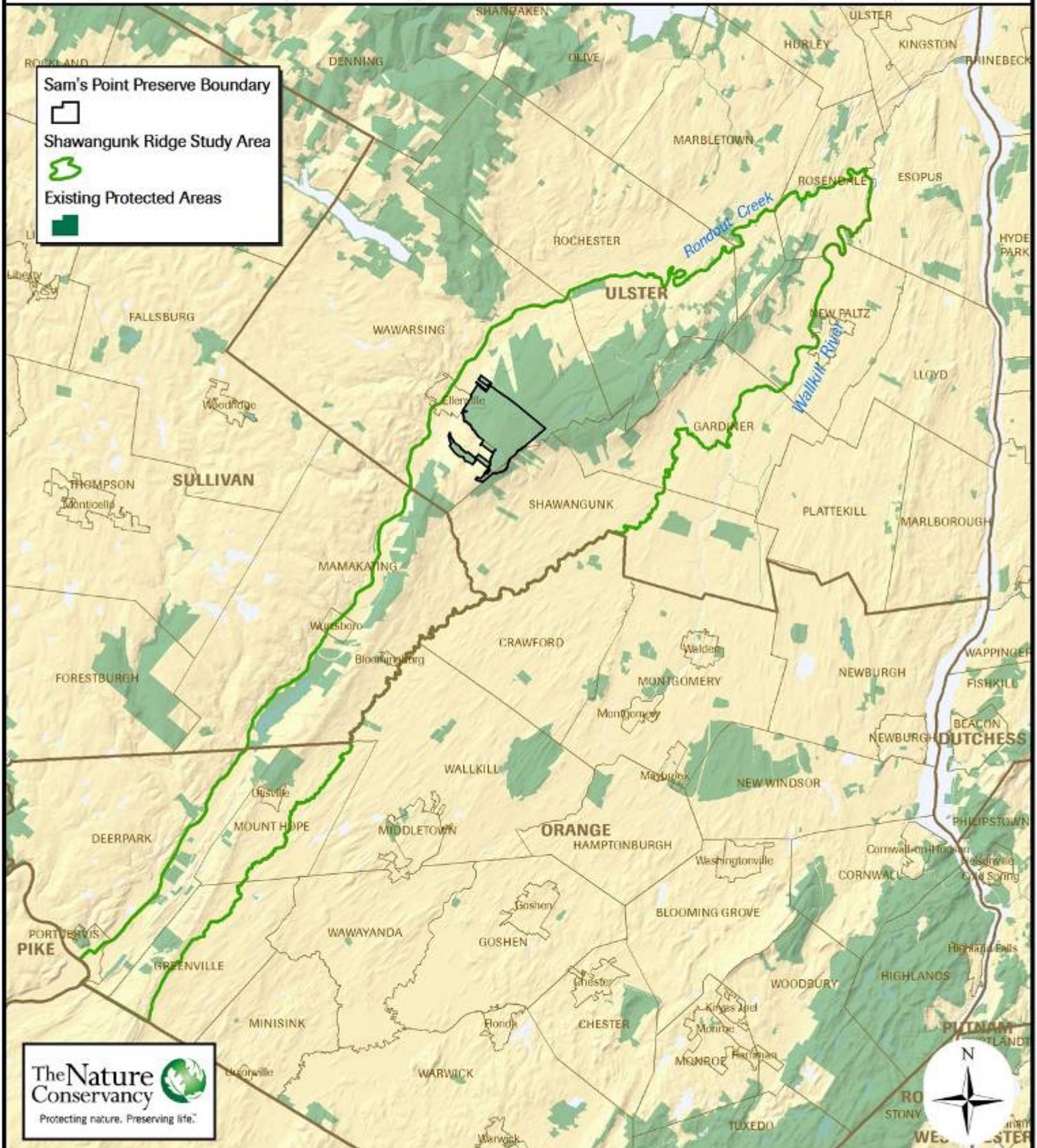
In 2006, 3,799 acres of the Preserve were transferred to the Palisades Interstate Park Commission (PIPC), which enables payments to be made to the local communities in lieu of taxes on the property. The remaining 1,080 acres were retained by the OSC. This area includes the entrance to the Preserve, Sam's Point, Lake Maratanza, the Loop Road and the Ice Caves Trail. The Nature Conservancy's management of both portions of the property extends until 2017. Although the portion of the property transferred to PIPC is officially part of Minnewaska State Park Preserve, the parties have agreed to maintain the identity of Sam's Point Preserve over the entire 4,879 acres in recognition of its distinctive ecology, history and discreet management.

#### D. Regional Context - Open Space Protection and Local Government

Sam's Point Preserve lies within Ulster County and the Town of Wawarsing in the Village of Ellenville (see Map 5). Unprotected lands to the southeast of the Preserve lie within the Towns of Shawangunk and Gardiner. The demographics of these communities vary, especially in terms of population growth and economic stature.

# Sam's Point Master Plan

## Map 3. Shawangunk Ridge Biodiversity Partnership Study Area



0 5 10 Miles

While development pressure continues to mount throughout the area, both Gardiner and Shawangunk have taken steps to address protection of resources on the ridge. In 1989, the Town of Shawangunk created a Critical Environmental Area (CEA) on the ridge which details the natural communities of the ridge and requires that any development project on the ridge be subject to a more rigorous review under the State Environmental Quality Review Act (SEQRA). Shawangunk has also established two “mountain zones” and has proposed a ridge stewardship zone that would rely on conservation density, cluster incentives and design standards. (Shawangunk Comprehensive Plan 2003) Gardiner has enacted a Shawangunk Ridge Protection Zone that takes a tiered approach to provide incentives for development at lower elevations and least sensitive areas, protection of steep slopes and blocks of unfragmented forest (see the Town of Gardiner and Town of Shawangunk websites for details on these planning and conservation strategies).

In addition, Shawangunk and Gardiner have joined with other Shawangunk ridge towns to form an intermunicipal collaboration called the Shawangunk Mountains Regional Partnership, and have created a scenic byway around the ridge, with the intention of developing a regional plan that will promote protection of the region’s natural, scenic, cultural and tourism resources.

The Shawangunk Mountains Scenic Byway traverses the Town along Route 52 from Wawarsing to Pine Bush, and along Route 208, from the Orange County line to the Town’s border with Gardiner. The Byways program is a cooperative effort that links together 11 municipalities on all sides of the Shawangunks. These communities are now working together as members of the Shawangunk Mountains Scenic Byways Steering Committee, along with representatives of Ulster and Orange counties, as well as the State of New York.

These initiatives on the part of local governments provide models for protection of a landscape feature like the Shawangunks. Since 2002, through a project called Green Assets, The Nature Conservancy works with the 9 towns around the Ridge to provide training, workshops, mapping and technical support to devise local strategies that are protective of the Ridge ecosystem. It is important to continue to support these local initiatives as tracts of unprotected forest and agricultural lands that buffer the Preserve are still vulnerable to development. Work is underway by the Open Space Conservancy to protect additional lands on the flanks of the Ridge adjacent to the Preserve.

Accommodating further population growth while protecting open space and ecologically important areas requires careful planning for development. Without proactive planning measures, development on the ridge may cause fragmentation and loss of significant habitat and species that depend on that habitat for migration, breeding and foraging.

Maintaining connectivity between Sam’s Point Preserve and protected areas in the southern Shawangunks, the Catskills and Hudson River Valley is important for the overall protection of the Ridge, ecologically, aesthetically and recreationally. To successfully accomplish this requires working with local communities to develop proactive, environmental land-use initiatives and a long-term vision for the region. Awareness continues to grow that the protected land of the Shawangunks will be a key to the economic future of the region and the towns around the Ridge. It was estimated in 1995 that the half million people who visit the ridge

each year contribute between \$10 and \$15 million to the local economy annually. (Kerlinger 1995).

The air space above Sam's Point Preserve is also vulnerable to impacts and pressures that come from outside Preserve boundaries. With the privatization of Stewart Airport in Newburgh, commercial and cargo traffic continues to increase. In addition, the Federal Aviation Administration (FAA) is proposing to redesign air traffic routes for the northeast corridor, which may result in heavier air traffic over the Shawangunk Ridge. These developments may result in increased aviation noise and air pollution at Sam's Point. Increased aviation traffic could have a negative impact on the experience of visitors seeking the tranquility of the wilderness at the Preserve, and may result in ecological impacts as well.

## **I. Natural Resource Information**

### **A. Geology and Soils**

Two rock types dominate the bedrock geology of Sam's Point Preserve and the larger Shawangunk Ridge (see Map 6). Perhaps the more striking and noticeable of the two is the milky-white quartzite caprock, known as the Shawangunk conglomerate. The distinguishing crags of the ridge, including those situated above the Preserve's parking area, are comprised of this hard, siliceous rock. The second major rock type found along the ridge is the Martinsburg formation, which consists of a deep layer of shale generally residing below the quartzite because it is older. The Martinsburg shale can be seen at Sam's Point in the old shale pit on the western side of the Loop Road, as well as along Sam's Point road before reaching the Preserve. The Shawangunk conglomerate and the Martinsburg shale, both sedimentary rocks, were respectively formed during the Silurian (408 to 438 million years old) and the Ordovician (430 to 500 million years ago) Periods.

Deposition of the Martinsburg Formation took place in a deep ocean trough, which formed as an island arc, and advanced towards ancestral North America during the late Ordovician. The shale comprising the Martinsburg Formation is essentially compacted silt and mud, and it is estimated to reach a thickness of nearly 10,000 feet below the conglomerate. This layer was folded and faulted before the Shawangunk conglomerate was deposited on top of it. Evidence of this can be seen in the numerous vertical beds exposed along the ridge, which in places point up into the conglomerate (Hoagland and Grego, 1997).

The Silurian landscape in which the Shawangunk conglomerate formed was also much different than today. Rising to the east of the Hudson Valley was an enormous, newly uplifted mountain range, the remnants of which today are the Taconic Mountains positioned along the New York, Massachusetts and Connecticut borders. These mountains were pushed up by the first of three great mountain building episodes that would form the Appalachian Mountains and consequently the Shawangunks. Running down off this ancestral Taconic mountain range were fast moving streams that became braided in a near shore tidal flat environment to southwest. Roughly 300 meters of quartz pebbles and white sand carried by these streams were deposited in this plane and then later compressed to form the Shawangunk conglomerate (Isachsen *et. al.* 1991). Today, the imposing cliffs of the ridge that face the Hudson Valley mark the southeastern

boundary of the Shawangunk conglomerate. To the northwest, the layer dips down to the Rondout Valley and extends under the Catskills where it is covered by younger sedimentary rock formations of sandstone, shale and limestone.

The unique attributes of the northern Shawangunks and Sam's Point Preserve are strongly tied to the attributes of the Shawangunk conglomerate. This hard, erosion-resistant caprock over the softer material of the Martinsburg formation has preserved the rugged topography and higher elevations of the northern Shawangunks. It is estimated that only one millimeter of the conglomerate was removed during the Pleistocene Epoch, the last glacial period when continental ice-sheets significantly altered the landform of the northeast (Kiviat 1988). The ecological model for the ridge (which shows the rare pine-barrens communities are largely found at higher elevations -- see Appendix V)) demonstrates the importance of the quartzite caprock. Without it, the northern Shawangunks might resemble the more rounded and gentle southern portion of the ridge and be largely covered with hardwood forests.

The conglomerate works in various indirect ways to promote the pine-barrens vegetation and influence natural community composition. Slowed microbial activity at the higher elevations, sustained by the quartzite caprock, results in poor soil development. Furthermore, since the quartzite has no buffering capacity, the soils are highly acidic. These conditions provide pitch pines with an ecological advantage over other plants (explained in more detail below). The bedrock also promotes wide variations in soil moisture. As it impedes the flow of water, the shallow soils can rapidly become inundated, then quickly dry out depending upon weather. After storm events the soils will be saturated, but their shallow nature inhibits water retention. Plant life must therefore be adapted to these stressful conditions (Batcher 1999). Many of the pine-barrens species found on the ridge and within the Preserve have water conservation adaptations for enduring such stress, such as having smaller, cup-shaped stoma and waxy coatings (cuticles) on their leaves.

## B. Vegetation and Natural Communities

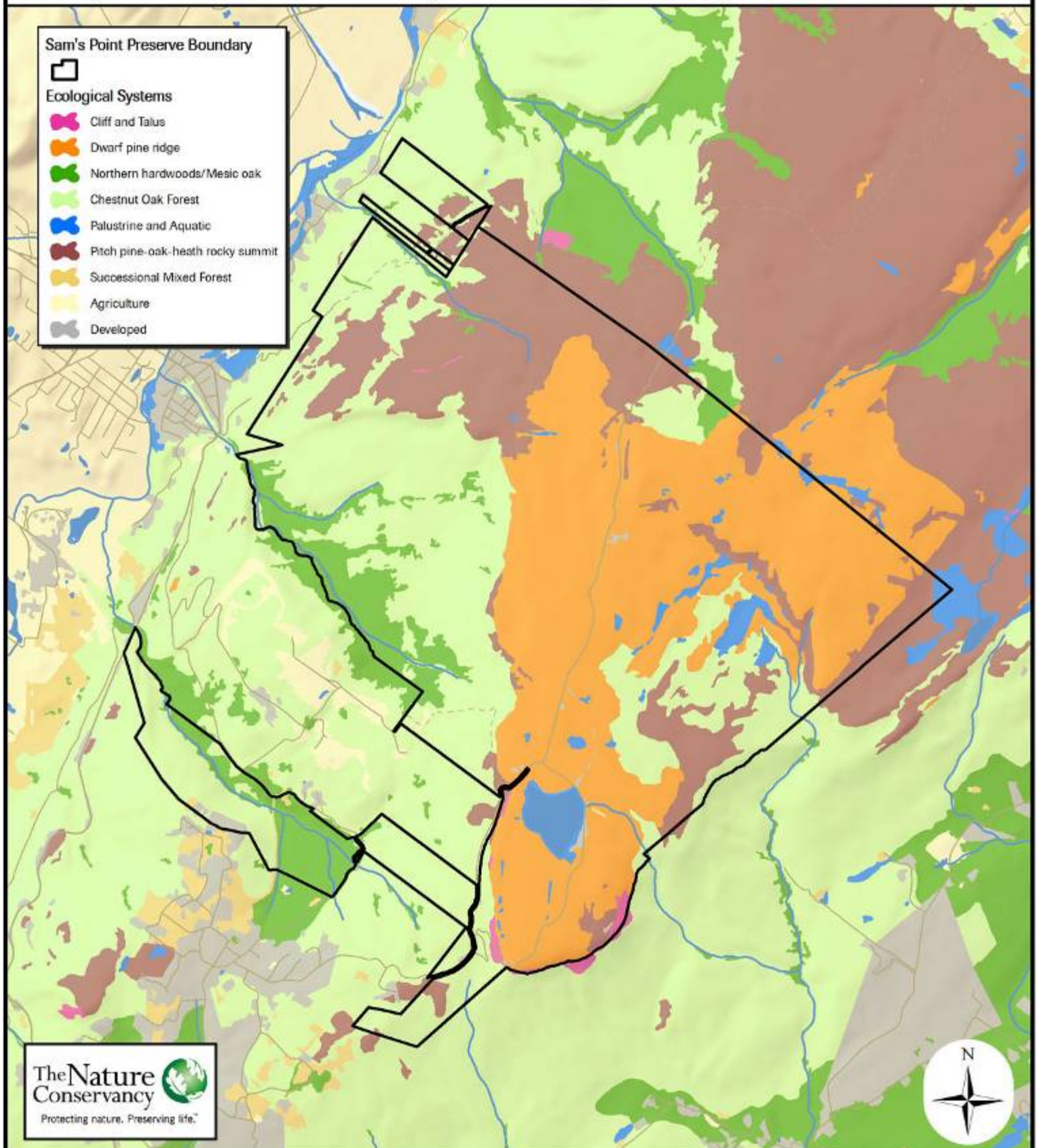
The biota of the Preserve is dictated in part by landform, and both slope and aspect can influence the hydrology and microclimate of an area. The distribution of natural communities at Sam's Point Preserve is influenced by many other factors as well, including fire, hydrology, climate, soils, vegetation succession and periodic insect infestation (Batcher 2000.) These factors do not act alone, but rather as an integrated system where factors influence each other.

The land-use history of the Preserve has also shaped its ecology, and today's natural communities have been shaped by those past events. Some ecological processes, such as wildfire, have been enhanced by human activities while others have been altered or suppressed. In some cases these changes in ecological process can threaten important natural communities.

Human uses of the landscape which have affected natural community composition include logging, quarrying quartzite for millstones, agriculture, tanbark peeling and wintergreen harvesting (Kiviat 1988) and the use of fire to increase berry production. Appendix V provides a graphic summary of how key ecological processes interact with and affect the vegetation communities of the ridge (See Map 4).

# Sam's Point Master Plan

## Map 4. Sam's Point Dwarf Pine Ridge Ecological Communities



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0 0.5 1 Miles

Produced by The Eastern New York Chapter of The Nature Conservancy

April 2009



Pitch Pine Barrens: More than half of the Preserve's 5,000 acres is covered with "barrens" vegetation. The term "barrens" is generally used to describe communities made up of species adapted to periodic fire (Thompson 1996). There are several different variants of barrens recognized that occur on the property, which include the following communities: heath rocky summit, scrub oak rocky summit, dwarf pine ridge, sparse dwarf pine ridge, pitch pine-oak heath rocky summit and sparse pitch pine-oak heath rocky summit (the "badlands").

These communities tend to occur on the shallow, nutrient poor soils found on the upper elevations of the Preserve. A broad plateau that rises above 2,000 feet within the Preserve is home to the bulk of this vegetation. The quartzite cliffs running northwest and northeast from Sam's Point (elevation-2, 255 feet) mark the southwestern edge of the plateau. The northeastern portion of this elevated area runs into Minnewaska State Park Preserve where it gradually loses elevation approaching Lake Awosting.

The barrens communities found at higher elevations in the Preserve are comprised of a hardy mosaic of species adapted to the stressful conditions of the Ridge. Along with the ecological stresses related to elevation and climate, these species also contend with the pervasive influence of periodic fires that sweep through the area. Many of them evolved to benefit from fire in the way of seed release and increased fruiting ability. Pitch pines, the predominant tree of higher elevations in the Shawangunks, epitomize the fire-adapted species. With their thick, protective bark and ability to resprout from charred trunks and roots, pitch pines can survive fires that completely defoliate the tree.

In addition to their ability to survive intense fire, pitch pines are also well suited to the high ridge environment because they are evergreen. The smaller, waxy needles of pitch pine are more efficient and less prone to drying out, enabling these trees to survive harsh conditions (e.g. nutrient poor and acidic soils, shorter growing season, damage from wind, ice and snow). Pitch pines do not have to reproduce their leaves each season, which gives them an obvious advantage over broadleaf trees in a resource scarce environment like the ridge-top.

Common species associated with barrens communities include low-sweet blueberry (*Vaccinium angustifolium*), black huckleberry (*Gaylussacia baccata*), sheep laurel (*Kalmia angustifolia*), scrub oak (*Quercus ilicifolia*), wintergreen (*Gaultheria procumbens*), black chokeberry (*Aronia melanocarpa*), grey birch (*Betula populifolia*) and bracken fern (*Pteridium aquilinum*). In sparsely vegetated barrens, like the "badlands," a fragile collection of bryophytes can be found thriving on the open bedrock surfaces. Characteristic lichens and mosses found in these locations include reindeer lichen (*Cladonia* spp.), target lichen (*Cetraria centrifuga*), haircap moss (*Polytrichum* spp.), cushion moss (*Leucobryum glaucum*), and granite moss (*Andreaea rupestris*.) Varying amounts of these and other species will be present depending upon the specific community type. All of these species are sensitive to recreational impacts because of the fragile and delicate substrates they inhabit.

Oak Forest Uplands: Forested uplands are the second major component of the vegetation communities found at Sam's Point. These communities are a mixture of hardwood and coniferous forests generally found on the slopes of the Preserve where soils are better developed. The forested uplands cover roughly 2,000 acres of the property. The most prolific community of

the forested uplands is the chestnut oak forest. It covers nearly 1,600 acres of the Preserve (see Map 7) and is part of a larger chestnut oak forest that stretches along the ridge, considered to be the finest example of this community type in the state (Hunt 1999). This forest occurs on well-drained soils and is characterized by chestnut oak (*Quercus prinus*) and red oak (*Quercus rubra*) in the canopy, and black huckleberry (*Gaylussacia baccata*) and mountain laurel (*Kalmia latifolia*) in the understory (Thompson 1996).

Similar to the pine-barrens communities, the chestnut oak forest is adapted to the periodic presence of fire. Both chestnut oak and red oak have thick bark, which protects the living tissue (cambium layer) from fire. They also have the ability to sprout from stumps after being fire-killed. Because of their ability to survive fires and re-sprout, they have an ecological advantage in fire-prone areas over fire intolerant competitors, such as northern hardwood species like red maple (*Acer rubrum*), sugar maple (*Acer saccharum*) and American beech (*Fagus grandifolia*). Fire suppression on the Preserve and the ridge may be altering the composition of these forests whereby fire intolerant species, like the northern hardwoods, become established. These changes will potentially impact wildlife species that utilize the fruit produced by fire tolerant trees, like the oaks and hickories.

Hemlock-Northern hardwood forest -The other major components of the forested uplands at Sam's Point include the hemlock-northern hardwood forest, northern hardwood forest and the red maple-hardwood heath forest. Combined, these communities cover a small portion (roughly 10%) of the Preserve, with the hemlock northern-hardwood occupying most of the area. The hemlock forests are predominantly found growing on the steep slopes of the north and south gullies where cooler temperatures provide a niche for this community type. On its fringes, various factors shown can cause transitions from this community to the northern hardwood or chestnut oak forests (see Appendix V). The long term effect of woolly adelgids on the hemlock-northern hardwood forests is a significant concern throughout the region. Woolly adelgid, an aphid, feed on and defoliate the hemlocks, thereby killing the trees. As more hemlocks die, these forests could lose some of their diversity in a transition to northern hardwood or oak forests.<sup>2</sup>

The unfragmented hardwood forests of the Preserve play an important role as buffers for the ridgetop pine barrens communities. Today, the Preserve is largely free of invasive plant species thanks in part to the presence of these large, contiguous hardwood forests. The chestnut oak forest (see Map 7), which envelopes most of the ridge and the Preserve, helps to prevent non-native and invasive plants and animals from moving onto the ridge-top from the valley below (Batcher 1999). Continued protection of these forests is therefore integral to continued protection of the rarer, ridge-top communities.

Other Notable Communities Smaller ("small-patch") community types contained within the larger communities, such as the chestnut oak forest and the dwarf pine barrens, make up the remaining vegetation types found at the Preserve. Of these small-patch communities, the **pitch pine-blueberry peat swamp** (G3 S1), the **perched bog** (G3G4 S1S2) and the **ice caves talus** (G3 S1S2) are the most significant conservation goals due to their rarity and integrity (see

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<sup>2</sup> Currently, the outbreak of woolly adelgids in the Shawangunks is largely restricted to hemlock forests on the eastern side of the ridge. Heavily infested areas include the talus slopes of Millbrook Mountain and Gertrude's Nose. At this point, woolly adelgids have not been observed in the North and South Gully hemlock forests.

Appendix I for a description of state and global ranks). Excellent examples of these communities can be found on the Preserve. Collectively, they make up about 43 acres, a very small portion of the property (approximately one- percent).

**A Perched bog** represents a nutrient poor peatland, which has developed in shallow depressions in the quartzite bedrock (Thompson 1996). The perched bog is ombrotrophic, meaning that it primarily receives its water from precipitation. Because of very little circulation of water, the community is highly acidic (pH less than 5.0), which yields a flora consisting of sphagnum mosses (often ranging in color from brown to red to green), leatherleaf (*Chamaedaphne calyculata*), sheep laurel (*Kalmia angustifolia*), rhodora (*Rhododendron canadense*) and hardhack (*Spiraea tomentosa*) (Thompson 1996).

**Pitch pine-blueberry peat swamp** is a common community found within the dwarf pine ridge on the Preserve's plateau. This wetland, unlike the perched bog peatland, is found on mineral soil and has an abundance of pitch pines and highbush blueberry (*Vaccinium corymbosum*) (Thompson 1996). These wetlands, like the perched bog, have also formed in shallow depressions in the bedrock where accumulated water creates more sterile and acidic conditions. The development of these swamps has been influenced by short stints of beaver activity, as seen in the swamp just north of Lake Maratanza.

**Ice caves talus** communities are also a unique component of Sam's Point. They support a regionally unique boreal biota as a result of cold air drainage emanating from the depths of the crevices. These communities, which are found in several locations on the property, are home to plants more commonly seen in subalpine forests and alpine meadows above 4,000 feet, such as those found on the highest Adirondack summits. Where enough soil has accumulated on the talus blocks that chock these crevices, there is a delicate carpet of bryophytes (mosses and lichens) and boreal plants, such as creeping snowberry (*Gaultheria hispidula*), goldthread (*Coptis trifolia*) and bunchberry (*Cornus canadense*). Alpine lichen called map lichen (*Rhizocarpum geographicum*) also occurs within this community type on the Preserve. Common trees associated with the ice caves talus communities also have boreal and alpine affinities, including black spruce (*Picea mariana*) and mountain ash (*Sorbus americana*). These areas, as discussed elsewhere in this plan, are highly susceptible to degradation from recreational use and will need to be managed accordingly.

### C. Wildlife and Rare Species

The vegetation communities described above provide habitat for a variety of animals, as well as several rare species of both plants and animals. Many of the animal species, especially birds and large mammals, move through and utilize a range of habitats on the Preserve. While some areas may serve for foraging activities, others may be more important for nesting and mating. Additionally, the Preserve and the adjoining areas on the ridge serve as an important travel corridor for wildlife. Large mammals like black bears and bobcats use the ridge to move from the Catskills to southern habitats. Migrating birds also use the ridge as a flyway when moving south or north. Rare plant species tend to be localized to specific habitats on the Preserve. There are several rare plant species on the Preserve needing protection, which are listed in Table 1. Some are discussed further below.

The large, unfragmented nature of Sam's Point Preserve is likely to benefit a number of animal species that require these types of habitats. The Cooper's hawk (*Accipiter cooperii*), which is a species of special concern in New York, is known to require large, undisturbed forested habitats for nesting (Kiviat 1988). Some species of thrushes, such as the hermit thrush (*Catharus guttatus*) and Veery (*Catharus fuscescens*) nest openly on the ground and therefore require large core areas to escape brood parasitism by cowbirds and minimize nest depredation. The development of roads and hiking trails can potentially interfere with their required nest-site security.

The timber rattlesnake (*Crotalus horridus*) (G5 S3) is a threatened species in New York. Although the population at Sam's Point has not been well studied, snakes have been observed in several locations on the property. Open rocky areas, which occur throughout much of the Preserve, are known to be important habitats for mating and basking activities. Timber rattlesnakes use a wide range of habitats when foraging. Snakes may be found in chestnut oak forests, red maple-hardwood heath forests or pine-barrens communities in search of prey (McGowan 1999). Because this species is vulnerable to poachers, den-sites should be undisclosed and important habitats kept inaccessible by minimizing trail development in such areas.

Cliff face communities at the Preserve harbor a concentration of rare plants and are also an important nesting habitat for some birds, especially the common raven (*Corvus corax*). Two rare plants found on the cliffs present interesting circumstance as the species are found at the opposite limits of their ranges, one from the north, and the other from the south. Mountain spleenwort (*Asplenium montanum*) (G5 S1) is a cryptic fern that typically can be found tucked under small or large overhangs where the plants are partially protected from the extreme environmental factors of the cliffs. Mountain spleenwort, which ranges from Georgia to southern New England and New York, is found at its northern extreme in the Gunks. In contrast, highland rush (*Juncus trifidus*) (G5 S2) is an alpine species more commonly found on the summits of the highest peaks in the northeast. A post-glacial relic, the highland rush is at its southernmost location in the Shawangunks. Like the mountain spleenwort, it is largely relegated to the cliff face habitats on the ridge. The Preserve is home of perhaps the most vibrant population of this species in the northern Shawangunks, which occurs in a small amphitheater near Sam's Point. Careful management of the cliff areas on the Preserve will ensure protection of these rare species.

Appalachian sandwort (*Minuartia glabra*) (G5 S1S2), rhodora (*Rhododendron canadense*) (G5 S1S2), and clustered sedge (*Carex cumulata*) (G4? S1S2) are additional rare plant species that are found in various habitats on the Preserve. Appalachian sandwort and clustered sedge tend to prefer habitats of open, disturbed soils. These species are prolific along the gravelly shoreline of Lake Maratanza and in other disturbed areas on the property. Appalachian sandwort is a vigorous pioneer that colonizes pockets of open soil along the Preserve's cliff edges. Due to its ability as a pioneer, the species is important for the restoration process of the badly damaged cliff edge north of Sam's Point. It helps to stabilize eroding soils with its roots, and also contributes nutrients and organic matter needed for the development of

late-succession species. *Rhodora*, another species with a more northern distribution, blooms early in the spring and is common in wet, boggy areas of the Preserve's pine-barrens communities.

*Table 1. Rare Species and Natural Communities of Sam's Point Preserve*

Element Occurrence	Global Rank	State Rank
<u>Communities</u>		
Pitch pine-blueberry peat swamp	G3	S1
Perched bog	G3G4	S1S2
Dwarf pine ridge	G1	S1
Sparse dwarf pine ridge <sup>3</sup>		
Ice caves talus	G3?	S1S2
Chestnut oak forest	G3G4	S4
Pitch pine-oak heath rocky summit	G4	S3S4
Sparse pitch pine-oak heath rocky summit <sup>4</sup>		
Pitch pine heath rocky summit <sup>4</sup>		
Hemlock-Northern Hardwood forest	G4G5	S4
<u>Plants</u>		
	G4	S1S2
<i>Carex cumulata</i> (clustered sedge)	G5	S2S3
<i>Carex retroflexa</i> (reflexed sedge)	G4	S1
<i>Minuartia glabra</i> (Appalachian sandwort)	G4	S1S2
<i>Asplenium montanum</i> (mountain spleenwort)	G5	S1
<i>Rhododendron canadense</i> (rhodora)	G5	S1S2
<i>Juncus trifidus</i> (arctic rush)	G5	S2
<i>Hedeoma hispdatum</i> (mock-pennyroyal)	G5	S2S3
<i>Pseudotaxiphyllum distichaceum</i> (two-ranked moss)		
<u>Animals</u>		
<i>Apharetra dentata</i> (Toothed Apharetra)	G4G5	S2S3
<i>Cicindela patruela patruela</i> (Northern Barrens Tiger Beetle)	G4	S2S4
	G4G5	S1S3
<i>Crotalus horridus</i> (timber rattlesnake)	G4	S3

Another important habitat for wildlife at Sam's Point is the ice caves talus communities discussed above. Small mammals such as the star-nosed mole (*Condylura cristota*), the long-tailed shrew (*Sorex dispar*) and a variety of bats, including the brown bat (*Myotis lucifugus*), big brown bat (*Eptesicus fuscus*), hoary bat (*Lasiurus cinereus*) and the eastern pipistrelle (*Pipistrellus subflavus*) have been known to use these habitats (Kiviat 1988). Despite this documentation however, little is known about the extent to which these bat species utilize the Preserve's caves for hibernation. Shingle Gully is also a historical location of the extirpated eastern woodrat (*Neotoma floridana*), and it has been suggested the ice caves talus communities are possible habitats for the rock vole (*Microtus chrotorrhinus*) (Kiviat 1988). The rock vole is another species having a northern affinity that could utilize these regionally uncharacteristic boreal habitats.

<sup>3</sup> Variant of the dwarf pine ridge community

<sup>4</sup> Variants of the pitch pine-oak heath rocky summit community

## II. Mission and Goals

### A. Mission Statement

*Sam's Point Preserve is home to an abundance of rare species and natural communities, including the globally rare ridgetop dwarf pine barrens. The mission of the Preserve is to use a science driven approach to protect:*

- *the biological diversity of the landscape, along with*
- *the wilderness character and spiritual quality it embodies, and*
- *the record of the relationship between these resources and human beings.*

As described in this mission statement developed by the Sam's Point Advisory Council, the leading objective for the Preserve is protection of its biological diversity through science-based land management. This will be accomplished by:

- perpetuating the natural ecological processes of the landscape,
- building community support;
- ensuring public use of the Preserve is consistent with this objective; and
- public education.

Protecting the wilderness character and spiritual quality of the landscape requires careful management of public use, and the development of appropriate infrastructure. Sam's Point Preserve has the fewest trails and roads of the Preserves of the northern Shawangunks, affording it a distinctive wilderness quality notable in the region. The Preserve's biological integrity and wilderness quality will be augmented even further when the natural processes of the landscape are returned through ecological management.

Minimizing further development at the Preserve and controlling large increases in public use is an important component of managing the Preserve appropriately and fulfilling the mission statement... Public use of the Preserve is encouraged to the extent that it does not degrade the natural or cultural resources, or the wilderness character of the landscape. Recreational activities on the Preserve are limited to passive uses, environmental education and scientific research.

Equally important are pro-active management actions taken to protect, and where necessary restore, the natural communities and native species of the Preserve, as well as the ecological processes on which they depend.

Conservation, programmatic and land protection goals for the Preserve are described below. These goals support the overall vision for the Preserve described above in the mission statement. The means for achieving these goals are described in the following sections of this plan.

## B. Conservation Goals

In December of 1999, the Shawangunk Ridge Biodiversity Partnership initiated landscape level planning for the 150,000 acre Shawangunk study area. The Partnership is a collaboration of the agencies and organizations that manage protected land of the ridge. The mission of the Partnership is *to work together to maintain, and where necessary restore natural communities and native species of the Shawangunk Mountains and the ecological processes on which they depend.*

The Partnership mapped the vegetation of the protected lands and undertook a conservation planning process that identified ridgewide conservation “targets” and a summary of the threats to these targets (Batcher 2000). Six conservation targets were selected for the ridge. They represent “ecological systems,” some of which contain one or more natural community types and multiple rare plant and animal populations. The systems are:

- Chestnut Oak Forest
- Hemlock-Northern Hardwood/Mesic Oak Forest
- Cliff and Talus
- Lakes, Wetlands and Rivers
- Dwarf Pine Ridge
- Pitch Pine-Oak-Heath Rocky Summit

Components of each system exist within Sam’s Point Preserve (see Map 7). The bulk of the dwarf pine barrens occurs on the Preserve, as do large, excellent examples of chestnut oak forest, hemlock-northern hardwoods, cliff and talus, and pitch pine-oak-heath rocky summit. The critical threats identified to these systems include:

- Fire Suppression
- Excessive Deer Browse
- Invasives
- Encroaching Development
- Recreational Visitor Use
- Hydrologic Alterations

This set of targets and threats are the basis of a set of strategies and actions defined by the Partnership to ensure the long-term viability of the systems identified and to mitigate threats to these systems... Ensuring their viability means ensuring the protection of **all** the plants and animals that constitute the systems.

The priority programs needed to accomplish this at Sam’s Point and on the larger Shawangunk Ridge includes:

- fire management
- deer management
- invasives management

- land protection;
- and recreational use management.

This plan provides a programmatic approach to each of these management needs and provides guidance for their continued development. It is the intent to carry out the actions outlined to preserve the unique resources of Sam's Point, and that the Preserve will provide an opportunity for the public, volunteers, supporters, students and scientists to observe the benefits of using science-based land management for protecting biodiversity through visitation and public educational programs.

### C. Programmatic Goals

Sam's Point offers an excellent opportunity to demonstrate the use of science-based land management for protecting biological diversity. Programs and partnerships with the surrounding communities have been designed to demonstrate and engage the public in management strategies that will protect and Preserve the unique resources at Sam's Point and along the Shawangunk Ridge. Programmatic goals to further this engagement and involvement include:

1. Demonstrate use of science-based land management and the effectiveness of fire, deer and invasives management in maintaining the dwarf pine barrens community and other elements of biological diversity at the Preserve.
2. Conduct long-term ecological research on the dwarf pine barrens and associated communities and rare species found at the site by working with local scientists, partners and universities.
3. Build the ecological management capabilities of the Shawangunk Ridge Biodiversity Partnership by engaging volunteers in research and land stewardship at the Preserve.
4. Manage public access to provide safe, low-impact recreational uses by implementing the monitoring program described in the VERP Framework included in this plan.
5. Develop outreach programs that support the conservation goals of the Preserve by providing education to visitors and local communities about the biodiversity and cultural history of the Preserve and the Shawangunk Ridge.

### D. Land Protection Goals

Protection of Sam's Point Preserve represented a huge accomplishment in the overall conservation of the Shawangunk Ridge. With close to 30,000 acres currently protected along the Ridge, additional land conservation will target contiguous parcels important to the long-term integrity of the Shawangunk landscape. Open Space Institute, the Preserve's most active land protection partner, is focused on protecting lands adjacent to the Preserve on both the eastern and western flanks of the Ridge. In light of the strides that have been made in protection of key parcels along the Ridge, conservationists can and should evaluate future priorities for protection. For example, see the following table of priorities areas for protection in the vicinity of Sam's



Point Preserve. Conservation partners (e.g. Cragmoor Association, Cragmoor Conservancy, Shawangunk Conservancy, Open Space Institute, the New York/New Jersey Trail Conference, NYSDEC, PIPC and The Nature Conservancy) can work to protect lands in the vicinity of Sam's Point Preserve through a combination of acquisition, easements and land use policies and practices. To ensure the long-term integrity of the important resources on the Preserve and the adjacent areas, three protection goals have been established:

- protect natural and cultural resources,
- protect linkages, and
- protect buffer areas.

Accomplishing these goals depends on cooperation of landowners and the availability of funding.

### *1. Protect Natural and Cultural Resources*

The Shawangunk Ridge Biodiversity Partnership developed a set of criteria for evaluating natural resources on properties adjacent to protected land along the ridge. The criteria were based on presence of rare species (Lyons-Swift, 1995, McCabe, 1997, Barbour, 1997), important natural communities (Thompson, 1997) and proximity to protected features. Land adjacent to protected land with high biodiversity values is inherently important. Outreach to adjacent landowners about biodiversity and conservation practices suitable for their land is a good conservation strategy for the conservation land managers along the ridge.

### *2. Protect Linkages*

Protecting linkages between protected lands will ensure that flora and fauna can continue to use such corridors to move across the landscape. The Shawangunk Mountains are believed to provide an important northeast-southwest oriented corridor for species movement along the ridge, in addition to dispersal between the Catskills and areas further south.

The ridge is in proximity to other significant biodiversity areas, such as the Rosendale Limestone Cave Complex, The Shawangunk Kill/Grasslands complex, and the southern Shawangunks. Maintaining linkages with these areas is important for wildlife and plant dispersal, as the lowland landscapes become increasingly developed. Such dispersal may be important for maintaining genetic diversity, especially for large mammal populations such as black bear, bobcat, and fox.

If dispersal corridors are not maintained, each area becomes a fragmented island. There is considerable scientific evidence showing that small "island populations" suffer from reduced genetic diversity and inbreeding, or are subject to environmental disturbances (fire, climatic events, disease, predation) which may result in the crash or extirpation of a species (Pimm, 1991). This may become a more significant factor with climate change.

Linkages are also needed to provide valuable recreational resources. Currently the Long Path (maintained by the New York-New Jersey Trail Conference) winds its way along the length

of the Ridge. Additional land protection will assist in routing the trail through scenic locations and minimize its placement in developed areas.

An area has high linkage value if it is situated between already conserved lands and supports only a low level of development. A “medium” value area could be situated between already conserved lands, but a moderate level of development existed on the property. If the area was not located between current conserved lands, the area would have low conservation value as a linkage.

### *3. Protect Buffer Areas*

Additional buffer areas are needed to enable fire management practices and minimize impacts from peripheral development (i.e. weedy species invasion, dumping, etc.). Additionally, many of the buffer areas can support recreational activities that may not be appropriate in other parts of the Preserve.

If a potential buffer area was located immediately adjacent to Preserve property that supports a fire dependent community and it had little to no development, it was given a “high” rank. If an area was located immediately adjacent to Preserve property that did not support a fire dependent community, or if the potential buffer area supported moderate-high levels of development, a “medium” rank was assigned. A “low” rank was assigned if the potential buffer area did not abut currently or potentially conserved land, or if it was intensively developed or disturbed.

### Future Land Protection Recommendations

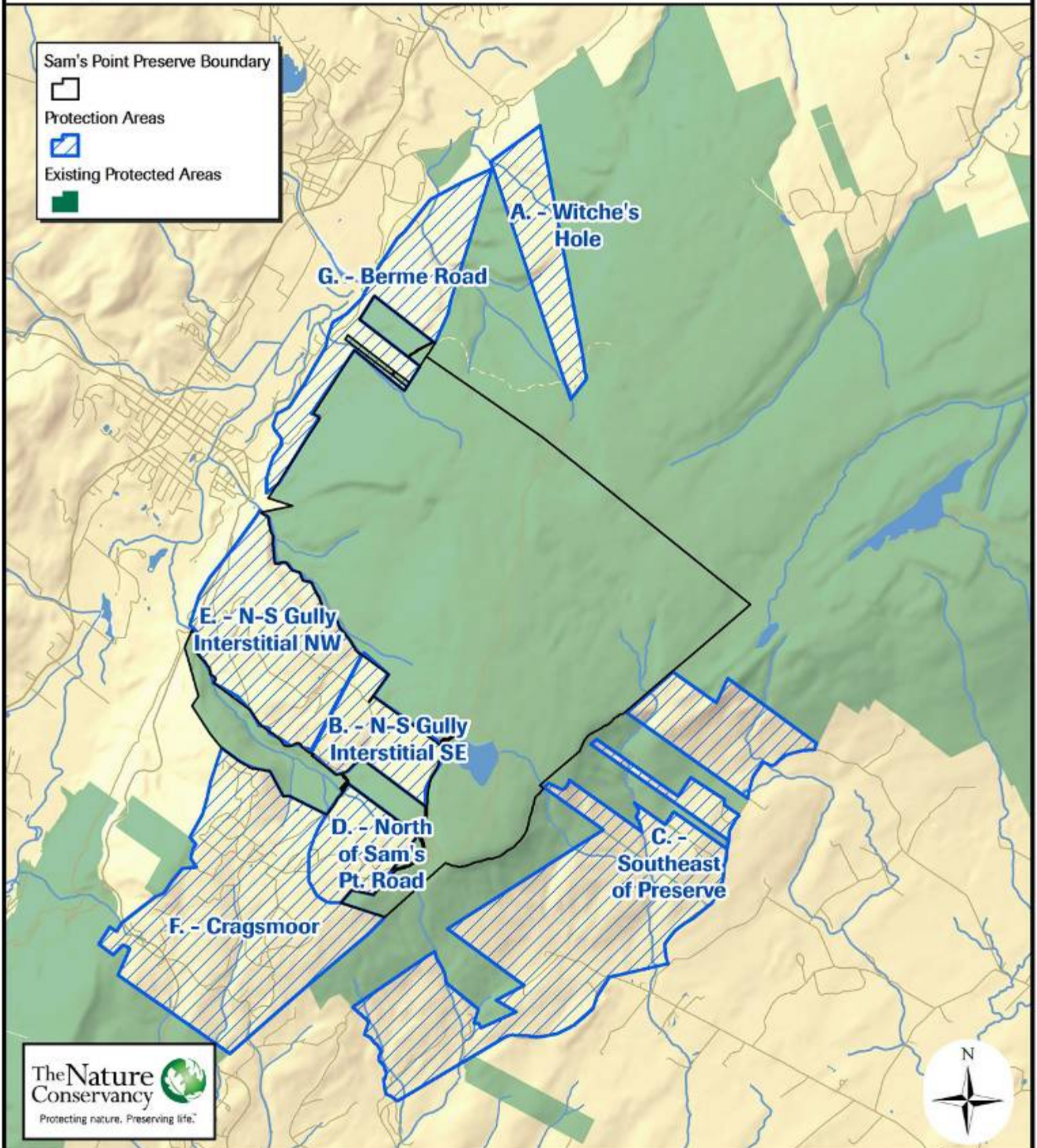
To determine the protection priorities, the three criteria described above were applied to currently unprotected lands located in the vicinity of Sam’s Point Preserve (see Map 8). Areas evaluated were based on natural and human-made features, not private property boundaries. The results of this analysis are presented in Table 2.

In addition to the seven protection areas listed in Table 2, broad protection zones have been developed by the Shawangunk Ridge Biodiversity Partnership for the purposes of planning and management. For example, the dwarf pine barrens protection area was developed based upon the system’s need for a 500-meter buffer from its core, to allow for fire management smoke buffers needed to achieve the ecological goals established for the system (see Appendix VI).

The forested upper elevations of the Ridge are generally surrounded by an outer “buffer”, an area largely dominated by agricultural lands, which serve as an important transition zone between more intensive human uses and the chestnut oak and other forest types within the protection areas. These areas are most vulnerable to future development and are also important open space and agricultural components for the communities around the Ridge. The scientific literature supports maintaining a 2,000 meter buffer zone to protect unfragmented forest resources (Batcher, 2000).

# Sam's Point Master Plan

## Map 5. Potential Protection Areas

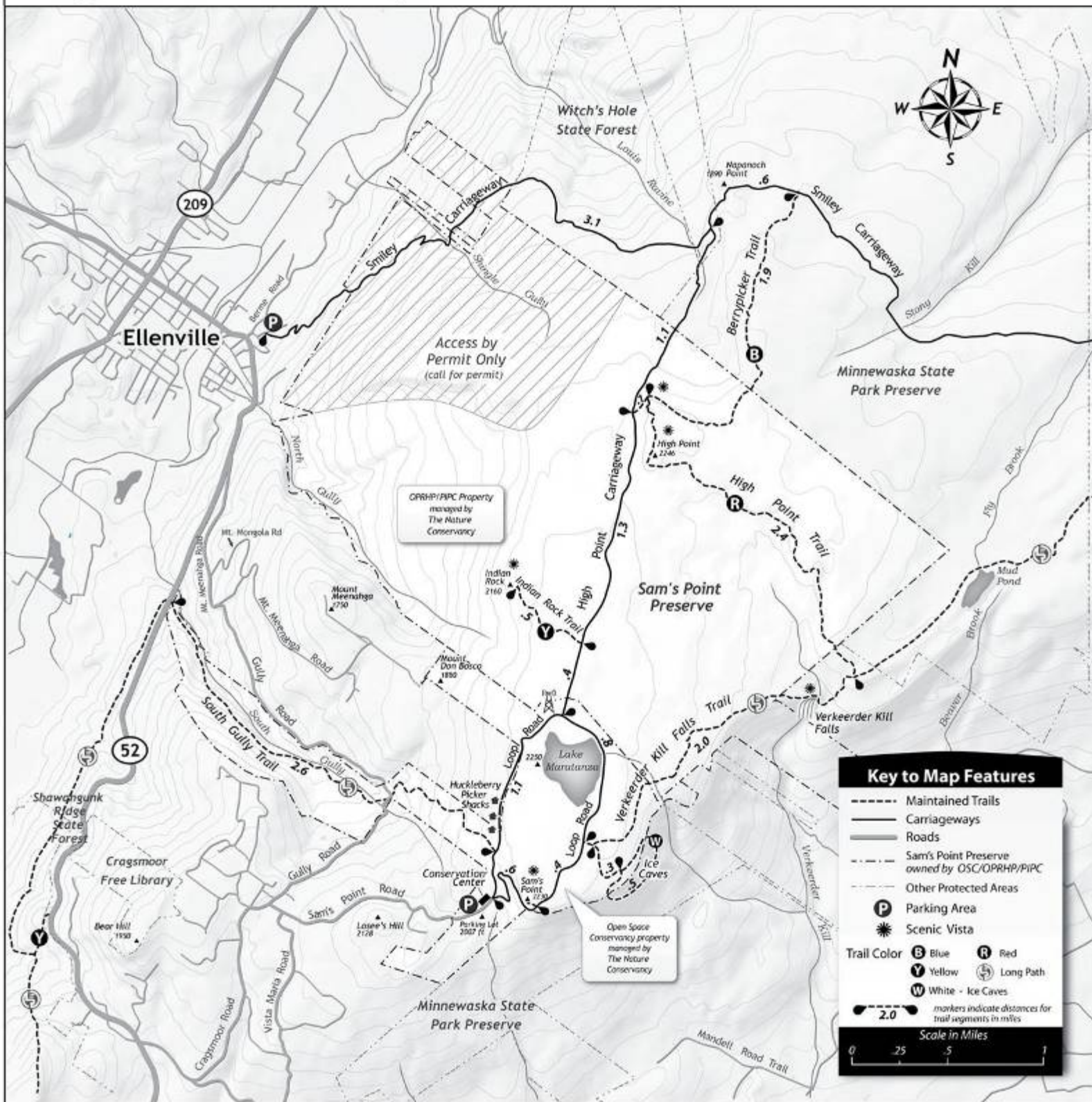


**Table 2. Evaluation of Areas According to Protection Criteria**

<b>Area Location</b>	<b>Presence of Important Resources</b>	<b>Linkage</b>	<b>Buffer</b>	<b>Priority</b>	<b>Recommended Action</b>
A. Witches Hole Area	High	Medium	High	1	Acquisition
B. N-S Gully Interstitial space – southeast	High	High	High	2	Acquisition
C. Southeast of the Preserve	Medium	Low	High	3	Acquisition, easement
D. North Sam's Point Road	Low	Medium	Medium	4	Acquisition, easement or management agreement
F. Cragmoor	Medium	Medium	Medium-Low	6	Work with landowner(s) to encourage environmentally sensitive development and land mgmt practices as well as protection through acquisition and/or easements
E. N-S Gully Interstitial space – northwest	Not Assessed	Medium	Medium	5	Work with landowner(s) to encourage environmentally sensitive development and land mgmt practices as well as protection through acquisition and/or easements
G. Berme Road	Not Assessed	Low	Medium-Low	7	Work with landowner(s) to encourage environmentally sensitive development and land mgmt practices as well as protection through acquisition and/or easements

# Sam's Point Master Plan

## Map 6. Trails and Points of Interest



### III. Infrastructure

Infrastructure at the Preserve includes buildings, lighting, parking areas, roads, trails, landscaping and signage. While not under the jurisdiction of the Preserve, there is also a set of cell towers located on the property that require special consideration.

Infrastructure has a profound impact upon the public's perception of the property, and every effort has been made to make infrastructure choices that represent a desirable conservation ethic. The most significant change in infrastructure has been the construction of a new conservation center, reconfiguration of the parking area at the entrance and the undergrounding of utility lines at the entrance of the Preserve. Renovation of the Gatehouse to provide for a live-in caretaker was completed in 2005 and has resulted in reduced after-hours vandalism and improved public-use management.

Environmental sensitivity and concern for potential impacts on cultural resources is a high priority when considering changes or additions in infrastructure. Replacement of existing facilities has been done with an effort to minimize environmental impact and with careful consideration of the surrounding landscape.

Since the purchase of the property in 1996, infrastructure has been repaired, replaced, removed and constructed, in an effort to maintain adequate infrastructure to accommodate public use to levels described below in the VERP (Visitor Experience and Resource Protection) framework, recognizing that if public use begins to exceed or affect any of the Limits of Acceptable Change (LAC) set forth in the VERP plan, changes to infrastructure or policies may be needed to protect the Preserve's resources. For example, trail erosion could warrant moving a trail or trail closure, erecting additional signs to educate visitors, or constructing barricades to channel visitors away from sensitive areas.

#### A. Facilities Plan

1. *The Gatehouse*: As noted above, renovations to the historic Gatehouse were made in 2005, based upon architectural and engineering plans, and it is now a functional part of the Preserve's infrastructure. The Gatehouse provides housing for a year-round, live-in volunteer caretaker. Renovations included winterization, running water, a bathroom, and a kitchen area. On-going maintenance is needed on the exterior of the house and evaluation of the energy efficiency of the building should be conducted with an eye towards reducing energy consumption.
2. *The Conservation Center*: The Meg Stewart Conservation Center opened in May 2005 and serves as a point of orientation and education for the public, as well as a home for the science, stewardship and volunteer activities at the Preserve. At 3,000 square feet, the center provides space for exhibits, educational programs, meetings and as an information and orientation location for visitors. The Center offers public bathrooms, a water fountain, vending machines and a small gift shop, where maps, books and nature-related items are available for sale. A receptionist is present part-time to collect parking fees and provide information and sales. The Center makes available volunteer and staff work space. The

center was designed by Matthew Bialecki Associates in accordance with the Leadership in Energy and an Environmental Design (LEED) standard developed by the US Green Building Council, and was LEED certified in 2007. In 2005, the building was recognized by the American Institute of Architects with an Honors Award for architectural design and sustainability. Site work contained disturbance to the original footprint at the entrance of the Preserve, and the parking lot was reduced in size and reconfigured. Existing utility lines servicing the cell towers were undergrounded to improve the view of the escarpment of Sam's Point. Making this facility energy efficient, utilizing local material and practicing sound maintenance that integrates the Preserve's ecology while providing for public programs, stewardship and volunteerism has helped build support for the Preserve's mission, and has functioned as a valuable management tool. (See Appendix X for additional information on the energy-efficient features of the Conservation Center).

3. *Work and Storage Space*: As the Preserve's programs continue to evolve, additional work and storage space will be needed to accommodate fire management equipment and a seasonal fire crew. Locations for a facility to meet these needs should be investigated over the next two years in anticipation of expanded ecological management activities, and may ultimately be located at Sam's Point Preserve or on other conservation lands held by partners, such as Minnewaska State Park Preserve or the Open Space Conservancy.

## B. Roads and Parking Areas

Background: A limited number of roads have existed at Sam's Point for more than 100 years, and early roads were built to access the early hotels located on the property on the shore of Lake Maratanza and at Sam's Point. These roads were constructed as "broken stone" carriage roads, similar to the carriage roads constructed at Mohonk Mountain House and Minnewaska, Acadia National Park and Rockefeller State Park. Broken stone construction relies on a larger stone under layer, with a pervious surface – crushed shale was the surface material used locally in the Shawangunks. Broken stone construction is suitable for rugged terrain, for horse and carriage traffic, and is designed to withstand frost heaving. Shawangunk carriage roads, as well as the few other examples of carriage roads found in the US, are now considered an aesthetic, historic and cultural landscape feature to be preserved.

In subsequent years the carriage roads at Sam's Point were paved to accommodate heavier vehicular traffic, and parking lots were constructed at Sam's Point and near the Ice Caves to accommodate tourists visiting "Ice Cave Mountain". Paving over broken stone construction does not work well, and much of the paving is now broken. In addition, drainage culverts built into the carriage roads have been crushed or jammed full of rocks, and severe washouts have occurred on all the roadways, in particular where grade is the steepest.

The carriage roads at Sam's Point serve multiple functions today – the Loop Road is the main point of access to the Preserve and the majority of visitors begin their visit near the Conservation Center and use the Loop Road to reach the Ice Caves Trail or other trailheads on foot. While public vehicular use is prohibited, the Loop Road is also used by the cell tower operators to access the towers for repair and maintenance. The roads are used for emergency services, such as search and rescue, and for stewardship and ecological management, to access

more remote parts of the Preserve by vehicle. In particular, the roadways are essential for fire management, providing access and serving as firebreaks. Meeting these multiple objectives means that the roads must be maintained to an adequate standard for light vehicular traffic, while achieving a pleasant and aesthetic experience for walkers and hikers.

Maintaining the wilderness character of the Preserve is a high priority. However, it will be important to maintain the existing roadways to meet the needs of the public, cell/radio tower owners and lessees and ecological management practices, including fire management. The Nature Conservancy recognizes the need to coordinate restoration and on-going maintenance of existing roadways to meet public use and ecological management goals.

The restored roadways should serve primarily as an inviting and aesthetic experience for hikers, as well as supporting other, less frequent uses. The challenges of maintaining multi-purpose roadways are similar to other publicly accessible Preserves along the ridge, including Minnewaska State Park Preserve, Mohonk Preserve and the Mohonk Mountain House.

### 1. *Inventory and Recommendations*

- a. **The Loop Road (west side)** - As an entry point onto the property and the primary access route to several major trailheads, the towers and Lake Maratanza, the west fork of the Loop Road is the most critical, and most heavily used road segment at Sam's Point Preserve. Lack of maintenance in recent years coupled with poor drainage, relatively high levels of traffic (including heavily loaded trucks), and improper plowing practices, have resulted in significant deterioration and widening of the roadway along most of its length. The majority of the original asphalt has broken up leaving an uneven surface of gravel and/or dirt. Substantial water channeling and washouts have also occurred. After a series of repairs in the spring of 2007, including the addition of one new culvert, repairs to two existing culverts, significant grading and localized resurfacing, the road is in easily passable condition for small to moderate sized vehicles. In its current condition, the road can support small to moderate sized vehicle access to the towers and lake. However, unless further improvements are made to the drainage and surface condition, this road segment will continue to degrade. Because it serves as the basis for recreational and ecological management, and provides emergency access crucial to maintaining public safety (i.e. search and rescue, fire suppression, access to 911, DEC and NYS Police towers) this segment of the road is the highest priority for restoration and repairs at Sam's Point Preserve.

**Recommendation:** The west fork of the Loop Road should be restored to a smooth surfaced, gravel road that can accommodate slow speed (< 10mph), one-way vehicular traffic and occasional emergency access to larger equipment such as fire trucks. Small to medium sized vehicles should be able to pass one another without difficulty along the majority of the roadway by pulling off slightly, however, accommodations will need to be made for larger vehicles (i.e. fire trucks, emergency vehicles) to pass one another at certain locations (e.g. large turnout across from towers). Due to the need for winter emergency access and the high levels of vehicular traffic on the road, a cooperative



maintenance agreement between The Nature Conservancy and the radio/cell tower operators is needed to include provisions for winter plowing and routine maintenance to preserve the existing road condition and provide future repairs.

- b. **The Loop Road (East side)** - This section of the Loop Road was historically used as a means of accessing the Sam's Point Overlook by car or foot and as a vehicle route for Ice Caves Mountain with visitors completing the loop and returning to the visitor center. This road segment includes a winding climb with several switchbacks from the parking lot up under the Sam's Point Overlook, and a short but very steep section to the old overlook parking area. The rest of the road surface is shale and gravel and with remnant patches of rough, broken asphalt. This segment of the Loop Road is one of the most heavily used areas of Sam's Point by hikers as it provides the easiest access to the Sam's Point Overlook and the Ice Caves. Portions of this road section between Sam's Point and the Conservation Center parking area were severely washed out after several heavy rainstorms in the spring and fall of 2005. Since that time, a series of repairs have been conducted to remove encroaching vegetation, fill in washed out areas, clean out drainage ditches and open up and/or repair 8-10 clogged and damaged culverts. The majority of this road segment is in easily passable condition by most vehicles with the exception of a few isolated locations that have more severe damage. The worst sections of this road segment are between the second hairpin turn to the cliffs under the Sam's Point Overlook, where broken asphalt, exposed culverts and rocks make the road surface extremely uneven.

This road will never support high levels of vehicular traffic. However, because it provides the most efficient access to high visitation areas for search and rescue, the road surface must be smooth and easily accommodate one-way traffic in the event of an emergency, including large fire apparatus. For this reason, a more comprehensive road improvement plan will need to be developed by a contractor to improve the existing roadbed and drainage. Two-way traffic will always be limited by the narrow section under Sam's Point Overlook, however, pull outs will be maintained at the first hairpin turn near the bottom of the road and at the old Sam's Point Overlook parking area so that larger emergency vehicles may pass one another. Because of the high levels of recreational use, aesthetics should always be considered and the roadway should be limited to the minimum width needed to support the aforementioned uses.

**Recommendation:** Although this section of the road does not receive heavy vehicular use, it is a key access/egress route in the event of an emergency. For this reason, it is critical to maintain the road segment and there are several immediate high priority repairs that have already been initiated. However, due to the lower levels of vehicular traffic and relatively stable condition, it is a lower priority for large scale repairs than other segments including the west side of the Loop Road and the Ice Caves Road.

Vehicular use of the Loop Road by tower facility personnel and other authorized parties will be governed by the following guidelines:

- The speed limit is 8 mph.
  - Vehicular use is only permitted on the western portion of the road to avoid pedestrians hiking up the eastern side to Sam's Point and the ice caves.
  - Vehicular use is only permitted for official business purposes.
  - Vehicular travel is not permitted beyond the High Point Carriageway for official tower business, or beyond the Lake Maratanza dam for official waterworks maintenance.
- c. **The Ice Caves Road** - The Ice Caves Road is the most severely degraded road section at Sam's Point Preserve. This road was installed as part of the Ice Caves Mountain tourist operation to provide 2-way vehicle access down to the Ice Caves and back to the Loop Road. The Ice Caves are the most frequently visited location on the Preserve after Sam's Point Overlook and this road provides the only means of access. However portions of the road are impassable with a vehicle due to failure of drainage culverts and ditching. The road is extremely rough but passable with a high-clearance pick-up truck from the Loop Road to the top of the last steep section leading to the old Ice Caves parking lot. Beyond this point, poor drainage has led to channels several feet across and equally as deep that preclude any type of vehicle access to the Ice Caves trailhead.

The current condition of this road is not adequate for hiking (hikers currently have to walk almost completely off of the roadway at one point and then have to cross channeled sections) nor does it provide adequate vehicle access to the caves, which, due to the terrain and the level of visitation, create a relatively high potential for injury compared to other locations at Sam's Point. Maintaining this popular feature, including the many railings, ladders and puncheon bridges throughout the caves is now significantly more difficult since all materials and equipment must be carried in by hand. In addition, as the road continues to degrade, a large amount of washed out material from the roadway has been deposited in the natural vegetation creating localized but significant ecological disturbances. Restoration of this road is particularly challenging due to the extremely deep bed of crushed shale and fill, steep grades and the side-slope position which channels water across the lower section of road. After the Loop Road West segment, this roadway is the highest priority for restoration along its entire length in order to improve recreational, emergency and stewardship access.

**Recommendation:** Restoration of this road section will require the development of a detailed plan by a contract engineer and will necessarily include the removal of large amounts of roadbed material and significant upgrades in drainage and surfacing. Future use will require a narrower, one-way road that can accommodate low levels of pickup truck and ATV use and occasional access by small firefighting apparatus (e.g. brush trucks). Although the road is not as critical to fire suppression operations as other sections of the Loop Road or High Point Carriageway, the vegetation should be kept back away from the road in order to provide an adequate defensible firebreak in the event of a wildfire. A turnaround location should also be maintained at the old Ice Caves parking area that is large enough to accommodate the types of vehicles mentioned above.

- d. High Point Carriageway** - The High Point Carriageway at Sam's Point Preserve is an historic access route from the Loop Road near Lake Maratanza to the old fire tower location near High Point. The road was subsequently extended (probably as a bulldozer line during suppression of the 1953 wildfire) from High Point out to the old Smiley Carriageway. Once relatively accessible, the roadway has suffered significantly from the lack of maintenance in recent years. At present, the High Point Carriageway is a severely degraded, rocky and overgrown two track road that is only accessible by four wheel drive truck. The High Point Carriageway provides an important access route for ecological management and stewardship at Sam's Point. It has also served as an important firebreak in suppressing large wildfires in 1953, 1947 and 1939 (Hubbs 1995). In its current state, the road can no longer safely function as a firebreak and is not accessible to any type of firefighting apparatus. This presents a barrier for implementing prescribed burning and other fuel management and stewardship activities along the carriageway and further out towards the Smiley Road. There is also significant ATV activity and trail cutting near the border with Minnewaska State Park Preserve. Without access down the High Point Carriageway, there is no way for staff to regularly patrol this area to curb illegal ATV usage and the associated damage from trail cutting.

Restoration of the High Point Carriageway is a priority and is necessary to provide safe and efficient access to the northeastern part of Sam's Point Preserve and to maintain a firebreak in the highly volatile dwarf pine fuel type. This is critical for maintaining an adequate level of safety during fire suppression and management operations as well as protecting human safety and preserving this globally rare ecological community. Continued degradation of the road surface will also make it unsuitable for hiking due to the presence of many large rocks.

**Recommendation:** The High Point Carriageway should be restored to a pick-up truck accessible condition and should also be in adequate condition to allow access to small firefighting apparatus (e.g. brush trucks, ATVs w/slip-on). Initial restoration and maintenance activities should include removal of large numbers of rocks to improve the existing road surface, filling in potholes and holes created during rock removal with smaller rocks and gravel found on-site, brush cutting 1-2 feet on both sides of the existing roadway (old road surface actually extends several feet on either side of the existing track - extreme care must be taken to minimize the impact to patches of *Rhodora* growing along the west side of road), improving and/or creating drainage off of road surface in low lying areas, and creation of 2-3 turnout areas along either side of the road that allow vehicles to be turned around efficiently. These areas will utilize existing disturbed/cleared areas so as to minimize additional clearing and other disturbances off the main roadway. Nearly all of this work will be completed by hand and a small tractor as necessary. Brush will be disposed of on-site by lopping and scattering out of view along both sides of the road. At the end of this phase of restoration, the roadway will be easily passable with a 4WD pickup truck. The second phase of restoration will involve bringing in material (crushed rock) to fill in low, rutted and/or rocky areas.

- e. **Lake Maratanza Dam** – The Loop Road crosses the dam at the northeast side of Lake Maratanza. The Village of Ellenville holds an access easement on the west side of the Loop Road, and a 50' easement along the dam and around the Lake, as well as an easement along North Gully brook, which defines the path of the water delivery pipe to the Village. The dam has been determined to be at risk by DEC's Dam Safety program, and is in need of restoration and maintenance, both to maintain water levels in the Lake and to maintain the road. Restoration of the Lake Maratanza Dam and the section of road it supports is a high a priority to assure the continued future use of the Loop Road.

**Recommendation:** The Village of Ellenville is responsible for maintenance of the Lake Maratanza Dam. Steps should be taken as soon as possible to restore the dam.

2. *Parking* - A Parking lot at the Conservation Center is designed to accommodate 60 cars and two school buses. Five additional parking places exist right outside the gate, to accommodate through hikers who may wish to leave a car, or can serve as overflow. On peak days, the public is discouraged from parking on the road outside the Preserve, as it creates a safety hazard, making access by emergency vehicles or fire trucks difficult to impossible.

Sam's Point Preserve can also be accessed from Berme Road Park in Ellenville.

Parking lots at other locations on the Preserve (Sam's Point and Ice Caves Trail) are being restored and have been replanted with pitch pines.

## C. Trails

### 1. *Inventory*

The following is a list of the formally maintained trails on the Preserve. An inventory is needed to assess the conditions of these trails to provide baseline data for the Preserve's VERP framework (see research under Section V for more details). Notes have been made next to each trail listed regarding maintenance needed to prevent further erosion and vegetation loss. In total, there are about 16 miles of formally maintained trails and carriage roads on the property. The Long Path is routed through Sam's Point, following the South Gully Trail (f below), the Loop Road and the Verkeerderkill Falls Trail into Minnewaska State Park Preserve.

- a. Indian Rock Trail – maintain puncheon bridges on wet sections
- b. High Point Carriageway – (see discussion above)
- c. High Point Trail – build scree-walls and rock cairns to direct hikers away from fragile vegetation on rock outcrops; install drainage on wet sections
- d. Verkeerderkill Falls Trail / Long Path – install drainage on wet sections; improve trail definition near the falls
- e. The Loop Road – (see above)
- f. South Gully Trail – maintain trail and monitor use
- g. Berrypicker Trail – maintain trail and monitor use.

- h. Gatehouse Nature Trail – a small nature trail has replaced the miniature golf course behind the Gatehouse. A guide is being developed to interpret common features of the oak forest along this short exploratory trail.

## 2. *Trail Development*

With the addition of a trail from Route 52 to the Loop Road to provide a route for the Long Path, and the refurbishment of the Berry Picker Trail, the development of new trails at Sam's Point is complete. The development of these trails was based on input provided by the New York-New Jersey Trail Conference and the Open Space Conservancy, and were carefully considered by the Sam's Point Advisory Council. It was concluded that these two trails helped meet the objective of providing off-road continuity for the Long Path and were consistent with the VERP Recreation Management Zones described later.

The South Gully Trail is within the Backcountry Zone, which allows for modest trail development. The Berry picker Trail, although within the Sensitive Resource Protection Zone, is an existing route that already received some use, and required minimal further disturbance of the area. This trail provided a logical new route for the Long Path when the connection was closed between Verkeerderkill Falls and Mud Pond. (This trail has been reopened since the acquisition of Awosting Reserve by New York State.) In addition, reopening the trail provided an alternative route for the portion of the High Point Carriageway located between the High Point Trail and Smiley Carriageway.

The two new trails were constructed by Trail Conference volunteers and will be maintained by same. Preventing further fragmentation of the Preserve dictates against the construction of additional new trails at the Preserve. The scientific literature has documented several negative impacts of densely trailed and fragmented areas on wildlife and vegetation (Noss 1999, Miller *et al.* 1998, Drayton and Primack 1996, Maschinski *et al.* 1996, Parikesit *et al.* 1995, Garber and Burger 1994.) Visitors can disrupt mating and nesting activities of wildlife, trample vegetation, cause soil compaction and introduce invasive species. Emphasis can now be placed on adequate maintenance to the existing trails system.

## 3. *Maintenance*

Trail maintenance will be accomplished through a combination of staff and volunteer labor. The Trail Maintainer program coordinated and run by the New York-New Jersey Trail Conference should continue to be utilized where volunteers are recruited to perform routine maintenance on adopted sections of trail. Routine trail maintenance should include: removal of debris and leaf litter from drainage structures in both the spring and fall; a spring walk-through to remove any winter "blow-down;" trail clearing as needed to maintain standards; and repainting blazes as needed. The hiking trails should be maintained to New York New Jersey Trail Conference standards. The standards are as follows: trail corridor – 2 feet wide with no height clearing requirements; tread – 18 inches wide; blazing – 2 inches by 3 inches (2 inches by 4 inches for the Long Path). Any trail maintenance that requires a significant disturbance to soils or removal of vegetation will be coordinated with Preserve staff, including trail relocations and

heavy construction maintenance (drainage structures, steps, cribbing etc.)<sup>5</sup>

#### *4. Unofficial and Illegal Trails*

This category includes both illegal (bootleg) trails and authorized trails that are not publicized and receive little maintenance. Notable bootleg trails exist on the cliff edges north and east of Sam's Point. The cliff edge north of Sam's Point receives more use than the eastern cliff edge and is significantly more impacted as a result. Hikers access this cliff edge from both Sam's Point and a herd path near the tower farm. Efforts to reduce use of this trail have included establishing a pitch pine restoration area at the Sam's Point end of the escarpment and establishment of a Volunteer Patrol.

Protection of the eastern and northern escarpment from recreational impact is essential considering it is perhaps one of the last intact cliff edges in the Shawangunks with a full array of lichens covering the bedrock. Illegal trails also exist in the talus below the cliffs north of Sam's Point and along the Verkeerderkill from the falls to the old drilling field. Efforts should be made to manage these illegal trails with closures. Successfully closing these illegal trails will require a regular patrol presence on the property.

Unofficial trails (authorized but not publicized and minimally maintained) refer to the paths in the vicinity of Shingle Gully, the Grand Canyon and the Ellenville Ice Caves (e.g. the northwestern portion of the Preserve). This area is three miles north of Sam's Point and access is currently by permit only. The Ice Caves are a series of deep crevices that contain ice and snow through much of the summer, and the area contains flora and fauna common to a northern boreal climate. These factors make the Shingle Gully Ice Caves area an ecologically sensitive area with several recreational management issues. Restoration and maintenance of these paths is badly needed to prevent further resource degradation. There are several trails in the area that provide access to popular crevices, some of which have fragile and unique plant communities along their bottoms. These trails should be mapped to document their existence and monitored for further unsanctioned trail developments. Methods for determining use levels should also be researched and tested (pressure plates, game counter).

There is currently extensive trail braiding and vegetation trampling along these paths as a result of poor delineation and layout. Steps are described below in the Preserve's VERP framework for managing the resource issues presented by these paths. A series of interviews with trail experts and land managers conducted in 2006 concluded that main trails in the area needed to be better maintained, social trails should be brushed in and that use of trail monitors and hike leaders were important to maintaining this sensitive area. It was agreed that because of the sensitive nature of the areas accessed by these paths, they will not be marked where they depart from official trails. They also will not be included on trail maps to minimize their use and the subsequent negative impacts. Trail markers will be used only when needed to prevent further erosion and trampling. Even though these trails will not be officially identified on maps, Trail Maintainers from the New York-New Jersey Trail Conference should be solicited to help manage and maintain them.

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<sup>5</sup> For further information on trail maintenance standards and techniques, see [The Trail Maintenance Manual](#), published by the New York-New Jersey Trail Conference.

## D. Signage, Kiosks and Access Points

### 1. *Access Points and Kiosks*

Given the present boundaries of the Preserve, designated access points for the property will be from the Conservation Center below Sam's Point and the Berme Road trailhead at the start of the old Smiley Road in the Village of Ellenville. In the event that other lands are added to the Preserve, the number of access points could increase. However, the increased recreational pressure from added parking lot capacity and access points will be weighed carefully against the Preserve's VERP framework.

Informational kiosks will be maintained at each entry point for the Preserve. Included on these should be interpretive information about the unique attributes of the property, information regarding trails, bulletins about volunteer opportunities and public programs being offered and stewardship guidelines for the property. The kiosks can also serve as a place to post information related to special issues, such as fire hazards, hunting or trail closings. In the long run, efforts should be made through the Shawangunk Ridge Biodiversity Partnership to synthesize the information posted on kiosks across the ridge.

### 2. *Signage*

There are several categories of signage that will be developed and/or maintained on the Preserve. The purposes of signage on the property will be to direct visitors, interpret the landscape, educate the public and delineate the area of the Preserve. The sign categories needed to aid management of the property are listed below. Proposed signs for the first four categories below can be found in Appendix VIII. All signage should bear the logos of the Open Space Institute and The Nature Conservancy and, when possible, be mounted on trees with "birdhouses." In some instances, like Shingle Gully and the Grand Canyon, signage will need to be mounted on small posts.

- a. **Boundary signs** – These signs will be used to delineate the property boundaries of the Preserve. The design of boundary signs for the Preserve has been developed cooperatively with the Open Space Institute, The Nature Conservancy and OPRHP and they will impart stewardship information, rules, and regulations for the property. Maintenance and upkeep of the boundary signs will be accomplished through annual volunteer workdays.
- b. **Stewardship signs for Entry Points** – Stewardship signage is needed for points of entry into the Preserve outside of the main trailheads. These locations include connecting trails from Minnewaska State Park Preserve, informal trails leading off the Smiley Road and trails leading onto the property from Verkeerderkill Falls. The purpose of these signs is to make visitors aware of the guidelines they should follow while they are on the property (described below under Recreational User Policies). As opposed to simply listing rules and regulations, these signs should impart a positive message where visitors are asked to be stewards of the resource. Depending upon their final design and wording, the boundary signs could be used for this category.

- c. **Stewardship signs for Fragile Areas** – Fragile area signage will be required in places where special resource protection steps must be followed to prevent resource degradation. Visitors to crevice bottoms and ice caves will need to be reminded of the fragile boreal flora present and the importance of not treading on it. Similarly, signage will be needed for the High Point Trail where visitors traverse a fragile cliff edge that is highly susceptible to erosion. These signs will need to convey the importance of walking only on solid rock surfaces when traveling across exposed, rocky sections of the trail. These signs should be 8.5” x 11” and be made with white plastic and green lettering.
- d. **Restoration Area signs** – Signs will be needed to alert visitors of priority restoration areas closed to foot travel. Section V and Map 9 provide details as to the location and nature of these sites. Restoration signs should also be written with positive language that encourages visitors to be stewards of the Preserve. The need for signage will vary depending on the restoration site and its proximity to heavily used areas of the property. These signs should be 8.5” x 11” and made with waterproof paper.
- e. **Interpretive signs** – Signs to interpret unique features of the property could be used to educate the public and improve visitor experiences in developed locations. Two areas to consider interpretive signs are the Loop Road and the mouth of the former commercial ice caves (see Education and Outreach below for more information).
- f. **Trail signs** – Signs to mark the official trails of the Preserve will continue to be maintained to assist visitors in route finding. These signs should indicate trail names and the direction of points of interest.
- g. **Off Property signs** – There are currently two signs placed in Cragsmoor to direct visitors to the Preserve. These signs should be maintained and their design should compliment the on-site signs if possible.

## E. Ice Caves Trail

Following the Ice Caves Mountain legacy, the former commercial ice caves continue as a point of interest with Preserve visitors. Many of the people who call to inquire about the Preserve are primarily interested with the status of access to these caves. The former commercial ice caves have continued to be one of the primary attractions of the Preserve, and hand railings and boardwalks are maintained to provide access to the trail that goes through the crevice caves. Motion detection lights within the caves are solar powered by panels mounted near the exit of the cave trail. Public visitation is channeled to this “hardened” resource to prevent disturbances elsewhere in the Preserve. As part of the restoration of the roads at the Preserve, the parking lot for the eastern ice caves will be restored to a hiking trail (see restoration under Section V). An informational/stewardship display is maintained at the entrance to the caves, and a short film regarding the ice caves can be viewed at The Conservation Center...



Renovation of the infrastructure within the caves has been kept minimal in light of the ecological significance of the site, as well as the potential archaeological resources that may exist. The trail goes through a natural community known as ice caves talus (G3 S1S2). A rare species, *Isopterygium distichaceum* occurs within caves and should be monitored. Trail infrastructure helps to protect the fragile vegetation remaining within proximity to the trail. The presence of springs, rock overhangs and an eastern aspect, make this area a likely spot for Native American cultural resources. Trail renovations were sensitive to this and avoided disturbing soils likely to contain these important resources.

## IV. Ecological Management and Research

Fire suppression, deer herbivory, and invasive species invasions are key threats to the ecological integrity of the natural communities at Sam's Point Preserve, as they are across the extent of the Shawangunk Ridge. These threats are inter-related and, as such, management and monitoring strategies will need to be planned and carried out in an integrated fashion in order to be effective in reducing the impacts of these influences. Tackling any one of these independent of the others will not be sufficiently protective of the forest and biodiversity resources of the Preserve.

### A. Fire Management

Fire has been a part of the Shawangunk Ridge since well before the time of European settlement. Through analysis of peat cores taken from Spruce Swamp, near the border of Sam's Point Preserve and Minnewaska State Park Preserve, researchers have documented evidence of fire in Shawangunks over the past 9,000 years. Over the past 2,000 years, the researchers also noted an increase in fire frequency and a corresponding increase in pitch pine pollen, suggesting a clear link between fire and the development of the ridgetop pine barrens at Sam's Point (Laing 1994).

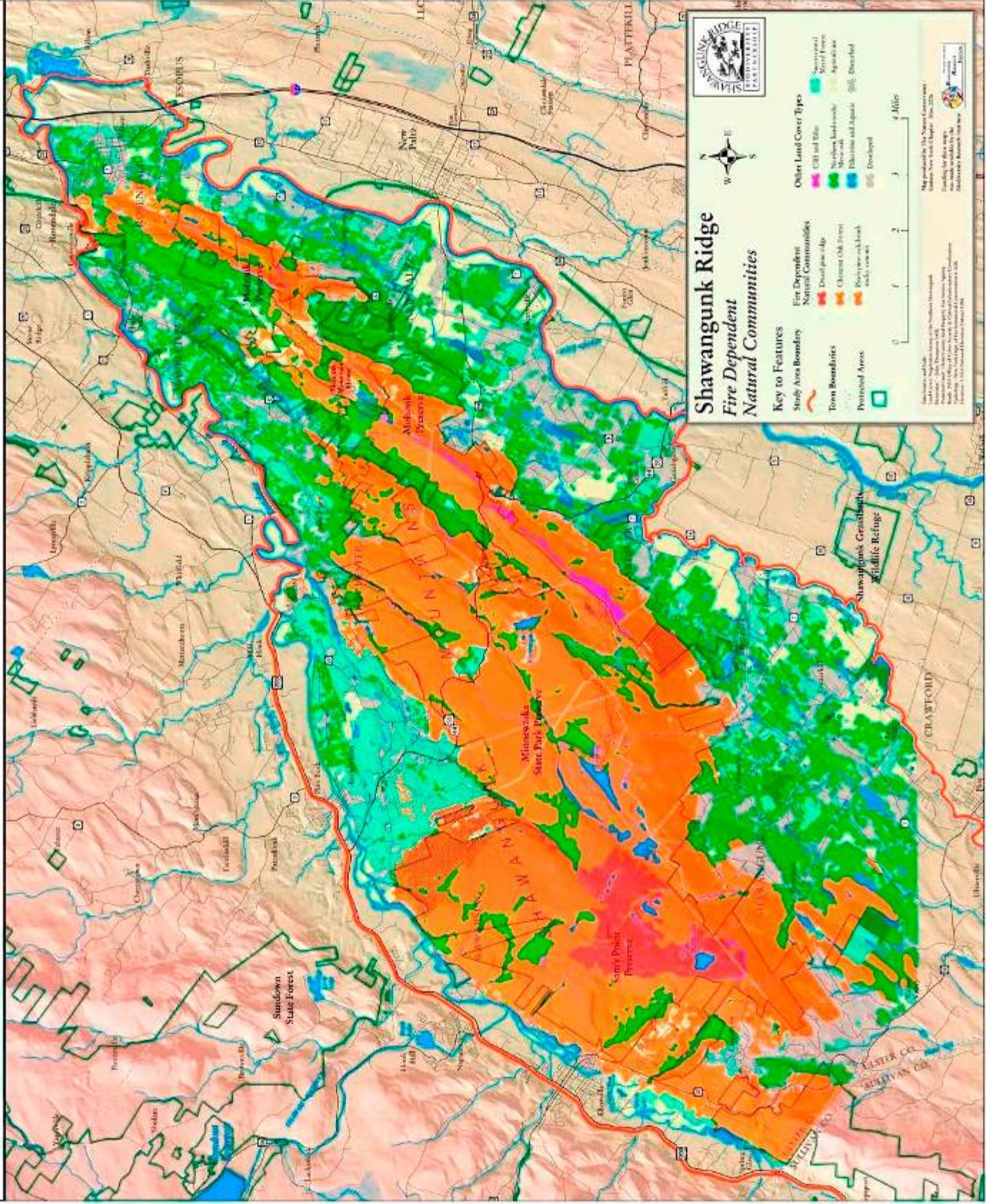
While lightning ignitions were undoubtedly a component of the historical pre-settlement fire regime at Sam's Point, American Indians were likely the predominant ignition source prior to Euro-American settlement of the region. Historical documents and evidence suggest that indigenous burning was widespread throughout eastern forests and was used to achieve a wide variety of specific management objectives, including stimulation of food producing plants (e.g. oak, chestnut, and blueberry), creation of a habitat mosaic for game species, reducing fire hazard around settlements, land clearing, and others (Kimmerer & Lake 2001).

More recent records document that from 1842 to 1995, one hundred and seven fires burned on the Shawangunk Ridge, many of the largest occurring in the vicinity of Sam's Point and the dwarf pine barrens community (Hubbs 1995). The majority of these fires can be attributed to human uses of the land, including charcoal burning, timber harvesting, and mining as well seasonal blueberry pickers who would routinely set fires on the ridgetop to increase berry production. The last major fire to burn in the Preserve occurred in 1947 and is believed to have affected the majority of the dwarf pine barrens that currently exists at Sam's Point (Hubbs 1995).

The long history of fire at the Preserve and on the Ridge has certainly influenced the shape and distribution of the natural communities we see today. Appendix V contains an ecological model developed for the Shawangunks in 1999 by Michael Batcher based on previous work with other pine-barrens experts (Batcher *et al.* 1997). This model summarizes our understanding of how various ecological factors may influence the natural communities found on the ridge.

# Sam's Point Master Plan

## Map 7. Fire Dependent Natural Communities



As the model suggests, much of the vegetation growing on the ridge is adapted to the periodic disturbance by fire. Many of the dominant plant species including chestnut oak, other oak species, pitch pine, and shrubs like low-sweet blueberry and huckleberry have adaptations to survive fires and, in fact, rely on fire to create the conditions necessary for them to thrive and regenerate. Oaks and pitch pines have thick bark that insulates the cambium tissue and they can resprout readily from the root crown or other meristematic tissue in the main trunk and branches following a fire. A significant proportion of the pitch pines in the dwarf pine barrens at Sam's Point also have serotinous cones that open only after the heat of a fire melts the hard resin sealing the cone scales shut.

Fire exclusion over the past 50-100 years or more in many areas of the Shawangunks has led to the degradation of pitch pine and oak dominated forests and a reduction in the spatial extent of xeric "barrens" communities on the Ridge (Russell 1999). Fire sensitive species, such as red maple, have become co-dominant in many areas, shading out pitch pine and oak regeneration and altering inherent fire, nutrient cycling, and moisture regimes. In the absence of fire, forest fuels have become more abundant as flammable shrubs such as mountain laurel and huckleberry have grown taller and thicker. This accumulation of fuel has increased the potential for widespread high intensity fire that can have negative ecological impacts and threaten human life and property adjacent to wildland areas.

Continued fire suppression at Sam's Point and other adjacent areas of Minnewaska State Park Preserve will have significant ecological impacts, particularly on the rare dwarf pine ridge community (G1/S1; also known as a pitch pine/black huckleberry shrubland by the international vegetation classification), by encouraging the encroachment of more mesic, shade tolerant species and inhibiting the ability of pitch pines to regenerate. A proactive fire management program at Sam's Point and adjacent protected lands is necessary to ensure the long term viability of pitch pine and oak dominated forests and protect local communities from damage resulting from high intensity wildfire.

A detailed Fire Management Plan is currently being developed for all TNC and partner managed properties in the Northern Shawangunks, and fire management implementation at Sam's Point Preserve will be conducted in accordance with this ridgewide plan. The Fire Management Plan will identify priority areas for prescribed burning and mechanical treatments, identify areas of high fire risk, outline fire management infrastructure needs (e.g. carriage roads and firebreaks), and provide guidance for implementation of prescribed fire and other related management activities. While planning for specific fire management activities is beyond the scope of this Master Plan, some general goals and strategies for how we will address fire management at Sam's Point are listed below.

### ***1. Fire Management Goals & Strategies***

Fire management efforts at Sam's Point Preserve will focus on achieving the following goals:

- Reduce the risk of high intensity wildfire that may threaten human life, cause damage to neighboring property or any facilities at Sam's Point Preserve (e.g. cell/radio towers and Conservation Center), or adversely affect ecological or cultural resources;

- Restore and maintain the long term ecological viability of fire dependent pitch pine and oak dominated ecosystems at Sam's Point Preserve and adjacent managed lands; and
- Create the conditions necessary to carry out fire management activities (including wildfire suppression and prescribed fire) in the safest and most ecologically appropriate manner.

Ensuring that these goals are successfully achieved will require a variety of management techniques that evolve over time; however, we expect that all of the following activities will be components of our fire management program:

- Fire Suppression** – In accordance with the Sam's Point Wildfire Response Plan, all wildfires at Sam's Point will be suppressed. While lightning or human ignited wildfires at Sam's Point could have beneficial ecological effects, we do not currently have the planning framework or infrastructure necessary to allow wildfires to burn in order to achieve a resource benefit. However, provided all safety precautions are met, wildfire suppression tactics should minimize ecological disturbance and utilize existing firebreaks to the greatest extent possible.
- Prescribed Fire** – A prescribed fire (or “controlled burn”) is an intentional ignited fire lit under strict prescription parameters and with fully trained wildland fire experts on hand that is designed to achieve a specific management objective. Prescribed burning is a widely accepted management tool for reintroducing fire into fire-dependent ecosystems to reduce hazardous fuel loads and protect the viability of these fire-dependent ecosystems. As part of the Shawangunk fire program, TNC will be investing in the purchase of fire equipment including additional fire engines, water-mules (i.e. ATVs with water tanks), personal safety equipment, and standard wildland hand tools. In addition, TNC will invest in a monitoring program to ensure these fires are meeting ecological management goals without causing significant harm to the natural resources at stake. (see monitoring section below).
- Mechanical Treatments** – Cutting, mowing, chipping, and other manual manipulation of vegetation can be a very useful tool for reducing hazardous fuel loads and mimicking and/or complimenting the effects of prescribed burning. While we do not expect to conduct widespread mechanical treatments of the vegetation at Sam's Point Preserve, it will be a key strategy for reducing fuels around fire-sensitive features (e.g. cell/radio towers) and along carriage roads, and for creation of temporary and/or permanent firebreaks.
- Maintenance of Carriage Roads & Permanent Firebreaks** – In order to safely implement prescribed burns and maintain firefighter safety while minimizing resource impacts during fire suppression, the existing network of carriage roads, trails, and other potential firebreaks at Sam's Point will need to be restored and maintained, and additional temporary and permanent firebreaks will need to be created. The creation of new permanent firebreaks will be limited only to what is necessary to support the safe and efficient implementation of prescribed fire and wildfire suppression operations, and the potential ecological and recreational impacts must be carefully considered prior to any new firebreak construction, particularly in sensitive habitat types. Burn unit configurations will be selected to maximize the use of existing permanent firebreaks and minimize the need for new temporary firebreaks around individual burn units. All

firebreaks will be held to the standard necessary to support safe fire operations in the fuel types present.

- e. **Monitoring** – Detailed fire monitoring plans are being developed and will be a critical component of ensuring that fire management goals and objectives are being met and that long-term ecosystem and species viability is being improved. Prescribed fire monitoring efforts will be focused on answering key questions related to regeneration of dominant species, exclusion of fire-sensitive species, maintenance of species composition and target spatial extent, and assessing differential fire effects based on burn intensity and seasonality.

## B. Exotic and Invasive Species Control

While the majority of Sam’s Point Preserve is relatively free of invasive species, control of non-native invasive plants and animals are a major ecological management issue for the Hudson Valley region and elsewhere on the Shawangunk Ridge. Non-native species can out-compete native species and become overly dominant, reducing biodiversity. Proper management of existing invasive species infestations at Sam’s Point and prevention of new invasions are critical elements of ecological management at the Preserve.

A large area of the Shawangunks, including Sam’s Point Preserve, has been identified as a proposed Invasive Species Prevention Zone (ISPZ) by the Lower Hudson PRISM (Partnership for Regional Invasive Species Management). In fact, this Shawangunk ISPZ was the first proposed by the Lower Hudson PRISM. These zones are high priority natural areas that are currently relatively free from the negative impacts of invasive species. It is recommended that as a prevention zone, current invasive species should be documented and mapped and an integrated invasive species management plan should be developed.

In 2003, an Invasive Species Control Plan was developed for Sam’s Point that identified critical invasive plant infestation locations and recommended actions for control. Several removal projects have occurred since 2003, and the control plan should be updated accordingly to map current invasive species locations and provide detail on specific plans for control and monitoring. In addition, the Shawangunk Ridge Biodiversity Partnership (SRBP) will continue to coordinate with the Lower Hudson PRISM to integrate the work on the Ridge with invasive work occurring elsewhere in the region. Work through the SRBP and PRISM will help inform invasive species management and monitoring at Sam’s Point. In general, efforts to manage invasive species at Sam’s Point should focus on the following activities:

- a. **Mapping** – Presently, most of the occurrences of exotic and invasive plants at the Preserve exist in disturbed areas, including the fringes of the Loop Road, the former Ice Caves parking area, the natural gas drilling site off the High Point Carriageway and the Berme Road entrance area. Some mapping of individual plant locations was completed in 2003, and this effort should be continued to revisit control sites, remap the extent of any large infestations (e.g. Phragmites patch along High Point Carriageway), and identify any new infestations. The known invasive forest pest and pathogens include gypsy moth, chestnut blight, and hemlock woolly adelgid. These are widespread on the Ridge.

Hemlock woolly adelgid and other new forest pests will be incorporated into mapping data as information is gathered and provided.

- b. Treatment & Control** – The preferred method for treating invasive species infestations at Sam’s Point is mechanical treatment (e.g. cutting or mowing) or removal, however, in many cases this may be ineffective and chemical treatment may be necessary. Any chemical applications should be as targeted as possible to individual plants and broadcast spraying should be completely avoided unless absolutely necessary. Any new or existing disturbed areas, including invasive species removal sites, should be restored to encourage establishment of native species and to minimize any further impacts from invasives.
- c. Monitoring** – Follow-up monitoring should be included as part of all invasive species control efforts. Monitoring should focus on evaluating the effectiveness of any treatments and to assess the extent of any infestations in the absence of treatment. Additional monitoring of forest pests should become a higher priority, particularly for forest pests which have the ability to significantly alter the oak and/or pine communities.
- d. Public & Volunteer Outreach** – To the greatest extent possible, Preserve staff should work to educate local hikers and volunteer patrol members to identify invasive species (both existing and potential threats) to assure the most rapid detection of new infestations. Volunteers can also assist with treatment monitoring. Additional education and outreach to visitors and local community members may also be necessary to prevent the unintentional importation of seeds and other plant material onto the Preserve that may propagate new infestations.

Table 3 lists the highest priority invasive plant species for management at Sam’s Point Preserve and rough estimates of their location and extent. Detailed information on individual invasive plants is widely available and so is not included in this plan. More information on the extent and potential forest pest threats needs to be developed. For more information on individual species, potential impacts and control methods, refer to the following Internet websites:

<http://www.invasivespeciesinfo.gov>

<http://nyis.info/>

<http://nbii-nin.ciesin.columbia.edu/ipane/>

<http://www.invasiveplants.net/>

**TABLE 3. EXOTIC AND INVASIVE SPECIES MANAGEMENT**

Species	Threat	Origin	Known Locations
Tree-of-heaven, <i>Ailanthus altissima</i>	Medium	Eastern China	Berme Road trailhead, road near the North Gully
Japanese barberry, <i>Berberis thunbergii</i>	Medium	Asia	Loop Road, Berme Road trailhead, Smiley Road, South Gully
Common reed, <i>Phragmites australis</i>	Low-Medium	Found worldwide	Test-drilling field, road near North Gully
Purple loosestrife, <i>Lythrum salicaria</i>	Low	Eurasia	A few plants observed annually along the Loop Road near Lake Maratanza dam.
Garlic mustard, <i>Allaria petiolata</i>	Low	Europe	Infesting open woodland areas near Berme Road entrance. Needs more detailed assessment.
Japanese knotweed, <i>Fallopia japonica</i> and <i>F. x bohemica</i>	Low	Asia	Scattered plants sighted in South Gully following flood disturbance in 2005. No follow-up since that time. This is a high threat to other riparian systems, so follow-up should be scheduled soon.
Miscellaneous weeds <sup>1</sup>	Low	Varied	Misc. plants located along the Loop Road and parking areas

<sup>1</sup> Miscellaneous weed species currently include: thistles (*Cirsium ssp.*), spotted knapweed (*Centaurea biebersteineii*), pussy's toes (*Antennaria ssp.*), exotic grasses (*Poa ssp.*), St. John's-worts (*Hypericum ssp.*), deptford pink (*Dianthus armeria*), hawkweeds (*Hieracium ssp.*), birdsfoot trefoil (*Lotus corniculatus*) and pineapple weed (*Matricaria recutita*).

### C. Deer Management

The impacts of excessive deer browse are well recorded in the scientific literature (Leopold *et al.* 1947, Miller *et al.* 1992, and Rooney 1998). It has been suggested the deer population be managed to less than ten animals per square mile to allow for natural forest regeneration (Batcher 1997), however, estimates indicate the current deer population in the mid-Hudson Valley may be ten times this level. As the white-tailed deer population has increased in our region so have the impacts on forest health, bird diversity, native species and composition, and human health (i.e. increase in tick populations and prevalence of Lyme disease). Deer have a preference to eat oaks, trillium, orchids, and other species. As a result, impacts to these species are very evident where the deer population is higher than the recommended rate. Some browse is to be expected, but this browse should not impact the long-term regeneration and viability of these plant populations.

Throughout the Shawangunks, deer overabundance has significantly impacted oak forest regeneration and understory species composition. While the impacts of excessive deer browse are evident, more information is needed to accurately assess the deer population and quantify the impacts of deer browse. The SRBP is working to develop standardized monitoring techniques and a more consistent approach to the existing hunting programs at Mohonk Preserve, Minnewaska State Park and Sam's Point Preserve.



The ridgetop pine barrens at Sam's Point offer some of the poorest quality deer habitat on the ridge, and as such, have not been heavily impacted by deer browse. However, adjacent areas of oak forest at the Preserve and the surrounding community of Cragmoor appear to harbor a much higher deer population. Activities to better understand and manage deer impacts on biodiversity at Sam's Point Preserve will include the following:

- a. **Data Collection** – Deer browse impact surveys and other methods of assessing deer impacts (e.g. deer exclosures) will be critical to both quantify the effects of overabundant deer on vegetation structure and composition, and pinpoint areas where deer populations (and impacts) may be concentrated for the purposes of directing management efforts. These activities will focus primarily in chestnut oak forest habitat around North Gully, South Gully, and adjacent State park lands.
- b. **Managed Hunting Program** – Besides coyotes and humans, we have lost the majority of our native predators. In the absence of these predators, our ability to maintain a deer population at the target levels is hampered. As a result, we need to employ a more heavily managed hunting program which focuses on reducing the doe population. See Chapter 5, Section B. Public Use Policies for additional detail on the hunting program. Deer Management Assistance Program (DMAP) permits have been obtained from the NYS Department of Environmental Conservation (DEC) as necessary to augment the hunting program by allowing hunters to harvest additional female deer. These DMAP permits are available to hunters based on a priority structure to provide permits to those who are more likely to use the permit. As resources allow, a deer self checking station is planned for the Berme Road entrance to gather additional data on deer that are harvested on the Preserve.

As new data on deer population and impacts become available, our hunting program and monitoring efforts may need to be adjusted accordingly. Other methods of deer control (e.g. baiting, sharp-shooting, contraception, etc.) are less desirable and more expensive than a hunting program which relies on traditional hunters, and should only be considered when sufficient data suggests that other ridgetop control efforts are failing and impacts to biodiversity are severe.

#### D. Restoration of Disturbed Areas

Although the Preserve is a largely intact area, there have been several significant disturbances over the years related to wildfire control, commercial ventures, and recreational use. Restoration work is already underway at several sites (see below); however, other areas are still significantly degraded. Restoration of these sites may be either passive or proactive, followed by any needed on-going maintenance. A site restoration plan developed for Sam's Point in 2002 provides detail on restoration planning, plant material, seed collection, site assessment and preparation, irrigation and weed control, herbivory and monitoring. (Brown, M. 2002)

Passive restoration, or natural succession, will be encouraged in cases where native species are already naturally revegetating previously disturbed areas that are relatively small. However, more proactive restoration techniques (i.e. native plantings) may need to be employed

when disturbed areas are large, exotic species threaten to invade the site, or where natural succession proceeds at a very slow rate (i.e. on exposed bedrock). The following is a list of the Preserve's disturbed areas (see Map 9) and recommended management actions for their restoration. A simple monitoring program should be established to track changes at these restoration sites. Annual walk through observations, cataloging the date of visit and primary vegetative cover would help to ascertain the rate of recovery.

### 1. Old Miniature Golf Course

The majority of the hardened surfaces that existed in this area have been removed and the old course path is currently being developed into a self-guided educational nature trail. Further work at this location should focus on maintaining the trail, developing educational materials for the kiosk, and improving points of interest as necessary (e.g. installing deer enclosure).

### 2. Shale Pit

The old shale pit along the west side of the Loop Road currently contains a significant amount of excavated rock from the construction of the Sam's Point Preserve Conservation Center and is utilized to pile and burn brush that gets cut annually around the Preserve. Some sections of the shale pit with more stable substrate are currently revegetating slowly. Until personnel and other resources become available, it will be left to natural succession. Presently, filling in this pit would be impractical and costly. As restoration techniques for this level of disturbance become available, restoration of this spot will be explored further.

### 3. The High Point Drilling Site

Cleared in 1968, the old test-drilling site below High Point is in varying stages of succession. The entry point from the High Point Carriageway and the center of the clearing is in early succession having a shale surface covered sparsely with graminoides, steeplebush (*Spiraea tomentosa*), and pearly everlasting (*Anaphalis margaritacea*). The perimeter of the clearing is in a later stage of succession and supports a dense cover of sweet fern (*Comptonia peregrina*), and widely scattered pitch pines (*Pinus rigida*) and highbush blueberry (*Vaccinium corymbosum*). Due to the active natural revegetation, the majority of the drilling site will be left to passively succeed to an open variant of the dwarf pine barrens ecological community.

The far end of the clearing is dominated by a thick colony of *Phragmites*, which is sending rhizomes into the surrounding dwarf pine barrens community. This invasive species should be contained and removed from the clearing to prevent further propagation. Some monitoring may be needed to track any invasive species treatment effects to ensure recreational use does not interfere with the process of succession or other restoration efforts in this area.

### 4. The Maratanza Bulldozer Scrapes

Two bulldozer scrapes exist on the north end of Lake Maratanza. One of these runs from the north end of the lake to the start of the Indian Rock trail and provides a firebreak for a potential burn unit along the beginning of the High Point Carriageway. The second sits below the lake's dam and is in the later stages of succession with a dense shrub layer

consisting of highbush blueberry, mountain laurel, pitch pines, black birch (*Betula lenta*), and steeplebush. Its restoration through natural succession should be allowed to continue.

### **5. The Tower Farm**

Currently, the tower farm consists of eight towers, which represent a prominent feature from many vantage points on and off the Preserve. Three of the towers are on property leased by the Village of Ellenville in the 1960's and 1970's and leases were subsequently transferred to the Open Space Conservancy, while five are built on private inholdings or adjacent private land. While decommissioning of several of the towers may be possible in the foreseeable future, others are actively used and managed. Therefore effort should be made to minimize the impacts of the tower sites on the ecology, scenic resources and management of the Preserve, including evaluation of sustainable, lower impact technology alternatives that could reduce the visual and spatial impacts of the towers. Decommissioning of unused towers should be pursued, as well as opportunities for co-location of equipment on a smaller number of towers. Alternative energy sources should be explored as a means of eliminating existing power lines on the west side of the Loop Road. Opportunities for increased participation in Preserve stewardship and road maintenance should be negotiated with tower operators,

### **6. The Maze**

Located northeast of Sam's Point, the Maze once functioned as part of Ice Caves Mountain, Inc. and consists of a random network of trails with a small observation deck in the center. The observation deck has been removed and this area has begun to regrow. Pitch pine seedlings were planted at the entrance to the maze in the summer of 2005 and should help to discourage any additional recreational impacts that may impede the natural restoration of this area.

### **7. The Glider Field & Road**

At its junction with the Indian Rock Trail, the High Point Carriageway divides into two segments creating a 30-foot wide corridor. The left-hand segment extends for nearly a half-mile north into the dwarf pine barrens, apparently the site of an old glider port. This corridor is a moist area being colonized by rushes (*Juncus* spp.), leatherleaf (*Chamaedaphne calyculata*), large cranberry (*Vaccinium macrocarpon*), sphagnum mosses, and scattered pitch pines. Some portions of this road consist of only exposed till or bedrock and these areas will require many years to recover. The glider fields and road should remain closed to recreational use and restored to dwarf pine barrens through natural succession.

### **8. The Cliff Edge North of Sam's Point**

A historic trail shown on an 1899 map runs along this cliff edge with various entries from the Sam's Point parking area. Many of these were brushed in with vegetation in 1999 by a group of interns from New York City. Although partially overgrown, this trail still receives some use today. Damage to the cliff edge from human trampling in the past has been moderate to severe in isolated areas. Although some of the old pathways are gradually filling in with huckleberry and blueberry (*Vaccinium* spp. and *Gaylussacia baccata*), there are still areas along the cliff edge that have been denuded. The current low level of use does not appear to be having significant additional impacts; however, complete natural recovery of

this cliff edge may take many more years. Currently, the area is providing habitat for the rare Appalachian sandwort (*Minuartia glabra*), and no active restoration is needed to restore the habitats further other than trying to keep use as low as possible to minimize further disturbance.

This cliff edge has been designated a Sensitive Resource Protection area under the Preserve's VERP (Visitor Experience and Resource Protection) framework (see recreation management). Controlling visitor use will be critical to the restoration of this area. Brushing in the remaining access points to the cliff edge and posting signs designating it a restoration area should be priority management actions.

#### **9. Road Opposite the Test-Drilling Field**

Opposite the test-drilling field off the High Point Carriageway is another old road that bisects the dwarf pine barrens to the west. Although deer and other wildlife activity maintain a tread, the road is mostly overgrown with a thick cover of heaths and young pitch pines. This area will be left to naturally revegetate.

#### **10. The Ice Caves Parking Lot and Road**

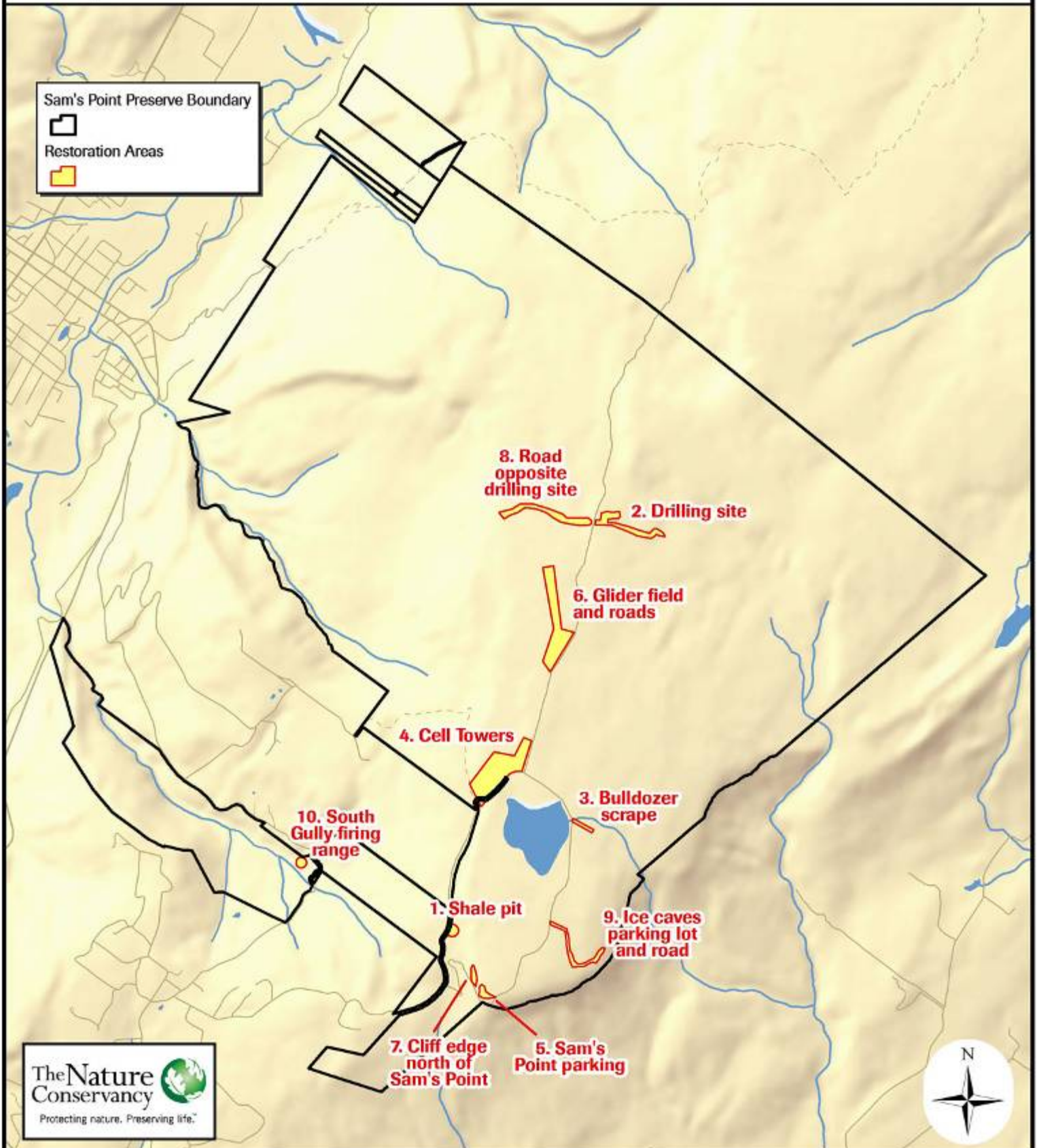
The Ice Caves Road and former parking area have suffered from extremely severe channeling and erosion and some immediate management is needed to stabilize the old roadway and divert runoff away from the parking area. Pitch pine seedlings were planted throughout the parking area in the summer of 2006 to accelerate natural succession of the parking area and stabilize the surface. Currently, funding is needed to install adequate drainage and repair the surface of the old roadway. Once drainage issues are addressed on the road, the parking lot should be left to gradually revegetate under the pitch pines that have been planted.

#### **11. The South Gully Firing Range**

A clearing exists in the South Gully that was once used as a practice firing range by the Village of Ellenville. This site is a relatively low priority for restoration and no management action has been taken to restore this area. However, similar to those areas mentioned above, this clearing should be restored through natural succession and invasive species management. As resources become available to do so, the gravel and blacktop will need to be removed and the area regraded to restore natural water seepage. Currently, drainage ditches and culverts significantly alter the hydrology of the site.

# Sam's Point Master Plan

## Map 8. Restoration Areas



## E. Research and Monitoring

Research and monitoring priorities for the Preserve will focus on providing information necessary to improve ecological management efficiency and effectiveness (i.e. to promote adaptive management practices). Long term monitoring plans are currently being developed by the Shawangunk Ridge Biodiversity Partnership to address questions related to fire management and deer management at a ridgewide scale. A viability status monitoring program is also needed to track *Key Ecological Attributes* (KEAs) and indicators outlined in the Shawangunks Ridge Conservation Action Plan (CAP) for each of the major conservation targets that occur at Sam's Point and across the entire Ridge ecosystem. This viability status monitoring should be focused to maximize efficiency and prioritized to gather information on the most significant threats facing each of the conservation targets.

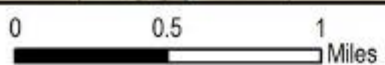
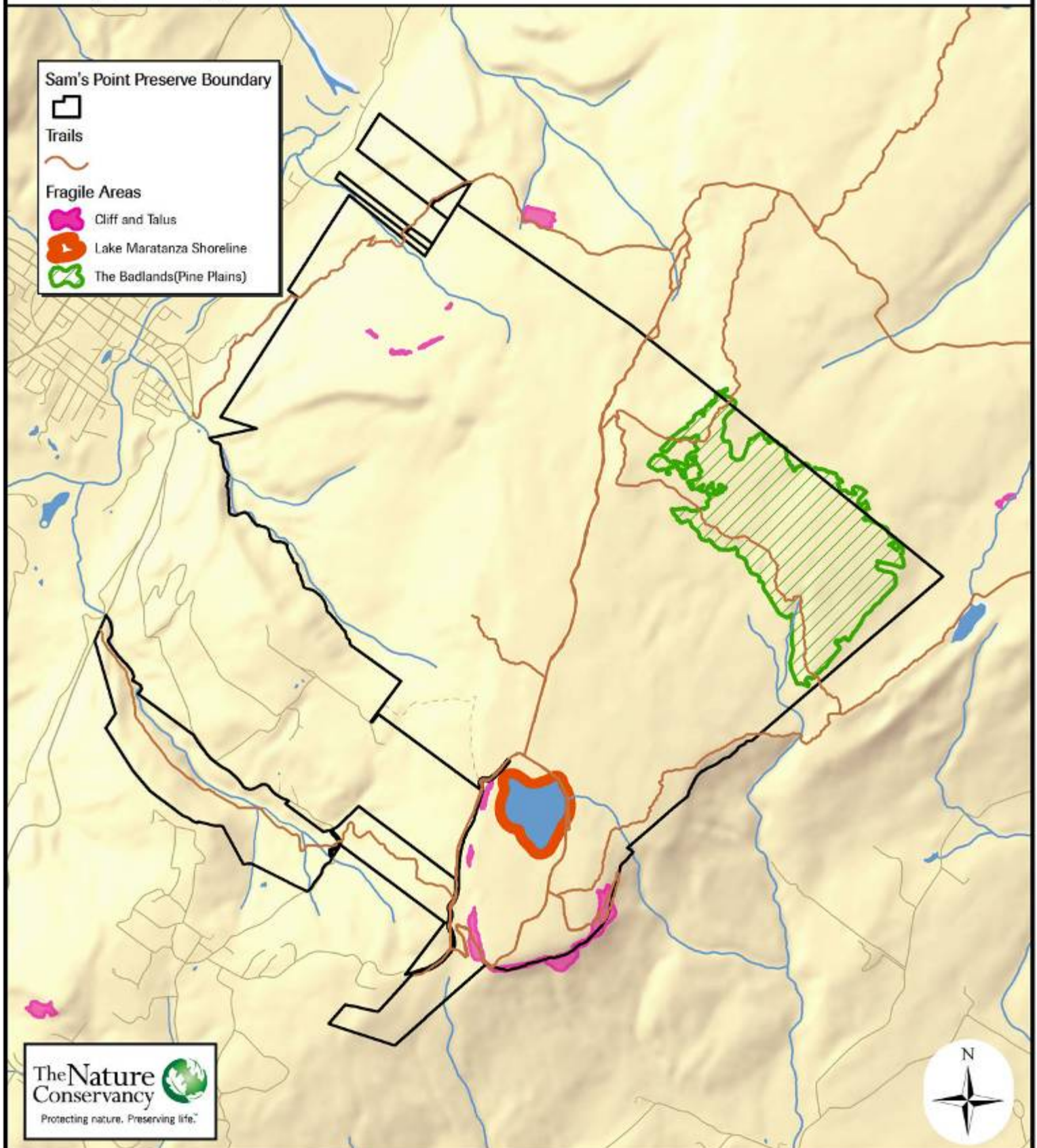
In addition to detailed fire and deer management monitoring plans that are being developed, and an assessment of overall conservation target viability, some monitoring of recreational and invasive species impacts will also be necessary at Sam's Point Preserve. A detailed monitoring framework for recreation management is laid out as part of the VERP framework in Appendix V. While current staff and resource limitations will not support the entire monitoring framework as described, these tables provide a list of monitoring indicators that can be prioritized as resources become available. In addition to basic monitoring needs, there are some additional research questions that would help clarify the impacts of recreational use at Sam's Point on the long term health of the ecosystem, including:

- What are the impacts of recreational use on sensitive and/or rare wildlife species that inhabit the Preserve, including timber rattlesnakes and nesting birds (such as the raven), and rare plant populations that exist in close proximity to heavily visited areas?
- What is the current level of recreational use that occurs in the Shingle Gully Ice Caves and how sensitive are species that utilize Ice Cave habitats to impacts from visitor use, such as trampling? Is the current use low enough to maintain the long term viability of these rare habitats?

Maintenance of existing monitoring efforts, including photo points, should be continued. Whenever possible, partners and volunteers should be engaged to assist in monitoring efforts. Currently, the New York Natural Heritage Program (NYNHP) tracks rare and/or vulnerable species populations at Sam's Point. The Preserve should continue to encourage use by researchers and other groups that inventory and update species lists, particularly of rare and difficult to identify species such as mosses and lichens. Researchers from academic institutions should be also engaged to fill in knowledge gaps related to the priorities outlined above or in the monitoring plans being developed for fire and deer management. To the degree possible, volunteers (e.g. Volunteer Patrol members) should be trained in species identification so that they can record sightings of various plants and animals at the Preserve, and potentially help with invasive species early detection and monitoring efforts. Regular Preserve visitors and/or volunteer patrol members can also be trained to make note of trail erosion or other impacts that may require management action.

# Sam's Point Master Plan

## Map 9. Fragile Areas



Due to the relatively low threat posed by exotic invasive species at Sam's Point, research on these species is currently a low priority. Invasive species monitoring should focus on rapidly identifying and mapping new infestation locations, and conducting follow-up visits to document any changes in size or control efforts. Research efforts related to invasive species should focus on predicting or documenting the impacts of new species or species that have a high likelihood of introduction in the future.

## **V. Public Use Management**

### **A. Balancing Resource Protection and Public Use**

Sam's Point Preserve has a long history of public use and visitation. Human use of the Preserve's land goes back centuries to Native American cultures that inhabited rock shelters found along the Ridge. It is likely native people harvested blueberries from the Preserve as did the European settlers and later visitors who lived in rustic colonies on the property over the last two centuries. Along with the blueberry picker colonies, human use of the property post-European settlement has varied. The Preserve has been a focal point for both recreation and commercial speculation.

The presence of hiking and walking trails on the Preserve's lands goes back to before the turn of the century. A set of maps from 1899 shows a dense network of trails on the property whose origins are associated with historic and possibly prehistoric uses of the property (Smiley 1899). Their use has waxed and waned over the years in conjunction with the various uses of the property. As a result, while some of the trails still exist today, many have grown into obscurity over the years. Currently, ten miles of marked trails and carriage roads are available for public use.

Prior to acquisition of the property by the Open Space Institute, the Preserve was home to a tourist attraction called Ice Caves Mountain. During the Ice Caves Mountain years, access to the property was fairly restricted, and visitors were encouraged to visit limited specific destinations by car.

Currently, visitors are permitted to use the sixteen mile trail and carriage road system on the Preserve for hiking, while vehicular access is prohibited. It is anticipated that hiking at Sam's Point Preserve will increase, as demand for hiking along the entire Shawangunk Ridge continues to grow. Less than a two-hour drive from New York City and Albany, the Preserve has the potential to become a highly visited site. With this anticipated growth, planning and monitoring is necessary to insure recreational use does not damage what is currently a remarkably intact and unfragmented landscape.

**Using a VERP Framework** - A Visitor Experience and Resource Protection (VERP) Framework was designed to supplement the general park planning process in the National Parks (NPS 1997). VERP is a modification of the Limits of Acceptable Change (LAC) system that was developed by the U.S. Forest Service in the 1980s. LAC was a turning point in recreation management as it



shifted the emphasis from how much use an area could tolerate to maintaining desired resource conditions. A VERP approach was used to evaluate sensitive resources, to establish management zones and to develop a monitoring plan to help guide recreational use.

A VERP framework consists of nine elements that entail taking a team approach to developing a public use management plan. One of the most important parts of a VERP framework is determining and describing management zones. These zones, identify specific areas within the Preserve, and are used to determine how recreation is managed. The zones at Sam's Point Preserve coincide with priority conservation areas where there are rare species and communities, important wildlife habitat, fragile areas and archeological resources. The management zones fix the limits of recreational use for an area, and each zone has a unique set of guidelines, restrictions and desired levels of resource protection that helps to identify the threshold of acceptable public use. A monitoring program is another important element of a VERP framework and is needed to ensure that each zone's standards are maintained. The final element of the VERP plan is a set of management actions to be taken when standards are not met.

In sum, a VERP Framework includes:

1. Establish an Interdisciplinary Project Team
2. Develop a Public Involvement Strategy
3. Develop Statements of Preserve Purpose, Significance and Interpretive themes
4. Analyze Preserve Resources and Existing Use
5. Describe a Potential Range of Visitor Experiences and Resource Conditions
6. Allocate Potential Zones to Specific Locations
7. Select indicators and Specify standard for each zone
8. Develop a Monitoring Plan
9. Monitor

The VERP framework is a valuable tool in visitor management planning and programming. Using a VERP framework, management units and a scientific monitoring program have been designed for the Preserve as a method to ensure balanced recreational use of the property. The VERP framework identifies and analyzes the sensitive resources of the Preserve and defines management zones through an analysis of those resources. The zones are then used as the basis of management decisions and level of use by the public. See Appendix V for details on the design of a model VERP framework for Sam's Point Preserve, including the Preserve's management zones, proposed indicators, standards and monitoring. Preserve staff reference this framework in addressing levels of use and as a decision-making and management tool. Currently monitoring is conducted by Preserve staff, New York-New Jersey Trail Conference Trail maintainers and a Volunteer Patrol, which is trained by the Preserve Manager to evaluate and report on impacts on trails and sensitive areas.

At Sam's Point Preserve the following are identified as sensitive resources:

1. Escarpments and cliff edges
2. The pitch pine barrens area referred to as "the Badlands"
3. Lake Maratanza

4. The Ice Caves Trails
5. Rare animal populations
6. Rare plant populations
7. Crevice and canyon bottoms.

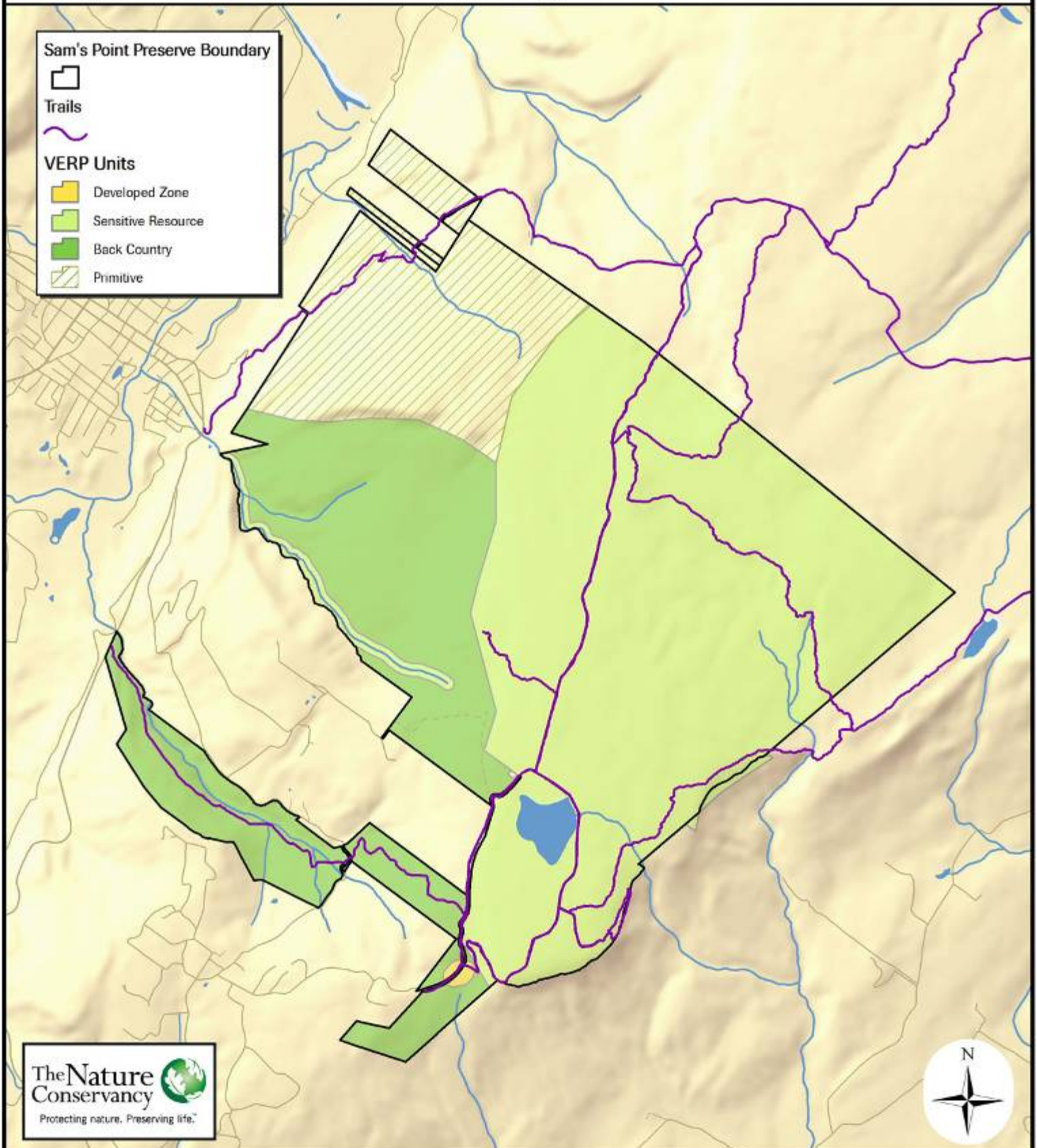
Management Zones at Sam's Point Preserve include:

- A. Sensitive Resource Protection Zone
- B. Primitive Zone
- C. Backcountry Zone
- D. Developed Zone

The location, resource conditions, visitor experience conditions and management objectives for each zone are described in Appendix V.

# Sam's Point Master Plan

## Map 10. VERP Recreation Management Units



0 0.5 1 Miles

Produced by The Eastern New York Chapter of The Nature Conservancy

April 2009

## B. Public Use Policies

Sam's Point Preserve is open to the public during daylight hours year round. The primary access points to the Preserve are from Berme Road in Ellenville and the parking lot located at the end of Sam's Point Road in Cragmoor. To protect the experience of all visitors, as well as the natural and cultural resources of the Preserve, visitors should observe the following "Leave No Trace" guidelines:

- **Stay on designated trails** and walk in the middle of the path to prevent trail widening. Do not cut corners on switchbacks. "Bushwhacking" is allowed by permit only.
- **Travel and rest on the most durable surfaces** when possible, including rock, gravel, dry grasses or snow.
- **Pack it in. Pack it out.** Please carry out all trash including "organic" garbage such as food waste.
- Restrooms are provided at the Conservation Center for visitor convenience and cleanliness. They should be used when possible. However, if nature calls while in the backcountry, **deposit human waste in holes dug 6 to 8 inches deep at least 200 feet from water** or trails. Mix waste with soil then cover and disguise holes and pack out toilet paper.
- Dog waste should be picked up and disposed of properly.
- **Do not remove plants, rocks or historical artifacts.**
- To prevent wildfires, **no campfires** please.
- **All pets must be on no more than a six-foot leash, and must be under their owner's control at all times.**
- Glass containers are not permitted.
- Only radios used with earphones are permitted.

A description of uses permitted at Sam's Point Preserve follows. Permitted uses were chosen in consideration of the Preserve's mission and recreational opportunities available elsewhere on the Shawangunk Ridge. Minnewaska State Park Preserve, Mohonk Preserve and several local campgrounds offer a wealth of diverse public uses within a short drive of Sam's Point Preserve.

### Hiking

With about sixteen miles of trails and carriage roads, several scenic and unique natural features, and a wide array of plant and animal life, Sam's Point Preserve is an excellent public resource for hiking and nature observation. Within the 90,000-acre Shawangunk Ridge study area (see Site Description for more information); the Preserve is perhaps the most intact natural area, offering visitors a unique wilderness experience not commonly found elsewhere on the Ridge. Along with its scenic nature and wilderness appeal, the Preserve harbors a variety of rare and endangered plants, animals and natural communities that can be damaged by recreational use. In order to protect these natural resources, while providing for public access, hikers are urged to abide by the "Leave No Trace" guidelines listed above. It is critical that hikers follow the regulations set forth in the VERP management zones to help protect the natural resources. The locations of trails have been carefully chosen to safeguard sensitive and fragile areas within the Preserve (see management zones above). On the High Point Trail, hikers should walk on

solid bedrock at all times to avoid disturbing the fragile escarpment community. Depending upon conditions, it may be necessary to close hiking trails for a short time each year during the spring mud season to protect the trails when they are wet and easily damaged. The scientific literature has shown that saturated trails are significantly more susceptible to erosion than drier trails (Kuss 1986, Helgrath 1975, Bryan 1977, Weaver and Dale 1978, Bratton *et al.* 1979, and Wilson and Seney 1994). During this time, visitors to the Preserve should be encouraged to only use the Loop Road. During the winter months, hikers are asked *not* to walk in cross-country ski tracks during periods of snow to allow for quality skiing. (See infrastructure section for trails plan).

### Hunting

Hunting at Sam's Point Preserve allows for a traditional use of the property and also assists in the control of herbivore populations, consistent with the ecological management goals described in Chapter 4. Hunting has been a traditional use of the Preserve since pre-colonial times. Today, hunters from the local area continue to come to the Preserve for, among other things, the peaceful setting and beautiful landscape. With an increasing deer herd in the Mid-Hudson Valley that is estimated to be ten times beyond its presettlement levels, hunting is an essential tool for ecological management of the Preserve. A number of studies have shown how excessive amounts of deer browse can severely alter forest structure and ecology (Leopold *et al.* 1947, Miller *et al.* 1992, and Rooney 1998).

Hunting at the Preserve is permitted with a special Sam's Point Preserve permit and a current New York State hunting license. Hunters are required to follow both NYS hunting regulations and any additional rules established for Sam's Point Preserve. In order to receive a permit for the following year, all hunters must report their effort and any animals harvested on a questionnaire.

The current hunting rules for the Preserve are listed below. Other hunting rules and regulations for Sam's Point may be added and/or modified as necessary from season to season in order to maintain a safe and effective hunting program. In addition, New York State designated hunting seasons for various game species may be modified slightly for Sam's Point Preserve to minimize potential conflicts between hunters and other visitors.

- Hunting is permitted only for deer, rabbit, variable (snowshoe) hare, turkey, ruffed grouse, squirrel and raccoon.
- Hunters are required to wear their permit visible on their clothing and display a vehicle permit on the dashboard of their cars while hunting at the Preserve.
- The use of any motor vehicles of any kind on the Preserve is strictly prohibited without prior approval from Preserve staff.
- To protect the native plants and animals of the Preserve, the release of any animal species, native or non-native (such as snowshoe hare or pheasant) is prohibited.
- Hunters are also expected to closely follow the "Leave No Trace" guidelines listed above. Vegetation may not be cut or removed, and camping and fires are not permitted. All litter should be removed (including spent cartridges, shells etc.).

Blinds and stands may be installed on a temporary basis and must be removed by January 1 of each year. The use of screw-in tree steps is not permitted.

- No hunting is permitted within 200 feet of the Sam's Point Visitor Center, the main parking area and the Loop Road. Hunting directly from or shooting a gun or bow across any part of a trail or carriageway is strictly prohibited.
- Hunters will be allowed to travel off designated paths. This is necessary in light of the following: firing from trails is not allowed; many important hunting areas are not in close proximity to trails;
- Target shooting or discharging a firearm for any purpose other than the harvest of a permitted game species is prohibited.
- To achieve deer herd management goals, Sam's Point staff will work with NYS DEC to secure Deer Management Assistance Program (DMAP) antlerless deer tags for the property that can be distributed to hunters. Hunters who are issued additional DMAP permits must comply with all NYS DEC regulations for the DMAP, and all hunters must report their harvest to DEC (via postcard provided with permit) and to Preserve staff (via phone or email) within 48 hours of their take.

In order to preserve a long standing traditional use of the property, Sam's Point Preserve staff has worked closely with local houndsmen over the past two years to initiate a pilot program allowing the limited use of dogs for hunting rabbit and hare. During this time, no conflicts or adverse impacts were observed and hunting with dogs for rabbit and hare is now permitted during the appropriate game seasons. The season for hunting with or training dogs will be limited primarily to the winter months at Sam's Point to avoid periods of high visitation in the fall. The various rules for hunting with dogs at Sam's Point, including seasons for hunting and training, may be altered slightly from year to year as the program develops, however, the following regulations will apply to the use of dogs for hunting:

- Hunting with dogs for any other game besides rabbit and hare is prohibited. Dogs may not be permitted to chase or harass other wildlife species.
- Hunting with or training dogs may only occur on areas of the Preserve that lie a) 500 feet or more to the north or east of the area encircled by the Loop Road and b) north of the Ice Caves Road. No hunting is allowed within the perimeter of the Loop Road or along the Loop Road itself, or on any Preserve lands that lie south of the Ice Caves Road.
- Dogs must remain leashed at all times while outside of the designated hunting area described above.
- Hunters are responsible for maintaining control of their dogs at all times and ensuring that the animals do not stray outside of the hunting area or onto adjacent non-Preserve lands.
- Hunters and dogs may access off-trail areas while hunting; however, cutting or disturbing vegetation for any reason is strictly prohibited. Hunters are not permitted to create new trails or access routes of any kind.

Sam's Point Preserve remains open for other uses during the hunting season. Therefore, hunters and other recreationalists must recognize and respect other uses of the property and treat each other courteously at all times. Sam's Point Preserve staff is responsible for managing the hunting program and ensuring that hunting activities are not resulting in an unsafe environment for users of the Preserve (including other hunters) and are not having any adverse ecological impacts. Consistent violation of any hunting rules and regulations or observed ecological impacts may result in modifications to or restrictions on the hunting program.

### Cross-Country Skiing and Winter Use

During winters when snow covers the ridge, the Preserve has excellent terrain for cross-country skiing and snowshoeing. The Loop Road and the High Point Carriageway provide moderate ski touring options, while the Preserve's footpaths offer terrain for more advanced skiers. Skiers should recognize that the Preserve is more of a backcountry skiing experience than visiting an area with groomed trails, such as Minnewaska State Park Preserve. Winter visitors to the Preserve must also abide by the "Leave No Trace" guidelines listed above.

### Pets

As listed above in the "Leave No Trace" guidelines, all pets must be kept on a leash no greater than six feet in length, and under their owner's control at all times. These guidelines are necessary for the following reasons:

- Leashes protect pets from becoming lost and from natural hazards such as cliffs, crevices, porcupines, rabid animals, and other pets;
- Unleashed pets are a source of negative social impact when they disturb other visitors who may be intimidated by them;
- Unleashed pets often harass, injure and sometimes kill wildlife;
  - Unleashed pets may trample and/or disturb rare plant populations in proximity to the hiking trails and carriage-roads at the Preserve.
  - 
  - In addition, dog owners are expected to clean up after their pets and properly dispose of dog waste.

### Group Use

Organized groups constitute a large percentage of visitor uses at many natural areas across the country. As Sam's Point Preserve is a nature preserve emphasizing natural resource conservation and management, it behooves us to accommodate organized groups interested in learning about the Preserve's natural history and assisting with our research and management program. However, organized group use must be controlled to prevent the negative ecological and social impacts it can have. Studies have shown that groups often have disproportionate impacts to resources than similar numbers of people hiking alone or in small groups. Large groups have a tendency to produce more noise thereby disturbing other visitors as well as wildlife, such as breeding birds that are sensitive to human activities. Large groups can also

disproportionately impact vegetation when thirty or forty people congregate in the same area to rest and/or eat lunch.

Organized groups include, but are not limited to hiking clubs, environmental organizations, college outing clubs and academic programs, boy-scout troops, summer camps, and local school groups. In order to prevent excessive ecological and social impacts, groups, consisting of 12 or more people, shall follow these policies when visiting the Preserve:

- Permits must be obtained from the Preserve by contacting the receptionist;
- Reservations for groups must be made at least one week in advance;
- All groups visiting the Preserve must provide the following:
  1. Reservation/Liability Form
  2. Certificate of Liability Insurance
  3. Payment of the parking fee
  4. Proof of tax-exempt status if applicable
- All groups shall closely follow the “Leave No Trace” guidelines listed above.

### Group Size Limits

Location	Group Size	Permit Required	Notes
Ellenville Ice Caves/Shingle Gully/Grand Canyon Area	Not to exceed 12	YES	Requires permit for specific day; requires orientation by Preserve Staff

### Permit Requirements for Special Events, School and Camp Groups

Type of Group	Group Size	Permit Required	Notes
Special events or organized groups exceeding 20 people	Not to exceed 60	YES - Permits must be arranged at least one week in advance	Requires permission of Preserve Manager.  May be limited during busy periods
Camp/School Groups	Not to exceed 60	YES – Permits available for visits Friday or Monday only  Permits must be arranged at least one week in advance	Requires orientation by Preserve staff; Requires 1 adult/10 children ages 6-16; Requires 1 adult/6 children under 6; Visit not to exceed 3 hours unless arranged with Preserve Manager



### C. Education and Outreach

The primary goal of the Preserve's education and outreach program is to inspire each visitor to become an active member and support biodiversity protection within the Preserve and the Shawangunks. Education and outreach activities at the Preserve will be directed at instilling a sense of conservation awareness in the surrounding communities.

As the education and outreach program develops, research should be conducted to determine the best tools for accomplishing program and Preserve goals. As a starting point, the education and outreach program will focus on engaging visitors in the conservation work of the Preserve and the Shawangunk ecosystem. Involving visitors in research and management activities are educational experiences that encourage visitors to embrace stewardship and develop a deeper awareness of the Shawangunk ecosystem.

Education programs (i.e. evening programs, school presentations, field trips) will help increase awareness of the Preserve's unique resources and how the public can participate in conserving these resources. Although education programs will be a part of the on-going outreach efforts at Sam's Point, as the outreach program develops, actively engaging the public in volunteer opportunities should become a dominant feature of the outreach program. Growth of the volunteer program will reflect the extent to which the outreach program is successful. Experience is the best teacher and provides a rewarding way to demonstrate that everyone can contribute towards improving their community. It also helps to support the Preserve's research, management, outreach and other programs.

The following interpretive themes and statements of significance should guide development of the education and outreach program at the Preserve. Emphasizing the unique natural resources of the Preserve and the ecological processes that sustain them is needed to ensure success with all facets of management at Sam's Point. Broad public support will be important for success of both the ecological and visitor management programs. Educating the public about the importance of fire and fragile areas like Shingle Gully and the Grand Canyon will be critical for the fire management program and resource protection. In the long run, seasonal naturalists should be employed to interact with the public about topics like these.

#### The significance of Sam's Point Preserve includes:

- Over 1,000 acres of dwarf pine barrens , the best known example of this rare community in the world,
- The Preserve is home to seven other rare natural communities, eight rare plants, and three rare animals,
- The ridge supports the state's exemplary chestnut oak forest,
- The Preserve has tremendous biological diversity and
- The Preserve is part of the 90,000-acre Shawangunk Ridge, designated one of the 75 Last Great Places by The Nature Conservancy.

- The Preserve constitutes a large portion of the most remote and intact portion of the Shawangunk Ridge.

The Primary Interpretive Themes include:

- Sam's Point Preserve is home to the best known example of a ridgetop dwarf pine barrens in the world, a globally rare natural community dependent upon and adapted to period fires (Laing 1994, Hubbs 1995).
- Sam's Point Preserve is part of the northern Shawangunks, a unique ridge system with a highly resistant caprock of quartz conglomerate, which sustains the region's rugged topography.
- Fire, hydrology, climate and land-use history are the most important ecological processes influencing and shaping the vegetation communities of the Preserve.
  - Due to nearby development and human-related impacts, ecological management (such as fire management and restoration) is necessary to ensure the long-term survival of the species and natural communities of Sam's Point and the Shawangunk Ridge.
- Our ability to conserve the natural, cultural, scenic and wilderness resources of Sam's Point Preserve depends on the ecological awareness, support and cooperation of our visitors and local communities.
- Sam's Point Preserve and the greater northern Shawangunk Ridge have a rich cultural history dating back to Native American inhabitation.
- Education and Outreach Tools
- **Field studies:** research and monitoring needs on the Preserve are vast and exceed the personnel resources currently available. Volunteers are needed to assist staff with the Preserve's VERP monitoring program and the research topics listed below in the Ecological Management section. It is likely that opportunities for research and monitoring will always exceed staff availability. This provides an outstanding opportunity to actively involve academic groups and volunteers in learning about aspects of the Shawangunk ecosystem, while providing meaningful and valuable information to land managers.
- **Volunteer activities:** given sufficient staff are available to provide the needed oversight, guidance and support, volunteer opportunities are abundant and diverse. They include volunteer workdays, assisting in the visitor's center, providing interpretive programs to Preserve visitors and developing displays. Volunteers can and should provide a large portion of support for the Preserve's operations. Conversely, the Preserve should have a program to recognize the invaluable work donated by dedicated volunteers. To recruit volunteers, the Preserve should pursue partnerships with entities like the Cragmoor Association, the Cragmoor Historical Society, the Cragmoor Free Library, the Town of Shawangunk, the Village of Ellenville and local schools.
- Public programs bring people to the Preserve and provide a focused time to engage them in learning about the Preserve and Ridge. Public programs can also provide a source of revenue.

Public programs should, when possible, focus on the interpretive themes and statements of significance listed above.

- **Displays and Exhibits:** Permanent and temporary displays will be established at access points and developed points of interest. Displays in non-developed, internal areas will not be permitted, except for safety reasons. The eastern ice caves, the Conservation Center and the new Berme Road parking area will be the focal point for educational displays.
  - Education and Outreach Program Goals
    - A combination of outreach activities should be used to reach diverse audiences. Interpretive programs will serve to increase public awareness and encourage involvement in more interactive activities. As the Preserve becomes better known, the emphasis will increase on involving the Preserve's constituency in activities that advance the research and management needs of the Preserve. Goals for the Education program include:
      - Recommended annual outreach goals include:
        - At least six public programs/field trips that focus on the natural and cultural history of Sam's Point and the Shawangunk Ridge;
        - At least than six volunteer workdays;
        - Outreach to local schools, including at least four in class presentations to be followed up with four corresponding field trips;
        - Creation/maintenance of at least four interpretive displays for the Conservation Center and/or interpretive kiosks, including: a) volunteer opportunities, b) on-going research, c) ecological processes (fire), d) the conservation importance of Sam's Point and the Shawangunk Ridge and the role of the Shawangunk Ridge Biodiversity Partnership, e) the cultural history of the Preserve (blueberry pickers, Native American presence etc.);
        - Training at least two volunteers to conduct educational programs for the general public and to assist in the Visitor's Center;
        - Development/maintenance of a slide/photograph library.

## VI. Cultural Resource Management

The term “Cultural resources” describes the material remains, structures, landscape features, and built environments associated with human occupations. Cultural resources exist above ground or in sub-surface contexts as archaeological sites. Analysis of prior research in the Shawangunks suggests that Native American and Euro-American cultural resources are located within the Sam’s Point Preserve. Adjoining the Preserve is the Cragmoor Historic District, a 362-acre mountaintop community comprised of residential, commercial, civic, and religious properties. Listed on the State and National Registers of Historic Places in 1996, the hamlet of Cragmoor has been active as a summer artists’ colony since the latter part of the nineteenth century.

Native and European American reliance upon the natural resources of the Shawangunk Mountains was manifested in such activities as hunting, gathering, quarrying, mining and logging. Within the Preserve, evidence of these pursuits and the lifeways associated with them, exist today in the form of cultural resources dating to both the prehistoric and historic periods. Both categories of sites are inherently fragile. The information about human history and prehistory that they contain is represented not only by artifacts and faunal remains but also by the stratigraphic contexts in which remains are found. These soil layers may also contain charcoal and fossilized pollen, critical for the reconstruction of past lifeways and environments. As the Preserve is opened to hiking and exploration, threats to these sites and the information contained within them increase. Preserve management activities may also damage both buried and above ground remains. In addition, Preserve visitors may remove artifacts and contribute to soil erosion. Avocational archaeologists, many of whom are knowledgeable about the materials contained within sites, do not always keep detailed records or share the results of their investigations with professional archaeologists and the public.

The research potential and possibility of future damage to the Preserve’s cultural resources make it essential that they be managed in a responsible and professional manner. The following paragraphs describe the cultural resources of the Preserve and delineate sensitive areas that may contain resources that have not yet been identified. Measures for identifying, evaluating, protecting, interpreting and preserving these resources are also presented.

### A. Prehistoric Native American Resources

The Shawangunk Mountain landscape, like much of the surrounding Hudson River Valley, has a long history of human intervention. Native American presence here dates to approximately 8000 BP (before the present time), and possibly earlier (Eisenberg 1991). Active participation in ecological processes by early human groups is possible since Native Americans routinely set fires to the landscape to improve wildlife habitat and keep the forest understory open.

Professionally conducted archaeological surveys or excavations within the Preserve have been extremely limited. However, excavations and surveys conducted within portions of the Shawangunks adjoining the Preserve suggest that the relatively inaccessible ridgetops of the Preserve contain a repository of archaeological information that cannot be found in other settings (De Micco 1978; Diamond 1996; Eisenberg 1991; Historical Perspectives Inc. 1991; Schrabisch

1919a, 1919b, 1920).

While open-air sites are known to exist, archaeological sites within this environment typically take the form of rockshelters. This type of site can be found in several contexts including rock/ledge overhangs along the bases of cliffs, within caves, or among rock masses that have become detached from “parent” cliffs (Schrabisch 1919). Such habitation spaces were sought after as temporary shelter by small mobile bands of prehistoric hunter-gatherers because they offered safety and protection from the elements. Activities within rockshelters usually involved “sleeping . . . , food preparation, cooking, and maintenance of equipment.” Groups tended to visit rockshelters repeatedly through time, allowing a significant accumulation of cultural debris (Walthall 1998).

The presence of such sites along the Shawangunk Ridge was demonstrated early in the twentieth century. As part of a larger study of rockshelter sites in New York and New Jersey, Max Schrabisch (1919) surveyed a tract of some 40 square miles west of Lakes Mohonk and Minnewaska, along the ridge north of the Preserve. Schrabisch (1919) noted the presence of 50 rockshelters, half of which contained evidence of prehistoric utilization.

More recent rockshelter investigations include the Mohonk Rockshelter, located within the Mohonk Preserve (Eisenberg 1991). First excavated in 1931 by Daniel Smiley, an avocational archaeologist, it was the subject of an extensive excavation in 1982-3 by Leonard Eisenberg of SUNY-New Paltz. Marc Fried (1981), a naturalist, historian, and avocational archaeologist has also published a brief account of excavations at Indian Cave located in Minnewaska State Park. Both the Mohonk Rockshelter and Indian Cave are situated along the eastern side of the Shawangunk ridge north of the Sam’s Point Preserve. The Roosa Gap Rockshelter, located on the top of the Ridge near Wurtsboro, several miles south of the Preserve, was excavated by members of the Orange County Chapter of the New York State Archaeological Association in the late 1960s (Funk 1989:49-50). In Cragmoor, the hamlet immediately adjoining the Preserve, a rockshelter containing Native American artifacts is located on lands belonging to the Cragmoor Association (Stanger 1999: pers. comm.).

Periods of Native American occupation represented at the sites itemized above include the PaleoIndian Period (11,500 – 10,000 BP), the Archaic Period (10,000 – 3,000 BP), the Woodland Period (3,000 – 500 BP), and Contact Period (500 – 300 BP).

### *1. Prehistoric Native American Resources – Significance and Research Implications*

Research indicates that Shawangunk prehistoric archaeological sites are unusually numerous, intact and well Preserved. As a group, they constitute a record of human adaptation to a unique ecosystem. The evidence for Native American occupation of the Shawangunks, together with other research conducted in the Hudson River Valley, suggests a number of important research topics that may now be addressed (Claassen 1995; Diamond 1995; Eisenberg 1991; Funk 1989; Lavin et al. 1993; Lindner 1998). For example, archaeologists have recently begun to recognize the importance of high elevation environments for understanding the development of prehistoric cultures in the eastern United States. Excavations in mountainous regions of West Virginia, New Hampshire, Vermont, and Missouri have led to the identification of sites

associated with cultural traditions for which there has been a general lack of knowledge, including the Early Archaic (ca. 10,000 – 8000 BP) and Middle Archaic Period (ca. 8000 – 6000 BP). Eisenberg's (1991) excavation at the Mohonk Rockshelter, which yielded seventy-three Neville projectile points (a type which has been dated to 7000 - 7750 BP), suggests the presence within the Shawangunks of additional sites associated with these cultures.

Evidence of occupations dating to the earlier Paleoindian Period (ca. 12,000 - 10,000 BP) and Early Archaic Period (ca. 10,000-8000 BP) was also recovered from the Mohonk Rockshelter site. Because so many lowland sites have been lost due to sea level rise and modern development, these early periods are poorly represented in the archaeological record. Thus, sites located in undeveloped upland contexts, such as the Preserve, are especially significant (Eisenberg 1991).

## *2. Prehistoric Native American Resources – Areas of Predicted Sensitivity*

Factors influencing Native American selection of rockshelters as potential habitation sites have been analyzed by professional and avocational archaeologists working in the Hudson Valley region (see especially Funk 1989). In general, the occurrence of rock overhangs and proximity to a water source are primary variables. These characterizations, however, are extremely broad and should be applied cautiously. As more data on local site conditions becomes available, this sensitivity model should be refined accordingly to accommodate factors such as aspect (east/west/north/south), accessibility, size, etc. Also, additional field research will be necessary to locate springs and wetlands that are not indicated on available maps or that have dried up since prehistoric times. Until a thorough reconnaissance level survey of the entire Preserve has been completed, these delineations should be considered preliminary.

Several areas that are now considered potentially sensitive for rockshelter sites are as follows:

1. Base of the escarpment and overhangs immediately west of Lake Maratanza
2. Base of the escarpment and overhangs extending southwest and northeast from the former Ice Caves Mountain.
3. Overhangs in the vicinity of Verkeerderkill Falls
4. Overhangs in the vicinity of the Verkeerderkill, its branches, and headwaters
5. Overhangs in the vicinity North, South, and Shingle Gullies
6. Overhangs in the vicinity of Ellenville Ice Caves and “the Grand Canyon”

Open-air sites are more elusive in high elevation/thin soil contexts such as those existing at the Preserve. However, like rockshelters, such sites would most likely be found near water sources. This includes the vicinity of Lake Maratanza and along the banks of the stream that outlets from the Lake to the east. However, it should be noted that the level of Lake Maratanza has been raised since the time of Native American occupation. Local avocational archaeologists

collected evidence of prehistoric activity in areas presently submerged during periods of drawdown of the Lake, which now serves as the Ellenville water supply (S. Matz: pers. comm.). It is possible, however, that this and other sites could extend beyond the area affected by the raising of the Lake. The 1899 Smiley map notes spring locations. The areas surrounding the springs should also be considered sensitive for open air sites.

There is also the possibility that certain high elevation locales may have been utilized for sacred purposes or as lookout points. It has also been suggested that these locations functioned as units within regional prehistoric directional systems (Brannan and Robinson 1980). Such areas, even if no water sources are present, should be considered sensitive for open-air sites. These include Indian Rock, High Point, Sunrise Rock, and Sam's Point. The archaeological site files of the New York State Museum (now housed at the New York State Office of Parks, Recreation, and Historic Preservation) list "petroglyphs" immediately east of the High Point Carriageway. Although no other information is available concerning this intriguing find, the area adjacent to it should also be considered sensitive.

As with rockshelter sites, the delineation of sensitive areas due to the presence of open-air sites should be considered preliminary until a thorough reconnaissance of the Preserve has been completed.

## B. Historic Period Cultural Resources

As discussed above, human beings have inhabited the Shawangunks for the past several thousand years. However, available evidence indicates that current Preserve lands were not intensively utilized by Euro-Americans during the early historic period. In fact, the poorly defined boundary lines and large size of present day Shawangunk Mountain tracts attests to the low value assigned to these rugged and uninhabited lands until very recently. Only a handful of eighteenth and nineteenth century Euro-Americans were able to establish livelihoods in the Shawangunks. Local industries and lifeways included wintergreen distilling, quarrying, mining, shinglemaking, barrelhoop making, charcoal making, trapping, and huckleberry picking (Snyder and Beard 1981). Foremost among this group were the latter, commonly known as "the huckleberry pickers" (berry pickers). The berry pickers, who partook in a locally important fruit gathering industry, were a group of working class men and women who began to seasonally inhabit the Shawangunk Ridge sometime in the middle of the nineteenth century.

The development of a fruit gathering industry in the Shawangunk Mountains was due to the availability of dense growths of blueberries. Fried (1995) speculates that the origin of the Sam's Point camps may be linked to the ca. 1850s construction of roadways linking this location to other communities. The 1899 Smiley map notes the presence of a series of "camps" thus providing additional evidence that berry pickers were active in the Sam's Point area, at least as early as the turn of the century. At some point the berry pickers began to establish seasonal and/or semi-permanent camps within what is now the Preserve and the lands that adjoin it (Fried 1995). Their harvesting activities drew them to many locations, but their settlements were for the most part clustered along the roadway immediately west of Lake Maratanza and along the Smiley Road, a roadway constructed at the beginning of the century providing a direct route from Ellenville to hotels at Lake Minnewaska (Fried 1995). By the late 1960s, the berry picker's

camps had been deserted and only a handful of elderly individuals remained. Today, the most visible historic period remains within the Preserve are associated with this group and their exploitation of the land's resources.

Remains of at least twelve distinct berry picker camps survive within the Preserve and on adjacent lands. They extend for a distance of some 2,500 feet along the western edge of the Lake Maratanza roadway described above. These ruins contain structural remains such as foundations and building materials, as well as refuse middens. Although, surface features suggest that the remains date to the early and mid-twentieth century, the 1899 Smiley map indicates that at least three camps existed at this location as early as the turn of the century. The older camps, once identified, may contain valuable archaeological data. Material culture useful for interpreting berry picker lifeways may also be preserved in the ruins of the more recent camps.

During the middle and late nineteenth century the Preserve was a popular tourist destination. Two resorts – one located at the base of Sam's Point and the other on the southern shore of Lake Maratanza – were built here by Thomas Botsford (S. Matz: pers. comm.). Structural remains and refuse middens associated with these structures may be present.

One intact historic structure survives within the Preserve today. This structure, known as “the gate house,” is also included in the Cragmoor Historic District as “the Ice Caves Mountain House and Entrance, #145.” Constructed in the 1850s (possibly earlier) it is considered one of the oldest buildings on the mountain. It functioned originally as a farmhouse. Sold in the second half of the nineteenth century to Thomas Botsford, owner of the hotels described above, it became “the point of access to Sam's Point” and “an important tourist attraction.” The National Register Inventory Form describes it as “a 2 ½ story gable roof building with a projecting bay window on the second floor” (Cragmoor Historic District Nomination 1996). Presently covered with asbestos shingles, portions of the structure may contain original structural details. It exists today as an important visual reminder of the region's early development as a resort district. It may also contain archaeological remains on its grounds.

### *1. Historic Period Cultural Resources – Significance and Research Implications*

Structural remains, landscape features, and artifacts associated with the berry picker camps, 19<sup>th</sup> century resorts, and other Shawangunk lifeways will be of great assistance in interpreting Euro-American history and culture within what is now the Preserve. However, as most research to date has centered upon the berry pickers, they are the focus of the following discussion of potential research themes and significance.

As stated above, the sites of at least twelve berry pickers' camps are located along the western edge of the roadway that extends from the visitor's center northward into the Preserve. Additional camp remains are located along Smiley Road. The ruins of small cabins, outhouses, and debris scatters are the most obvious indicators of the campsites. However, preliminary investigations have revealed that partially buried foundations of older structures are also present in the area. As indicated on the 1899 map, camp locations were influenced by proximity to springs and roadway access. Traces of overgrown roadways are visible today, as are several of the springs. In addition to buried structural remains such as foundations, archaeological evidence



of the camps also includes refuse middens associated with the various camp locations.

Although the lives and experiences of urban industrial workers of the eighteenth, nineteenth and early twentieth centuries has been extensively chronicled, their rural counterparts - agricultural laborers, miners, quarry workers, brickyard workers, stonemasons, loggers, shinglemakers, trappers, and ice house workers – remain somewhat of a mystery (Gutman 1977; Samuel 1982; Harris and Pickman 1999). A number of traditional Shawangunk Mountain lifeways are represented among these occupational categories (Evers 1972, Fried 1981, Gilchrist 1976, Harris 1998, Snyder and Beard 1981). The landscape and built environment associated with the berry pickers can be viewed as important visual reminders of the often-overlooked emergence of the region's nineteenth and early twentieth century rural working class. The Preserve, therefore, offers an ideal setting for research on this subject. As a landscape, the historic and archaeological significance of the remains must be evaluated within the context of their association with huckleberry picking as a traditional Shawangunk Mountain lifeway and their location within the high altitude ecosystem that once constituted berry pickers' agricultural resource base (Snyder and Beard 1981).

The recovery of archaeological artifacts from the sites of the camps could provide insights into research questions concerning several aspects of the berry pickers' lives. The analysis of temporally diagnostic artifacts will help establish the dates when the camps were first occupied. Artifacts and faunal remains can also be used to examine ethnic differences among the inhabitants of the various camps. Other interesting research topics regard differences in material culture and lifeways in the camps' occupants through time. Did substantial cultural changes occur as the Shawangunks became less isolated as the region was gradually integrated into the larger market economy? The archaeological record may also enable researchers to detect changes in the size, age, and gender composition of the camps.

## *2. Historic Period Cultural Resources – Areas of Predicted Sensitivity*

Two concentrations of berry picker camps' remains exist within the Preserve and the lands immediately adjoining it. These include the corridor surrounding the western side of the Loop Road and several sites along the Smiley Road. Several scatters of berry picker's artifacts have also been observed along the base of the escarpment that also runs to the west of Lake Maratanza. Remains of a few shacks also exist near the entrance to the Preserve. Remains associated with the 19<sup>th</sup> century hotels may be located along the southern shore of Lake Maratanza and at the base of the escarpment that forms Sam's Point. The "gate house," is an historic structure located near the entrance to the Preserve... This building and any associated archaeological remains should be considered sensitive.

### **C. Potential Impacts to Cultural Resources**

Many activities associated with the use and management of the Preserve have the potential to disturb or destroy cultural resources. Clearly, impacts arising from in-ground disturbance (i.e. excavation below the present grade or ground surface) pose threats to prehistoric archaeological sites (both open air and rockshelters), and historic refuse middens (which often contain both above ground and sub-surface components). However, the removal or modification

of above ground historic remains, standing structures and landscape features are also causes of concern. Examples of activities that may affect the integrity of cultural resources within the Preserve are listed below:

1. **Construction:** If precautions are not taken, construction-related activities may damage historic structures associated with Euro-American use of the Preserve. Buried prehistoric and historic archaeological remains may also be disturbed. Possible detrimental activities include physically altering an historic structure, as well as the installation of utilities, or excavation for footings, or piles. Secondary impacts associated with construction include the development of staging areas and movement of heavy machinery as both actions may result in soil compaction.
2. **Road/Trail Maintenance:** Buried archaeological remains may be affected by activities relating to the construction, modification, or repair of roads and trails. Some trails and roads may be associated with the history and prehistory of the Preserve. Thus their modification may constitute an adverse effect.
3. **Landscaping:** Buried prehistoric and historic archaeological remains, historic refuse middens, and historic landscape features may be affected by activities including tree cutting, installation of signs and fencing, and any changes to existing landforms or watercourses. Some categories of historic structures (i.e. berry picker's shacks) may be considered unsightly intrusions into the Preserve's natural beauty and thus become candidates for demolition.
4. **Fire Management:** Fires may damage structures or above ground features associated with historic Euro-American use of the landscape.
5. **Non-Passive Recreational Uses:** Many forms of non-passive recreation may affect cultural resources because they result in a) compaction of soils containing buried remains; b) modifications to the ground surface; or c) removal or disturbance of remains or features that are located on the ground surface. Examples of such activities include trail biking, caving, and rock climbing.
6. **Expanded Access:** As many more locations within the Preserve are made accessible to visitors, the likelihood increases for adversely affecting formerly remote cultural resources. Rockshelters are particularly vulnerable because they often constitute attractive sites for hikers seeking shelter or picnic areas.

#### D. Protection of the Preserve's Cultural Resources

Several options for protecting cultural resources are being explored, including an archaeological survey of the Preserve, the development of a cultural resources inventory, the addition to the Preserve's existing natural resource GIS data base of a culture resources layer, and the creation of a stewardship program staffed by local volunteers. Artifacts and information generated by these efforts will serve as a basis for protecting and interpreting the Preserve's landscape. Inclusion on the National Register of Historic Places of the remains of the berry picker's camps and associated terrain is also seen to be an important step towards acknowledging

the cultural and historic aspects of the Preserve's landscape and this too is being considered.

However, none of these proposals can become a reality until adequate funding is secured. In order to preserve the Preserve's cultural resources until programs such as these are established, procedures are proposed to ensure that the managers of the Preserve consider the effects of undertakings within the Preserve upon prehistoric and historic sites, structures, and landscape features – both above and below the ground surface. These procedures recognize that the Preserve's cultural resources are entitled to a level of protection commensurate with that afforded to those controlled by the State of New York and therefore regulated by the New York State Historic Preservation Act of 1980 (Chapter 354 of Parks, Recreation and Historic Preservation Law). Cultural resources regulated by this statute include those located within Minnewaska State Park and other lands on the Shawangunk Ridge controlled by the New York State Department of Environmental Conservation.

#### Recommended Procedures for Identifying, Evaluating and Protecting the Preserve's Cultural Resources

1. If any project planned for the Preserve entails one of the activities described above as potentially causing impacts to cultural resources, and is to be undertaken within any of the "areas of predicted sensitivity," the Preserve's managers should consult a professional archaeologist (i.e. current member "Register of Professional Archaeologists" and meeting the standards established by the New York State Office of Parks, Recreation, and Historic Preservation) or an architectural historian with equivalent credentials. (Note: Professional archeological services were used prior to the development of the Conservation Center and the demolition of the old visitor's center. The foundation of the old visitor's center was not disturbed and was buried to allow for future archeological research.)
2. In consultation, the archaeologist (or architectural historian) and the Preserve's managers will seek to determine whether the planned undertaking will have adverse impacts upon cultural resources that may be present within the project activities' area of impact.
3. If it is determined that the undertaking will have adverse impacts, the Preserve's managers should mitigate adverse impacts to the cultural resource by exploring feasible alternatives and giving them due consideration. Examples of mitigation measures would include data recovery in the form of recordation, mapping, or archaeological excavation.
4. Any archaeological surveys or excavations performed within the Preserve should comply with "Standards for Cultural Resources Investigation and the Curation of Archaeological Collections in New York State" (prepared by the New York Archaeological Council and adopted by the New York State Office of Parks, Recreation and Historic Preservation, 1994).

## VII. Implementation

As its mission statement indicates, the primary purpose of Sam's Point Preserve is to protect its unique ecological features and wilderness character while accommodating controlled public use. Therefore, staff resources will be directed at meeting this dual set of priorities. Since 2001, the Preserve has relied on the staff listed below to implement programs, support public access at the Preserve, oversee ecological management, supervise volunteers and work with partners on ridgewide initiatives. Local staff resources are augmented by other Nature Conservancy staff for special projects and for administrative support.

In the coming years it is anticipated that additional, specialized staff resources will be provided to assist with fire management as the program grows. Currently, a Student Conservation Association fire crew is employed part-time in the Shawangunks to assist with fire management activities at Sam's Point such as brush clearing and firebreak preparation.

### A. Staffing

#### Director, Shawangunk Ridge Program

The Shawangunk Ridge Director's primary responsibilities include overseeing Preserve operations, networking with local, regional and state conservation leaders and fundraising to promote conservation of Sam's Point Preserve and the Shawangunks. In addition to oversight of the Preserve, this position works across the ridge on issues related to the conservation plan being developed for the entire ridge by the Shawangunk Ridge Biodiversity Partnership.

#### Land Steward

The Land Steward is responsible for ensuring that the natural, cultural and open space resources of the Preserve are adequately protected and for the design and implementation of ecological management strategies.

The Land Steward will perform and oversee tasks, such as boundary posting, trail maintenance, inventories to identify the location and condition of natural and cultural resources, support priority research and monitoring projects, guide public use planning and control, implement the fire and invasive species management programs, implement the hunting program and oversee any restoration projects. The Land Steward will also address trespass issues that pose a threat to the Preserve's resources. He/She will work closely with volunteers and other organizations to accomplish their work. The Land Steward will also advise and provide technical support to the Shawangunk Ridge Biodiversity Partnership on ridgewide ecological management issues.

#### Preserve Manager

The Preserve Manager will oversee all headquarters/visitor center operations; recruit and coordinate volunteers for all Preserve program areas; coordinate, design and conduct outreach programs; design and implement interpretive displays and signage; and work with schools and other groups to design and implement an educational program that supports the Preserve's research and management programs. The education program will focus on involving students and adults in research and management projects that advance Preserve goals. He/She will work

closely with volunteers and other organizations to accomplish their work. The Preserve Manager will manage search and rescue activities, permitting and implementation of Preserve public use policies.

#### Administrative Assistant

In addition to supporting Preserve staff, the Administrative Assistant will be responsible for interfacing with the public as a receptionist, receipting and billing, maintaining information systems and office equipment, maintaining records related to the visitor center gift shop, maintaining financial statements for parking fees and assisting with volunteer coordination and implementing the hunting program.

The Director of the Shawangunk Ridge Program and Director of Ecological Management (from the TNC Chapter Office) will co-supervise a Preserve Steward provided by the Eastern New York Chapter to take on special projects as assigned.

### B. Partner Support

TNC staff work closely with conservation and land management partners along the Shawangunk Ridge to manage Sam's Point Preserve in a manner that is consistent with the Management Guidelines adopted by the Shawangunk Ridge Biodiversity Partnership. Staff communicates frequently with other land managers on research, ecological management, and recreation use policies and practices.

OPRHP/PIPC – Since the transfer of a portion of Sam's Point Preserve to PIPC, there has been increased collaboration on signage, patrolling, visitor management, hours of operation and other shared issues. Also, OPRHP Park Police provide back-up emergency support and limited patrolling at the Preserve.

NYS DEC – DEC provides support and takes the lead in the event of a search and rescue incident at Sam's Point Preserve. TNC staff has worked closely with DEC on a Search and Rescue Protocol and has developed and trained a volunteer Search and Rescue Patrol that can be called on by DEC, on an as-needed basis.

Cragsmoor Fire Department – The Cragsmoor Fire Department provides support to the Preserve for emergency services. In the event of a Search and Rescue incident, the Fire Company is contacted by 911 in addition to Preserve staff.

### C. Capital Needs

**Investments to Date:** Since 2001, close to \$1.8 million has been invested at Sam's Point Preserve to meet capital needs, including the development of the Meg Stewart Conservation Center and the related facilities at the entrance of the Preserve.

**Road Restoration and Maintenance:** In the coming years, restoration and on-going maintenance of the Loop Road, the High Point Carriage Road and the Ice Caves Road will be a high priority, and it is estimated that this will require an investment of \$600,000 - \$700,000.

Maintenance Facility: As the ecological/fire management program grows, there will be a need for a maintenance facility to provide additional storage, garage and bunk space for fire crew. A maintenance and bunk facility is envisioned that could be located at Sam's Point or on a related conservation property. It is estimated that such a facility would require an investment of \$150,000.

## VIII. Management Actions

The following tables provide a consolidated list of the management actions suggested throughout this plan. The tables are organized congruently with the organization of the plan. These tables include management actions related to infrastructure (Table 10), recreation management (Table 11), and ecological and cultural resource management (Table 12). Management actions related to staffing and fundraising are listed above under Section VIII, while Table 2 covers management actions related to land protection. For each management action listed, a broad target date is provided, along with the entity designated to carry out the action. A location within the Preserve for each management action has also been noted. Deviations from the specified timeline are possible due to staffing, budget constraints and unanticipated special issues, which may necessitate a reallocation of staff time and resources.

**Table 4. Infrastructure and Capital Investments**

<b>Management Action</b>	<b>Lead</b>	<b>Notes</b>	<b>Season</b>	<b>Year</b>
Hire contractor to develop plans for Headquarters construction and Gatehouse renovations	TNC – Director of Ecological Management	Contractor Hired		Completed
Construct/renovate facilities and Gatehouse per contractor plans	TNC – Shawangunk Ridge Director and Contractor(s)	Work anticipated to begin in Fall 2001		Completed
Identify and construct facilities for Preserve storage and office space	TNC – Shawangunk Ridge Director	Will likely be part of facilities plans		Pending
Discuss maintenance needs of the Loop Road with tower users and develop plan.	TNC – Land Steward and OSI General Counsel	From parking area to tower facilities	Summer/ Fall	Pending
Consolidate towers	OSI-General Counsel			Ongoing
Restore disturbed areas	TNC – Land Steward	See Section V for more details	Field Season	Ongoing
Construct gate at start of High Point Carriageway to prevent illegal vehicular use	TNC – Preserve Steward		Summer	No longer planned
Work with New York New Jersey Trail Conference to plan and implement trail maintenance priorities	TNC – Preserve Steward and NY/NJ Trail Conference	See Section IV, “trail inventory” for details	Summer	Ongoing
Restore and improve unofficial trails in ecologically sensitive areas	TNC – Preserve Steward and Land Steward	Vicinity of Shingle Gully and the Grand Canyon	Summers	Ongoing
Develop and erect informational kiosk for Berme Road	TNC – Preserve Steward and Visitor Center Manager	Work with Village of Ellenville and PIPC	Spring/ Summer	Completed
Complete property survey	OSI-General Counsel		Summer	Completed

Post Preserve boundary signs	TNC –Preserve Steward and Land Steward	Work with OSI and PIPC to develop signage	Fall	Ongoing
Develop and post stewardship signs for major entry points and ecologically sensitive areas	TNC – Preserve Steward	See Section IV, “signage” for details	Summers	Completed2
Design and post off-property signs in Cragsmoor	TNC – Visitor Center Manager	Work with town on design	Spring/Summer	Completed2
Complete renovations of eastern ice caves	TNC – ENY Preserve Manager	See Section IV, E for details	Spring/Summer	Completed
Purchase 4-wheel drive one-ton pick up truck	TNC – Shawangunk Ridge Project Director		Field Season	2009
Continue Visitor Center Operation	TNC-Visitor Center Manager and Director of Outreach and Volunteerism		April-November	Ongoing
Evaluate Dam Restoration with Village of Ellenville	TNC and Village of Ellenville			2009
Complete Nature Trail behind Gatehouse	TNC			2009
Evaluate Energy Efficiency of Gatehouse and Plan Retrofit	TNC			2009



**Table 5. Recreation Management Actions**

<b>Management Action</b>	<b>Assigned to</b>	<b>Notes</b>	<b>Season</b>	<b>Year</b>
Set up photo-monitoring points and maintain	TNC – Preserve Steward and Land Steward	Shingle Gully, Grand Canyon, Eastern Ice Caves, High Point Trail, Cliff edges north and south of Sam’s Point	Summers	Set up in 2003 Ongoing
Update NY Natural Heritage Program rare species forms	TNC – Land Steward and Preserve Steward	See Table 1 for a list of rare species found on the Preserve	Summers	See Table 4
Revise Shingle Gully permit form to include a line for reporting number of people encountered during a visit	TNC – ENY Director of Ecological Management		Spring	Permit Updated
Develop monitoring forms for volunteers to assist with Preserve’s VERP framework	TNC – Preserve Steward	See Table 4 for a list of indicators to be monitored	Summers	Completed and on-going
Research and implement a visitor monitoring program to track actual vs. perceived use of permit required areas	TNC – Preserve Steward	Needed for The Primitive Zone (Shingle Gully and the Grand Canyon)	Spring/ Summer	2010
Develop a log / method for recording visitors encounters with wildlife (esp. snakes)	TNC – Visitor Center Manager and Naturalist	Important for VERP indicators	Summer	2010
Complete cave surveys to assess the potential impacts of recreational use of Preserve caves	New York Natural Heritage Program	Locations to be determined with caving community	Field Season	When \$ permits
Finalize a comprehensive trails plan for the Preserve	TNC, OSI, Sam’s Point Advisory Council	Work with NY/NJ Trail Conference and Minnewaska State Park Preserve	Spring	Completed
Develop an outreach program for local schools	TNC – Director of Outreach and Volunteerism	See Section VI for more details	Field Seasons	Begun in 2008
Develop interpretive displays for Visitor Center on current research, ecological processes and biodiversity importance of the Shawangunks	TNC – Director of Outreach and Volunteerism and Visitor Center Manager	See Section VI for more details	Field Season	Ongoing
Develop slide / photograph library	TNC – Director of Outreach and Volunteerism	See Section VI for more details	Field Season	Ongoing

**Table 6. Ecological Management Actions and Research Priorities**

<b>Management Action</b>	<b>Assigned to</b>	<b>Notes</b>	<b>Season</b>	<b>Year</b>
Develop a Ridgeway Fire Management plan	TNC – Director of Ecological Management	See Research under Section V for more details	Spring	2009
Implement Experimental Burn Program	TNC - Land Steward and Director of Ecological Management	See Research under Section V for more details		2010
Install weather station to assist with prescribed fire planning	TNC – Land Steward	See Research under Section V for more details	Field season	2007
Map infestations of invasive species	TNC		Field Season	2003 and updates
Implement measures for controlling exotic species	TNC – Preserve Steward and Land Steward	See Table 6 for details on specific species and management actions	Summers	Ongoing
Develop outreach program / materials on the benefits of landscaping with native species	TNC – Preserve Director of Outreach and Volunteerism	To be directed at the surrounding communities		2008
Research restoration techniques on disturbed areas; implement restoration	TNC – Land Steward and Preserve Steward	Drilling field, shale pit, specified roads		2003, Ongoing
Remove electric cable to former commercial ice caves	TNC – Preserve Steward		Summers	Complete
Remove decaying observation deck from the “Maze”	TNC – Preserve Steward	Brush in paths leading into the area to promote restoration	Field Season	Complete
Obscure access points to cliff edge north and south of Sam’s Point	TNC – Preserve Steward	To promote restoration of damaged areas	Field Season	Complete
Develop research to aid with analyzing the Preserve’s deer herd	TNC – Land Steward	See Section V for more details and specified steps	Field Season	2009
Construct Deer Enclosure	TNC and partners	See Section V for more details	Field Season	2009
Implement necessary research for supporting the visitor management program	TNC – Preserve Steward and Land Steward	See Section V for a list of research questions	Field Seasons	2010
Implement a cultural resources inventory	Wendy Harris	See Section VII for more details		2012
Supplement Hunting Program to manage herbivores	TNC- Land Steward	Continue to modify based on deer mgmt. goals and success		Ongoing

Implement trail monitoring program	TNC – Preserve Steward and interns	See Appendix XI	Field Seasons	Ongoing
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Matz, Sally. President, Cragmoor Historical Society

Mills, Michael. Ellenville Village Manager, Ellenville, New York.

Stanger, V.P. Resident and amateur archeologist, Cragmoor, New York.

#### Personal Observations

Lougee, Jeff. Sam's Point Science and Stewardship Assistant, Eastern New York Chapter, The Nature Conservancy. Troy, New York.

**APPENDIX I. CONTRIBUTORS TO THE SAM’S POINT MASTER PLAN –  
SAM’S POINT ADVISORY COUNCIL MEMBERS AND STAFF**

**Current Advisory Council Members**

Hank Alicandri – Director of Stewardship and Head Ranger, Mohonk Preserve  
 Paul Elconin – Land Steward, the Open Space Institute, Inc.  
 Iris Friedman, the Village of Ellenville  
 Jack Grifo – Cragsmoor resident and recording secretary  
 Wendy Harris – Register of Professional Archaeologists  
 Liana Hoodes, Town of Shawangunk Environmental Management Council  
 Eric Humphrey – Park Superintendent, Minnewaska State Park Preserve  
 Paula Medley – The Cragsmoor Association  
 Eric Meyer – New York-New Jersey Trail Conference  
 Maureen Radl – Friends of the Shawangunks

**Previous Advisory Council Members**

Elliott Auerbach, Manager, Village of Ellenville  
 Tom Briggs, Mayor, Village of Ellenville  
 Alicia Carroll, Mohonk Ranger  
 Tom Cobb, Preserve Manager, Minnewaska State Park Preserve  
 Tom Gil, Cragsmoor Resident  
 Michael Mills, Manager, Village of Ellenville  
 Irwin Rosenthal, Ellenville Lumber  
 Robert Siegal, New York-New Jersey Trail Conference

**OSI Staff**

Robert Anderberg, General Counsel  
 Paul Elconin, Mid-Hudson Land Steward

**TNC Staff**

Andy Beers, New York State Director of Conservation (previous)  
 Gabriel Chapin, Forest and Fire Ecologist, Shawangunk Ridge Program  
 Stephanie Gifford, Director of Ecological Management, Eastern New York Chapter (previous)  
 Chris Hawver, Director, Albany Pine Bush Preserve  
 Joel Hecht, Stewardship Director, Albany Pine Bush Preserve  
 Mark King, Director of Land Protection, Eastern New York Chapter  
 Cara Lee, Shawangunk Ridge Program Director  
 Jeff Lougee, Sam’s Point Science/Stewardship Assistant, Eastern New York Chapter (previous)  
 Brad Stratton, GIS Specialist  
 Maria Trabka, Director of Conservation Science, Eastern New York Chapter (previous)  
 Heidi Wagner, Sam’s Point Preserve Manager  
 Troy Weldy, Director of Ecological Management, Eastern New York Chapter  
 Michael Batcher, Consultant

## **APPENDIX II. SHAWANGUNK RIDGE BIODIVERSITY PARTNERSHIP MEMBERS AND MISSION STATEMENT**

### Members

Cragsmoor Association  
Friends of the Shawangunks  
Mohonk Preserve, Inc.  
The Nature Conservancy  
New York/New Jersey Trail Conference  
NYS Department of Environmental Conservation  
NYS Museum Biological Survey  
NYS Natural Heritage Program  
NYS Office of Parks, Recreation and Historic Preservation  
Open Space Institute, Inc.  
Palisades Interstate Park Commission  
US Fish and Wildlife Service

### Mission Statement

The mission of the Shawangunk Ridge Biodiversity Partnership is to actively protect the elements of biodiversity and other natural, cultural, scenic and recreational resources of the Shawangunks by sharing information and expertise.

**APPENDIX III. RARE SPECIES AND NATURAL COMMUNITIES OF THE SHAWANGUNK RIDGE**

**Definitions of Natural Heritage Program Global and State Ranks**

**NEW YORK NATURAL HERITAGE PROGRAM  
Report on Rare Plants, Rare Animals, and Significant Natural Communities  
for the  
NORTHERN SHAWANGUNK RIDGE**

This report does not contain precise locations, and therefore may be included in documents. However, information that does disclose the precise locations of rare plants or animals may lead to the collection or disturbance of those plants or animals. Therefore, information on precise locations should not be included in any reports or maps made available to the public. The New York Natural Heritage Program can offer guidance on presenting rare species location information in such a way as to minimize the risks to the plants and animals.

Prepared March 2009, from the Biodiversity Databases of the New York Natural Heritage Program, NYS DEC, 625 Broadway, Albany, NY, 12233-4757.

Table 10

	COMMON NAME	SCIENTIFIC NAME	NY STATE LISTING	NY STATE RANK*	GLOBAL RANK**
<b>Last documented since 1980</b>					
Animals	Eastern Small-footed Myotis	<i>Myotis leibii</i>	Special Concern	S2	G3
	Bald Eagle	<i>Haliaeetus leucocephalus</i>	Threatened	S2S3B,S2N	G5
	Peregrine Falcon	<i>Falco peregrinus</i>	Endangered	S3B	G4
	Pied-billed Grebe	<i>Podilymbus podiceps</i>	Threatened	S3B,S1N	G5
	Bog Turtle	<i>Glyptemys muhlenbergii</i>	Endangered (also federally listed as Threatened)	S2	G3
	Timber Rattlesnake	<i>Crotalus horridus</i>	Threatened	S3	G4
	A Noctuid Moth	<i>Zale curema</i>	Unlisted	SU	G3G4
	Blueberry Gray Pine Barrens Zanclognatha	<i>Glena cognataria</i>	Unlisted	S1S3	G4
	Tawny Emperor	<i>Zanclognatha martha</i>	Unlisted	S1S2	G4
	Toothed Apharetra	<i>Asterocampa clyton</i>	Unlisted	S2S4	G5
	Northern Barrens Tiger Beetle	<i>Apharetra dentata</i>	Unlisted	S2S4	G4
	Arrowhead Spiketail	<i>Cicindela patruela patruela</i>	Unlisted	S1	G3T3
	Brook Snaketail	<i>Cordulegaster obliqua</i>	Unlisted	S2S3	G4
	Rapids Clubtail	<i>Ophiogomphus aspersus</i>	Unlisted	S2	G4
	Brook Floater	<i>Gomphus quadricolor</i>	Unlisted	S1S2	G3G4
	Appalachian Sandwort	<i>Alasmidonta varicosa</i>	Threatened	S1	G3
Plants	Arctic Rush	<i>Minuartia glabra</i>	Threatened	S2	G4
	Beakgrass	<i>Juncus trifidus</i>	Threatened	S2	G5
		<i>Diarrhena obovata</i>	Endangered	S2	G4G5

	COMMON NAME	SCIENTIFIC NAME	NY STATE LISTING	NY STATE RANK*	GLOBAL RANK**
	Black-edge Sedge	<i>Carex nigromarginata</i>	Endangered	S1S2	G5
	Blue Wild Rye	<i>Elymus glaucus ssp. glaucus</i>	Unlisted	S1	G5T5
	Broom Crowberry	<i>Corema conradii</i>	Endangered	S1	G4
	Button-bush Dodder	<i>Cuscuta cephalanthi</i>	Endangered	S1	G5
	Carey's Smartweed	<i>Persicaria careyi</i>	Threatened	S1S2	G4
	Clustered Sedge	<i>Carex cumulata</i>	Threatened	S2S3	G4?
	Davis' Sedge	<i>Carex davisii</i>	Threatened	S2	G4
	False Hop Sedge	<i>Carex lupuliformis</i>	Rare	S2	G4
	Georgia Bulrush	<i>Scirpus georgianus</i>	Endangered	S1	G5
	Mock-pennyroyal	<i>Hedeoma hispida</i>	Threatened	S2S3	G5
	Mountain Spleenwort	<i>Asplenium montanum</i>	Threatened	S2S3	G5
	Reflexed Sedge	<i>Carex retroflexa</i>	Endangered	S2S3	G5
	Rhodora	<i>Rhododendron canadense</i>	Threatened	S2	G5
	Riverweed	<i>Podostemum ceratophyllum</i>	Threatened	S2	G5
	Rough Avens	<i>Geum virginianum</i>	Endangered	S2	G5
	Violet Wood-sorrel	<i>Oxalis violacea</i>	Threatened	S2S3	G5
	Wood Reedgrass	<i>Calamagrostis perplexa</i>	Endangered	S1	G1
	Woodland Rush	<i>Juncus subcaudatus</i>	Endangered	S1	G5
	Anderson's peat moss	<i>Sphagnum andersonianum</i>	Unlisted	S1	G3?
	Flat-leaved peat moss	<i>Sphagnum platyphyllum</i>	Unlisted	S1	G5
	Soft-leaved peat moss	<i>Sphagnum tenellum</i>	Unlisted	S2	G5
	Trinidad peat moss	<i>Sphagnum trinitense</i>	Unlisted	S1	G4
	Two-ranked moss	<i>Pseudotaxiphyllum distichaceum</i>	Unlisted	S2S3	G4G5
Communities	Acidic Talus Slope Woodland			S3	G4?
	Chestnut Oak Forest			S4	G5
	Cliff Community			S4	G5
	Confined River			S3S4	G4
	Dwarf Pine Ridges			S1	G1G2
	Dwarf Shrub Bog			S3	G4
	Floodplain Forest			S2S3	G3G4
	Hemlock-Northern Hardwood Forest			S4	G4G5
	Highbush Blueberry Bog Thicket			S3	G4
	Ice Cave Talus Community			S1S2	G3?
	Perched Bog			S1S2	G3G4
	Pitch Pine-Blueberry Peat Swamp			S1	G3?
	Pitch Pine-Oak-Heath Rocky Summit			S3S4	G4
	Vernal Pool			S3S4	G4
<b>Last documented prior to 1980</b>					
Animal	Allegheny Woodrat	<i>Neotoma magister</i>	Endangered	S1	G3G4



	COMMON NAME	SCIENTIFIC NAME	NY STATE LISTING	NY STATE RANK*	GLOBAL RANK**
Plants	Bradley's Spleenwort	<i>Asplenium bradleyi</i>	Endangered	SH	G4
	Cut-leaved Evening-primrose	<i>Oenothera laciniata</i>	Endangered	S1	G5
	Hyssop-skullcap	<i>Scutellaria integrifolia</i>	Endangered	S1	G5
	Large Twayblade	<i>Liparis liliifolia</i>	Endangered	S1	G5
	Northern Running-pine	<i>Diphasiastrum complanatum</i>	Endangered	S1	G5
	Prairie Wedgegrass	<i>Sphenopholis obtusata</i>	Endangered	S1	G5
	Primrose-leaf Violet	<i>Viola primulifolia</i>	Threatened	S2	G5
	Puttyroot	<i>Aplectrum hyemale</i>	Endangered	S1	G5
	Riverbank Quillwort	<i>Isoetes riparia</i>	Endangered	S1	G5?
	Scarlet Indian-paintbrush	<i>Castilleja coccinea</i>	Endangered	S1	G5

\* Rarity in NYS as ranked by NY Natural Heritage Program on a 1 to 5 scale:

S1 = Critically imperiled; S2 = Imperiled; S3 = Rare or uncommon;

S4 = Abundant and apparently secure; S5 = Demonstrably abundant and secure;

SH = Historical records only; no recent information available.

B = Breeding population; N = Non-breeding/wintering population.



\*\* Global rarity as ranked by Nature Serve on a 1 to 5 scale:

G1 = Critically imperiled throughout its range due to extreme rarity (5 or fewer occurrences, or very few remaining individuals, acres or miles of stream) or extremely vulnerable to extinction due to biological factors.

G2 = Imperiled throughout its range due to rarity (6 – 20 occurrences, or few remaining individuals, acres or miles of stream) or highly vulnerable to extinction due to biological factors

G3 = Rare or vulnerable; Either very rare throughout its range (21 – 100 occurrences), with restricted range (but possibly locally abundant), or vulnerable to extinction due to biological factors.

G4 = Apparently secure throughout its range (but possibly rare in part of its range).

G5 = Demonstrably secure throughout its range (however it may be rare in certain areas).

GH = Historically known, with the expectation that it might be rediscovered;

GX = Species believed to be extinct; GU = Status unknown.

Range ranks, e.g. G1G2, indicate not enough information is available to distinguish between two ranks.

? = a question exists about the rank. Q = a question exists whether or not the species or variety is a good taxonomic entity.

T-ranks (T1 - T5) are defined the same as G-ranks (G1 - G5), but the T-rank refers only to the rarity of the subspecies or variety.

**State Ranks:**

- S1 = Typically 5 or fewer occurrences, very few remaining individuals, acres or miles stream, or especially vulnerable to extirpation in New York State for other reasons.
- S2 = Typically 6 to 20 occurrences, few remaining individuals, acres or miles of stream, or very vulnerable to extirpation in New York State for other reasons.
- S3 = Typically 21 to 100 occurrences, limited acreage, or miles of stream in New York.
- S4 = Apparently secure in New York
- S5 = Demonstrably secure in New York

**APPENDIX IV. ECOLOGICAL GOALS FOR SHAWANGUNK RIDGE  
CONSERVATION TARGETS (ECOLOGICAL COMMUNITIES)**

<b>Conservation Targets</b>	<b>Pitch Pine-Oak-Heath Rocky Summit</b>	<b>Hemlock-Northern Hardwood and Mesic Oak Forests</b>
<b>Size</b>	1. Maintain a total area of between 5,000 and 7,000 acres	1. Maintain a total area of between 18,000 and 24,000 acres
	2. Maintain all community types found within this system (see Table 2).	2. Maintain all community types found within this system (see Table 2).
	3. Maintain largest patch of between 600 and 700 acres and eight other patches of between 100 and 400 acres	3. Maintain largest patch of between 500 and 600 acres and 15 patches of 200 to 400 acres.
	4. In addition to above, maintain between 500 and 700 patches of varying sizes	4. In addition to above, maintain between 1,000 and 1,500 patches of varying sizes.
<b>Condition</b>	5. Maintain this system within the chestnut oak forest matrix. There should be a minimum of 500 meters of chestnut oak or northern hardwoods as buffer to cultural land uses.	5. Restore logged northern hardwoods and adjacent successional types to northern hardwood or chestnut oak.
	6. Successful recruitment of native species found within each of the community types; few or no invasives	6. Successful recruitment of native species found within each of the community types in all strata; few or no invasive species.
	7. Minimal or no fragmentation from roads, trails, successional community types, invasive species, or other human uses within largest patches; no fragmentation in small patches (see #3 and 4).	7. Minimal or no fragmentation from roads, trails, successional community types, invasive species, or other human uses within largest patches; little fragmentation in small patches (see #3 and 4).
	8. Maintain distances between patches that allow for movement and dispersal of component species	8. Maintain distances between patches that allow for movement and dispersal of component species
<b>Condition: Rare, declining and vulnerable species (including state/federally protected species; see Appendix II)</b>	9. Where appropriate, expand the number of rare species occurrences to three for S1 species and five for S2 and S3 species (See Appendix II).	9. Where appropriate, expand the number of rare species occurrences to three for S1 species and five for S2 and S3 species (See Appendix II).
<b>Other Species (those in <b>bold</b> are ecoregion targets; those in <b>bold italics</b> are state or federally listed)</b>	10. Maintain the following species groups:	10. . Maintain the following species groups:
	Amphibians including:	Amphibians including:
	<b>Marbled salamander (NYS Special Concern)</b>	<b>Marbled salamander (NYS Special Concern)</b>
	<b>Jefferson salamander (NYS Special Concern)</b>	<b>Jefferson salamander (NYS Special Concern)</b>
	Woodland nesting birds including:	Forest nesting birds including:
	<b>Prairie warbler (Partners in Flight – S. New England, TNC)</b>	<b>Black throated-blue warbler (TNC)</b>
	<b>Whip-poor-will (NYS Special Concern)</b>	<b>Cerulean warbler (Partners in Flight - N. Ridge and Valley and S. New England, TNC) (NYS Special Concern)</b>
	<b>Golden winged warbler (Partners in Flight –N. Ridge and Valley and S. New England, TNC) (NYS Special Concern)</b>	<b>Coopers Hawk (NYS Special Concern)</b>
	<b>Blue-winged warbler (Partners in Flight – S. New England, TNC)</b>	<b>Canada warbler (TNC)</b>
		<b>Northern goshawk (TNC ecoregional target) (NYS Special Concern)</b>
	<b>Sharp-shinned hawk (NYS Special Concern)</b>	

		<b>Wood Thrush (Partners in Flight-S. New England, TNC)</b>
		<b>Worm-eating warbler (Partners in Flight N. Ridge and Valley and S. New England, TNC)</b>
		Reptiles including
		<b>Wood turtle (NYS Special Concern)</b>
		<b>Eastern Box turtle (NYS Special Concern)</b>
<b>Ecological Processes and Conditions</b>		
Fire	10. Fire return interval of 5-25 years with variation in size, seasonality, intensity and severity of fires.	12. No fire in hemlock or northern hardwood forests and fire return interval of 10-50 years in oak forests.
Soil and Hydrologic Conditions	11. Variation in soil depth, moisture and organic content due to landform, local climate, and fire.	13. Seasonal and multi-year variation in water level and quantity to allow for species variation within imbedded wetland communities (e.g., vernal pond) and low to moderate nutrient input.
	12. Seasonal and multi-year variation in water level and quantity to allow for species variation within imbedded communities (e.g., highbush blueberry bog thicket) and low nutrient input.	

Conservation Targets	Dwarf Pine Ridge	Chestnut Oak
<b>Size</b>	1. Maintain a total area of at least 2,000 acres.	1. Maintain a total area of between 22,000 and 27,000 acres
	2. Maintain all community types found within this system (see Table 2).	2. Maintain all community types found within this system (see Table 2).
	3. Maintain largest patch of between 500 and 600 acres and five patches of between 150 and 400 acres.	3. Maintain the two large patches at between 3,000 and 5,000 acres and an additional five of between 1,000 and 2,000 acres.
	4. In addition to above, maintain between 30 and 50 patches of varying sizes.	4. In addition to above, maintain between 400 and 600 patches of varying sizes
<b>Condition</b>	5. Maintain this system within the chestnut oak forest matrix. There should be a minimum of 500 meters of chestnut oak or northern hardwoods as buffer to cultural land uses.	5. Restore logged chestnut oak and adjacent successional types to chestnut oak, to increase patch size and contiguity
	6. Successful recruitment of native species found within each of the community types in all strata; few or no invasive species.	6. Maintain the functions of the chestnut oak forest as a matrix community.
	7. Minimal or no fragmentation from roads, trails, successional community types, invasive species, or other human uses within largest patches; no fragmentation in small patches (see #3 and 4).	7. Successful recruitment of native species found within each of the community types in all strata; few or no invasive species.
	8. Maintain distances between patches that allow for movement and dispersal of component species	8a. Minimal or no fragmentation from roads, trails, successional community types, invasive species, or other human uses within largest patches; 8b.no fragmentation in small patches (see #3 and 4).
<b>Condition: Rare, declining and vulnerable species (including state/federally protected species; see Appendix II)</b>	9. Where appropriate, expand the number of rare species occurrences to three for S1 species and five for S2 and S3 species (See Appendix II).	9. Where appropriate, expand the number of rare species occurrences to three for S1 species and five for S2 and S3 species (See Appendix II).
Other Species (those in <b>bold</b> are ecoregion targets; those in <b>bold italics</b> are state or federally listed)	10. Maintain the following species groups:	10. Maintain the following species groups:
	Amphibians including: <i>Marbled salamander</i> (NYS Special Concern)	Amphibians including: <i>Marbled salamander</i> (NYS Special Concern)
	<i>Jefferson salamander</i> (NYS Special Concern)	<i>Jefferson salamander</i> (NYS Special Concern)
	Woodland nesting birds including	Forest nesting birds including:
	<i>Prairie warbler</i> (Partners in Flight – S. New England, TNC)	<i>Black throated-blue warbler</i> (TNC)
	<i>Whip-poor-will</i> (NYS Special Concern)	<i>Cerulean warbler</i> (Partners in Flight - N. Ridge and Valley and S. New England, TNC) (NYS Special Concern)
		<i>Coopers Hawk</i> (NYS Special Concern)
		<i>Whip-poor-will</i> (NYS Special Concern)
		<i>Wood Thrush</i> (Partners in Flight-S. New England, TNC)
		Reptiles including
		<i>Wood turtle</i> (NYS Special Concern)
		<i>Eastern Box turtle</i> (NYS Special Concern)
<b>Ecological Processes and Conditions</b>		

Fire	10. Fire return interval of 5-25 years with variation in size, seasonality, intensity and severity of fires.	11. Fire return interval of 5-25 years with variation in size, seasonality, intensity and severity of fires.
Soil and Hydrologic Conditions	11. Variation in soil depth, moisture and organic content due to landform, local climate, and fire.	12. Variation in soil depth, moisture and organic content due to landform, local climate, and fire.
	12. Seasonal and multi-year variation in water level and quantity to allow for species variation within imbedded wetland communities (e.g., dwarf shrub bog) and low nutrient input.	13. Seasonal and multi-year variation in water level and quantity to allow for species variation within imbedded wetland communities (e.g., vernal ponds) and low to moderate nutrient input

Conservation Targets	Cliff and Talus	Lakes, wetlands and rivers
<b>Size</b>	1. Maintain a total area of between 350 and 450 acres	1. Maintain a total area of between 2,000 and 2,500 acres.
	2. Maintain all community types found within this system (see Table 2).	2. Maintain all community types found within this system (see Table 1).
	3. Maintain largest patch between 150 and 200 and two other patches of at least 25 acres.	3. Maintain largest patch of 100 acres and five other patches of at least 50 acres.
	4. In addition to above, maintain between 50 and 70 patches of varying sizes.	4. In addition to above, maintain between 300 and 400 patches of varying sizes
<b>Condition</b>	5. Maintain high quality examples of cliffs in all height and length classes.	5. Maintain high quality examples of all lake, wetland and stream community types, and where necessary, restore disturbed or degraded examples.
	6. Maintain this system within the chestnut oak forest matrix. There should be a minimum of 300 meters of chestnut oak or northern hardwoods as buffer to cultural land uses.	6. Maintain this system within the chestnut oak forest matrix. There should be a minimum of 300 meters of chestnut oak or northern hardwoods as buffer to cultural land uses.
	7. Successful recruitment of native species found within each of the community types in all strata; few or no invasive species.	7. Successful recruitment of native species found within each of the community types in all strata; few or no invasive species.
	8a. Minimal or no fragmentation from roads, trails, successional community types, invasive species, or other human uses within largest patches; 8b.no fragmentation in small patches (see #3 and 4).	8a. Minimal or no fragmentation from roads, trails, successional community types, invasive species, or other human uses within largest patches; 8b.no fragmentation in small patches (see #3 and 4).
<b>Condition: Rare, declining and vulnerable species (including state/federally protected species; see Appendix II)</b>	9. Where appropriate, expand the number of rare species occurrences to three for S1 species and five for S2 and S3 species (See Appendix II).	9. Where appropriate, expand the number of rare species occurrences to three for S1 species and five for S2 and S3 species (See Appendix II).
Other Species (those in <b>bold</b> are ecoregion targets; those in <b>bold italics</b> are state or federally listed)	10. Maintain the following species groups:	10. Maintain the following species groups:
		Amphibians including:
		<b>Marbled salamander</b> (NYS Special Concern)
		<b>Jefferson salamander</b> (NYS Special Concern)
	Nesting birds including:	Nesting birds including:
	<b>Peregrine Falcon</b> (NYS Endangered)	<b>Louisiana waterthrush</b> (Partners in Flight – N. Ridge and Valley and S. New England, TNC)
	Reptiles including	
	<b>Wood turtle</b> (NYS Special Concern)	
<b>Ecological Processes and Conditions</b>		
<b>Fire</b>	11. No fire return interval, though fires may burn to edges of sparsely vegetated communities.	11. No fire return interval, though fires from other community types may burn to edges of lacustrine and palustrine types and within the latter.
<b>Soil and Hydrologic Conditions</b>	12. Variation in soil depth and moisture due to localized climate and storm events.	12. Seasonal and multi-year variation in water level and quantity to allow for species variation with palustrine and riparian communities and low to moderate nutrient input.

## **APPENDIX V. RATIONALE FOR NON-PERMITTED USES AT SAM'S POINT PRESERVE**

### **1. Off Road Vehicles (ORV) and Snowmobiles**

One of the primary goals for the Preserve is protecting its' wilderness character. Although the concept of wilderness is largely a subjective one, the many attempts to define it always emphasize the importance of minimizing the "works and influences of man." (Watermans 1993). As a result, in federally designated wilderness areas, mechanized equipment including chainsaws, drills and vehicles are typically banned. Likewise, in an effort to sustain the wilderness appeal of Sam's Point Preserve (a scarce experience in the mid Hudson Valley), ORVs and Snowmobiles will not be permitted. The traveling speed and noise associated with these vehicles would be encroachments on the Preserve's wilderness character.

A second and equally important aspect of the decision to not allow these uses is their ecological impacts. The field of conservation biology has produced extensive literature on the fragmentation effect of roads and other human travel corridors. The road does not cause fragmentation itself, but more the human activity associated with the road. Research has shown that ORVs and snowmobiles enhance the fragmentation effect of roads and other areas they travel by disturbing and scaring wildlife population via noise and the perceived threats the vehicles create (Dorrance *et al.* 1975). Some species cease to cross heavily used roads or trails and thereby become isolated (island) populations subject to genetic deterioration and other problems associated with rarity (Noss 1999). Snowmobiles can also contribute to fragmentation in another way by compacting snow and eliminating important subnivean environments for small mammals and other wildlife (Fancy and White 1985). Additionally, disturbances from snowmobiles come at a difficult time of year for wildlife when stressful winter conditions create complex survival problems.

Negative impacts from these uses upon vegetation are also likely. Fragmentation of wildlife can trickle down and result in fragmentation of plant populations dependent upon wildlife for their seed dispersal (Noss 1999). The literature shows that trails used by ORVs and snowmobiles invariably get wider, destroying peripheral plant populations (Wooding and Sparrow 1978). Even vegetation covered with snow can be damaged from snowmobile use (Neumann and Merriam 1972). These facts would conflict with the goals established in Section V to restore disturbed areas on the property and convert some of the roads into trails.

### **2. Camping**

Camping can cause a variety of adverse impacts including vegetation trampling and cutting, disturbance to wildlife, waste management issues and wildfires (Lougee pers. obs. 1999, Hammit and Cole 1987). In order to accommodate camping at the Preserve with minimal environmental impact, a designated, hardened camping area would need to be constructed with tenting platforms and a composting toilet. Construction of such a site would further fragment the Preserve and also require resources, which are currently needed for other



stewardship and management activities. The Sam's Point Advisory council reviewed and considered potential sites for this use and determined suitable locations do not exist within the current boundaries of the Preserve. As additional lands are added to the Preserve, they will similarly be reviewed for possible camping opportunities.

### **3. Caving**

The deep crevices/caves of the Shawangunks comprise a small portion of the landscape and as such, represent unique habitat. Currently, little is known about the plants and animals that reside within the crevices/caves of the Shawangunk Ridge. In general these areas are characterized by harsh (cool, dark and moist) conditions which limit not only what can survive there, but also how quickly it can respond to disturbance (i.e. trampling, pollution). Due to the sensitive nature of these areas, and lack of information about the potentially unique biological resources they may support, caving will not be permitted at Sam's Point Preserve until plant and animal inventories of the caves can be completed. Pending available funding, The Nature Conservancy will work with representatives from the caving community and the New York Natural Heritage Program to identify high priority caves/crevices to inventory and to complete the necessary work.

### **4. Equestrian Use**

Horses have been recognized in the scientific literature to be more destructive to vegetation and soils than hikers and other trail users (Weaver and Dale 1978, Seney and Wilson 1991.) Horse manure is also a source of negative social and ecological impacts. Manure can contain seeds of exotic plants and also pollute water sources (Hammit and Cole 1987). Although the Loop Road could accommodate horse use with little impact to vegetation and soils, Lake Maratanza could be contaminated by pathogens from manure, which is not acceptable as the Village of Ellenville draws ten percent of its drinking water supply from the lake (pers. comm. Mike Mills, Village Manager). Additionally, manure could spread additional alien and invasive plant species along the road, further subjecting the Preserve to a significant ecological threat. Horse riding will not be allowed at the Preserve for these reasons.

### **5. Hang-gliding**

This use would require development and maintenance of a clear take-off area at the Preserve, identification of an off-site landing area and vehicular access to transport equipment to and from the take off and landing sites. As discussed above, protecting the wilderness character of the Preserve is a priority, and vehicular access has been restricted as a result. Combined with the vegetation clearing that would be required for a take off area, these issues make hang-gliding an inconsistent use of the property.

### **6. Mountain Biking**

The rationale for not allowing mountain biking on the Preserve closely follows that explained above for ORVs and snowmobiles. While not as intrusive as these uses, mountain bikes would similarly present an encroachment on the wilderness character of the Preserve. They would also enhance the fragmentation effect of paths, and conflict with restoration goals established in Section V. The literature has documented how mountain bikes are perceived as an impact to wilderness appeal (Chavez *et al.* 1993, Chavez 1996, Watson *et al.* 1991).

Also of concern is that the majority of the trails at the Preserve are pedestrian trails, often referred to as “single-track” by bike riders and sought out for their challenge. The added use of these trails by mountain bikes would present serious erosion problems due to the fragile and thin soils found on the ridge. Vegetation along the margins of hiking trails would be damaged as bikers avoided rocks and obstacles in the main trail corridor. This would exacerbate soil erosion as plant roots binding the soils together were lost. Currently, the Preserve has little enforcement capabilities, and therefore has a limited ability to manage mountain bike use and prevent illegal trespass onto hiking trails.

Finally, mountain biking is widely available elsewhere on the ridge, especially in Minnewaska State Park Preserve. Restricting biking at Sam’s Point will help to minimize recreational use of the Preserve, which is considered to be the most fragile and biologically important component of the Northern Shawangunks.

### **7. Rock Climbing and Ice Climbing**

In the summer of 1998, a group of local climbers surveyed the cliffs around Sam’s Point for climbing routes and reported not finding much potential for quality climbing opportunities. The cliffs at the Preserve and the talus slopes below them are relatively undisturbed from recreational use at this point. They are also known to provide habitat for three rare plant species, including mountain spleenwort (*Asplenium montanum*), arctic rush (*Juncus trifidus*), and mountain sandwort (*Minuartia groenlandica* var. *glabra*). The common raven (*Corvus corax*) has also been documented to nest on the cliffs north of Sam’s Point. The scientific literature documents damages rock climbing can have on cliff and talus communities (Camp and Knight 1998, Kelly and Larson 1996). One study found a 50 percent reduction in lichen cover and species density on open cliff faces with popular climbing routes (Nuzzo 1996). With nearly 850 climbing routes established between Mohonk Preserve and Minnewaska State Park Preserve, these areas provide sufficient opportunities for rock climbing in the Northern Shawangunks. Therefore, to protect these rare and unique communities, rock climbing will not be permitted at the Preserve.

### **8. Swimming**

Lake Maratanza is a water supply for the Village of Ellenville. To protect this resource, swimming and other water-based recreation (diving, boating, fishing and ice-skating) will not be permitted at the Preserve. Signs will be maintained around the lake to alert visitors to these restrictions.

### **9. Trapping**

Trapping is an activity more commonly associated with financial gain than subsistence hunting. Since the Preserve is a public resource, activities yielding a financial gain for the participants are not appropriate. Also, there is a strong possibility for non-target species to be caught in traps.

## APPENDIX VI. VERP FRAMEWORK FOR SAM'S POINT PRESERVE

### Appendix X - Overview of the Visitor Experience Resource Protection (VERP) Framework

The VERP framework consists of nine elements that entail taking a team approach to developing a public use management plan. One of the most important parts of the VERP framework is determining and describing management zones. These zones, when applied to geographical areas within the Preserve, determine how recreation is managed. How the zones are determined depends on specific goals for a given preserve. As each preserve is unique, so are the management zones.

For Sam's Point Preserve, management zones coincide with priority conservation areas based on rare species and communities, wildlife habitats, fragile areas, and archeological resources. Traditional use patterns of the Preserve and established trails are typically secondary considerations in how management zones are determined. The management zones fix the limits of recreational use for an area, in some cases prohibiting it entirely. Each zone has a unique set of guidelines, restrictions, and desired levels of resource protection that helps to identify the threshold of acceptable public use.

Once the zones are determined and applied to specific areas, a monitoring program is an essential element of the VERP framework needed to ensure that each zone's standards are maintained. To protect the standards, the final element of VERP entails developing management actions to be taken when standards are not maintained. Other elements of the VERP framework include involving the public and developing a mission statement and interpretive themes.

#### **The VERP Elements:**

1. Assemble an Interdisciplinary Project Team
2. Develop a Public Involvement Strategy
3. Develop Statements of Preserve Purpose, Significance, and Primary Interpretive Themes
4. Analyze Preserve Resources and the Existing Visitor Use
5. Describe a Potential Range of Visitor Experiences and Resource Conditions
6. Allocate the Potential Zones to Specific Locations in the Preserve (Prescriptive Management Zoning)
7. Select Indicators and Specify Standards for Each Zone; Develop a Monitoring Plan
- 8/9. Monitor Resources and Social Indicators

The following VERP framework covers elements four through eight. The first three elements are addressed elsewhere in this plan. The Sam's Point Advisory Council, which served as the project team for this framework, and the public involvement strategy, were discussed at the outset of this plan. Element 3 is closely tied to the Preserve's interpretive program and discussed below under the Education and Outreach section.

## VERP Framework for Sam's Point Dwarf Pine Ridge Preserve

### Element 4: Analyze Preserve Resources and the Existing Visitor Use

The purpose of element 4 is to assess potential conflicts between visitor use and resource protection. This is accomplished through identifying sensitive resource areas of the Preserve, which then can be looked at in the context of traditional use patterns, desired visitor experiences, and existing trails and facilities. Being one of the most biologically unique areas in New York State, Sam's Point Preserve is home to many sensitive resources that can be damaged from recreational misuse. Areas of concern include the following and are shown on Map 10.

#### Sensitive Resource Areas

*Escarpments and Cliff Edges:* Due to the erosion resistant conglomerate caprock that covers the Northern Shawangunks, the ridge has an abundance of escarpments and cliff edges. The cliff edges often constitute transition or tension zones where one natural community grades into another. At the Preserve, the escarpments comprise boundaries between pine-barrens communities and hardwood forests occupying the slopes below the cliffs. On the tops of the cliffs, the pine-barrens species grade into the open rock cliff edges, which are dominated by delicate lichen floras and scattered vascular plants. The vertical cliff faces are known to support rare plant populations and important wildlife habitats. The bases of the escarpments are often locations of rock overhangs or rockshelters that once supported Native American or early Euro-American habitation. It has been shown in the scientific literature that cliff edges are delicate and fragile environments easily damaged by hiker trampling and slow to recover from such impacts (Parikesit *et al.* 1995). The majority the cliff edges in the Northern Shawangunks presently have hiking trails traversing them. The damage caused by these trails can be easily observed by the presence of devegetated soils, exposed bedrock not having been weathered or colonized by lichen species, and braided paths formed from hikers pursuing different vantage points along the cliff edges. The Preserve has nearly five miles of cliff edges. One section, which spans from near Verkeerderkill Falls to High Point is traversed by a hiking trail. The remaining cliff edges do not have official trails but receive use nonetheless and have developed social trails as a result. The escarpment that runs north from Sam's Point was shown on an historic 1899 trail map (Smiley 1899.) While use is limited today, there are still widespread impacts along this cliff edge that will require many years to recover. Even without established trails, hikers will continue to venture out onto the escarpments making them special areas of concern for our visitor management program.

*Rare Plant Populations:* The Preserve contains seven rare plant species, all of which have locations in close proximity to hiking trails and pedestrian use areas. These populations are especially vulnerable to hikers who may trample them when wandering off trail to pick blueberries or "bushwhack." (See Table 1 for a list of rare species within the Preserve)

*Crevice and Canyon Bottoms:* Some of the most unique terrain of the Preserve is the crevices that have formed through fracturing and subsequent shifting of the bedrock. Because of the cool air that circulates along the bottom of these crevices, they provide a habitat for boreal plant species disjunct from their typical mountain environs. Within these habitats one can find

clintonia, mountain wood-fern, bunchberry, and a collection of mosses that would more commonly be seen just below the summits of the Adirondack Mountains.. These communities are comprised of very shallow soils forming a thin mantle over the underlying talus, which partially fills the crevices. Due to this and the limited amount of space along the crevice bottoms, the potential for vegetation trampling and soil erosion is high, yet these areas (e.g. Shingle gully and the Grand Canyon) are attractive to hikers due to the distinctive terrain and vegetation.

*Social Paths / Trail Braiding:* Social paths and trail braiding occurs when hikers and walkers cut corners, seek out viewpoints, or are unable to follow a poorly marked trail, and is an issue throughout the Preserve. With the use of any trail system comes the potential for trail braiding along the periphery of the established trails, resulting in erosion, trampling and impacts on sensitive resources. In the area of Shingle Gully and the Grand Canyon, ambiguous trail delineation has led to significant trail braiding. Social paths cutting through dwarf pine stands abound around Lake Maratanza.

*Rare Animal Populations:* The Preserve is home to three rare animals, the timber rattlesnake, a noctuid moth (*Apharetra dentata*) and the blueberry grey moth (*Glena cognataria*). Hikers who stumble upon their den sites and basking areas can easily disturb timber rattlesnakes. Black bears, bobcats, breeding birds and small mammals are additional wildlife populations of concern that need to be protected from disturbances. The scientific literature has shown how recreational activity can disturb nesting and mating habits, disrupt feeding activities and stress animals during winter months (Knight and Gutzwiller, 1995)

*The Badlands:* The open nature of this sparse pitch pine forest appears to lend itself to off trail travel. Although open for easy passage, this can cause assorted recreational impacts including disturbance to wildlife, illegal camping and fires, and subsequent trampling of sensitive vegetation, such as very old lichen communities coating the open bedrock. Soils are extremely thin in this community making erosion a serious concern.

*Lake Maratanza:* The lake serves as a backup drinking water supply for the Village of Ellenville. According to Village officials, the lake supplies 10 percent of the town's water supply (pers. comm. Mike Mills, Village Manager). Access to the lake is therefore prohibited and the village retains a conservation easement around the lake and associated water supply system. However, with the onset of hot, humid weather during the summer months on the ridge, pressure for swimming and recreational use of the lake is high. Visitors inevitably will use the lake in the absence of proper enforcement capabilities. The shoreline of Lake Maratanza is home to several locations of the Preserve's rare plant populations, including arctic rush (*Juncus trifidus*), clustered sedge (*Carex cumulata*), and Appalachian sandwort (*Minuartia groenlandica* var. *glabra*). Furthermore, outside of the dredged gravel beach on the eastern shore of the lake, the shoreline is relatively undisturbed. Trampling of both the rare plant populations and the undisturbed shoreline are potential management issues, in addition to impacts to water quality. The shoreline may also contain sensitive archaeological sites related to Native American presence.

*Commercial Ice Caves:* Due to the historic use of the property, it is likely that the eastern ice caves will continue to be one of the primary interests of the visiting public. The eastern ice caves represent a globally unique natural community (ice caves talus (G3 S1S2 See Appendix I for descriptions of G and S ranks). It is also one of the areas within the Preserve likely to contain prehistoric artifacts from Native American cultures. The existing trail follows terrain not unlike the crevice and canyon bottoms mentioned above. These caves are therefore sensitive areas bound to absorb a large percentage of the public use of the Preserve. Careful management will be needed to ensure there is no further resource degradation.

Elements 5 and 6: ***Describe a Range of Visitor Experiences and Resource Conditions; apply them to Geographic Locations within the Preserve***

Element 5 is where the desired future conditions for the Preserve are described. It outlines what resource and managerial conditions and visitor experience opportunities will exist at the Preserve. Through developing and describing management zones for the Preserve, the carrying capacities are defined. The management zones detail the type and extent of recreational use that will be permitted for each landscape area the zones are applied to.

It is intended that the management zones below describe a perpetual and long-term vision for the natural resource conditions at the Preserve. Only passive recreational uses are permitted at the Preserve including hiking, nature observation and winter activities such as cross-country skiing and snowshoe hiking. Other forms of public use will be research, education and stewardship activities, which includes hunting to control excessive herbivory. Each zone will allow varying levels of these uses.

It is envisioned that Sam's Point Preserve will be maintained as the "wilderness" component of the open space areas in the northern Shawangunks. This predicates that public use should be carefully managed to prevent the congestion and heavy visitation found elsewhere on the ridge. In accordance with the Preserve's mission statement, protection of the natural resources is the primary goal for the Preserve, and limiting public access in some areas will be necessary to sustain this objective. The following management zones provide for both resource protection and compatible public use. For simplification, VERP Elements 5 and 6 have been combined below. Table 3 provides a summary of resource attributes by management zone. Below, the management zones are described at length, detailing geographic distributions, resource and social conditions, and management activities for each zone. The management zones are shown in Map 11.

The management zones were developed through an analysis of the Preserve's natural resources. Vegetation community maps and element occurrence information was consulted to determine the locations of rare species and natural communities (Thompson 1996; Lyons-Swift 1995). The recreation ecology literature was reviewed to determine areas and features within the Preserve that would be sensitive to recreational impacts. Taking into account the existing infrastructure on the Preserve (facilities, trail and roads), the zones were then developed based upon rare species, communities and areas with predicted sensitivities. The management zones largely follow the boundaries of natural communities.

## ***Description and Application of Management Zones***

### **A. Sensitive Resource Protection**

*Geographical Distribution:* A majority of the pine-barrens communities within the Preserve will be included in this zone. The entire dwarf pine ridge, as well as the sparse pitch pine-oak-heath rocky summit community (the “badlands”), will be sensitive resource protection areas. This zone will encompass the fragile cliff edges that constitute transition zones between the pine-barrens communities and the hardwood forests. The Verkeerderkill watershed, Lake Maratanza and the North Gully will also be within this zone to protect water quality.

*Resource Conditions:* The Sensitive Resource Protection Zone (SRP) is comprised of areas within the Preserve where resource protection is the highest priority. The Sensitive Resource Protection Zone exists to protect fragile areas and rare species and natural communities (see Table 1 for a list of the Preserve’s rare species and natural communities). It will be left to evolve without the influence of human disturbances, with the exception of ecological management such as prescribed fire, ecological restoration and other resource protection actions. There will be no further alterations (hiking trails) made to the Sensitive Resource Protection Zone except possibly firebreaks. Animal paths may also cause some alteration to this zone.

*Social and Experiential Conditions:* There are several hiking trails and carriage roads within the Sensitive Resource Protection Zone. Public access beyond these trails will be permitted only for research, stewardship, and ecological management (which includes hunting). Encounters with other visitors will vary depending upon location and time of year. Generally, backcountry trails should have lower use levels than carriage roads (a.k.a. the Loop Road). The trails within this zone will allow visitors to experience and observe unique natural features of the Preserve, namely the dwarf pine ridge community and some of its associated wetlands. This zone will also provide visitors with excellent views from the craggy High Point trail.

*Management:* Management in the Sensitive Resource Protection Zone will include research, stewardship, trail management and controlling visitor use and ecological management like prescribed fire and wildlife management.

### **B. Primitive Zone**

*Geographical Distribution:* This zone covers the northwestern corner of the Preserve and includes the Ellenville ice caves, the Grand Canyon and Shingle Gully. Its southern boundary is where the pitch pine-oak heath rock summit community meets the chestnut oak forest, while its other borders are the Preserve’s boundaries to the north and west and the High Point Carriageway from the old red trail towards the Smiley Road.

*Resource Conditions:* The Primitive Zone also includes largely unmodified areas and is designed to protect rare and sensitive natural communities and rare species populations (see Table 1 for a list of the Preserve’s rare species and natural communities.) These elements of the Preserve’s biological diversity will be left unharmed by visitors who will be required to use established paths and obtain a permit for access. The resource conditions of this zone will also be determined

by natural processes, except where ecological management, restoration and possible public control measures are needed.

*Social and Experiential Conditions:* The Primitive Zone provides visitors with a wilderness quality experience. Footpaths will receive little maintenance (enough to protect the resource), and route finding may be challenging. Map and compass skills are necessary for travel in this zone. Permits will be required for access to the Primitive Zone, which will help to protect sensitive resources and maintain a quality visitor experience. Encounters with other visitors will be few in this zone. Public uses will include education and interpretation, hiking, hunting, research and stewardship. The risks of travel in this zone include over-exertion, weather, poisonous snakes, cliff edges and crevices.

*Management:* Management of the Primitive Zone includes education, visitor management and enforcement, research, stewardship, and ecological management and wildlife management.

Table 7. Management Zones Attributes, Sam's Point Dwarf Pine Ridge Preserve

<i>Descriptors</i>	<i>Management Zones</i>			
	<b>Sensitive Resource Protection</b>	<b>Primitive</b>	<b>Backcountry</b>	<b>Developed</b>
Visitor Encounter Expectation	Medium	Very-low	Low	High
Tolerance for Resource Degradation	None	Very-low	Low	Moderate
Trail Standards	18"	18"	18"	N/A
Opportunity for Solitude	Very-high	Very-high	High	Low
Management Action for Resource Protection	Very-high	High	Moderate	Very-high
Trail Development Potential	None	None	Moderate	N/A
Maximum Group Size Permitted	20	12	20	N/A



### C. Backcountry Zone

*Geographical Distribution:* This zone includes the South Gully and the chestnut oak forest below the Loop Road and southwest of the old red trail that leads to the Smiley Road.

*Resource Conditions:* The Backcountry Zone consists of large contiguous common communities capable of sustaining greater amounts of public use than the Sensitive Resource Protection Zone and the Primitive Zone. This zone, while benefiting high quality natural communities, will also accommodate public access without requiring a permit as needed in the Primitive Zone. Alterations to this zone may include wildlife paths and modest hiking trail development. The areas of the Preserve within this zone are close to human settlements, and in a few locations crossed by roads. Therefore, alterations such as roads, houses and electrical lines may also be present.

*Social and Experiential Conditions:* The Backcountry Zone also provides a “wilderness” quality experience for visitors, but encounters with other parties may be higher than in the Primitive Zone. Off trail travel will be permitted in this zone, and visitors will need map and compass skills to navigate the terrain. Public uses will include education and interpretation, hiking, hunting, research and stewardship. Risks of travel in this zone are the same as for the Primitive Zone.

*Management:* Management of the Backcountry Zone will include education, trail maintenance, research, stewardship, and ecological management and wildlife management.

### D. Developed Zone

*Geographical Distribution:* The Preserve’s parking lot, buildings and associated infrastructure will constitute the Developed Zone.

*Resource Conditions:* Human alterations of the landscape dominate this zone. Present within the zone are a house, a visitor center, equipment storage facilities, picnic tables, a kiosk, parking barriers, trashcans, garbage disposal facilities, electrical lines and a variety of signage.

*Social and Experiential Conditions:* Social interaction is an important component of this zone. People can expect to encounter other visitors and preserve staff.

*Management:* Important management in this zone will include visitor education, parking fee collection, facilities maintenance and invasive species control.

### Element 7: **Select Indicators and Specify Standards for each Zone; Develop a Monitoring Plan**

Selecting indicators and specific standards for each zone “is the pivotal element because it marks where the VERP framework moves from being qualitative to being quantitative” (VERP Manual, page 58). It is intended that the following set of indicators and standards will be supplemented as more baseline information is gathered for the Preserve’s natural and cultural

resources. A list of research questions tied to the visitor management program has been described in the Ecological Management section of this plan. Subsequent to the indicators and standards described below is a protocol for photo monitoring at the Preserve. A combination of staff and volunteer labor will be needed to carry out this monitoring plan.

The following characteristics make good indicators and standards for measuring potential impacts (VERP Handbook, 1997):

<i>Indicators</i>	<i>Standards</i>
<ul style="list-style-type: none"> <li>• Easy to measure</li> <li>• Cost-effective</li> <li>• Minimal variability</li> <li>• Response over a range of conditions</li> <li>• Large sampling window</li> <li>• Availability of baseline data</li> </ul>	<ul style="list-style-type: none"> <li>• Quantitative</li> <li>• Time or space-bound</li> <li>• Expressed as a probability</li> <li>• Impact-orientated</li> <li>• Realistic</li> </ul>

Table 8. Indicators, Standards and Monitoring Frequency for VERP Management Zones

<i>Indicator</i>	<i>Standard</i>	<i>Monitoring Frequency</i>
<b>Sensitive Resource Protection Zone</b>		
Presence of “social” paths	Obvious unofficial trails forming	Annual walk-through
Trampling of rare plant populations	10% of any rare plant population trampled within a 5yr period	Update NYNHP rare plant forms biannually
Presence of priority exotic plant species	An exotic plant is observed that was not noted the previous season or a spp occurs in a new locations	Annual walk-through to determine presence/absence and distribution
Evidence of camping	Obvious signs of hardened campsites	Annual walk-through observation
Disturbance to timber rattlesnakes	No more than 2 encounters reported in a month	Annually
Encounters between staff and illegal visitors	No more than 5 encounters with illegal visitors over a 1yr period	Annually
The presence of denuded soils on cliff edges	No more than 20% of any photopoint taken on the High Point Trail is exposed soil	Biannually
Trail width	Not to exceed 18 – 24” on the Verkeerderkill Falls trail; 8’ on the H.P. Carriageway	Biannually
Encounters between staff and illegally trespassing recreational users	No more than 2 encounters in a month	Monthly
Vegetation disturbance in the eastern ice caves	No further disturbance from baseline photopoints	Biannually
Disturbance to cultural resources	Any evidence of looting, vandalism and disruption	Biannually

<b>Primitive Zone</b>		
Trampling of rare plant populations	10% of any rare plant population is trampled within a 5yr period	Update NYNHP rare plant forms biannually
Presence of priority exotic plant species	There are currently no known occurrences of exotic plant species w/in this zone	Annual walk-through to determine presence/absence and distribution
Impact to wildlife (ravens)	Nesting ravens are not observed in Shingle Gully	Annually
Trail width on the canyon/crevice floors	Not to exceed 18 – 24”	Biannually through photopoints
Vegetation disturbance on canyon/crevice floors	No further disturbance from 1999 photopoints	Biannually
Trail braiding of primitive paths	No more than 1 path w/in 50’ from trail centerline	Every 5 years
The presence of “social” paths	Obvious unofficial trails forming	Annual walk-through observations
# of non-permitted visitors	No more than 20% of annual visitors did not obtain a permit	Biannually
Encounters between visitor groups	A visitor group encounters no more than 1 other party in a day	Annually based on questionnaires to permittees.
<b>Backcountry Zone</b>		
Trampling of rare plant populations	10% of any rare plant population is trampled within a 5yr period	Update NYNHP rare plant forms biannually
Presence of priority exotic plant species	An alien plant species is observed that was not seen the prior season or a spp is noted in a new location	Annual walk-through to determine presence/absence and distribution
Impacts to wildlife (timber rattlesnakes)	Pending research	Pending research
The presence of “social” paths	Obvious unofficial trails forming	Annual walk through observation
Evidence of camping	Obvious signs of hardened campsites forming	Annual walk through observation
Encounters between visitor groups	A visitor group encounters no more than 3 other parties in a day	Annually on no fewer than 10 randomly selected days
<b>Developed Zone</b>		
The presence of priority exotic plant species	An exotic plant is observed that was not noted the previous season or a spp occurs in a new location	Annually
# of visitors	No more than 35,000	Annually
Resources (staff time, equipment) devoted to visitor management and restoration <b>due to visitor impacts</b>	Percentage of financial resources devoted to visitor mgmt and restoration not to exceed 25-50% of total operating budget	Every 3 years

### Elements 8 and 9: *Monitor Resources and Social Indicators*

If and when the standards listed in the previous element are broken, action will need to be taken to return the indicators to their desirable conditions. Determining what management action, or “mitigation measure” to take should be done by carefully evaluating each situation. The most effective solution may not be obvious at times. Restricting visitor use to prevent trail braiding may not be as effective as improving trail delineation. On cliff edges, the reverse may be true when very clear trail definition doesn’t prevent vegetation trampling caused by hikers seeking out viewpoints.

Table 6 provides a set of management actions to be used for returning indicators to their LAC standards. It should be noted that Table 6 is not a definitive statement on the appropriate course of management action. The actions listed should be viewed as options for future land stewards to mitigate recreational impacts. In some instances, it may be desirable to employ all three management actions at once. Furthermore, if resource impacts still continue after each approach has been employed, other management actions will need to be determined.

Monitoring indicators should be accomplished through a combination of staff time and volunteer assistance. The volunteer patrol used during the winter months to watch the Preserve could be utilized to assist with the VERP monitoring program. Monitoring for the VERP framework should also be incorporated into the Preserve’s education and outreach program. Many of the indicators described above will only require a thorough walking of the Preserve to monitor for them. Others, such as the photopoints and rare plant surveys, will require more time and a modest amount of training to complete. A set of forms should be developed for conducting monitoring activities at the Preserve.

**TABLE 9. VERP MANAGEMENT ACTIONS, SAM’S POINT PESERVE**

<b>Indicator</b>	<b>Standard</b>	<b>Action 1</b>	<b>Action 2</b>	<b>Action 3</b>
The Presence of Social Paths	There are obvious unofficial trails forming	Rehabilitate the resource. Brush in paths, improve trail definition	Educate visitors through signage and land steward patrols	Control visitor use by roping off paths until vegetation is restored
Trampling of Rare Plant Populations	10 percent of any rare plant population is trampled within a five year period	Educate visitors through signage and land steward patrols	Control visitor use by roping off locations of plant populations	Reduce visitor access to areas with rare plants (reroute trails).
The Presence of Aggressive Alien Plant Species	A species is seen not observed the previous season	Manage occurrence as detailed under Ecological Management	Same as Action 1	Same as Action 1
Evidence of Camping	There are obvious signs of hardened campsites forming	Rehabilitate the resource. Remove fire rings and brush in campsites	Educate visitors through signage and land steward patrols	Divert visitor use away from camping areas

The Presence of Denuded Soils on Cliff Edges	There is an increase in exposed soil over baseline photos	Decrease access to cliff edges by brushing in entry points	Educate visitors through signage and land steward patrols	Control visitor use by roping off cliff edges
Impacts to Wildlife (timber rattlesnakes and ravens)	Standard is specific to management zone (see above)	Educate visitors about minimizing impacts to wildlife	Implement seasonal closures during breeding season	Control visitor use by land steward patrols
Trail Width	Standard is specific to management zone (see above)	Rehabilitate and harden the resource with brush, step stones, bridges etc.	Educate visitors through signage and land steward patrols	Divert visitor use during peak times and spring mud season
Trail Braiding	No more than 1 path within 50 feet of a trail centerline	Rehabilitate the resource by brushing in braids	Educate visitors through signage and land steward patrols	Control visitor use by roping off braids until vegetation is restored
Vegetation Disturbance in Shingle Gully and the Grand Canyon	No further disturbance from 1999 photos	Improve trail definition	Educate visitors through signage and land steward patrols	CLOSE canyon bottoms to public use until vegetation is restored
Vegetation Disturbance in the Eastern Ice Caves	No further disturbance from baseline photos	Improve trail definition	Educate visitors through signage and land steward patrols	Harden the resource by erecting fences and other barricades
Encounters between Visitor Groups	Standard is specific to management zone (see above)	Divert and channel public use through education	Control access points by reducing parking lot capacity	Limit public access via a permit system
The Number of Visitors to the Preserve	Not to exceed 35,000	Charge visitation fees	Reduce parking lot capacity	Limit public access via a permit system
Disturbance to Cultural Resources	Any evidence of looting, vandalism or disruption	Educate visitors about minimizing impacts to cultural resources	Divert use away from cultural resources by moving trails etc.	Implement closures of cultural resource areas and enforce with land steward patrols

## APPENDIX VII. TRAIL MONITORING METHODS

### Trail Monitoring Manual Sam's Point Preserve

This manual describes the procedures for assessing the conditions of the trails. Make sure you completely understand how to fill-out this survey before going out on the trails.

#### Materials:

Tape measure	Measuring Wheel	Map	Flagging Tape
Level Stick	Pencils	Clipboard	Clinometer

#### Procedure:

Starting from the beginning of your trail segment, push the measuring wheel along the middle of the trail making sure that it does not skip or bounce in rough terrain. If you come to a log or a large rock, lift the wheel over it and then manually add the skipped distance to the wheel. After 1000 feet, stop to collect the sample point data listed below. IF you go over 100 ft. by mistake, stop where you are and take the measurements at that point.

Each number below corresponds to the same number on one of the data sheets.

#### Before Beginning (Cover):

- 1) **Trail Name:** Record the name of the trail that you will be surveying.
- 2) **Section Number:** Record the section number of the trail that you will be surveying (marked on the map).
- 3) **Surveyors:** Record the name(s) of the trail survey crew.

#### En Route to the Sample Point (Data Sheet A):

Record the cumulative distance (from the beginning of the trail) to the following features along the trail. Also record the distance at which features for numbers 6, 7, 8, 9, and 10 end.

- 4) **Visitor-Created Trails:** These are trails, intersecting the trail that you are surveying, that visitors have created to access scenic attractions or to make a shortcut. DO not include formal trails or roads of any type.
- 5) **Attraction:** Any feature (waterfall, scenic view, etc.) that attracts the attention of visitors.

6) **Muddy Soil:** Seasonal or permanently wet and muddy trail soils greater than 5 ft. in length that show imbedded foot prints. Do not count temporary mud created by a recent rain.

7) **Running Water:** Sections of the trail greater than 5 ft. in length that are crossed by moving water from seeps, springs, or small streams.

8) **Bedrock:** Sections of the trail greater than 5 ft. in length that have eroded to bedrock.

9) **Excessive Soil Erosion:** Sections of the trail greater than 5 ft. in length with soil erosion exceeding 2 ft. in depth from the original trail surface. Look for large rocks and tree roots whose tops were probably at the original trail surface, but have been exposed more fully because of erosion.

10) **Dwarf Pine Ridge Community:** Sections of the trail that cut through the Dwarf Pine Ridge Community.

#### **At the Sample Point (Data Sheet B):**

Set down the pole horizontally across the section of the trail that you will be monitoring. Take a picture of the pole on the trail being sure to capture the trees around it. This enables future Trail Surveyors to know exactly where you took the data.

11) **Distance:** Record the true cumulative distance to the sample point. (Not the distance you were supposed to stop at.)

12) **Trail Width:** At the sample point, measure the width of the trail using the boundaries created during the construction of the trail as the endpoints.  
(Refer to Figure 1)

13) **Tread Width:** At the sample point, measure the width of the tread using the most pronounce boundary of human disturbance as the endpoints. (Refer to Figure 1)

14) **Tread Condition Characteristics:** Along the width of the sample point, estimate to the nearest 10% the lineal length occupied by the tread surface categories listed below. (Make sure that your estimates sum to 100%.)

S-Soil:	All soil types including sand and organic soils.
L-Litter:	Crushed leaves, needles, or twigs that cover the trail surface.
V-Vegetation Cover:	Live vegetative cover including herbs, grasses, mosses, and low growing shrubs that are rooted within the trail boundaries. (Ignore all overhanging vegetation.)

RS-Rock Surfaces:	Naturally-occurring rock surfaces (bedrock, boulders, rocks, cobble, or natural gravel). If rock is embedded in soil estimate the percentage of each and record separately.
MS-Muddy Soil:	Seasonally or permanently wet and muddy soils that show embedded foot prints. Do not count temporary mud caused by recent rain.
SW-Standing Water:	Portions of mudholes with non-moving water.
ER-Exposed Roots:	Exposed tree or shrub roots.
RW-Running Water:	Moving water from seeps or streams intercepted by the trail.
G-Gravel:	Human-placed gravel.
W-Wood:	Human-placed wood.
R-Rock:	Human-placed rock.
O-Other:	Explain.

15) **Maximum Incision:** Extend the *level* stick so that it spans the width of the tread. Use the tape measure to determine the maximum gap (to the nearest 16<sup>th</sup> of an inch) between the pole and the surface of the trail (not to the tops of rocks or mud puddles). Refer to Figure 2 for methods of measuring maximum incision.

16) **Slope:** Use the clinometer to measure the slope of the trail. Line the clinometer up with the apparent slope of the terrain and record the measurement in degrees.

17) **Vegetative Ground Cover:** Beyond the trail boundaries, observe the non-wood ground cover (herbs, grasses, mosses, flowers, bushes). If the ground cover is:

Less than 5 inches in height	record 1
Between 5 and 12 inches in height	record 2
Greater than 12 inches in height	record 3

18) **Tree Canopy Coverage:** Estimate the tree canopy coverage directly above monitored transect in increments of 25%. (0, 25, 50, 75, or 100 percent)

Collect all equipment and move to the next sample point making sure to refer back to **En Route to Sample Point** along the way.

When you have completed the assigned section of your trail, place the two wire flags on both sides of the trail at the last sample point you surveyed so that the next surveyor knows where to begin.