

Green Assets:  
*Planning for  
People and Nature  
Along the Shawangunk Ridge*



*A Project of the  
Shawangunk Ridge  
Biodiversity Partnership*

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**Please Note:**

**A set of large format overlay maps that are described  
in this text have been provided to your town  
and are on file at your town office.**

# The Shawangunk Ridge Biodiversity Partnership and the *Green Assets* Project

Since 1994, the Shawangunk Ridge Biodiversity Partnership has been studying the northern Shawangunks to provide a scientific basis for implementing conservation actions to protect the biodiversity of the Shawangunks landscape. The focus of this work is the entire 94,000 acre area between the Wallkill and Rondout Rivers.

The Partnership includes: Mohonk Preserve, The Nature Conservancy (TNC), the Open Space Institute (OSI), the New York State Office of Parks, Recreation and Historic Preservation (OPRHP), the Palisades Interstate Park Commission (PIPC), the New York State Department of Environmental Conservation (NYSDEC), the New York Natural Heritage Program, the New York State Museum, Friends of the Shawangunks, and the Cragmoor Association. Many of these partners own and manage property within the study area, and have expertise in the management and protection of the natural resources of the Shawangunks.

The Partnership's mission is to work together with other interested organizations to maintain, and where necessary, restore natural communities and native species of the Shawangunks and the ecological processes these species and communities need to survive.

Local planning and town boards frequently make land use decisions affecting the future of the Shawangunks. As our towns and villages develop open space plans and go about the daily business of local land use planning, it will be critically important for local decision-makers to understand the habitats and ecological communities of the Shawangunks, and what is needed to sustain the diversity of plant and animal life that abounds on the ridge.

Through a project called *Green Assets*, the Shawangunk Ridge Biodiversity Partnership is sharing information with surrounding towns about the natural communities of the Shawangunks so that habitat protection can become part of local land use planning. This guide is intended to accompany a series of overlay maps which has been provided to your town by the Biodiversity Partnership. The information is also available electronically in Geographic Information System (GIS) format.

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# Green Assets: Planning for People and Nature Along the Shawangunk Mountains

## INTRODUCTION:

Located between the Catskill Mountains and the Hudson River, the spectacular scenery of the Shawangunk Mountains adds immeasurably to our region's "sense of place" and helps define the character of our human communities.

But scenery is only part of what makes the Shawangunks special. The Shawangunks are also recognized as a top priority for biological 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. Surveys of the plants and animals of the Shawangunks have revealed more than 1,400 species, including 57 rare and imperiled plants and animals.

The northern Shawangunks extend from Rosendale to Route 52 in Ulster County – an area of approximately 94,000 acres. Of this area almost 30,000 have been permanently protected. The interconnected, intact, forested areas of the Shawangunks provide habitat for animals that need high-quality, undisturbed areas to live, including spotted salamanders, bobcats, fishers, hawks, falcons, uncommon neotropical warblers, timber rattlesnakes and more.

While most of the ridgetop is protected, the forested slopes of the Shawangunks are threatened by human activities that are changing the natural landscape. The top three threats to the natural landscape and the biodiversity of the Shawangunks are:

*TNC Archive*

- **Conversion of open land to residential and other uses:** Conversion is occurring primarily at lower elevations, but increasingly, development is encroaching on the forest at higher elevations. Suburbanization around the Shawangunks is resulting in a decrease in habitat and increasing isolation from other undeveloped areas such as the Catskills.
- **Elimination of forest fires:** Fire is a key factor in the ecology of the Shawangunks. Decades of fire suppression is changing the forests of the Shawangunks, resulting in a gradual decrease in biological diversity.
- **Recreational Over-Use:** With more than 500,000 visitors annually, unchecked recreational use in sensitive areas can cause soil erosion, and damage and loss of habitat.



*Pink Lady Slipper*  
*TNC Archive*

## THE SHAWANGUNKS AS HABITAT

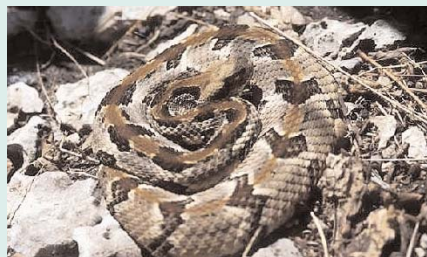
The northern Shawangunk Mountains are known for their exceptional wealth of biological diversity. The variety of habitats and richness of plants and animals is due to an unusual combination of factors coming together in one place. These factors include:

- 1. The geology of the Shawangunks** creates a large number of distinctive landforms – “sky” lakes, ice caves, cliffs, slab rock, ravines and talus fields are all found in a relatively small area. These landforms provide special habitats for many highly adapted species of plants and animals, living in close proximity to each other.
- 2. An “ecological crossroads”**, the location of the Ridge is such that plants and animals from one ecological region are overlapped with those of another region. On the border of two distinct areas, each with their own set of species - the High Alleghany Plateau and the Lower New England ecoregions - the Shawangunks are home to species not typically found in the region that are living at the edge of their ranges. All told, the result is an unusually high number of species in a relatively small area. The Shawangunks provide an important north-south migration corridor through New York, New Jersey and Pennsylvania.
- 3. The sheer ruggedness of the Shawangunks** has protected its unique natural communities, despite a history that includes farming, logging, fires, mining and hunting. Today, the lowlands around the Shawangunks are extensively developed, leaving the mountains as a forested refuge.
- 4. A conservation ethic**, advanced in the mid 1800’s by the Smiley family, has resulted in more than 40,000 acres of the Shawangunks being protected by conservation and recreation interests, keeping large forest and field habitats intact.

**The Shawangunks are a treasure trove of biodiversity. For example:**

- The Shawangunks are home to the world’s best example of the rare ridgetop dwarf pitch pine barrens, found at Sam’s Point Preserve;
- The slopes of the ridge are home to the second largest chestnut oak forest in New York;
- The Shawangunks are home to wide-ranging mammals such as black bear, fisher and bobcat;
- Many regionally rare animal species, including eastern box turtle, five-lined skink, timber rattlesnake, Jefferson, red, spotted and spring salamanders are among the animals found in the Shawangunks;
- Peregrine falcons, a New York State endangered species, nests in the Shawangunks - one of only a few wild nest sites in the State.

*The diversity of plants and animals, healthy forests and clean water found in the Shawangunks are there because the mountain’s forests, streams and wetlands are essentially intact - or unfragmented - by roads, subdivisions, power lines and other infrastructure that can diminish how natural areas function.*



Timber Rattle Snake  
TNC Archive

## Why Protect the Natural Communities of the Shawangunks?

- **Protecting Clean Water and Air –** The wetlands and forests of the Shawangunks help keep our water and air clean, and provide clean drinking water at the lowest cost. Forested lands are the silent “lungs” for our area, constantly processing and improving air quality. These are free “ecosystem services” provided by natural areas that would be prohibitively expensive otherwise. Preserving intact natural areas is an “insurance policy” on ecological services now and in the future.
- **Sustaining Our Economy –** Protection of wildland recreational areas and scenery translates directly into tourism dollars and economic vitality. The chance to live near nature increases property values, fueling a more vibrant economy. Natural areas provide recreational opportunities such as hunting, fishing, bird-watching, photography and hiking.
- **Benefits to Human Health –** By maintaining larger intact forest, human health risks may be reduced. For example, research has revealed that the diversity of small mammals (mice, voles, shrews) is reduced by forest fragmentation, leaving the white-footed mouse dominating the remaining fragments. White-footed mice are the primary carrier of Lyme disease. The risk of Lyme disease is much lower in areas with unfragmented forests. More generally, natural areas can enhance quality of life and health.
- **Our Biological Legacy –** As more habitat is lost or degraded and species disappear, it is important to protect places that support a wide array of plants and animals, as a means of conserving our natural heritage for future generations.

## What If We Do Nothing?

Urban and suburban “sprawl” seems to be the bane of modern life. Unabated, sprawl will continue to fragment our landscapes, isolating and degrading the value of what habitat remains. Species diversity will decline and some species will be eliminated. Without careful planning, we risk the following:

**Loss of Healthy Forests:** In the northern Shawangunks, much of the ridgetop is protected by conservation organizations or is in public ownership. However, the slopes of the ridge are not protected in this way and are vulnerable to development. More remote land at higher elevations once considered too difficult to develop for homes is now developable. Poorly planned development fragments forest habitat, impedes wildlife movement and can disrupt wetland functions. Fragmentation creates barriers to movement and dispersal of plant and animal species, and can lead to population declines and/or local extinctions. Roads and development are the main sources of permanent fragmentation.



*Fragmented Landscape*

**Decline in Water Quality and Supply:** The Shawangunks contain the headwaters of numerous streams that flow into the Rondout and Wallkill Rivers. Collectively, these streams and adjacent wetlands comprise watersheds that depend on intact natural systems to function. Loss of riparian forests and buffers surrounding wetlands reduces the ability of these systems to improve water quality and to provide groundwater recharge.

**Degradation of Habitat:** Habitat degradation occurs when various activities, such as logging or development, reduces the quality of habitat for plants and animals. Degraded habitat can no longer support sensitive species that have particular habitat requirements. Degraded habitat may also result in water pollution, erosion, and proliferation of less desirable, invasive species. Invasive species are frequently adapted to flourish in disturbed areas. Once introduced in a disturbed area, invasives can overrun and eliminate native species, ultimately reducing species diversity. Examples of invasive species in our area include garlic mustard, purple loosestrife, Ailanthus, Japanese knotweed, Japanese stiltgrass and Japanese barberry.

**Reduced Wildlife Diversity:** As fragmentation continues, we can expect to see a loss of rare species native to the Shawangunks. Populations of plants and animals can become isolated by barriers so that they cannot successfully travel, feed or reproduce. While *generalist* species, such as raccoons, crows and Canadian geese can live in many habitats and disturbed conditions, rarer *specialist* species, including salamanders, leopard frogs, forest warblers and bobcats are less resistant to disturbance and face a lack of suitable habitat when fragmentation occurs. As a result, specialist species decline as forests are fragmented and degraded. Migrating species such as raptors and songbirds need migration routes to remain intact. *Edge* species, such as the white tailed deer, proliferate in fragmented landscapes, thriving in disturbed areas with forested edges.

*Pin Cushion Moss*  
TNC Archive

*Wild Blueberries*  
G. Gleason



*Red Eft Salamander*

**Loss of Farmland:** Farmland surrounding the Shawangunks has long provided an “eco-permeable” buffer – that is, lands that remained open and wildlife-friendly, despite their human use patterns. Much of this land is now most valuable for residential development and is increasingly being subdivided. If not carefully planned, subdivisions eliminate important habitat, interfere with wildlife movement, disrupt wetland function and other natural processes.

## **GREEN ASSETS: A FRAMEWORK FOR PROTECTING NATURAL COMMUNITIES OF THE SHAWANGUNKS**

**Project Overview:** Most of the towns around the Shawangunk Ridge are planning for the future. Several towns are updating master plans and zoning, and most are reviewing an increasing number of subdivision and site development applications. As each community addresses land use and open space protection, there are multiple opportunities to specifically address protection of Shawangunk habitat and biodiversity.

In order to facilitate understanding about the habitats and natural communities of the Shawangunks, the Shawangunk Ridge Biodiversity Partnership *Green Assets* project has created a series of maps that show the different natural community types of the Ridge. Using these maps, your community can incorporate protection of important Shawangunk ridge habitat areas into land use decisions, and can build a system of interconnected and conserved lands in your town. While these maps focus on the Ridge, the principles presented can be used to create linked open space that allow for recreation and protection of wildlife habitat throughout your town.

**The *Green Assets* maps focus on protection of three key resources:**

- **Important Ecological Communities:** The Partnership has identified about 40 different ecological communities in the Shawangunks. For the purposes of planning and management, these communities have been rolled together into six major ecological systems in the Shawangunks, referred on the maps as "Conservation Targets". These six system types support the numerous rare plant and animal species that are found in the Shawangunks, and are described in more detail later. The communities of plants and animals that make up these systems do not have any specific legal protection from state or federal government. These valuable areas can be best protected at the local level through informed land use decision-making, good site planning, conservation easements or land acquisition. Effective conservation requires knowing where these important resources are, and minimizing disturbance when development occurs.
- **Large Habitat Blocks:** Construction activity can result in large patches of landscape habitat being broken into smaller fragments. Loss and fragmentation of habitat is the single most significant threat to biodiversity of the Shawangunks and other forested habitat areas. Habitat loss may be speedy, as in the case of a major subdivision, or incremental, through development of individual lots. Either way, habitat is lost through the cumulative and irreversible effects of development. Effective conservation will result from protection of intact, interconnected natural communities and ecosystems; the preservation of individual species will naturally follow. The maps show how large habitat blocks are connected across parcels, allowing for informed decisions about where and how connections can be maintained.
- **Wetland Habitats:** The Shawangunks include lakes, streams, and wetlands, as well as floodplain forests, bogs, and vernal pools - in other words, there are many habitats that are influenced hydrologically. Wetland areas are often "hotspots" of biological diversity - places where there are particularly high concentrations of important plant and animal species, as well as being areas which provide a large number of ecological functions and values. In the last 200 years, 80% of riparian land - land along streams, rivers and lakes - in North America and Europe has been converted to non-natural areas. Local communities can protect riparian and wetland habitats by establishing buffer zones around wetlands, rivers, streams and lakes.

## USING THE *GREEN ASSETS* MAPS

The purpose of the maps is to help land use decision-makers identify and protect ecologically important habitat, unfragmented forest, and connections between natural areas.

Your town has been provided with a series of maps showing the locations of valuable natural habitats of the Shawangunk Ridge in your locale, in relation to other features and protected land. These maps were made by studying aerial photos and by conducting studies in the field and information from other sources. Each map shows a different layer of information. The maps include:

- an orthophotograph of your town (an aerial photograph converted to a map);
- a base map showing the elevation and slope of the ridge;
- a map showing protected Shawangunk lands that are in your town, as well as familiar roads and boundaries;
- a map showing the location of important ecological systems. From this map it is possible to locate large, undeveloped blocks of sensitive habitat;
- a map showing ownership by tax parcels. This information is valuable in terms of understanding the units which will determine future land use decisions.

These maps are designed for overlay use, to illustrate how features and resources line up with each other. The data presented in these maps is available digitally to your town for use in a computer GIS. While the paper overlay maps are useful in a meeting to give people a sense of what lands and natural resources lie in their town, the GIS version can be used to answer many more detailed questions about those resources.

These maps are a unique resource that has been created to help your town make informed decisions about the Shawangunks. The Shawangunk Ridge Biodiversity Partnership is continuing to gather new information, and welcomes input from your town to help close information gaps and provide supplemental data. The maps are most useful when knowledgeable residents use them and add to them. For example, a new subdivision may have eliminated habitat currently shown on the map. A hunter may know about the value of a particular spot, or a landowner may know the location of a significant vernal pool. Adding this information to the maps makes them more valuable. There are many ways your town can use the habitat information on these maps. In addition to using it for land use planning, it can be used for outreach and education, in local regulations, to inform and direct land protection initiatives or to develop joint conservation strategies with neighboring towns.

*Green Assets Overlay Maps*

## WHAT THE MAPS SHOW:

**Elevation/Slope:** Subdivision and development of land in mountainous areas is challenging because of slope. Development on slopes can result in ground disturbance which produces erosion problems. In the Shawangunks, this can be particularly damaging because soils are shallow to begin with. Runoff and erosion can result in disruption of drainage patterns and the contamination of streams, with damaging results for aquatic life. Downstream users may find water quality diminished and recharge of groundwater may be affected, as water runs off, instead of being absorbed by soil cover in recharge areas.

Also, in mountainous areas, homes placed on steep slopes are highly visible from the towns and communities in the valleys below.

The maps show where steep slopes are present in your town. In order to protect water quality, soils and visual quality for your community, these may be areas where protection strategies are needed.

**Protected Areas:** Of the 94,000 acres of the northern Shawangunks, more than 40,000 have been protected by conservation efforts and are owned by conservation organizations or state agencies dedicated to conservation and public access. Compatible management/stewardship of properties adjacent to these protected properties can create larger unfragmented forest blocks, may provide additional recreational opportunities in the future and can help protect the mountain viewsheds seen from the valley communities below the ridge.

**Tax parcels:** The map set also includes a layer showing tax parcels. This is useful in evaluating where sensitive resources are in relation to ownership patterns and where there are opportunities for conservation, such as larger properties that are currently undeveloped and include sensitive resources.

**Important Ecological Systems or “Conservation Targets”:** The vegetation of the northern Shawangunks is dominated by deciduous hardwood forests, surrounding ridgetop pine barrens, coniferous forests, wetlands and cultural uses, such as farming. On the maps these are shown in different colors. The ridgetop pine barrens mostly occur between Sam’s Point and Lake Minnewaska, with patches occurring elsewhere. Deciduous forest occurs across the landscape and includes many different community types. Larger wetlands are found in the upper reaches of the Verkerderkill and at lower elevations southeast of the ridge. Cultural uses such as agriculture cover a significant part of the study area and nearly encircle the ridge.

These ecological communities have been rolled together into six larger systems. Taken together, these six systems include the biodiversity of the Shawangunks, and are referred to on the maps as “conservation targets”. These are the priority areas for protection and make up about 58% of the area between the Walkkill River and the Rondout Creek.

*Pitch Pine/Oak/Heath Rocky Summit  
TNC Archive*

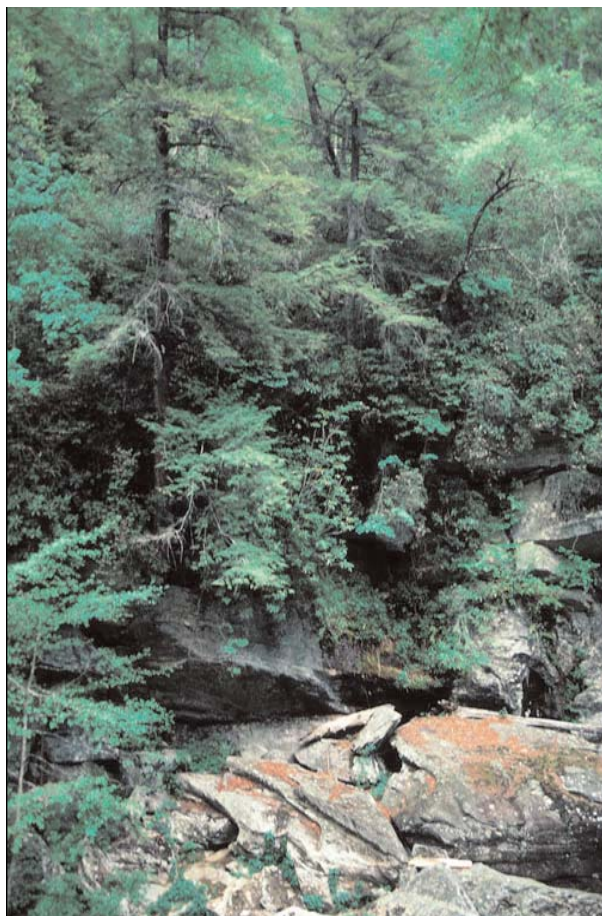
## THE SIX CONSERVATION TARGETS SHOWN ON THE MAPS ARE:

- **Ridgetop Dwarf Pitch Pine Barrens:** Located primarily at Sam's Point Preserve, this globally rare community depends on shallow, infertile soils, and is dominated by dwarf pitch pine trees, huckleberries, blueberries and scrub oak. There are 51 large and small patches of this community type, totaling 2,058 acres, or about 2% of the ridge. While proportionally small, this community is one of the richest areas for rare species. The term barrens is generally used to describe communities adapted to periodic fire that occur on droughty, infertile soils. Current fire suppression practices are causing this community to change in ways that ultimately may reduce biodiversity.

Ninety-five percent of the dwarf pitch pine barrens are located in Wawarsing, and much of it is within Sam's Point Preserve. This community is slow to recover from disturbance, such as roads, trails or other human impacts. Several rare types of wetlands are interspersed within the dwarf pitch pine barrens, including perched bogs, highbush blueberry bog thickets, dwarf shrub bogs and pitch pine-blueberry peat swamps. Rare animal species found in this community include: marbled salamander, Jefferson salamander, prairie warbler, whip-poor-will.

- **Pitch Pine/Oak/Heath Rocky Summit:** Like the dwarf pitch pine barrens, this community is found at the higher elevations and typically has shallow soils, is adapted to frequent fire and supports rare species. Species include pitch pine, chestnut oak, highbush blueberry, black huckleberry, low-bush blueberry, sheep laurel and mountain laurel. This community is found in large and small patches within the chestnut oak forest, and there is a total of just over 6,000 acres, or about 7% of the ridge. As with the dwarf pitch pine ridge community, this community is slow to recover from disturbance, and is therefore fragile. The largest rocky summit areas are found in Wawarsing (83%) and Rochester (15%).
- **Chestnut Oak Forest:** The chestnut oak forest on the Shawangunk Ridge is the second largest in New York State, totaling over 28,000 acres. This is the dominant forest type of the Shawangunks, and in addition to being an important buffer to the rarer, higher elevation communities, the chestnut oak forest contains numerous rare species and natural communities. The dominant trees are chestnut oak, red and white oak. Common shrubs include mountain laurel and black huckleberry. Groundlayer species include Pennsylvania sedge, wild sarsaparilla, wintergreen and pin cushion moss.

The largest blocks of chestnut oak forest are in Wawarsing (8,595 acres or 31%), Rochester (7,356 acres or 26%) and Gardiner (5,448 acres or 19%) The chestnut oak forest replaced the native chestnut forest after it was decimated by chestnut blight.



Hemlock - Northern Hardwood Forest

- **Hemlock-Northern Hardwood Forest:** There are approximately 21,000 acres of hemlock-northern forest in the Shawangunks, with almost half occurring in Minnewaska State Park Preserve, Mohonk Preserve and Sam's Point Preserve. The most abundant tree is usually hemlock, with white pine, sugar maple, red maple, black and yellow birch and black cherry interspersed. Witch hazel is a common shrub.

The Town of Shawangunk has the largest area of northern hardwoods (26% or 5,531 acres), followed by Gardiner (18% or 3,821 acres) and Rochester (6% or 3,356 acres).

Cliff and Talus Habitat  
TNC Archive

- **Cliff and Talus:** Cliff edges, escarpments and talus provide habitat for lichens, ferns and several locally rare animals including the peregrine falcon, common ravens and black vultures. Cliffs include three components: the cliff edge, the free face and the talus slope. The cliff edge is at the top of the cliff and often has a sparse cover of heaths and barrens vegetation. The free face is the vertical portion of the cliff below the cliff edge. The talus, or scree slope is the rocky slope beneath the cliff, which has varying amounts of vegetation, from forested to exposed rock. The cliff faces provide an ecological niche for rare species and several state-endangered plants occur on the cliffs, such as mountain spleenwort, arctic rush, broom crowberry and Appalachian sandwort. There are 416 acres of cliff and talus, with 66% of this habitat type in the town of Gardiner, and 11% in Rochester. Cliff and talus areas are some of the least disturbed areas in the Shawangunks.
- **Lakes, streams and wetlands:** The Shawangunk Ridge has five "sky lakes" and numerous wetlands and watercourses, as well as ponds and reservoirs. These water resources play a critical role in supporting biodiversity. Wetlands provide for floodwater storage, pollutant uptake and groundwater recharge. Many wetland communities are found along the ridge, such as shrub swamps, peat lands, wet meadows, marshes, bogs, swamps, flood-plain forests and vernal pools, and are "hotspots" of faunal diversity. Wetlands are interspersed within the forests - 1,610 acres were mapped within the study area.

## WHAT DO BIODIVERSITY CONSERVATION OPPORTUNITIES LOOK LIKE?

When looking at the *Green Assets* maps of your town, here is a checklist of biodiversity conservation opportunities to look for:

### Checklist

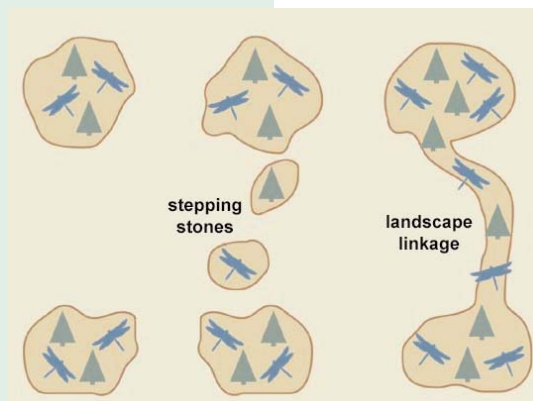
- Does the land include **ecologically important areas** (is it mapped as one of the six conservation targets)?
- Does the land contribute to a **large unfragmented block**? (Is it contiguous with already protected land)?
- Does the land contribute to a **“stepping stone forest” or corridor**? (Is it part of a medium-sized, unfragmented patch on the ridge or connecting the ridge to other open space?)
- Is it a **small but important area** (less than five acres) that supports ecologically important resources (a wetland, a patch of dwarf pitch pines, or known habitat for a rare species)?
- Does the land provide a **buffer** to an ecologically important area (such as a stream, wetland, cliff, talus area or other identified

**Important Ecological Systems** – The six natural community types identified on the maps as “conservation targets” all represent important areas for biodiversity. The table at the end of this section provides a “ranking” that can be applied to these areas to help guide decisions about protection of these high quality resources in the Shawangunks.

**Maintaining Large Blocks of Forest** - Large, intact forested areas support wildlife species that need large areas and species that are most sensitive to specific habitat requirements, particularly interior forest habitat. Examples of these species would include birds such as Cooper’s hawk, barred owl and neotropical warblers. Areas that are greater than 15,000 acres are considered *globally* important and are likely to include different stages of forest succession, following fires, storms and other natural disturbances. The unfragmented forest of the northern Shawangunks has been identified by The Nature Conservancy as a globally significant forest block. Opportunities to build or protect large forest blocks may include protecting areas adjacent to existing protected large blocks, such as the ridge-top preserves.

**“Stepping Stone” Forests and Corridors** - Smaller forested areas, between 200 and 1,000 acres, sometime referred to as “stepping stone forests”, provide relatively broad corridors and link larger patches of habitat, enabling a large array of species to move from one habitat to another across otherwise “hostile”, fragmented terrain. Corridors between large natural areas should be at least 300 feet wide in order for there to be a functioning link between any two areas, and even this may not

be enough to support forest nesting birds. Research suggests that corridors that are less than 900 feet wide will not be able support important ecosystem functions within them, such as new growth of important plant species, shade or other conditions needed for habitat-dependent species.



“Stepping Stone” Habitat Linkage

**Small but Important Habitat Patches** - In the Shawangunks there are small, but important habitat patches that support rare plants and animals. For example, the dwarf pitch pine barrens make up only about 6% of the Shawangunks and are found in about 50 small patches. These areas represent the world's best example of a high elevation pitch pine barrens and support associated rare plants and animals. Similarly, the summit community is another patchy community that supports rare species. Cliff and talus areas also tend to be smaller areas. These areas tend to be surrounded by forest. While it is better to protect larger blocks where possible (100 acres and up), patches as small as five acres can be very important for maintaining biodiversity. Thus the small patches, and the forest around them, are important to protect.

#### **Buffer Areas**

Natural communities depend on and are affected by outside influences. Therefore it is important to consider areas outside of the habitat boundaries. This area is often referred to as a "buffer". The appropriate size for buffer areas depends on what is being protected and local conditions. Buffers designed to protect plants and animals found in aquatic systems like streams, ponds and wetlands, are larger than those designed to just protect water quality. Agricultural land often provides an important buffer around sensitive upland resources and forested areas of the Shawangunks. Some broadly agreed upon "rules of thumb" on different buffer types include:

- **Forest Patches** – Small and large forest patches should be buffered from direct human impacts by a baseline buffer of about 50 feet. As recommended below, 1600 foot buffers for Shawangunk dwarf pitch pine and rocky summit areas are desirable.
- **Lakes, Streams and Rivers** – Lakes, streams and rivers can be protected through the creation of riparian buffers, and forested land is better buffer than most other non-forested land. The precise width required for a buffer varies in different circumstances, according to vegetation, soil, slope and other site characteristics, as well as stream protection goals. Buffers of at least 300 feet are recommended for water quality and habitat protection. Some research indicates that in order to avoid proliferation of non-native vegetation along stream corridors, buffers of 500 feet or more may be required. Protection of certain reptiles and groups of birds may need as much as 1,500 feet. In general, recommended buffers size is significantly greater if the intent is to protect ecological function, such as wildlife habitat or species diversity.
- **Wetlands** - Vegetated buffers of at least 300 feet are needed to protect species richness in wetlands. Such buffers also protect surface and ground water quality.
- **Cliff and Talus** – 1,000 foot buffers are desirable to protect rare species often found in cliff and talus areas, such as cliff-nesting birds (peregrine falcons, ravens) and other wildlife.

*For a complete review of the scientific literature on buffers, corridors and patch size please refer to Conservation Thresholds for Land Use Planners, The Environmental Law Institute, 2003. (This report can be downloaded for free from the Environmental Law Institute website, [www2.eli.org](http://www2.eli.org)).*

## USING PROTECTION CRITERIA TO SCORE PARCELS

The next table shows a scoring system developed by the Biodiversity Partnership for the conservation targets of the northern Shawangunks, based on patch size, buffers, condition and the presence of rare, declining and vulnerable species.

Towns can use the scoring to prioritize parcels for conservation, determine which parcels would most benefit from cluster development, to better assess environmental impacts of projects on specific parcels.

*Note: While all areas within the study area on the map are considered of value to the ecology of the ridge, this scoring approach may help establish priorities for protection.*

### Protection criteria and scores for the northern Shawangunks

<b>Conservation Target Criteria</b>	<b>Score</b>
Chestnut oak patch of >1,000 acres . . . . .	.5
Chestnut oak patch 500-1,000 acres . . . . .	.4
Chestnut oak patch of 100-500 acres . . . . .	.3
Northern hardwood forest patch of 100 acres or greater . . . . .	.3
Dwarf pine ridge with a contiguous patch of 100 or greater acres . . . . .	.5
Natural communities providing buffer of 1,600 feet for dwarf pine ridge . . . . .	.5
Habitat for rare, declining or vulnerable species . . . . .	.5
High quality cliff and talus . . . . .	.4
Pitch pine-oak-heath rocky summit patch of 100 acres or greater . . . . .	.4
Lands providing buffer for pitch pine-oak-heath rocky summit of 1,600 feet . . . . .	.4
High quality lake, river or wetland . . . . .	.4
Lands providing buffer for chestnut oak or northern hardwoods systems, at the edge of the protection areas mapped . . . . .	.2
Areas providing buffer of 1,000 feet for cliff and talus . . . . .	.3
Areas providing buffer of 1,000 feet for lakes, rivers, streams and wetlands . . . . .	.3
Disturbed northern hardwood or chestnut oak forest > 100 acres . . . . .	.2
Other natural community . . . . .	.2
All other within protection areas . . . . .	.1
All other . . . . .	.0

To evaluate a given parcel of land using these criteria, look on the maps to see if the parcel or area corresponds to one of the habitat types listed above. Evaluate its size and/or relationship to other ecological resources to determine a score for the parcel. Check to see if the parcel meets more than one criterion, and add scores together to arrive at a total score. For example if a parcel includes 100 acres of chestnut oak forest (4) high quality cliff and talus (4) and provides buffer for those cliff and talus areas (4), which include habitat for rare and declining species (5), it would have a total score of 17.

Score	Biodiversity Ranking (based on criteria listed above)
21 - 25	Very High
15 - 20	High
11 - 15	Medium - high
5 - 10	Medium - low
1 - 4	Low



Bonticou Crag  
B. Fisher

## LOCAL STRATEGIES FOR PROTECTING THE SHAWANGUNK RIDGE

There are a number of tools and techniques local governments can use to protect habitat along the Ridge. Using the *Green Assets* maps, the location of important ecological communities, forest blocks and riparian areas can be incorporated into local decision-making to minimize the impact development will have on ecosystems of the Ridge. In using the maps for project review, local land use planners and decision-makers should use field inspections to verify the presence and precise location of important habitat areas. The *Green Assets* maps provide a tool for developing local plans that are sensitive to biodiversity resources. But in every case, local plans will necessarily be customized to reflect actual site conditions and community preferences and values.

### Comprehensive Planning

While most comprehensive plans generally recognize the importance of preserving the Shawangunk Ridge, they do not provide specifics about what types of preservation techniques should be used in various areas of the Ridge.

The *Green Assets* data base can be used to identify open space that includes important of Ridge habitat. Comprehensive or open space plans can include provisions for monitoring and maintaining those resources as settlement proceeds in the community. Plan recommendations can range from establishing priority parcels for public acquisition to identifying ways to maintain ecosystems as development occurs on or near them.

### Strategies:

- Meet with the Shawangunk Ridge Biodiversity Partnership to become acquainted with the *Green Assets* maps and learn about the ecological resources found in your community;
- Identify priority areas for protection;
- Identify linkages to other important resource areas in town;
- Set some protection goals for different resource types;
- Compare notes with other towns on their priorities, goals and opportunities for larger, linked protection strategies.

TNC Archive



Lake Maratanza  
R. Bahret

### **Cooperation with Landowners**

Communities have an opportunity to build close working relationships with landowners on and around the Ridge. Local government can share the information from the *Green Assets* database with landowners so that they are better aware of the value of the ecosystems at work on their lands. Landowners can use this information in making their plans for their properties. At the same time, localities can work with local land trusts and interested landowners to place conservation easements on sensitive areas to enable the owners to realize individual land stewardship goals (and potential tax savings) while the municipality also realizes an important conservation objective.

#### **Strategies:**

- Conduct information and outreach meetings to inform landowners of the value of Shawangunk habitats;
- Develop a database of local property owners who host significant habitat and supply landowners with information on habitat retention and improvement;
- Create local reward and incentive programs for landowners;
- Explore programs to purchase development rights for important habitat areas

*TNC Archive*

*TNC Archive*

## Zoning, Subdivision & Project Review

Communities can use the *Green Assets* database and maps to improve stewardship of the Ridge through a number of techniques related to zoning and project review.

### Strategies:

- **Development guidelines or standards** – Municipalities can set voluntary or mandatory standards for the ways in which lots are cleared, houses sited, the percent impervious surface allowed and more. Standards can be used by themselves or as part of some of the techniques described below (e.g., overlay zoning, site plan review, etc.) The Dutchess Land Conservancy's guidebook *Planning and Siting Your House* provides a starting point for developing such development guidelines or standards.
- **Evaluate Zoning Patterns** – If existing zoning is encouraging sprawl, zoning which encourages more compact, centralized patterns should be considered as a means of preserving rural character and maintaining open space and habitat.
- **Overlay Zoning** – An overlay zone is superimposed on existing zoning to provide additional requirements for specific areas. The existing zoning still pertains, but the overlay identifies the areas where additional regulations apply. An overlay zone may set higher environmental standards for site clearing, landscaping, building setbacks, or other criteria where there are sensitive resources
- **Incentive zoning** – Under incentive zoning, a locality could create a system that would provide density bonuses or other incentives for a developer to reduce or eliminate any negative impacts on Shawangunk ecosystems.
- **Site plan review** – During the site plan review process, the municipality could require applicants to identify and locate any significant habitats that may be on the site and require a design that minimizes disruption of those areas. Housing density yields should take into account areas that are not buildable due to environmental constraints, such as wetlands or steep slopes.
- **Conservation subdivision** – This technique requires that, during the subdivision process, the developer identify important resources on the site and configure the development to minimize the impact on those resources. The *Green Assets* database and maps serve as the basis for conservation subdivision regulations whereby the presence of important habitats are identified in advance and building lots, roads and utility rights of way are configured to minimize their impact on those systems. A good reference on this topic is *Shawangunk Ridge Conservation and Design Guidebook* by David Church and John Myers, available from the Catskill Center for Conservation and Development.
- **Adopt Habitat Assessment Guidelines** Habitat assessment guidelines can inform developers of habitat impacts they must consider in their applications for projects. This information can assist planning boards in doing more thorough reviews of the impacts of a project.

Bunchberry  
Troy Weldy

S. Zablocki

- **State Environmental Quality Review Act (SEQRA)** – Planning boards can include the impact of development on Shawangunk habitats as part of their environmental assessment form or “scoping checklist” for environmental reviews of projects on the Ridge. The *Green Assets* database could also be used to define areas in the Town where the presence of significant Ridge habitats justify creation of a Critical Environmental Area (CEA), requiring special review of projects proposed for the CEA.
- **Generic Environmental Review process** – For improved review under SEQRA, a generic Environmental Impact Statement (GEIS) can be created for a large area, such as the Ridge. Then, as individual development projects are proposed, they could be evaluated against the information in the GEIS. The cost of creating a GEIS could be recovered by the town via pro-rated fees for development projects.

### Looking at the Whole Landscape

Taking an Intermunicipal Approach - Increasingly, landscape planners, scientists and land use planners are recognizing the need to look at whole landscapes when doing planning. Sensitive natural resources do not stop at town or parcel boundaries, and planning around significant natural features such as the Shawangunks is becoming more common. Oftentimes this is the only way it is possible to achieve protection of sufficiently large forest blocks, a river corridor or a sensitive species that is found intermittently across a landscape.

*Chestnut oak forest*  
*TNC archive*

New York State law allows municipalities to create intermunicipal agreements to address issues related to resource conservation. Under this approach, local governments can create coordinated comprehensive plans and land use regulations. In addition, they can enter into agreements to share the costs and responsibilities for enforcing and monitoring conservation efforts. (See N.Y. Town Law S.284; N.Y. Village Law S. 7 – 739; N.Y. Gen. city Law S. 20-g)

### Strategies:

- Review the maps and your town’s open space plan with local officials from neighboring towns, land trusts, the Shawangunk Mountains Regional Partnership and the Shawangunk Ridge Biodiversity Partnership;
- Continue to meet cooperatively to discuss the conservation of large blocks of habitat across political boundaries;
- Meet cooperatively to discuss consistent regulations for shared habitats and resources;
- Evaluate any major subdivisions proposed for the ridge in a regional context;
- Develop principles for protection of the Shawangunks that can be adopted across town lines for inclusion in comprehensive plans, open space plans and conservation finance initiatives;
- Share information when projects arise that threaten shared resources.

## GLOSSARY

**Biodiversity** - The variety of living organisms, including the ecosystems and natural processes on which they depend

**Conservation** - planned action or non-action to protect, manage, restore, or enhance natural resources for future generations

**Natural community** - A group of plants and animals living and interacting with one another in a specific region under relatively similar environmental conditions

**Conservation target** - Ecosystems, natural communities and species identified as priorities for protection by the Shawangunk Ridge Biodiversity Partnership.

**Corridor** - A linear strip of habitat that differs from the adjacent land on both sides, connecting otherwise isolated larger habitat patches.

**Buffer** - Linear bands of permanent vegetation, located between aquatic or natural areas and areas subject to human alteration.

**Ecosystem** - A dynamic and interrelating complex of plants and animals communities and their associated non-living environment

**Ecosystem functions** - The biophysical processes that take place within an ecosystem apart from any human context

**Ecosystem services** - Refers to the ecosystem goods (e.g. food and medicine) and services (climate regulation, water purification, flood control) that humans derive benefit from ecosystem functions

**Habitat** - The area where a plant or animal lives that provides all the necessary elements it needs to survive (e.g. food source, cover, mating grounds)

**Fragmentation** - The process where large, contiguous landscapes are broken into smaller, more isolated fragments surrounded by human-modified environments

**Impervious surface** - Surfaces that are impermeable to water, such as roofs and pavement that prevent the infiltration of water on the landscape

**Invasive species** - Usually a non-native species that is able to exploit the landscape into which it was introduced, out-competing native species due to lack of natural predators and competitors (see also native, non-native)

**GIS (Geographic Information System)** - A computer system that allows for input and manipulation of geographic data to allow researchers to manipulate, analyze, and display information in a map

**Landscape** - A large heterogeneous land area consisting of a cluster of interacting ecosystems repeated in a similar form

**Land use** - The purpose to which land is used by humans (e.g. protected areas, forestry, pasture or settlement)

**Patch** - A relatively homogeneous type of habitat that is spatially separated from other similar habitat and differs from its surrounding

**Recharge Area** - An area where water percolates into the soil, replenishing ground-water.

**Riparian** - On the edge of a river, stream, or lake

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The New York Natural Heritage Program  
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**APPENDIX I**

Distribution of Shawangunk Conservation Targets by Town										
	Wawarsing	Rochester	Marbletown	Rosendale	New Paltz	Gardiner	Shawangunk	Total		
Pitch Pine Barrens	95%	3%	0	0	0	0	2%	100%		
Pitch Pine/Oak/Heath Rocky Summit	83%	15%	0	0	0	1%	1%	100%		
Hemlock-Hardwood	10%	16%	8%	9%	14%	18%	26%	100%		
Cliff/Talus	9%	11%	1%	2%	7%	66%	5%	100%		
Lakes, Streams & Wetlands	27%	10%	6%	6%	13%	18%	20%	100%		
Chestnut Oak Forest	31%	26%	3%	4%	4%	19%	13%	100%		

# Shawangunk Ridge Conservation Targets



## Key to Features

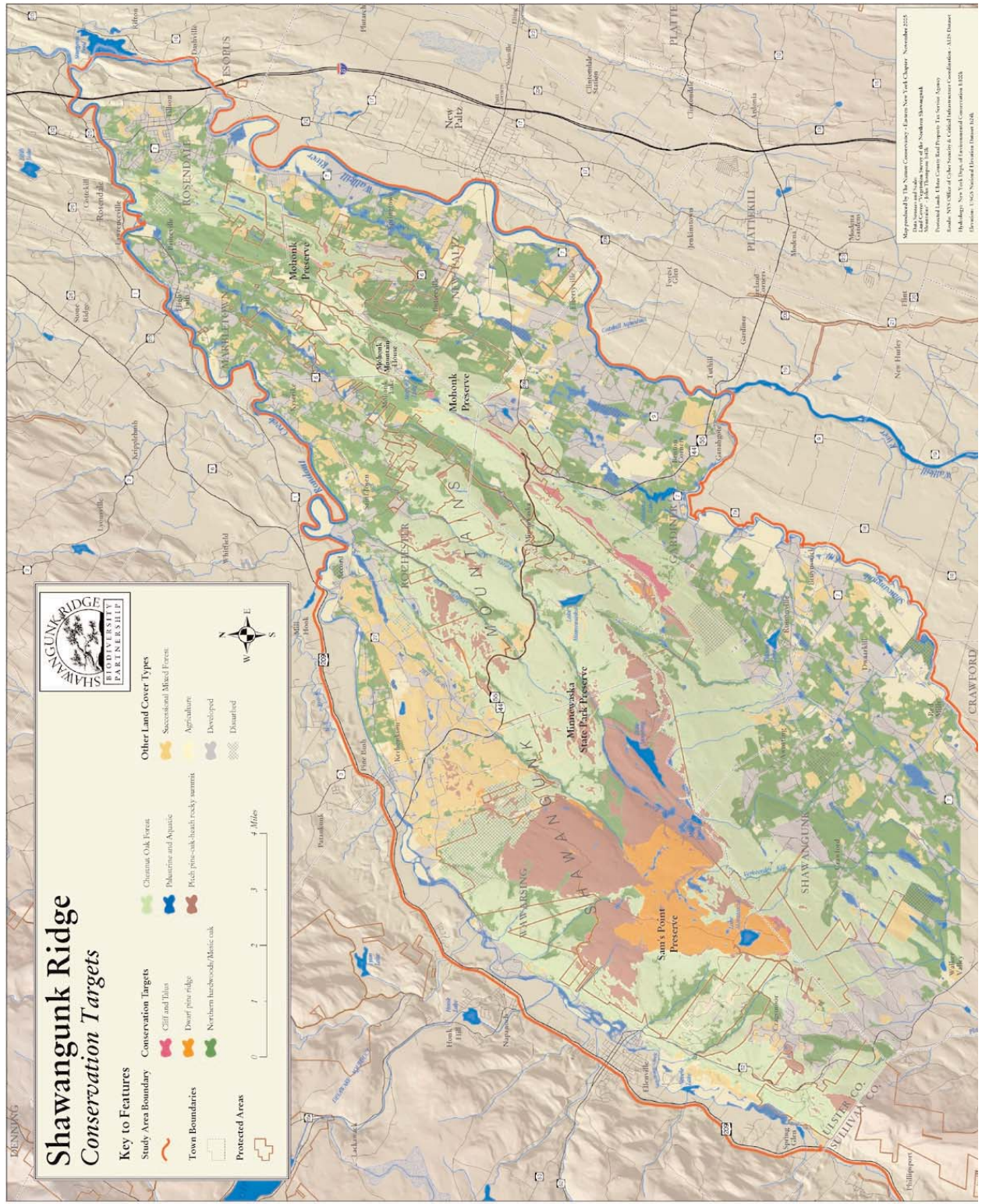
- Study Area Boundary
- Town Boundaries
- Protected Areas

## Conservation Targets

- Cliff and Tilt
- Dwarf pine ridge
- Northern hardwoods/Basic oak

## Other Land Cover Types

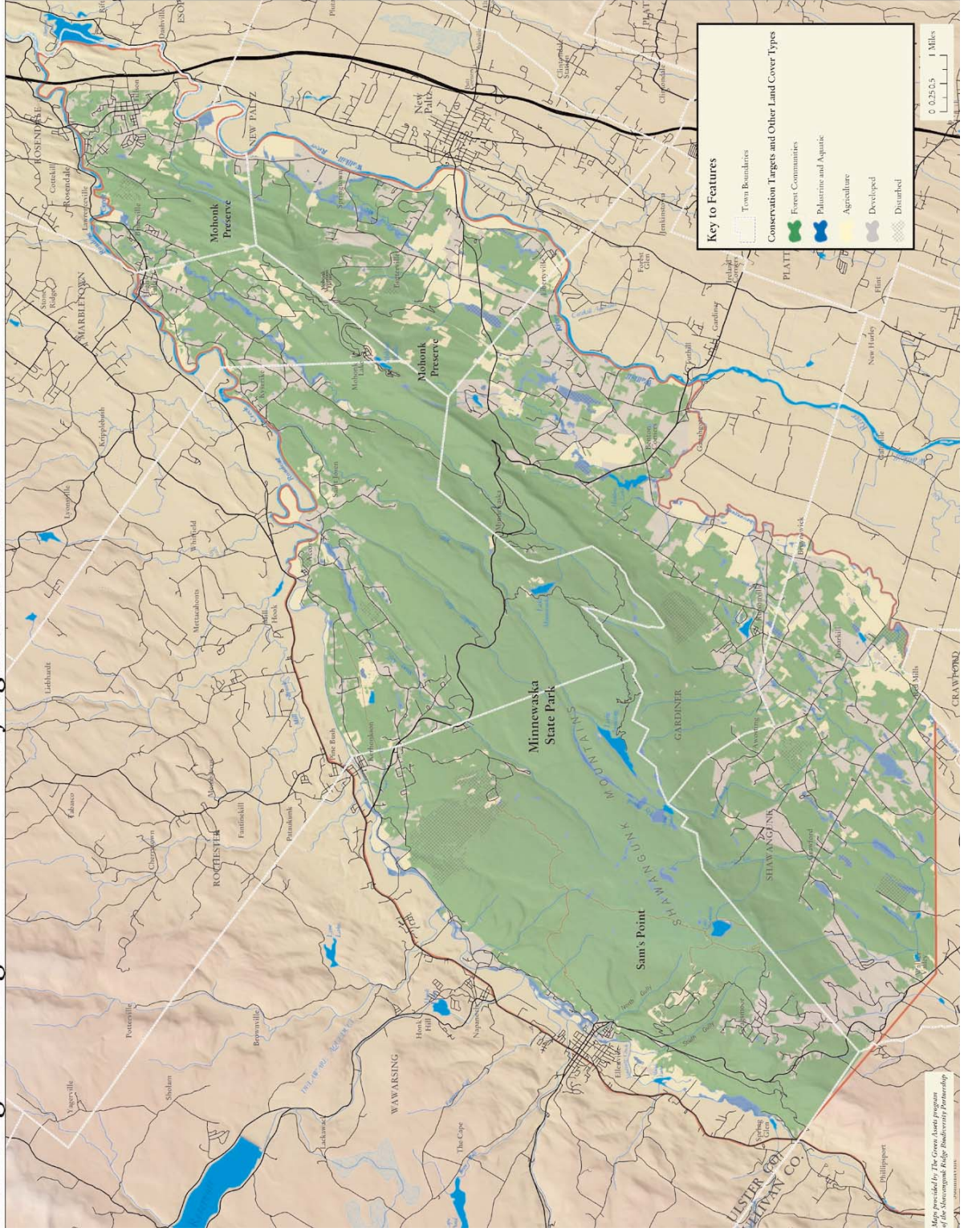
- Chernia Oak Forest
- Successional Mixed Forest
- Agriculture
- Developed
- Disturbed

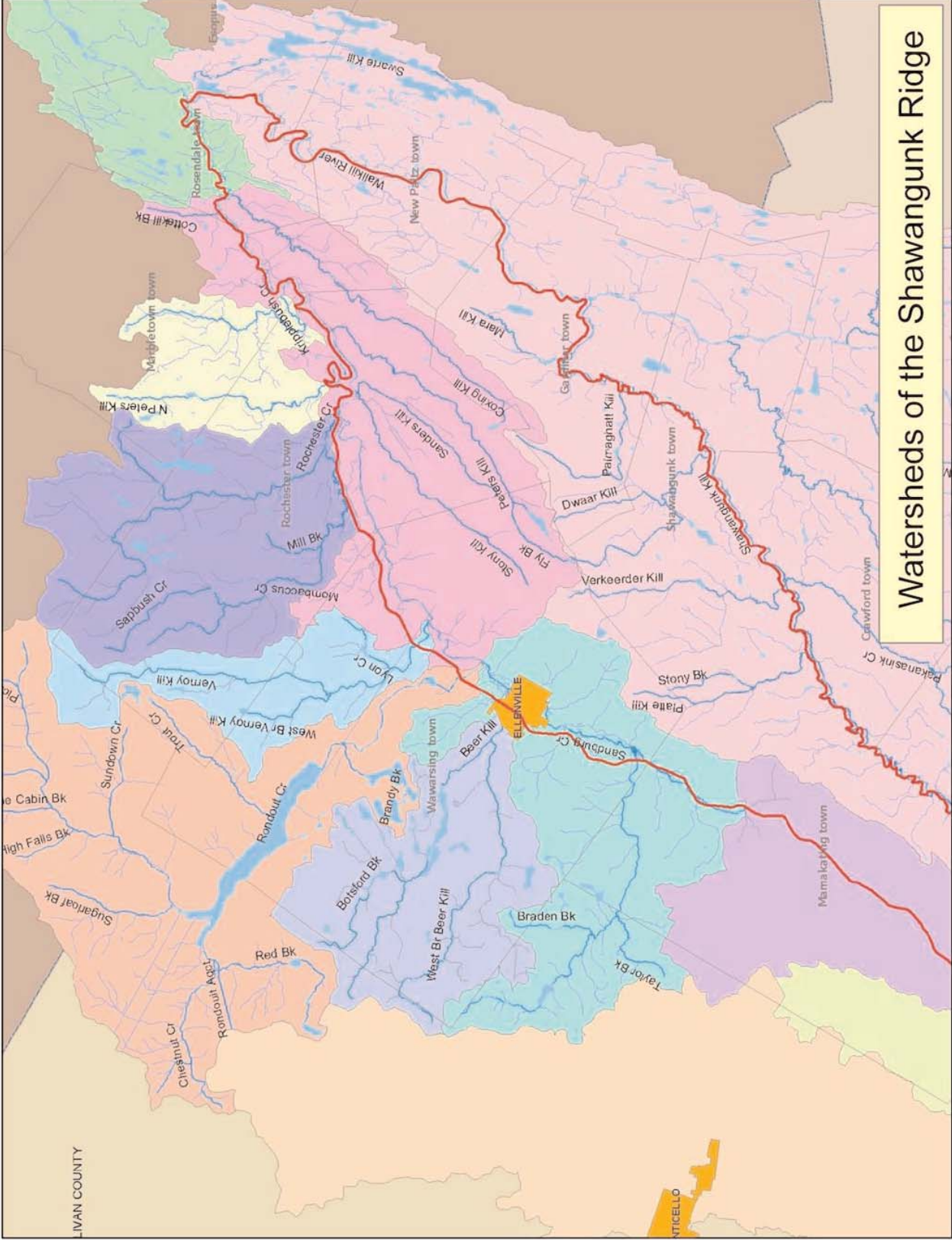


Map produced by the Nature Conservancy - Eastern New York Chapter - November 2012  
 Land cover data provided by the National Wetlands Inventory  
 Protected Land & Water Conservation Program, Inc. Service Agency  
 Funded: NYS Office of Cyber Security & Critical Infrastructure Coordination - A115 Grant  
 Hydrology: New York Dept. of Environmental Conservation 1.025  
 Division: U.S.D.S. National Wetlands Inventory 1.025

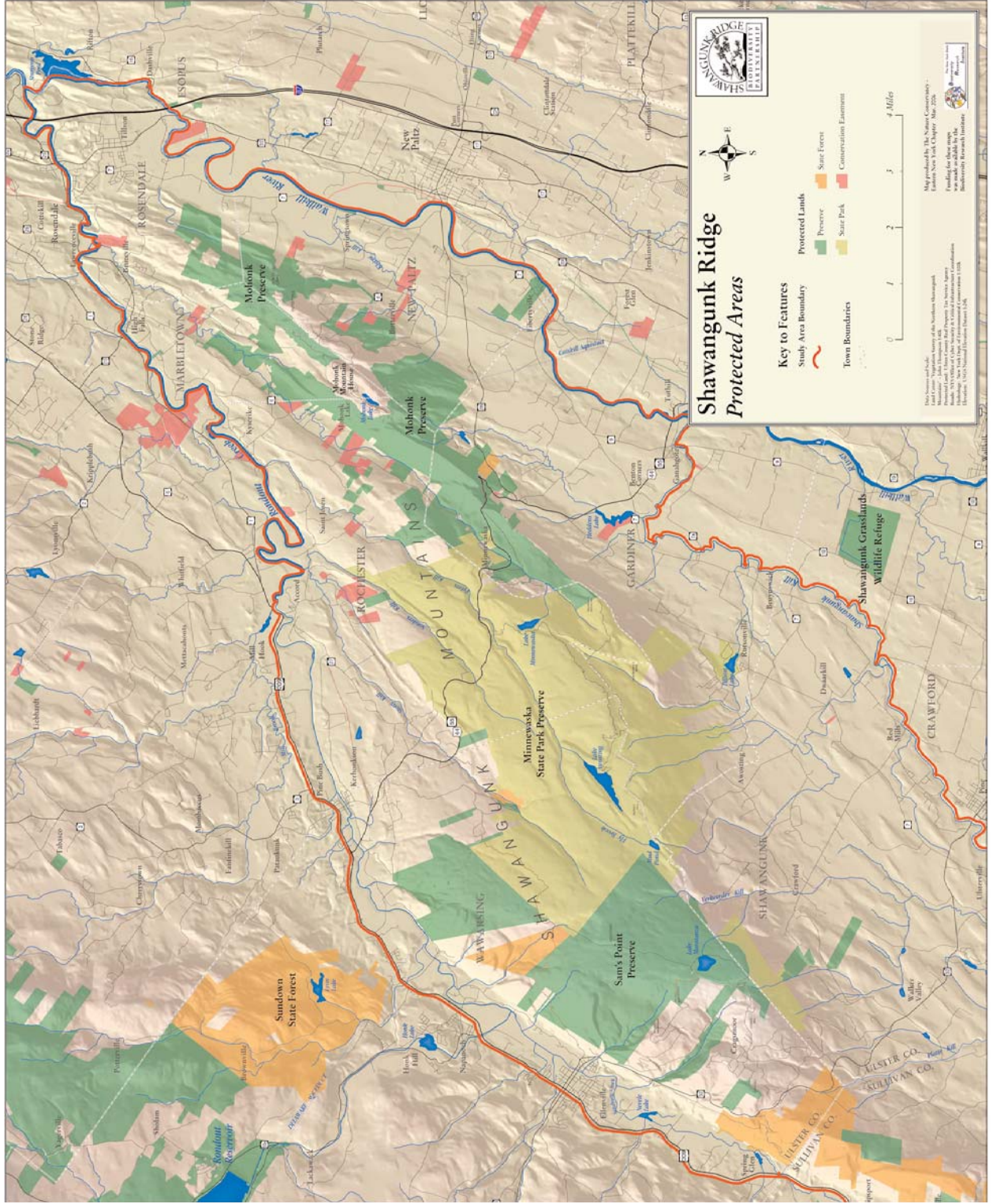
# Shawangunk Ridge

# Unfragmented Forests





Watersheds of the Shawangunk Ridge



*Green Assets:  
Planning for People and Nature Along the Shawangunk Ridge*

