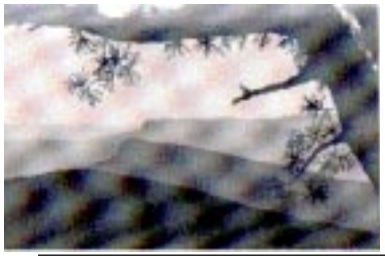


SHAWANGUNK WATCH

Summer 2011 Preserving Open Space in the Shawangunks Volume 16 # 1

Friends of the Shawangunks & The Shawangunk Conservancy

How to Track a Long-gone Glacier

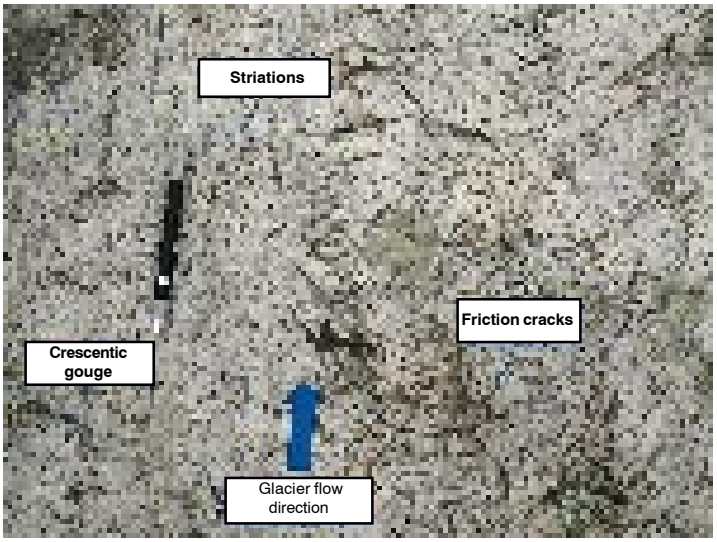
by Danny Davis

THE SHAWANGUNK RIDGE IS ONE OF THE BEST PLACES I have been on this planet to read the story left behind by passing glaciers. The ridge's white capstone rock—orthoquartzite conglomerate—is 99% quartz and is so resistant to erosion that the tracks of the last Pleistocene continental ice sheet that left this area over 15,000 years ago are evident all across the ridge. When I take people on geology walks at Sam's Point or around Minnewaska Lake everyone notices the glacial polish and scratched lines we call striations. These common features and other erosional clues are like the tracks of flowing ice. If we examine the glacially scoured rock closely we can tell which direction the ice was flowing and what it carried with it along the grinding, sliding base. Glaciers also leave droppings, not unlike animal scat. We can examine the detritus left behind by the big melt and see what and where the glacier ate along its way and where it may have stopped to rest for awhile in its retreat back to its arctic home.

Just like animal tracking is a combination of science and storytelling, tracking long-gone glaciers requires some scientific investigation, a curious mind, and an imagination to tell the glacier's story. How did the glacier leave these tracks and what are the tracks of the glacier telling us? What can we infer from the various glacier droppings ranging from the isolated large boulders at improbable locations (think Patterson's Pellet along the Palmaghatt Ravine) to the dense lodgment till formed from the plastered aggregated mess being dragged along the base of flowing ice thousands of feet thick? Were there smaller glaciers in the valleys after the ice sheet retreat? Spend enough time hiking all over the ridge with the need to know and some practical tips and you can track the ancient glaciers.

One of the stories I wanted to learn a few years ago is how the ice flow conditions changed as the climate shifted and the glacier went from advance to retreat. Was the ridge an obstacle that forced ice flow around it like a boulder in a stream, or did the ice just flow over the ridge with the forceful push from Canada? In the late 1990s I spent much of my free time gathering some of the scientific evidence needed to construct part of this glacier story. Fortunately I live on the ridge and could bike, hike, or run out to various places across the ridge to collect measurements of the key indicators of ice flow direction: striations and associated chatter marks. I could use the locations of these measurements (with over 3,000 actual measurements) extending from Sam's Point to eastern parts of the Mohonk Preserve to satisfy my curiosity on how the ridge's topography might influence the glacier's flow path. Along with looking at the various glacial "droppings" and the regional work of others I could easily engage my imagination to think through the information to come up with a plausible story.

ALSO IN THIS ISSUE



So, what are these striations and chatter marks? What is glacial polish, how is it formed? These features are the products of abrasive glacial erosion. Think of the thick flowing glacier dragging a base clogged in places with all the rock fragments that freeze to it. These rock fragments are most often from the native bedrock, and in the case of the Shawangunk ridge the scouring rocks are also 99% quartz and under unimaginable pressures from above and from the push of the flow. The result is like using a multi-grit sander on wood in one direction. You will see a range of scratches in the surface. There will also be a lot of wood dust that eventually clogs the sander. The process is similar when the scoured rock produces rock dust (clay and silt) that begins to bind up the bigger fragments or is flushed out in milky melt water flowing between the ground and the ice.

The striations are simply created by applying enough pressure to force an ice-bound rock to "scratch" the bedrock. Points on the ice-bound rock drag across the bedrock surface, fracturing, chipping and scouring out scratches. The sizes and lengths of the striations can give a rough idea of the fragment size (sand, gravel, boulder) and its shape (usually very angular). Eventually the scratching point on the rock fragment is diminished as it too erodes and the striation ends. The striations give us an orientation; for instance, a striation with an orientation of 220 degrees could be from ice flowing from the NE to the SW, or in the reverse direction. Usually, it's safe to make the assumption that the ice flowed from the north to the south, but to be sure you can use other clues for confirmation.

Chatter marks offer a quick means to determine the direction. The name "chatter mark" is taken from the effect of a skipping wood planer leaving divots or gouges across the smooth surface. There are two kinds of chatter marks that are prevalent on the ridge: friction cracks and crescentic gouges. Friction cracks are crescent shaped fractures in the rock with the concave side facing in the "downstream" direction of ice flow. They form when rocks press into the bed producing a tensile stress (pulling apart) that results in a curved fracture around the back end of the moving rock. Often we see long sequences of "nested" friction cracks that track the stick-slip passage of an individual rock.

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The Causes, Effects, and Management Options of the Dramatic Decline of Eastern Hemlock in the Northern Shawangunk Mountain Bioregion

by Shanan Smiley

THE POPULATION OF EASTERN HEMLOCK IS IN DANGER across much of the northeastern United States. Invasive insects in conjunction with climate change have caused a dramatic decline in vigor and a significant increase in mortality of the hemlock in the last decade in the Northern Shawangunks. Hemlock is an evergreen conifer with small needles and cones—a keystone species which provides year-round shade, and is a source of food or shelter for many mammals and birds. With the widespread loss of hemlock, forest floor light levels and temperatures will rise. Some management actions may need to be implemented to minimize deleterious effects on the ecosystem and to ensure human safety in recreation areas.

HEMLOCK WOOLLY ADELGID, AN EXOTIC INVASIVE INSECT similar to an aphid, is from southern Japan and first appeared on Eastern hemlocks in the Northern Shawangunks in 1991. By 2009, the entire mountain ridge (40,000 acres) was affected by the adelgids. There are no known native species that serve as predators of hemlock woolly adelgid (HWA). Extended periods of low winter temperatures below -22°F cause mortality of these insects. But with climate change and warming winters, the populations have increased. Adelgids weaken the trees allowing an infestation of another Japanese insect—the elongate hemlock scale (Fiorinia externa).

Photo by John Thompson

Adelgids insert their mouthparts at the base of a needle, then feed on tree fluid. Trees of any age or size can be fed on and therefore damaged by HWA. Elongate hemlock scale feed on the fluids of young needles. This causes discoloration and premature needle drop. Their feeding removes the chlorophyll from the needles, terminating the ability to produce energy for the tree. These insects are literally sucking life out of the trees.

Hemlock decline initiates microenvironmental changes such as increased amounts of light reaching the forest floor, resulting in higher soil temperatures. This in turn decreases soil moisture levels. This small change alone affects many species in the hemlock-northern hardwood forest. Drying soil negatively affects insects on the forest floor, and therefore the amphibians who prey on them.

As the vitality of the tree decreases, the canopy cover thins. This structural change is a factor for many breeding migratory bird species who rely on hemlock for cover and nesting. Such species include black-throated green warbler, blackburnian warbler, blue-headed vireo and winter wren. The black-throated green warbler is considered a hemlock obligate in some eastern forests, depending on hemlock for feeding and nesting sites. Similarly, the Acadian flycatcher nests solely in hemlock ravines in this area, the northern part of its range.

Hemlocks also serve as an important food source for wintering birds like American goldfinch, pine siskin, and black-capped chickadee, as well as small mammals like the red squirrel.

Other herbivorous mammals that prefer hemlock habitats, partially because of the amount of canopy cover, are deer mouse, southern red-backed vole and porcupine. Research has found the porcupine-hemlock habitat relationship to be a complex one. Porcupines often find suitable foraging sites and denning sites in both large-diameter cavity trees, large fallen hollow logs, and rocky talus slopes in hemlocks stands. White-tailed deer commonly winter in hemlock groves. Porcupines cut branches from the tops of the trees; the branches fall to the ground and are often consumed by deer. White-tailed deer and porcupine seem to have a symbiotic relationship with mature hemlock in the winter.

Yellow-bellied sapsuckers and pileated woodpeckers have affinities for hemlock tree trunks for the purpose of foraging and cavity nesting. Since hemlock is a long-lived tree that may live to 900 years or more, they develop a number of potential cavity sites and perhaps a higher level of cavity-dwelling and foraging use by an array of woodpeckers, smaller mammals, and forest carnivores.

With a canopy transitioning to be more open, the subcanopy and shrub layers will be affected. Amelanchier (shadbush) populations dramatically increase with canopy openings in hemlock forests, as will the invasive Japanese barberry, which in turn will impact predator access to prey. These include fisher, raccoon, and barred owl. Fisher use hemlock as spring- to early-summer den sites. They also select denning sites in areas supporting wintering deer populations, as reliable sources of food (e.g. deer carcasses, and the porcupines they hunt).

The impact of the HWA population is great enough to affect needle chemistry and mortality, when nitrogen fluxes eventually start to increase in throughfall (when needles fall to the forest floor through the canopy) of hemlock. The forest floor beneath the infested trees receives higher nutrient inputs than uninfested stands. Over the extended period of time during which hemlock trees decline from infestations, these inputs may help to alter biogeochemical cycles in ways that affect forest development. At the point when the impact of HWA affects the nitrogen amounts in needles, elongate hemlock scale can invade. Once scale becomes established, it reproduces prolifically. Hence the current drastic decline in hemlock.

Right now there is no published research on the competition of both HWA and scale on the same host. However, interspecific competition most certainly occurs. HWA feed at the base of the needle, while

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elongate hemlock scale feed generally on the underside of the needles. HWA is easily spread by wind, animal, and human vectors. As a result of climate change it has slowly been advancing north.

The only known predator of elongate hemlock scale that occurs in both the northeastern United States and Japan is Aspidiotiphagus citrinus. Although A. citrinus is effective at population control of scales in Japan, it is not effective in the U.S. because of climatic differences and since peak abundance of predator and prey species are not in synch. Although there are no known native predatory insects of HWA, there is an insect from the northwestern United States, Laricobius nigrinus, that has been found to occasionally feed on adelgids. Three thousand L. nigrinus have been released as a biological control since 2007 . L. nigrinus are colonizing, but it is too soon to know if this predator will be successful at stabilizing or controlling HWA populations. However, without predators or natural defenses against elongate hemlock scale, the population of hemlock will continue to decline. And so, the structure and the composition of much of the hemlock forest is changing.

Landscape effects include the widespread and selective elimination of hemlock, eventually creating a more uniform landscape dominated by black birch. Black birch has small seeds, intermediate shade tolerance, and germinates readily when light levels increase. Large quantities of birch seeds disperse by wind in autumn and winter, and only persist in the seed bank for a few years. Hemlock will be very slow to recolonize stands following removal of overstory hemlock by the insect infestation, especially because the HWA and scale infest and kill hemlocks in all size classes. Compounding this, hemlock seeds are short-lived in the seed bank, only surviving a single season.

Photo by John Thompson

Signs of hemlock distress from HWA and scale

Other changes on the forest floor include the abundance of moss. In uninfested hemlock forests, the forest floor is typically low in vascular plants mainly because of the amount of shade. The foliage of eastern hemlock is extremely dense, allowing little light to reach the forest floor. Mosses grow, however, with some success. Infested areas with more light and larger amounts of coarse woody debris on the forest floor, resulting from dead branches falling, create the perfect environment for moss. This occurrence is beneficial to many species in the forest because of moss retains water. More light reaching the forest floor, higher soil temperatures, decrease in soil moisture and an increase in coarse woody debris are a dangerous combination when considering the potential for a catastrophic forest fire.

This raises the opportunity for potential management strategies to be considered. In many areas in New England that have been infested, preemptive logging or salvage logging have taken place despite undesirable characteristics of the harvested wood. There are benefits from harvesting and removing damaged, dead, or dying trees that pose a direct hazard to people or property. Most importantly, it enables the manager to influence the future course of forest development.

Many aspects of preemptive or salvage logging of hemlock have been studied recently. According to studies by Kizlinski et al. (2002), net nitrification rates were 41 times higher in HWA-damaged sites, 72 times higher in recent harvests, and over 200 times higher in old harvests when compared with the near-zero rates in undamaged hemlock sites. This same study found that there are no significant differences in forest floor or mineral soil total carbon or total nitrogen levels among undamaged, damaged, or cut sites. Soil pH was significantly higher in both forest floor and mineral soil horizons at old harvests. Undamaged sites had 20% more forest floor mass than HWA-damaged sites and recent harvests, and twice the mass as old harvests. Nitrogen cycling is dramatically altered by hemlock harvesting, even many years after the initial disturbance.

One indirect consequence of natural disturbance and pest outbreaks that is often overlooked is that salvage or preemptive harvesting may affect a larger area or create a greater impact on forest ecosystems than the disturbance itself. From a functional perspective, substantial evidence indicates that northeastern forest ecosystems are extraordinarily resilient, and that natural disturbances are inherent and essential processes for ecosystem function.

In contrast, salvage and preemptive harvesting generate more rapid and extreme changes in microenvironment, forest cover, and soil litter and organic layer depth. Slow decline and the gradual development of a hardwood understory appear to result in the lowest loss of nitrogen. Preemptive cutting poses the greatest threat, and logging of declining sites poses the second greatest threat for nitrate leaching due to reduced vegetative uptake. Care must also be taken not to encourage invasive or equally undesirable early-successional species by creating large forest openings and exposing mineral soil.

Regarding the potential danger of a catastrophic forest fire, we can glean results from hurricane experiments which suggest that fine fuels, which are the main fire concern, are unevenly distributed and highly transient due to the rapid decay of fine material and the gradual mortality of the trees. The decomposition of fine fuels and the rapid growth of hardwood sprouts and understory plants quickly reduce the fire hazard.

There are, of course, other options to consider. Silvicultural options such as multi-stage shelterwood cuts, or less intensive single harvests, may lessen the ecological impact. Reducing site and soil disturbance, and encouraging understory vegetation to develop prior to overstory mortality or removal will decrease nitrogen leaching.

In many situations evidence suggests that the best management approach is to do nothing (Foster & Orwig, 2006). However, we can not ignore the potential risk and liability of a limb falling or a tree tipping out. After the thick coat of needles are lost from the boughs, the trees have a lower center of gravity, and are less susceptible to windthrow, which in healthy hemlocks is a result of their shallow root system. In

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most cases this threat seldom warrants more than local removal along roads, trails, and vistas and need not be a motivation for stand-wide harvesting.

In addition to evaluating the present threats to hemlocks, climatic parameters and possible future climate change should be considered when determining forest management strategies or goals. According to the weather records from the National Oceanic and Atmospheric Administration's Mohonk Lake cooperative weather station, from 1896 to the present day, the annual average temperature has risen 2.7 degrees. The most dramatic increases in temperature have occurred in the past decade. Total yearly precipitation has also increased an average of 16 centimeters. Hemlocks require cool, moist areas to grow. While the precipitation appears less likely to become a limiting factor, if the temperature continues to rise, the hemlock may eventually change its range to become a more northern species than it is today. According to the Union of Concerned Scientists:

> *These trees may be able to persist in areas where the climate is no longer suited to them. However, winter warming projected under the higher- emissions scenario would allow the hemlock woolly adelgid to extend its range throughout Maine and into Canada, potentially eliminating hemlock from forests in the northeastern United States* (Frumhoff, McCarthy, Melillo, Moser, & Wuebbles, 2007).

Along with keeping the future in mind, the past may reveal essential information. Lake sediment core samples show the abundance of species pollen over time, and therefore reveal prehistoric forest species dynamics. A rapid hemlock decline occurred across New England during the mid-Holocene (about 5,000 years before present). While previous research postulated the species-specific decline to be a result of a pathogenic outbreak or an insect pest, more recent research suggests the mid-Holocene climate change, rather than a biological agent, was the primary driver of hemlock decline, but does not exclude the possibility that pest or pathogens may have affected hemlocks in response to their stressed condition in the altered climate setting.

With careful deliberation of the above aspects of the dilemma of the impending decimation of the hemlock, and hemlock-northern hardwood forest ecological communities, I propose the following recommendations:

Biological Control: L. nigrinus have possibly been released on some lands in the Northern Shawangunks, but the use of biological controls is not allowed on the 9,200 acres of the Mohonk Preserve and Mohonk Mountain House lands for philosophical reasons. Information should be requested from the U.S. Forest Service as to release locations and species identification characteristics of L. nigrinus. This information should be shared with the Shawangunk Ridge Biodiversity Partnership so that presence and success of L. nigrinus can be surveyed and/or monitored ridge-wide.

I strongly discourage any future release of biological control, as I agree with the statement made by McClure (1986):

> *Scientists who study the population dynamics and control of introduced herbivorous insects would be prudent to keep in mind that even if natural enemies from the endemic community are successfully established in the exotic community, factors may impact quite differently on the population dynamics of the target pest species.*

In addition, the complicated dynamics of attempting to control two pest insect species on the same host is problematic.

Pesticide: First and foremost, because of the extensive area of hemlock northern-hardwood forest in the Northern Shawangunks, the use of pesticides is not a realistically feasible option. Second, the risk of other arthropods being impacted by the pesticide is not acceptable, and would be disastrous to our ridge-wide goal of habitat conservation and protection.

Logging: Preemptive or salvage cutting should not be conducted in the majority of areas because of the many negative associated impacts. In select areas of talus slope with trails or roads bisecting the affected hemlock forest, risk of damage or injury and liability is escalated. Selective cutting of trees more likely to fall from precarious positions amongst the boulders should be executed with great care—preferably in winter after the ground is frozen hard, and with a thick layer of snow on the ground so that minimal scarification of the soil will occur. Trees cut near roads could be sold and processed for pulp. Because of the undesirable traits of the wood, and great risk and effort to harvest large trees in talus boulder fields, most cut trees should be left to naturally decompose.

Fire: Certain habitats can benefit tremendously from the occasional presence of fire. Fire used under specific prescription of relative humidity and temperature can be successfully used as a land management tool. Intermittent elimination of coarse woody debris on the forest floor can prevent catastrophic forest fires during times of drought in the northeast.

However, the amount of precipitation throughout the year in the northeast is sufficient for fairly quick decomposition of debris on the forest floor. The occasional drought condition could potentially pose some acute risk of a forest fire, but the likelihood is small, especially compared to habitats in the western United States that have served as the nation-wide fire model. Also, because hemlock occur primarily in ravines, swamps, and talus slopes, risk of injury for fire crews is too high to consider this a viable option for management.

In closing, because there are infestations of two pest species with no proven effective predators and the compounding issue of climate change affecting natural forest succession, my recommendation is to remove hazard trees along paths and roads, but in all other areas let nature take its course.

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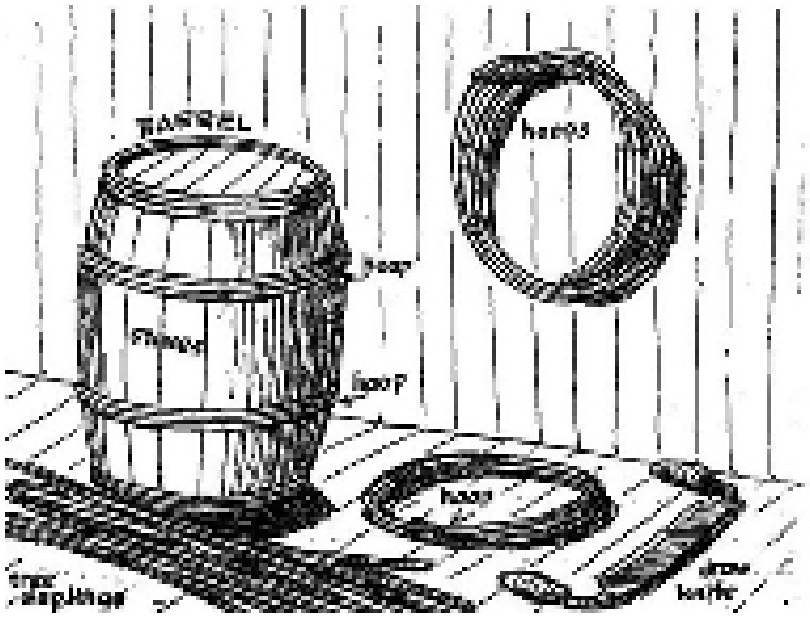
Shawangunk Forests: Cut to the Ground and Put Over a Barrel

by John Thompson

In the 18th Century, as the population in the Rondout Valley was growing, the Shawangunk Mountains were settled because the land held economic value in its trees and rocks. The Shawangunks provided raw materials for a growing country. Much has been written about the Shawangunk tanbark, millstone, huckleberry, and even the charcoal industry; but I would like to focus on a subject that gets a little less attention, but had a great impact on our forests, the hoop pole industry.

It's important to remember that prior to the 20th Century, many items were shipped and stored in barrels: from horseshoes and nails to sugar and gunpowder. Barrels had different names based on their volume and use, and some of these names have been long-forgotten, such as firkin and hogshead. Barrels were constructed of staves held together with wooden hoops, and the people that shaved and shaped those hoops helped shape the Shawangunks landscape as we know it.

As we walk through tracts of mature Shawangunk woods, it's difficult to imagine that this land has a long history of ecological disturbance, (but take a stroll through the Overlook Fire area and tell me what that makes you think about?). The oak forests surrounding the cliffs and ridgetops were periodically swept by fire over thousands of years, creating conditions that perpetuated the forest. Fires open up the forest canopy by girdling thin-barked trees and consume leaf litter to prepare seed beds. This creates light and favorable germination condition for oaks and other species adapted for fire. In addition, many woody plant species have dormant buds that will sprout from the root collar, the point where roots spread out from the base of the stem. If leaves and branches are removed, buds are stimulated to grow. Fire initiates regeneration from buds by killing surface plant parts that inhibit their growth. The buds that become shoots are usually those nearest to the part of the plant killed by the fire. Increased light will both stimulate dormant buds and encourage regeneration of some plants.



As Europeans came in to the Shawangunks in the 1700s, they first harvested lumber, fuelwood, and the bark of hemlocks and oaks for the tanning industry. The open, cutover land began growing back in hardwood saplings and sprouts. Settlers grew some vegetables and buckwheat and kept livestock. The land was not good for farming— soils were thin and poor. Therefore, residents of the Trapps and other mountain hamlets had to be resourceful in providing for their families.

Beginning in the 1830s hoop poles were cut and shaved to provide barrel hoops. The poles were cut in October and November, after other farm work was done for the season and employment was scarce. Saplings and stump sprouts from 12 to 30 feet long were cut and branches trimmed off. Stumps cut closer to the ground (the root collar) produced more sprouts. One American chestnut stump could sprout 25 to 30 shoots. Chestnut, red oak, red maple, birch hickory, white oak, black ash, and willow, from ¾- to 1½- inch diameter, were cut in lengths from 4½ to 8 feet. Often these poles were piled in "hoop pole lots" and later hauled out in wagons or on sleds over snow.

In the farmyard, poles were split into strips, furnishing two to five hoops per pole. On a bench called a "horse," the pole is laid flat, and clamped under a "head" and worked by a treadle (see photo). The head holds the pole, which is shaved by a drawknife and shoved further along under the head until it is cut through.

The shaved hoops were then sorted and bound into bunches of 100. Hoops were often not sold right away, but stored in sheds waiting for more favorable prices. This storage at times proved unfortunate. In May of 1882, the *Gardiner Weekly* reported that Lewis E. Wynkoop's hoop shop was burned to the ground, resulting in the loss of eight thousand hoops and a number of poles, worth about $50.

Both ends of the strip were notched to fit into each other and hold a circular shape. For barrel assembly, the hoop was pushed down around the barrel and nailed to the staves to hold the staves in place.

The price fetched by hoops depended on the wood and its use. Hickory made the best hoops which were used for the finest cooperage of apple, vinegar, and beef barrels and kegs. Oak hoops were used to strap packing boxes. Mountain ash was used for butter tubs, firkins, flour and sugar barrels. Seconds, or "shorts" were used for hooping the cement and lime barrels in Rosendale and Kingston. Smoothly shaved chestnut was used to bind gunpowder kegs.

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Save the Lakes: The Williams Lake Project

Comments on the Draft Environmental Impact Statement (DEIS) of Hudson River Valley Resorts (HRVR) concerning the planned development of Williams Lake were heard on June 6th. Save the Lakes (STL) felt it was the time for all good people to come to the aid of their community. The public hearing was the place and chance to be heard and to hear from neighbors. The Department of Environmental Conservation (DEC) was looking for comments on the project's environmental effects (including effects on the people of Rosendale and Ulster County), as well as the degree to which the DEIS addressed issues raised in the scoping document. About 125 people showed up to voice concerns and for support.

Save The Lakes feels the following points should be considered:

1. Taxes. The applicant projects significant tax revenues for the town, Rondout School District, Ulster County, and New York State, ignoring the likelihood of a significant additional financial and social burden due, for example, to:

◆An influx of construction workers and part-time resort employees who will require additional community services, from schools to public income supplements.

◆The stress on local roadways from construction vehicles.

◆ A PILOT (payment in lieu of taxes) or similar tax-abatement program, which the applicant "will not rule out" and which would greatly reduce their initial taxes.

2. Water. In response to a report from an independent hydro-geologist hired by the town, stating that the applicant's geological analysis was "worthless," the applicant resubmitted the same data and conclusions. If the water issues are not correctly assessed, grave consequences could follow. For example, the "mining" of Williams Lake jeopardizes the long-term sustainability of the project. Another problem is the release of 86,000 gallons per day of treated wastewater along Binnewater Road and into the Rondout Creek.

3. Recreation: The applicant offers vague promises to "collaborate with" other organizations to retain access to a "potential" Wallkill Valley rail trail connector (or a convoluted variant of it). The list of amenities available to day-pass purchasers changes constantly, and the proposed entrance fees are not specified. This makes it difficult to gauge the local recreational value of the project. Swimming in Williams Lake is not among the opportunities available to the public, in spite of the applicant's claim that they will "expand opportunities for public access to the property."

4. Traffic: The applicant states that 10 years of construction, followed by 450 rush-hour vehicular trips per weekday will have no significant impact on local roads. How can that be? Simple: the DEIS specifically excludes roads maintained by Ulster County and New York State — maintenance that gets its funding from....you. This kind of sleight-of-hand permeates the DEIS.

5. Jobs: At full build-out (10 or more years from start of construction), the project would employ 300 "Full Time Equivalents" at an average wage of $30,600. But the people employed in many of those jobs would work only part-time, at a proportionally lower salary and reduced, if any, benefits. As a result, many of the jobs would fall below the definition of a 'living wage.'

6. Alternatives: The applicant is required to discuss how the project compares with four possible alternatives, including one "that evaluates the potential designation and use of the site as permanent and publicly-accessible open space or parkland." The discussion in the DEIS, however, is limited to restating the conclusion of meetings held over four years ago which "considered the goal worthwhile, but concluded that financial and management constraints made such a plan infeasible." And besides, HRVR's "business model does not contemplate" such an alternative, an explanation applied to the other alternatives as well.

7. The Gated Community. The applicant continues to distance itself from the term "gated," in a calculated attempt to difuse public opposition to such a development. The DEIS, while not using the term, describes a "gated" community in detail: private roads and maintenance, homeowner's associations, private security, access limited to residents and guests. To be sure, a "gated" community can decide to stage a bicycle race every now and then. Such events do not mean that a community is not gated—they simply mean that permission to enter the grounds is granted for that event. Regular permitted access depends on written agreements since verbal assurances are inadequate. The "gated" nature of the project should be out in the open, but the applicant steadfastly ignores it.

The DEIS consisted of a 42-page executive summary that described the project in glowing terms, followed by 608 pages of more revealing detail, followed in turn by *thousands* of pages of appendices. As usual, the devil was in the details. You can also download the three zipped files from the HRVR website.

In general we found it very upsetting that the DEC released this DEIS for public review. There were so many inaccuracies and omissions—it surely wasn't complete

Speakers favoring a way to have much-needed, but "projected," 300 full-time jobs, were offset by opponents who contended the draft environmental impact statement was missing critical information.

Warren Reiss, attorney for STL said that "despite the rosy fiscal predictions, there are questions about the actual fiscal returns especially if a PILOT is pursued." He felt that the DEIS was missing "key documents" that do not allow a full or accurate review of the project.

The Rochester town Supervisor Carl Chipman felt that opponents of the project were using state regulations to slow the process down at a time when the region needs jobs and economic development.

Save the Lakes was very disappointed that the developer failed to provide state-required information during the DEIS hearing.

There is going to be more to come on this critical development that is so close to the northern terminus of the Shawangunks. Save The Lakes was established in the fall of 2007. Its goal is to protect the natural resources of all the land included in the Williams Lake property and preserve it in perpetuity for the region; to insure that the future of Rosendale is planned in concert with community needs and values; and to research information and provide data to the public and to the decision-makers.

For up-to-date information go to their website at:
www.SavetheLakes.us

Peregrine Falcons Establish Three Eyries in the Gunks

by Joe Bridges

Following a successful 2010 peregrine falcon breeding season at the Trapps (two fledglings) and Millbrook Mountain (three fledglings), hopes were high for another successful year as Mohonk Preserve volunteers began the 2011 peregrine breeding season vigil, in mid-February with air temperatures in the 20s! By late February and early March, volunteer peregrine observers were able to determine that a pair of falcons had established an eyrie at the Trapps and another pair, an eyrie at Millbrook.

The Trapps eyrie was located under a prominent overhang near the top of the cliff about 150 feet north of last year's eyrie. The Millbrook eyrie was the same one used by peregrines in 1999 and 2009, — the only eyrie to be used three times since the return of peregrine falcons to the Gunks in 1998, after an absence from the Gunks of nearly a half century.

In March, after conferring with Mohonk Preserve rangers, a line-of-sight closure of climbing routes to the left and right of the Trapps eyrie was posted on the Preserve's website in order to avoid disturbing the peregrines and to increase the chance for successful breeding and fledging of young. A similar notice advising climbers to avoid climbing near the Millbrook eyrie was also posted on the Preserve's website.

By early April, the Trapps female peregrine was on eggs and the Millbrook pair was observed copulating. A few weeks later, the "disappearance" of the female at the Millbrook eyrie and the hunting activities and aggressive attacks on vultures by the male falcon indicated that she too was on eggs.

In mid-April, staff of the Preserve's DSRC alerted volunteers that they had recently seen and heard peregrines at the Bonticou-East crag. Shortly thereafter, volunteers observed a pair of peregrines in the process of selecting an eyrie! A few weeks later, the "absence" of the female and the behavior of the male indicated that the pair had selected an eyrie in the same general location as the failed 2007 eyrie and that the female was likely on eggs—rather late in the breeding season for peregrines in our area.

In early May, both male and female peregrines at the Trapps eyrie were seen hunting and making a nest exchange, so it was suspected that chicks had hatched. On the morning of May 19th at the Trapps, volunteers saw two peregrine chicks walk sprightly to the front of the ledge where an adult female began to feed them! At the end of May, four chicks ready to leave the eyrie were seen and a week later four fledged falcons were pursuing their parents above the Trapps begging to be fed. With fledging complete and the falcons now accomplished flyers, a climb to the eyrie to collect data and take photographs was conducted on June 10th, and the climbing closure at the Trapps was lifted on the following day.

Unfortunately, by the end of May at Bonticou-East and Millbrook, it became evident from the lack of peregrine sightings that these eyries had failed.

The reasons why peregrines abandon suitable breeding sites and eyries fail are not always clear. With continued observation and study, some answers may be forthcoming. For the meantime, the volunteers plan to continue monitoring the breeding behavior of this fascinating aerialist.

Mohonk Preserve Peregrine Falcon Volunteer Observers were Eric Abrahamson, Anka Angrist, Allan Bowdery, Joe Bridges, Paul Comstock, Bea Conover, Richard Goldstone, Mary McEwan, Annie O'Neill, Eric Perlman, Glenn Proudfoot, Doug Robinson, Tom Sarro and Betsy Tully.

A young peregrine in the Trapps just after being banded.

photo by Joe Bridges

photo Annie O'Neill

REMEMBRANCE OF FROST PAST! WHAT A FEBRUARY?

February, 2011 Weather from records of the Mohonk Lake Cooperative Weather Station

The Daniel Smiley Cooperative Weather station was established in January, 1896, and has 115 years of statistics for the Northern Shawangunks. Looking back, February was a cruel and beautiful month.

Snow on Ground: There was 20" on the 1st that increased to 22" on the 2nd, decreased to 20" on the 6th, increased to 22" on the 8th, decreased to 14" on the 19th, increased to 16" on the 21st, increased to 18 in. on the 27th, decreased to 16 in. on the 28th.

Precipitation pH: 4.62 (n=8)

The Research Center's summary reported that temperature for the month was 2.0°F above the 115 year average of 26 F. Precipitation for the month was 5.07 in., 54% above normal. There were nine days of measureable precipitation recorded (73 year average is 9.4 days). Snowfall for the month was 16.4 in., 11% above normal.

Paul C. Huth, Director of Research Emeritus/Associate Curator and John E. Thompson, Director of Conservation Science

The other chatter mark we use as an indicator for flow direction is called a crescentic gouge. While their formation is more of a complicated mystery than the friction crack, we typically find these crude crescent-shaped gouges in the rock with the convex side facing the downstream direction of flow, but with a lot more variability in orientation.

One of the unique abrasive features on the ridge is the spectacular glacial polish. There are places where the polish is so smooth the surface is as slick as ice. Glacial polish forms in two basic ways: mechanical abrasion and chemical precipitation from the film of melt water that forms along the base of the glacier. If you examine a polished surface closely with a hand lens or, in some cases with a pencil rubbing on tracing paper, you will most often find micro-striations in the surface. The polished surface is an area where the primary material dragged beneath the ice was concentrated silts and clays abraded from the rock. The quartz on quartz abrasion at this scale produces as smooth a finish as nature gets.

Walking upstream along the Stonykill is another location to find glacial striations and polish

Glaciers, of course do more than scour the earth's surface; they are also very effective at quarrying rock. Most spectacularly, the sky lakes were glacially quarried along pre-existing bedrock fracture orientations. For example, Mohonk Lake pools in a breached upward fold (anticline) in the rock, where the rock was relatively very fractured, and so easily quarried out. Awosting was quarried along a fault zone that made the rock less resistant to erosion. Large areas of angular boulders that are "downstream" of some of the lakes are most likely the quarried rock. Quarrying happens on smaller scales too, with the removal of big blocks to small fragments of rock helping create the Shawangunk step/cliff topography present at so many scales.

All this quarried and abraded fragmented rock was entrained into the base of the ice sheet, carried forward some distance and left in place after the ice stopped flowing, or was subsequently resorted by silty melt-water streams. In the lower reaches of the Stony Clove and Coxing Kill valleys we find thick silty clay deposits that were once the bottoms of glacial lakes impounded by retreating ice in the Rondout Valley and the long valley-spanning mounds of debris marking the place where the ice sheet rested for awhile. The depositional part of the glacial story is quite complicated and adds too much plot development for this article. For instance, the sandy stream deposits with complex layering and lenses of clay bisected by normal faults at certain locations along Lyons Road tell of a time when small ice-marginal streams functioned as the plumbing system for the decaying ice sheet.

One important depositional character in our glacier story that needs to be mentioned is the glacial "erratic." This character gives us key circumstantial evidence that lets us know the glacier that crossed this ridge was the advancing ice sheet and not some smaller glacier that started and ended on the ridge. An "erratic" is a rock that originated from a different geologic provenance from the one in which it is found. When you find a small cobble of Adirondack gneiss (a metamorphic rock) embedded with garnet crystals in a Shawangunk streambed, or, you sit on a Catskill Mountain blue sandstone boulder set upon the slabs of the white Shawangunk badlands, you have encountered an erratic—an emissary from a different geologic terrain that the glacier must have crossed over on its way south.

The best way to experience this story is to get out and read it in the landscape. Bring a compass and take some bearings on striations around Minnewaska Lake. You'll probably find two prevailing flow directions. See if you can tell which direction was first. Think about what it took to get the glaring polish and spectacular striations and chatter marks at the Peters Kill Area overlook along the High Peters Kill trail. Why is Minnewaska Lake shaped like it is? What created the smooth rounded ledges along the Gertrude's Nose trail? Take a walk and ask some questions and seek answers.

Here's a short story of the Shawangunk ridge going back a few years. It is a historical fiction that we can start at any point in previous time, depending on how complicated we want the plot to be and how much fact we can use to give our fiction some heft. We can be a bit sloppy with our precision of time if we go back far enough. Let's start about 25,000 years before the present. This was a time of an advancing ice sheet the size of a continent reshaping the earth's surface. The Shawangunk ridge was buried under flowing ice so thick that the ridge was just a big bump that the ice barely acknowledged in its gravity-driven push from the Canadian arctic down to Long Island and northern New Jersey. The view at least 2,000 feet above Castle Point on the surface of the glacier would have been of a blinding expanse of wind-blown white, broken only in the north by a few of the highest peaks of the Catskills just barely sticking up like isolated boulders in a rising stream. Elsewhere, the view is a plain of snow-covered ice moving almost due south.

The ice reached its zenith stage at Long Island only about 1,000 – 3,000 years later. There's a good possibility of some Shawangunk conglomerate rocks included as erratics in the earth debris that forms much of Long Island. The climate changed, as it always does, and over several thousand more years the southern front of the ice sheet becomes a wasted mess of decaying ice, with straggling pioneering vegetation and animals reclaiming the barren land.

Later on, say 17,000 years ago, the ridge is still covered by flowing ice that is noticeably thinner as the global climate has warmed over the centuries and the massive continental ice sheet is in "retreat." Ice does not flow backward but the zone of active flow retreats northward, leaving vast blocks of decaying ice in the south to release all this stored water into the emergent Hudson river estuary. To the north, ice still flows over most of the Catskills, though the peaks (called nunutaks) are more prominent with black lines of rocky debris snaking out from the exposed flanks, revealing the glacier's flow paths through the mountains. The ridge is still covered in flowing ice but those days are numbered as the ridge prominence above the Rondout and Wallkill valleys becomes an obstacle to the decreasing ice flow and the glacier is diverted to flow southwest and then almost due west along the Rondout Valley corridor.

In the next couple of thousand years the change for the Shawangunk ridge becomes more pronounced and precipitous as the ice retreated from the ridge. The view from the scoured crest at the Trapps would reveal the region at the height of glacial decay as climate change accelerated. To the south, the Hudson River valley is free of ice and a land of forest and peat bogs is home to Mammoths

continued from previous page

and humans who have returned to the emergent landscape. To the northeast the mass of ice has retreated to the Hudson corridor, though lobes of ice extend into the Rondout and Esopus valleys. The melt water draining these fractured and waning sheets of ice fills the valleys with rivers and lakes clouded by silt and clay. The Catskills are free of continental ice and filled with braided streams draining into muddy lakes hundreds of feet deep. The scoured Shawangunk ridge rises as a rocky "island" above the muddy lakes, melting ice, and reforested land.

By 10,000 years ago the flowing ice retreated so far north that it is maybe a faint glimmer on the horizon north of Albany. The Ice Age is practically over here. The ridge is quite probably re-colonized with a range of wild, centuries-old forests, but soil still has a hard time forming in the tough slopes and hardness of the bare rock. Many thousands of years later and here I am on a walk out to the crest of Dickie Barre from my house on the ridge in Accord, and this 25,000 year-long story is so well told in the land I cross.

Danny Davis is a geologist currently specializing in Catskill stream geology for the New York City Department of Environmental Conservation. He is fortunate enough to live and have raised a family on the ridge and work in the mountains to the north.

The Shawangunk ridge offers so many spectacular locations for viewing the outcome of millions of years of geologic activity. Take a hike on the Preserve, at Minnewaska or on the Sam's Point Preserve and examine the conglomerate, look for glacial impact, and enjoy your summer on the ridge!

Barrel Hoops - continued from Page 5

Tree saplings were "farmed" as any agricultural crop might be. Repeated cutting favored trees that could resprout and farmers were selecting for the stumps that could produce the most sprouts. After cutting, stumps would resprout and grow to be harvested every three to four years. Hoop dealers were constantly looking for more land in early regrowth. In 1882, Case Elmendorf contracted with the Mohonk Mountain House to harvest hoops below Pine Hill, in an area burned over by a wildfire in 1864, agreeing to share one-half of the profits with Daniel Smiley.

It was stated in 1887 that the hoop pole industry was more profitable than grain in Ulster County. Local dealers would buy and sell hoop poles numbering in the millions every year. The nearby cement industry required 2,250,000 barrels, each barrel needing twelve hoops. The Shawangunk Mountains were said to produce over 30 million hoops per year in the 1880s. In 1908, the largest barrel hoop producer in the country was Theodore Wiklow in Ellenville, making an astounding 75 million hoops every year.

The demand for barrel hoop poles faded in the early 20th Century as iron bands replaced wooden hoops. This declining demand for hoops and other wood products eventually led to forests maturing in to the woods that we now have. Today there is a particular area of the Mohonk Preserve known as the Hoop Pole Lot. After the practice of hoop pole cutting was abandoned, the stump sprouts grew into trees and are mature multiple-stemmed trees along Overcliff Road.

The recovery of these forests from the 19th to the 21st Century is a testament to the resilience of these natural communities, but our oak forests are much different in species composition and structure than the forests at the time of European settlement. Decades of fire suppression and deer overbrowsing have led to the formation of a closed canopy forest where oaks are rarely able to germinate. Though mature red and chestnut oaks are still abundant in much of the forest canopy, the subcanopy is often dominated by red maple, which was able to reproduce under the shade of the oaks. Oak forests are gradually shifting to maples and we are in danger of losing much of the wildlife that depends on oak forest. To sustain oak forests and the biowealth that the Shawangunks support, land managers throughout the region need to improve forest habitat through thinning the canopy, prescribed burning, and reducing deer browsing impacts. It is important now more than ever that we improve the health and resiliency of our region's forest habitats, as we are faced with global changes happening at an accelerated rate.

John Thompson is the Mohonk Preserve's new director of conservation science at the Daniel Smiley Research Center of the Mohonk Preserve *(see article on page ten)*

Minnewaska – Shawangunk Campground Development

A PIPC agenda item in April included the campground project that "will develop a section of the Minnewaska Park Preserve along Route 299. There will be approximately 60 campsites, including a manager's quarters/office, a pavilion/bathhouse and comfort station developed for this site. Plans are being designed and developed for regulatory review and construction. It is anticipated we will be submitting plans to the regulatory agencies. We anticipate submitting plans to DOH for sewer and/or construction approval later this month. DEC and DOT submittals will probably be in July. Once regulatory approval is received as well as full project funding, the bidding process will commence. The construction cost estimate is $1,500,000 of which Parks currently has $700,000 allocated to this project."

photo Annie O'Neill

John lost in the Millbrook river of talus studying a peregrine eyrie

Mohonk Preserve Announces New Director of Conservation Science

In March, The Mohonk Preserve named John E. Thompson to the new position of Director of Conservation Science. John has over 20 years of experience in research field studies, ecological research and analysis, geographic information systems, specimen collection, database management, partnership outreach and project management. For the past 14 years, he has served as Natural Resources Specialist at Mohonk Preserve, where he was co-leader in the development of the organization's cutting-edge land management plan. Thompson also spearheaded the "Sharing the Cliff" campaign to educate the recreationists and the public about sharing the ridge with peregrine falcons, and helped develop the Loewy-Mohonk Preserve Liaison Fellowship, which annually brings independent, professional-level researchers on site to conduct ecological monitoring projects.

In his new position, Thompson will lead the team based at the Preserve's Daniel Smiley Research Center, which includes longtime Director of Research, Paul Huth, who has assumed the part-time position of Director of Research Emeritus/Associate Curator.

"I am truly humbled by the fact that only two men have previously led Mohonk Preserve's research department—Daniel Smiley and Paul Huth," Thompson said. "I look forward to continuing to work with Paul and the entire Mohonk Preserve team to promote the research legacy that we have built here, and to apply that information to better steward the Shawangunks into the future."

"We are delighted that John will now lead and support our skilled and dedicated research, curatorial, and natural resources management team" said Mohonk Preserve Executive Director Glenn Hoagland. "Under John's leadership, we look forward to working together to evolve the legacy and continuum of observational natural and cultural history, interpretation, and applied ecosystem management that has helped the Preserve use science to effectively guide land management and conservation of a very special landscape."

A native of New Hampshire, Thompson lives in Accord, N.Y. He has a Bachelor of Science degree in Environmental Conservation from the University of New Hampshire, and a Master of Science degree in Geology from the University of Pennsylvania. He has written numerous magazine and journal articles for publications including *Natural History* and the *International Journal of Climatology*, and has made many regional presentations about the Mohonk Preserve's diverse research and land management programs. Thompson is a member of several science and environmental organizations, and serves as vice president to the board of trustees of the John Burroughs Natural History Society and secretary to the board of the Hudson River Environmental Society.

Open Space Institute Acquires three miles of rail trail along the historic O&W Railroad bed in Mamakating

An acquisition that will further the 140-mile network of recreational rail trails running through the Hudson River Valley and Catskills was announced by OSI to celebrate National Trails Day in early June. The three miles of rail trail follow the old O&W rail bed in the Sullivan County town of Mamakating.

The trail was acquired by OSI's land acquisition affiliate, the Open Space Conservancy, and runs north from Sullivan Street in the village of Wurtsboro to Route 209 and the D&H Canal Linear Park. The acquisition allows for the development of a nearly eight-mile-long loop for hikers, walkers, bikers and other recreational users. From one end, the trail will head north from the village of Wurtsboro along the historic O&W rail bed before doubling back to the south along the historic D&H Canal Linear Park and canal path.

The newly acquired three-mile stretch of trail links downtown Wurtsboro with the Wurtsboro Ridge, Roosa Gap and Shawangunk Ridge state forests.

"OSI's acquisition sets the stage for a recreational corridor that connects the village and the state forests, with beautiful wetlands along the way," said Ed Goodell, the executive director of the New York-New Jersey Trail Conference. "We believe this will become a very popular destination for local residents and tourists alike."

OSI envisions that today's acquisition will one day help complete a 140-mile-long interconnected rail trail network that would run from southern Dutchess County, through Ulster, Sullivan and Orange counties on to the southern and western Catskills.

OSI envisions that today's acquisition will one day help complete a 140-mile-long interconnected rail trail network that would run from southern Dutchess County, through Ulster, Sullivan and Orange counties on to the southern and western Catskills.

Several pieces of the proposed network have already been acquired by OSI. In 2009, OSI and the Wallkill Valley Land Trust acquired 11.5 miles of railroad bed in the towns of Rosendale and Ulster, in Ulster County. Once this trail is open to the public, it will extend from the town of Shawangunk to the city of Kingston, expanding the Wallkill Valley Rail Trail to nearly 24 miles.

In 2001, OSI acquired nearly 2 miles of rail trail on the west side of the Shawangunk Ridge in the town of Wawarsing. OSI is currently in negotiations to purchase an additional 2.1 miles of rail bed in Wawarsing, which would be added to the regional network.

Other portions of the trail network are already publicly owned and maintained, including the Dutchess Rail Trail, Walkway Over the Hudson, the Hurley Marbletown Rail Trail and the Accord Rail Trail. As a unified system, however, the trails would link some of the most well-known, picturesque and historic landscapes in the state.

"The Hudson River Valley and the Catskills are blessed with some of the most beautiful rail trails in the state of New York," said Kim Elliman, OSI's president and CEO. "These trails run through our most bucolic landscapes, connecting towns, villages, parks and rivers. OSI will continue to acquire key stretches of privately held rail beds to assemble and open up an extensive network of trails for the public to enjoy. Recreational rail trails offer a boost to local economies and communities while preserving local land use and heritage. As we have seen elsewhere, everyone wins from access to rail trails."

From an OSI press release

Southern Shawangunks' Huckleberry Ridge Forest Expanded

by Georgette Weir

On Friday, June 3, 2011, representatives of the New York-New Jersey Trail Conference and the Dept. of Environmental Conservation (DEC) met at the trailhead for the Minisink Trail on Route 6 in Greenville to mark expansion of recreational trail opportunities in the region, and transfer to the state 389 acres on the Shawangunk Ridge. The land is to be added to Huckleberry Ridge State Forest in Orange County.

The Trail Conference purchased the land in 2006 as part of its project to expand recreational trail opportunities in the region. The land, in the towns of Greenville and Deerpark, was purchased with money from the state's Environmental Protection Fund and the New York State Conservation Partnership Program in collaboration with the Land Trust Alliance and the state Department of Environmental Conservation.

"By protecting the steep forests that comprise that wildlife and recreational corridor, the Department of Environmental Conservation is demonstrating once again that it is possible to simultaneously promote local economic development, provide healthy recreation, and protect the environment," said Edward Goodell, Trail Conference executive director.

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Just a decade ago, no state forest land existed on the Shawangunk Ridge in Orange County. With this transfer, Huckleberry Ridge State Forest now comprises nearly 1,500 acres.

The Trail Conference was instrumental in creating this state forest, working closely with the Trust for Public Land and DEC on the first 527-acre acquisition nearly a decade ago. The Trail Conference subsequently purchased an additional 980 acres in this region using funds from its Land Acquisition and Stewardship Fund (LASF). With this transfer, 958 of those acres will have been transferred to New York State, nearly tripling the size of the Huckleberry Ridge State Forest.

Protecting this land is key to the Trail Conference's goal of protecting the 43-mile long Shawangunk Ridge Trail, built in 1992-93 to connect the Appalachian Trail in High Point State Park in New Jersey and Sam's Point Preserve in Cragsmoor, NY. The Trail Conference also aims to expand the network of recreational trails in the region. In 2007, Trail Conference volunteers opened two new hiking trails in Huckleberry Ridge State Forest, the Minisink and Lenape Ridge Trails.

These two linked trails offer the opportunity for a 5-mile loop hike with many great view points. With direct connection to the Metro-North train station in the City of Port Jervis, the trails also offer metro area hikers a unique hiking destination. The Lenape Ridge Trail leads into Port Jervis and connects with the Delaware River Heritage Trail. Following this trail will lead you to the Port Jervis Metro-North train station located near the corner of Pike and Front Streets. In the future, the Trail Conference hopes to connect the Lenape Ridge Trail to the Shawangunk Ridge Trail.

The Trail Conference created its Land Acquisition and Stewardship Fund to permanently protect the four long-distance trails that its volunteers maintain: Shawangunk Ridge Trail, Long Path, Highlands Trail, and Appalachian Trail. The fund is completely financed through donations by many generous donors. In less than 10 years, the fund has been used to protect many miles of trails, 2,439 acres through direct acquisition, and 2,205 acres through research, purchase options, and mapping assistance.

The Open Space Institute, The Nature Conservancy, and the Orange County Land Trust have also been instrumental in preserving thousands of acres on and near the southern Shawangunk Ridge along with protecting the Shawangunk Ridge Trail.

The Shawangunk Ridge is the northern portion of a 240-mile ridge that stretches from southern Pennsylvania, where it is known as Blue Mountain, through New Jersey, where it is called the Kittatinny Mountains, to its northernmost point at the south side of the Roundout River in Rosendale, NY. The Shawangunk Ridge serves as a corridor between the two largest conservation areas in the region—the Catskill Forest Preserve and the Delaware Water Gap National Recreation Area.

New York State Department of Environmental Conservation Commissioner Joe Martens stated "the Shawangunk Ridge is listed as a priority project in New York State's Open Space Conservation Plan in recognition of its unique and outstanding array of natural resources, abundant recreational opportunities and scenic significance. The ridge's 50-mile span is a major east coast flyway for migratory birds, and its forests are habitat for bobcats, black bears, timber rattlesnakes and more than 200 species of nesting birds. We are indebted to the Trail Conference for all their help in protecting and preserving this and other critical parcels on the Shawangunk Ridge."

Directions to Minisink Trail: *From I-84 south/west, take Exit 2 to Mountain Road. Turn left on Mountain Road, cross underneath I-84, and turn right onto Rt. 6 (deli at the corner). Follow Rt. 6 for approximately 2 miles, passing over the ridge. The Minisink Trail is on the right, at the Greenville/Deerpark town line. There is a pull-out on the left, and enough room on the right to park off the road.*

From Port Jervis, take Rt. 6 north/east. The trailhead is about 1.5 miles up the mountain, on the left side, at the Deerpark/Greenville town line, across from a pull-out on the right.

Georgette Weir is the communications manager for the NY-NJ Trail Conference and a new member of the Friends of the Shawangunks board.

Friends Goes Online

www.Shawangunks.org

Check out Friends of the Shawangunks website at **www.Shawangunks.org**

It has back issues of our newsletter *Shawangunk Watch,* links to dozens of Shawangunk sites, updates on ridge projects and threats, and more than 80 photos showing natural features of the ridge. The site also provides an easy way to join Friends, contact us, or send a donation using a credit card.

Give a Friends Tee Shirt

Tee shirts are $15, and that includes shipping.

Our shirt is 100% cotton, and features a portion of the NY/NJ Trail map so you can never be lost if you hike in that area! Go to our website: shawangunks.org for an order form.

Please Consider a Contribution

There is still work to be done protecting Open Space and it is critical to be able to do it now!

Thank You For your Support

YES, I want to support your work

q YES, I would like to join

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Please make checks payable to *Friends of the Shawangunks* or *The Shawangunk Conservancy*. Contributions are tax-deductible.

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q This is a change of address

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Matching Grants: If the organization for which you work has a matching grant program, just send us the forms and we will do the rest. IBM matching checks must be made out to The Shawangunk Conservancy.

Mail contributions to: *Friends of the Shawangunks*, P.O. Box 270, Accord, NY 12404

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Preserving Open Space Since 1963

Friends of the Shawangunks, Inc. is a not-for-profit organization working to preserve open space in the Shawangunks.

The Shawangunk Conservancy, Inc. is a not-for-profit land conservancy.

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