Mohonk Preserve, Inc.

Research Report

February 1987

Botanical Significance of the Shawangunk Mountains and the Mohonk Preserve

by

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My friend Stan Smith, when Curator of Botany-New York State Museum, told me some years ago during a visit, that our area of New York State - Ulster County southward to the Pennsylvania and New Jersey border and eastward to Connecticut - was very significant botanically because of the pivotal position between the northern boreal and southern Carolinian plant associations. The boreal plant association, dominated by Hemlock, Spruce, White Pine, Sugar Maple, Beech, and Birch, is well represented in the Shawangunks on north slopes, in cold ravines, and on some higher elevations. The southern plant association is characterized by Oaks, Hickories, Pitch Pine, and Tupelo. This association is widespread in the Shawangunks, and in both adjacent valleys. Two species of note in the Shawangunks related to this southern flora, and which are near the northern edge of their range, are the Tulip Tree and the Great or Rosebay Rhododendron.

The overlap of northern and southern floras though makes for great plant diversity - the Shawangunk study area (Figure 1) of about 90 square miles is only 1/8 (12.7%) the area of Ulster County - but in contrast it has some 50% (to date, 840 species) of the documented County plant species. This, without the diversity of the Hudson River estuary and the Catskill Mountains. As compared to New York State as a whole, we have at present documented just under 1/3 (about 28%) of the State species (this according to recent Botany Department figures).

This overlap of the northern and southern plant associations makes for a dilemma for ecologists visiting the Preserve who ask if a vegetation map is available. None has been produced, since major vegetation changes can be found in distances as small as 100 feet. To map the 90 square miles of the northern Shawangunks would, we feel, be practically meaningless in any detail.

Stan Smith, having such a broad background in plant geography and distribution, knew of several species (including at least two grasses) that were recorded from northeastern Pennsylvania and western Connecticut that had not been documented in New York State. He felt strongly that because of our position and special habitats they should be searched for in the Shawangunks. None have as yet been discovered.

Apparently at the end of the last glacial advance, according to Research Associate Russ Waines, geologist at SUNY-New Paltz, the ridge top became free of ice as much as 3,000-4,000 years earlier than the adjacent valleys. Assuming this is correct, it leads to a good deal of speculation as to what was going on on the bare ridge

top during the periglacial period. This rib of exposed rock and glacial till soil probably connected directly to the surviving biological communities to the south in the central Applachians. This most likely provided a corridor for plant and animal migration north into the present day Shawangunks and beyond. It is now indicated that this advance of plants back into glaciated areas was much quicker than formerly thought possible. This was not restricted to wind-seeded species but included heavy-seeded species as well.

Linda Olsvig, who did part of her Ph.D. thesis study of northeastern pine barrens vegetation here in the Shawangunks, cited pollen analyses from farther down-ridge that indicated the first post-glacial vegetation was mostly not tundra but consisted of fir-spruce, and deciduous forest. Several subsequent swings in climate produced variations in dominance. Curiously, about 8,000 years ago during a warm time called the hypsithermal period, Oaks increased generally, and Hemlock appeared. In 1964 Don Lewis of the New York State Museum did a preliminary pollen analysis of the 5(+)m. of Rhododendron Swamp sediments. He postulated that early post-glacial conditions here may be related to those found in present-day Alaska, where there are plants "available for immediate colonization close to the ice front." Don found Alder and Willow pollen in some of the oldest levels. Pine, Birch and Oak pollen is found from the earliest levels to the present. Variations in dominance of species were also found. These he related to possibly 10 major long-term fluctuations in temperature and precipitation, the most recent of which we are experiencing at present.

Some of the Shawangunk's most interesting and rarest plants are glacial relicts- species that have survived from the cold early post-glacial period to the present. Some are well known - for example Red Spruce is fairly common on the ridge in the Minnewaska Park section of the Shawangunks, and in areas like Spruce Glen Swamp on Minnewaska State Park land. Recently, Ed Cook from Lamont-Doherty's Tree Ring Lab, found Red Spruce in this swamp in excess of 300 years old. Also of interest was a Hemlock tree just over 400 years old - the oldest Ed has found in New York State. Ed and his assistant drilled about 20 Red Spruce. We have not gotten their final report. When complete, the cores will be useful in studying variations in the growth of trees in relation to environmental factors such as precipitation. Broom Crowberry is a rare relict plant now found in only two relatively small populations on Minnewaska State Park land. These are the only stations surviving in New York State. It is listed on the N.Y.S. Rare Plant List. A Mohonk Preserve Research Report we completed in 1982 traces the discovery of these stations over a century ago, and records its more recent decline - due in part to deer browse. Several of these relict species were included in a recent Preserve Research Report on Endangered Plants. Ice caves in the area of Sam's Point and Shingle Gully above Ellenville contain other relict species that are being investigated by Joe Beitel as part of a doctoral research project at the New York Botanical Garden.

From the advent of European settlement some 400 years ago to the present, monumental changes have taken place in the vegetation of the Shawangunks. These have been due primarily to the introduction of non-native species. Records in the New York State Herbarium indicate that some 36% of the State's flora is now composed of non-native species. Here, on the Preserve's land in areas of heavy human disturbance (such as roadsides and in farm fields) studies indicate that as many as 60% of the species encountered can be introductions that are persistent in the flora.

One way alien plants were introduced was intentionally - where settlements were established, families many times brought seeds or pieces of plants with them to have some reminder of home overseas. These they propagated near their New World doorsteps. Some were herbs (ex. Marjoram and Thyme), and some were part of their pharmacopia (Motherwort - healing virtues, and Heal-all). Unintentional introductions occurred from sources such as impure crop seeds, and from discarded straw and hay used as bedding, as food for livestock, and as packing material (ex. Plantain, Dandelion, Dock, and many forage grasses). Later, horticultural developments such as ornamental gardens and greenhouses facilitated introduction of more species from other parts of this continent and around the world. Both intentional and unintentional introductions have occurred in the Shawangunks. These introductions have led to intense competition between native species occupying niches which are invaded by one or more alien species. For the most part our studies show that native species loose ground in these situations.

In this relation, major clearing on the ridge flanks for pasturage and cultivation, where suitable, led to a major discontinuity in the native vegetation. In some recently received photographs taken by N. H. Darton of the U. S. Geological Survey in the early 1890s, showing the Trapps from the east valley, the scope of the clearing is very evident (Figure 2). This, coupled with cutting for Hemlock tan bark, charcoal production, hoop poles, and fuel wood, opened up vast forest areas where introduced species, being very aggressive, had the advantage over the native vegetation.

Of major importance to the Preserve botanically and taxanomically is the card record file and the herbarium at the Elms Research Center. Most credit for these records and plant specimens must go to Dan Smiley. The herbarium contains some 2,200 sheets, representing about 840 species. The card file of some 2,300 cards records species stations and observations for over 50 years. The botanical library is well stocked, including many important out-of-print and rare books and manuscripts. One rarity is John Torrey's famous 2 volume - Flora of the State of New York published in 1843 (as part of the Natural History of New York series). Another is Homer D. House's Annotated List of Ferns and Flowering Plants of New York State published in 1924.

We have been fortunate to have had many notable botanists making trips to the Shawangunks and Ulster County for over a century to observe and collect plants.

These included:

Charles Horton Peck (State Botanist) - visited Mohonk in 1872, collected ferns and mosses on Sky Top. Signature found in Mohonk Guest Register (Figure 3).

Nathaniel Lord Britton - visited Sam's Point in 1883, and visited and lectured at Mohonk in 1918 and 1919.

Robert Ridgeway - visited Sam's Point in 1883.

Charles E. Smith (1880) and John H. Redfield (1884)-(both with the Academy of Natural Sciences) - described and discussed the relict Broom Crowberry station at Gertrude's Nose.

Ellen M. Dallas - authored Minnewaska's flora in 1896, listing some 289 species found in the vicinity of Minnewaska (copy on file in the Research Center).

Clarence J. Elting - visited Mohonk and Minnewaska in the 1890s and collected plants with great skill and insight. Collection at N.Y.S. Museum.

Raymond H. Torrey - visited the Shawangunks several times in the 1930s with the Torrey Botanical Club.

Donald Eves - contributed information on localities of plants and assisted in identifications.

G. G. Nearing - listed plants found growing in the Shingle Gully ice caves in 1953.

Eugene C. Ogden (State Botanist) - visited the Palmaghatt with the Eastern New York Botanical Club in the early 1950s.

Henry F. Dunbar - co-author(with Mary Domville) of Ulster County Flora (1970), visited the Shawangunks numerous times in the 1950s and 60s collecting and listing plants.

Stanley J. Smith - Curator of Botany, New York State Museum, visited the area several times in the 1950s and 60s noting and collecting plants.

Ruth H. Smiley - studied and collected ferns of the Shawangunks.

The invaluable lists, descriptions, and collections from these people allow us to make comparisons concerning abundance, habitats, and occurrence of plants in the Shawangunks that would otherwise be impossible. Many opportunities for individual research still exist today.

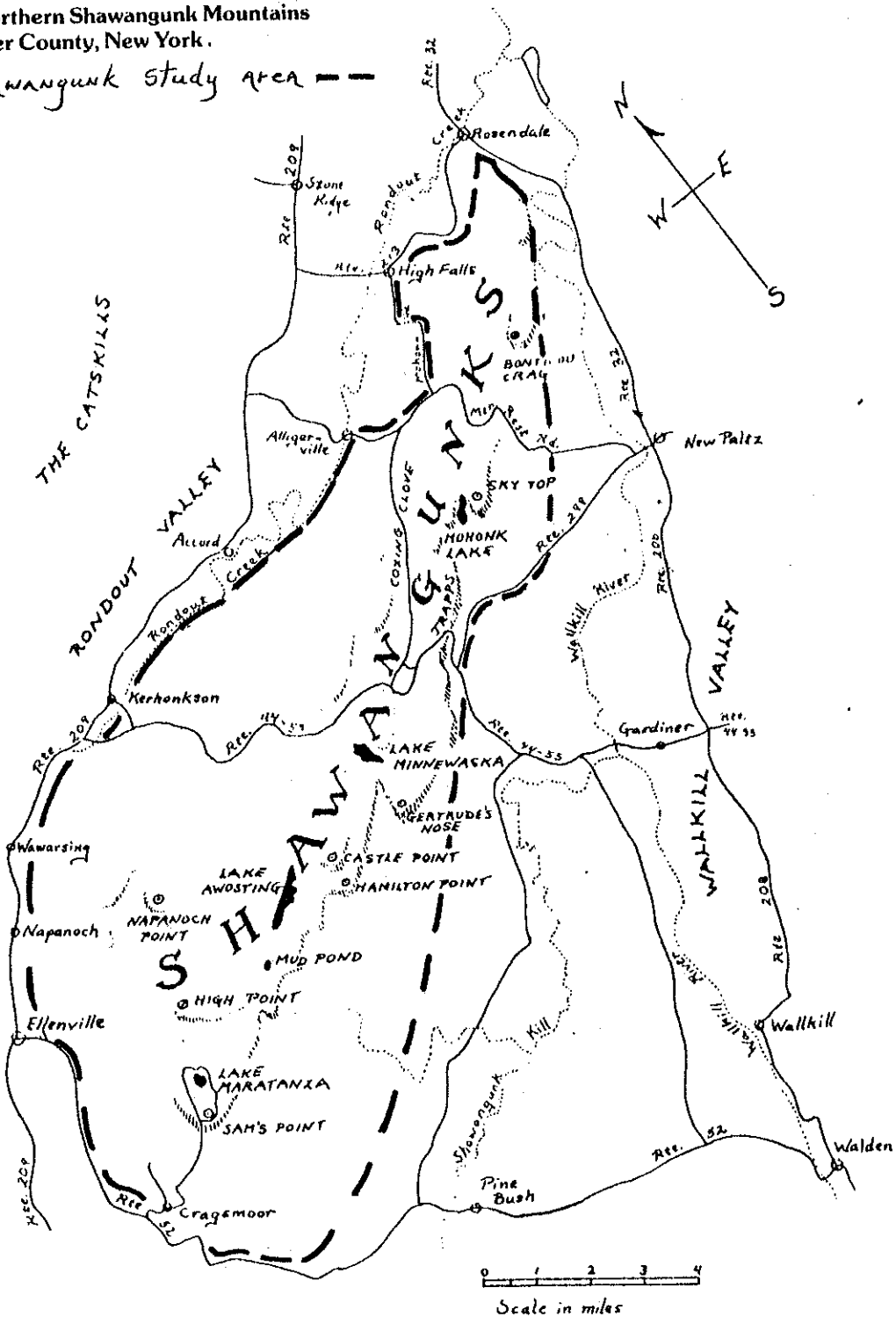
In closing, I must emphasize that the Shawangunks are fortunate, as very few other areas, in having such a well explored and documented flora. This important resource should not be overlooked when making policy and management decisions.

Note: This address was given to members of the Board of the Mohonk Preserve, Inc. on 13 December 1986.

Figure 1

The Northern Shawangunk Mountains of Ulster County, New York.

Shawangunk Study Area ——



From: The Shawangunk Mountains - A History of Nature and Man
Bradley Snyder & Hal Beard, 1981

Figure 2 - N. H. Darton photograph, 1893, showing Trapps from East side.

Figure 3.

1872

MOHUNK HOUSE,

ALBERT K. SMILEY, Prop'r.

DATE.	NAME.	RESIDENCE.
June 17th	Benjamin H. Terry	N. York
" "	Miss Lillie B. Hamlin	"
" "	Chas. H. Peck	Albany
	Thomas Barton	
	Amelia Barton	
June 18	E. P. Dorland,	Poughkeepsie
	Miss Kate, S. Cary.	"
	E. Krusta	"
	Wm Conklin & Wife	Brooklyn
June 19	B. M. Conklin & "	Poughkeepsie
	Mark H. Hitchcock & Wife	"
	Miss Mary Nelson	"
	H. E. Losey	"
	John B. Dewey	"
	Sara E. Chichester	"
	Mo McConnell	"
	M E Nie	