The Pitch Pine Community of Mount Everett: Ecological Context and Importance

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CONTEXT

As a forest ecologist with over 15 years of experience working and teaching in a variety of eastern and northern forests, I offer here some perspectives on the value of the unusual dwarfed pitch pine community of the summit of Mount Everett. This brief report presents my observations, comments, and tree ring data from my visits to the summits of Mount Everett on July 29 and Mount Race on July 30, 2000. Bob Leverett and I cored a dozen pitch pines, and Eleanor Tillinghast provided a wealth of historical research and field observations from other summits in the southern Taconics. The more detailed scientific studies now under way will provide much more information than this brief account, which serves primarily to place the Mount Everett landscape in a broader context.

ECOLOGICAL IMPORTANCE AND NATURALNESS

The plant communities on the summits of Mounts Everett and Race are unusual, natural, and high in ecological integrity. Each summit is crowned with an island of unusual habitat surrounded by forested slopes. The summits lack tall trees but host an assemblage of plants well adapted to xeric conditions on bedrock. The summits are characterized by very thin soils, extensive bare rock, and heavy wind. Such ridgetops elsewhere are subject to lightning strikes and resultant natural wildfires. Although it appears that neither Mount Everett nor Mount Race has experienced a summit fire in the past century, the plant communities have probably been influenced by occasional fires over the millennia. A model of such fires is provided by the 1929 fire on Bear Mountain (south of Mount Race).

Taken together, these tough environmental conditions have favored the development of a shrub-scale community of pitch pine, fire-adapted scrub (bear) oak, scattered red oaks and red maples, and carpets and tufts of shrubs, especially blueberry and huckleberry. The plant assemblage bears resemblance to the communities of distant ridges in the Shawangunks of New York and the adjacent Kittatinny Ridge of New Jersey, and it also bears some floristic similarity to the flat pine barrens of southern New Jersey which are also subject to extremely dry conditions and fires. Lee Frelich describes the Mount Everett summit as a mosaics of patches of two communities: hardwood/huckleberry and pitch pine/blueberry. The interactions between these two communities over time is of considerable ecological interest.

The summit plant communities are naturally open and almost surely pre-date settlement of the area by European-Americans. Eleanor Tillinghast has compiled observations from early explorers that describe the summits as "bald." She also has old photographs, including one I saw from 1893 that shows Mount Everett's summit clothed in dwarf pitch pines somewhat smaller in stature than those of today. The presence of pitch pine itself suggests a long history for these communities. Because its distribution is so patchy in New England today, it would not easily colonize a summit that was cleared of forest by people.

Beyond their "naturalness" and integrity, another reason for stringent protection of the summits has to do with their isolated "island" nature. Each summit supports a set of plant (and animal) populations that is partially cut off from other populations. This situation with restricted gene flow provides fertile ground for genetic diversification within these species. Moreover, high elevations provide insurance to help protect wild species against the threat of global warming; even those plants and animals of the lower slopes may rely upon the summits as conditions become warmer and drier in the future.

PITCH PINE IN THE SOUTHERN TACONICS

A set of fascinating questions surrounds the distribution and age structure of pitch pine in the Southern Taconics. Eleanor Tillinghast's field reconnaissance shows that pitch pine occurs on some summits but not others within the Southern Taconics. The reasons for this distribution pattern need to be investigated.

I initially expected Mount Everett's pitch pines to be even-aged and of fire origin. However, our tree-ring data and Eleanor's historical data clearly demonstrate an uneven-aged population that has established asynchronously without fire. Lee Frelich's recent work shows the absence of serotinous (cones only opening with fire) genotypes from Mount Everett and Mount Race.

Although pitch pines have not always required fire in the past, controlled burns will likely be called for in the future, to prevent pitch pine exclusion by oaks and other hardwoods. Fire is used routinely as a management tool to maintain a variety of pine ecosystems throughout North America. This potential need for controlled burns to maintain the integrity of the pitch pine community argues against summit infrastructure that might impede such efforts. I believe that the protection of the ecosystem should be paramount given its ecological value.

SURPRISINGLY OLD PITCH PINES AND UNEVEN-AGED POPULATIONS

Some summit pitch pines reach unusually old ages for the species, particularly on the southwest side of the Mount Everett summit, where the four pitch pine we cored had ring counts of 100, 119, 126, 130 years (note that these are minimum ages missing years of growth to the coring height). Moreover,

on Mount Race, the two trees I cored were surprisingly old. One tree only 2.5 m in height had 157 rings, while a taller tree (6.5 m) had a rotten center whose rings could not be counted but had 98 rings in just the most recent 4.4 cm (of 11.5 cm radius). Both trees had a growth form that Lee Frelich had predicted to reflect long-lived trees.

A range of tree ages was exhibited by five other Mount Everett pitch pines on the summit center and southeast of center: 59, 85, 88, 93, and 102 years (plus years to growth at coring height). It is clear that the Mount Everett population is uneven-aged, and it is also clear that tree size does not predict tree age in this habitat.

On the lower flanks of Mount Everett are different forest communities that are quite impressive in their diversity for second-growth forests. While the region was subjected to near-complete forest clearance for charcoal by the mid 1800's, large expanses of the forest have been undisturbed since then. Most exciting is the finding by Bob Leverett and others that portions of this forest matrix escaped logging and thus represent old growth forests of types besides the pitch pine on the summit.

OLD TREES AND OLD ECOSYSTEMS

I want to emphasize that the ecological value of these ecosystems, particularly the summit ecosystems, is not predicated on their including old trees nor on being free of all anthropogenic disturbance. Although several genuine old growth communities are present on Mount Everett, other forest communities in this landscape are high in ecological integrity.

Some long-established forest types represent intact, natural ecosystems whose trees are not terribly old. Examples of old forest ecosystems whose trees are not ancient include the jack pine (*Pinus banksiana)* forests of Minnesota. A fire frequency of 30-90 years keeps the flammable, serotinous-coned jack pine trees young; however, my research shows that jack pine communities harbour extremely high diversity of lichens, wildflowers, and other vascular and nonvascular plants. A long history of forest presence on these sites has provided continuity for accumulation of great diversity including rare species. Likewise, other fire-adapted pines such as lodgepole pines *(Pinus contorta)* of western North America can form long-standing, ancient forests even though the natural disturbance regime of wildfires prevents individual trees from attaining large sizes or old ages.

It is very important that "old growth" not be defined so narrowly as to exclude such forests. This issue of protecting old forests with young trees was much discussed at last year's Old Growth Definitions Symposium at the Harvard Forest, and is also raised in Mary Byrd Davis' book "Eastern Old Growth Forests." Natural disturbance regimes must be accommodated in our efforts to preserve examples of natural ecological communities.

WHY PROTECT MOUNT EVERETT

There are several compelling concerns about road-building, tower-building, and other construction of infrastructure on the Mount Everett summit. Such projects threaten the integrity of the summit and other interconnected ecosystems in several ways:

Edges: The powerful, negative impact of roads on ecological systems is well understood. Moreover, clearings for new or enlarged towers and for vehicle parking and turnarounds will cause similar damage. Artificial edges introduce new, unnatural elements to the biota, including cowbirds as nest parasites which damage songbird nesting success and including many weedy invasive plants that spread from edges into fragmented eastern forests. Edges also change the physical environment by elevating light, decreasing humidity, and introducing dust; these changes can penetrate 100 meters or more and have consequences for species assemblages including those of lichens and wildflowers. More generally, edges disrupt ecosystem continuity by fragmenting the habitat, interfering with movements of small animals and changing patterns of gene flow and disperal amongst many organisms in the ecosystem. While wildlife managers once created edges intentionally, we now know that the result is an unnatural shift in the community that may favor deer and weeds at the expense of nesting songbirds and orchids.

Effects on other communities: Development activities have potential impacts on ecosystems besides the summit pitch pine community itself. Erosion and runoff problems could damage only the surrounding slope forests and the Schenob Swamp preserve to the east. The summits represent the ultimate headwaters for multiple watersheds.

Problems with fire management: Summit infrastructure will interfere with the use of fire as a management tool to maintain the pitch pine communities in the future.

Ecological value and integrity: The peaks of the southern Taconics encompass unusual natural ecosystems with significant ecological and conservation value. The dwarf pitch pine trees reach ages > 150 years which are old for the species. The island-like communities of pitch pine, scrub oak, and other xerophytic plants are extremely unusual for the region. Moreover, the recreational and aesthetic value of the southern Taconics cannot be overstated; these wild and relatively natural areas provide an accessible outdoor experience very near both New York and Boston. Roads, towers, and other clearings obviate this potential while also directly and indirectly destroying portions of high-integrity natural ecosystems.