

Classification of Western Massachusetts Pitch Pine-Scrub Oak Ridgetops

**Sally Shaw and Frank Lowenstein
The Nature Conservancy**

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Pitch pine-scrub oak communities or pine barrens are a rare natural community occurring in the eastern states from Virginia to Maine. Pine barrens are associations of drought-tolerant plants that tend to occur on well-drained sand and gravel deposits and acidic rocky summits. These complex, disturbance-dependent communities are favored by frequent fire, but are subject to succession to white pine and hemlock in the northern regions and oak-pine in the south if the fire factor is removed (Bromley 1935; Bernard & Seischab 1995).¹

...[R]idgetop pitch pine barrens are thought to be edaphically controlled natural communities which have probably persisted on acidic bedrock at highly xeric sites for millenia (Seischab 1996; Sneddon 1998; Batcher 1994). These communities are deserving of further study in their own right, as they provide habitat for a number of state and regionally rare plant and animal species.

Scattered ridgetop occurrences and side-slope rock outcrop communities can be found in the mountains of Berkshire County, Mount Tekoa and Shatterack in the Connecticut River valley, and in the Blue Hills near Boston. These ridgetop occurrences have some affinity to ridgetop occurrences in Pennsylvania, New York and Vermont (Anderson 1994), but have floristic differences as well, the description of which is outside the scope of this report.

Ridgetop pitch pine-scrub oak occurrences have a far more limited distribution and extent, occur in small to large patches, and approach the northern extent of their range in Massachusetts. Due to their high elevation, xeric habitat, and often steep and rocky terrain, they are less subject to development or logging pressures, and may provide refugia for fire dependent plant species. They are, however, susceptible to human impacts including littering, trampling, fire suppression, and in some areas development of viewing or telecommunications towers (e.g. Mt. Everett). They have received far less study than pitch pine communities on glacial outwash, and their ecology is less well understood (but see Seischab 1996; Bernard 195; McIntosh 1959; Laing 1994; and Patterson 1994).²

Vegetation surveys using standard releve methods were conducted in pitch pine communities on Mt. Tekoa and Shatterack Mountain in the Connecticut Valley, and on Round Mountain, Race Mountain, Mt. Everett, Alander Mountain, Black Rock [and Jug End] in Berkshire County...Comparison of pitch

¹ Sally Shaw and Frank Lowenstein. *Classification of Western Massachusetts Pitch Pine-Scrub Oak Ridgetops and Natural Community Inventory of Mount Tekoa in Russell, Massachusetts* (Boston, MA: The Nature Conservancy, 1999), p. 1.

² Shaw and Lowenstein, pp. 1-2.

pine/scrub oak ridgetops in the Connecticut Valley with those in Berkshire County shows some distinct differences in the plant communities...[A scatter] graph shows the Mt. Tekoa plots falling between Shatterack and Black Rock on the first axis, and distributes the remaining Berkshire County occurrences along the second axis. The two groupings suggest the hypothesis that the spread along the first axis may be related to fire history, while that along the second axis is related to site elevation.³

To further test the hypothesis that the vegetation groupings...are somewhat related to fire history and elevation, we...correlate[d] environmental variables (including elevation, bedrock geology, aspect and fire history) with species assemblages...[W]hen environmental data is overlaid...on the plots based on vegetation alone...elevation and fire history appear to be the environmental variables most strongly related to plot distribution, although the percent of total variance explained is low.

To test whether other environmental parameters were influencing the plot distribution, we analyzed a subset of 25 plots for which we had complete data for fire history, elevation, bedrock geology, soil depth, percent cover of exposed bedrock and solar radiation index. This analysis did not substantially change the plot distribution, although 10% more variation in the vegetation was explained. Fire history and elevation again appeared to be the strongest environmental gradients, although solar radiation explained some of the distribution...Soil depth and bedrock cover were not strongly related to the major environmental axes.⁴

Similarities in vegetation composition and structure characterize two primary groups of plots. The higher elevation plots (average elevation 605 m.) with less recent fire (>25 years) include all plots on Alander, Mount Everett, Race Mountain, Jug End and Round Mountain (all located in the southwest corner of Berkshire County). These sites also had a lower average canopy height (2.75 m.) with a frequent to dominant occurrence of dwarf pitch pines (showing contorted growth form, low stature, and or multiple stems) and a dense low shrub layer (average 95% cover) including *Quercus ilicifolia*, *Gaylussacia baccata*, *Vaccinium angustifolium* or dwarfed forms of *Pinus rigida*. Species characteristic of these sites, but not of the lower elevation sites include *Maianthemum canadense*, *Potentilla tridentata*, *Pteridium aquilinum*, *Deschampsia flexuosa*, *Acer rubrum*, *Trientalis borealis* and *Viburnum cassinoides*.

The lower elevation pitch pine-scrub oak communities at Mt. Tekoa, Mt. Shatterack and Black Rock (average elevation 304 m.) have taller average canopies (6.5 meters, including taller oaks and white pines, or 5.3 m. including only pitch pines) and a more open understory structure (average 38% cover). Species not found in the plots sampled at the higher elevations, include *Apocynum androsaemifolium*, *Comandra umbellata*, *Schizachyrium scoparium*, *Corydalis sempervirens*, and *Vaccinium pallidum*. [Although Black Rock's] fire history is closer to the other Berkshire ridgetops[, it] shares the following species with Tekoa: *Vaccinium pallidum*, *Betula lenta*, *Melampyrum lineare*, *Kalmia latifolia*, *Carex pennsylvanica*, and *Pinus strobus*. The three Jug End plots are similar in elevation and fire history to Black Rock, although the canopy height and structure of the plots are more similar to the higher elevation sites.⁵

³ Shaw and Lowenstein, pp. 3-7.

⁴ Shaw and Lowenstein, pp. 8-12.

⁵ Shaw and Lowenstein, pp. 13-14.