

Sandstone Pavement Barrens



Sandstone pavement barrens at Gadway Sandstone Pavement Barrens.



Photo credits: Gregory J. Edinger

System	Terrestrial
Subsystem	Barrens And Woodlands

Did you know?

It is believed that the Potsdam Sandstone bedrock of these barrens was exposed with catastrophic flooding from the abrupt drainage of Glacial Lake Iroquois during deglaciation, roughly 11,000 years ago. This flooding stripped away much of the soil and unconsolidated material that had previously covered the underlying bedrock (Franzi and Adams 1999). "Potsdam Sandstone" was named by geologist Ebenezer Emmons in 1838 for Potsdam in St. Lawrence County, NY (Emmons 1838).

Summary

Protection Not listed in New York State, not listed federally.

Rarity G2, S1

A global rarity rank of G2 means: Imperiled globally because of rarity (6 - 20 occurrences, or few remaining acres, or miles of stream) or very vulnerable to extinction throughout its range because of other factors.

A state rarity rank of S1 means: Typically 5 or fewer occurrences, very few remaining individuals, acres, or miles of stream, or some factor of its biology makes it especially vulnerable in New York State.

Conservation Status in New York

There are probably less than two dozen occurrences statewide. A few documented occurrences have good viability and a few are protected on public land or private conservation land. This community is limited to the regions of the state underlain with Potsdam Sandstone, and there are only a few high quality examples. The current trend of this community is probably stable for occurrences on private conservation land and public land, or declining slightly elsewhere due to moderate threats that include wildfire suppression, invasive plants, quarrying, excessive ATV use, excessive logging, and trash dumping.

Short-term Trends

The number and acreage of sandstone pavement barrens in New York have probably declined slightly in recent decades due to fire suppression, disturbance by off-road vehicles, trash dumping, and development.

Long-term Trends

The number and acreage of sandstone pavement barrens in New York have probably had moderate declines from historical numbers due to fire suppression, fragmentation, disturbance by off-road vehicles, trash dumping, and development.

Conservation and Management

Threats

Loss of Jack pine dominance due to wildfire suppression and the invasion and spread of exotic plants are the primary threats to sandstone pavement barrens. Quarrying, excessive ATV use, excessive logging, and trash dumping are secondary threats.

Conservation Strategies and Management Practices

Increase and/or maintain the size of existing sandstone pavement barrens by increasing patch size where appropriate, by "softening" the abrupt forest edges by maintaining a native shrub transition zone. Improve the condition of existing sandstone pavement barrens by reducing and/or eliminating invasive species (including invasive native woody species), minimizing trail network and clearly marking existing trails, and developing and implementing a prescribed burn plan at appropriate sites. Improve the landscape context by encouraging surrounding landowners to establish natural buffers and restore natural corridors to other larger natural landscape blocks.

Development and Mitigation Considerations

Soils are very thin or lacking in and around this community and the effect of clearing and construction on soil retention and erosion must be considered during any development activities. Similarly, these soils are acidic and nutrient-poor and any soil enrichment contamination (e.g., from septic leach fields and fertilized lawns) may alter community structure and function. The open structure of this community is maintained by fire and presents a fire hazard to existing and proposed development. Unprotected structures located within or near this community are more susceptible to damage from fire.

Inventory Needs

Periodic inventory of the sandstone pavement barrens is needed in order to keep occurrence data current. Need more thorough inventory of the best sites, especially including identification of mosses, lichens, and fauna.

Research Needs

Determine the optimal fire regime for this community. The effect of prescribed burning needs to be evaluated. Evaluate the success of mechanical removal of woody plants in areas where fire is prohibited.

Rare Species

Bird Dropping Moth (*Cerma cora*)
Bridgham's Brocade (*Oligia bridghamii*)
Toothed Apharetra (*Sympistis dentata*)
A Noctuid Moth (*Chytonix sensilis*)
Pine Barrens Zanclognatha (*Zanclognatha martha*)
Jack Pine Looper (*Macaria marmorata*)
A Zale Moth (*Zale largera*)

Identification Comments

A terrestrial open canopied (averaging 25 -60% cover) woodland that occurs on very shallow soils (dysic lithic borofolist) over sandstone bedrock; this community is best developed where the bedrock is nearly level, thus forming a pavement. Fire is the most important ecological process for the maintenance of healthy sandstone pavement barren communities (Stergas and Adams 1989, Hawver 1993). Other disturbances that have influenced these barrens include blow downs, ice storms, and subsequent restoration cutting. Physiognomic variants such as exposed bedrock, open heath shrubs, sparse woodland, and closed canopy forest reflect the disturbance history of a given site.

The Best Time to See

In late summer and early fall the shrublayer and hardwood trees turn warm shades of yellow, red, and scarlet which provides a lovely contrast to the greens of the pines.

Characteristics Most Useful for Identification

In New York the dominant tree is typically jack pine (*Pinus banksiana*) but pitch pine (*Pinus rigida*) may be more common at some sites. Other associated pines include white pine (*P. strobus*), and red pine (*P. resinosa*). Other characteristic trees include red maple (*Acer rubrum*), paper birch (*Betula papyrifera*), and red oak (*Quercus rubra*). The shrublayer is dominated by black huckleberry (*Gaylussacia baccata*) and blueberry (*Vaccinium angustifolium*). Other important shrubs are black chokeberry (*Photinia melanocarpa*), sheep laurel (*Kalmia angustifolia*), and sweet-fern (*Comptonia peregrina*). The groundcover includes many lichens and mosses, which may form a continuous cover in some areas. Characteristic lichens include *Cladina rangiferina*, *C. mitis*, *C. stellaris*, and *Cladonia uncialis*. Characteristic mosses include *Polytrichum juniperinum* and *Pleurozium schreberi*. Herbs grow throughout this groundcover and include bracken fern (*Pteridium aquilinum*), wintergreen (*Gaultheria procumbens*), cow-wheat (*Melampyrum lineare*), poverty-grass (*Danthonia spicata*), and common hairgrass (*Deschampsia flexuosa*).

Elevation Range

Known examples of this community have been found at elevations between 27 feet and 1005 feet.

Similar Ecological Communities

Alvar pavement grassland: This upland barrens occurs on flat to gently sloping pure calcareous bedrock with a pH greater than 5.5 and dominated by calcareous indicator species such as eastern red cedar (*Juniperus virginiana*) and northern white cedar (*Thuja occidentalis*), in contrast to sandstone pavement barrens where acidic indicators such as jack pine (*Pinus banksiana*), blueberries (*Vaccinium* spp.), and black huckleberry (*Gaylussacia baccata*) predominate.

Characteristic Species

Trees > 5m

Red Maple (*Acer rubrum* var. *rubrum*)
Jack Pine (*Pinus banksiana*)
Pitch Pine (*Pinus rigida*)
Eastern White Pine (*Pinus strobus*)

Shrubs 2-5m

Jack Pine (*Pinus banksiana*)

Shrubs < 2m

Sweet Fern (*Comptonia peregrina*)
Black Huckleberry (*Gaylussacia baccata*)
Sheep-laurel (*Kalmia angustifolia*)
Mountain Holly (*Nemopanthus mucronatus*)
Black Chokeberry (*Photinia melanocarpa*)
Jack Pine (*Pinus banksiana*)
Lowbush Blueberry (*Vaccinium angustifolium*)

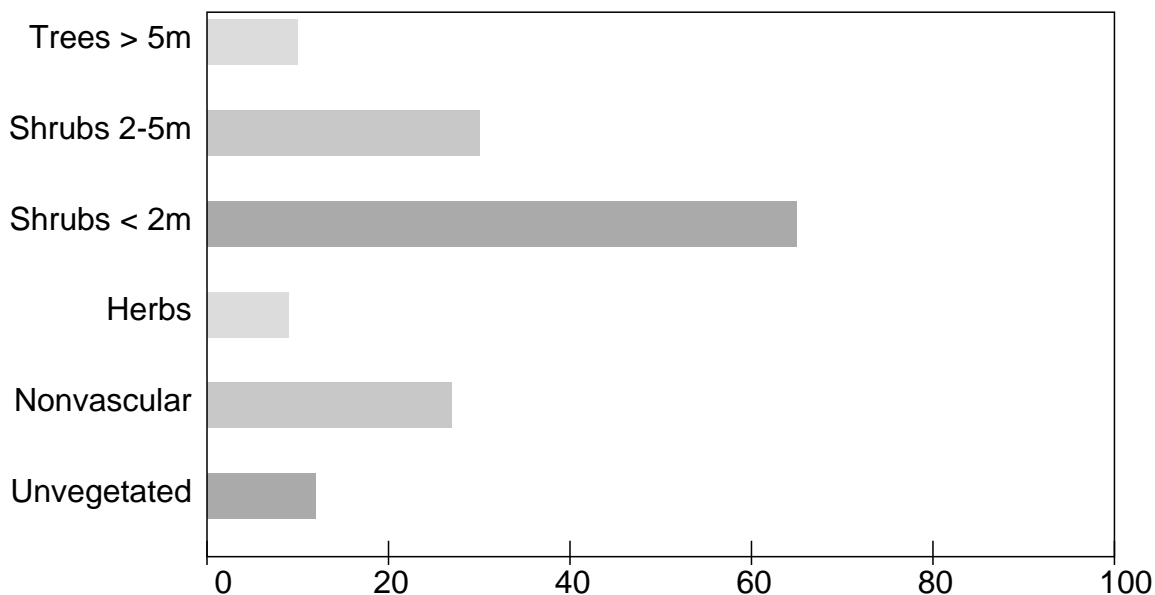
Herbs

Poverty Oatgrass (*Danthonia spicata*)
Wavy Hair Grass (*Deschampsia flexuosa*)
Teaberry (*Gaultheria procumbens*)
Canada May-flower (*Maianthemum canadense*)
Eastern Bracken (*Pteridium aquilinum*)

Nonvascular

Cladina mitis
Cladina rangiferina
Cladina stellaris
Cladonia uncialis
Dicranum spp.
Pleurozium schreberi
Polytrichum juniperinum
Sterocaulon saxatile

Xanthoparmelia plittii



This figure helps visualize the structure and "look" or "feel" of a typical sandstone pavement barrens. Each bar represents the amount of "coverage" for all the species growing at that height. Because layers overlap (shrubs may grow under trees, for example), the shaded regions can add up to more than 100%.

International Vegetation Classification System Associations

This New York natural community encompasses all or part of the concept of the following International Vegetation Classification (IVC) natural community associations. These are often described at finer resolution than New York's natural communities. The IVC is developed and maintained by NatureServe.

Jack Pine / Black Chokeberry / Boulder Lichen species Woodland (CEGL005045)

NatureServe Ecological System Associations

This New York natural community falls into the following ecological system(s). Ecological systems are often described at a coarser resolution than New York's natural communities and tend to represent clusters of associations found in similar environments. The ecological systems project is developed and maintained by NatureServe.

Northern Appalachian-Acadian Rocky Heath Outcrop (CES201.571)

Additional Resources

Links

url_type URL Miner Institute Ecosystems Studies Field Lab at Altona
Flatrock #http://www.whminer.com/facilities_flatrock.html

Flat Rock State Forest (NYS DEC)

<http://www.dec.ny.gov/lands/93755.html>

Gadway Sandstone Pavement Barrens (TNC)

<http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/newyork/places-preserves/adirondacks-gadway-sandstone-pavement-barrens.xml>

Altona Flatrock (Miner Institute)

<http://www.whminer.org/facilities/altona-flatrock.php>

Potsdam Sandstone

https://en.wikipedia.org/wiki/Potsdam_Sandstone

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