PROPERTY PLANNING COMMON ELEMENTS

COMPONENTS OF MASTER PLANS

HABITATS AND THEIR MANAGEMENT

Barrens (Oak Barrens and Pine Barrens)

Description

Barrens are fire-dependent plant communities that occur on sandy, often dry and nutrient-poor soils and are dominated by grasses, low shrubs, small trees, and scattered large trees. They are communities that are dynamic in nature and variable in structure and species composition, and so are difficult to describe and classify. In general, barrens in northern and central Wisconsin have been described as pine barrens and those in southern and west-central Wisconsin as oak barrens.

Historically, the most extensive barrens in Wisconsin occurred in areas of sandy glacial deposits such as outwash plains, lakebeds, and outwash terraces along rivers, and were concentrated in the Northeast Sands, Northwest Sands, Northern Highland, and Central Sands Ecological Landscapes. These communities were heavily influenced by fire, with local topography and soil factors influencing fire behavior. This typically resulted in a complex mosaic of burned and unburned patches depending on fire intensity and frequency, topography, soil moisture, and local weather. Most oak and pine barrens were fragmented and lost after Euro-American settlement due to conversion to agriculture, conifer plantations, or development, logging, fire suppression, and invasion by non-native invasive plants. Both oak and pine barrens are considered globally rare and endangered.

While oak barrens and pine barrens share many similarities, prairie species are better represented in the southern oak-dominated barrens, and pines and their characteristic associates better represented in the north. However, jack pine is an important component of some of Wisconsin's southernmost barrens occurrences. Oak barrens and pine barrens are described below.

Oak Barrens

This community is found mostly in southwestern, central, and west-central Wisconsin. Black oak is the dominant tree of oak barrens, although white oak, bur oak, northern pin oak, and occasionally red oak also may be present. Common understory species include lead plant, black-eyed Susan, round-headed bush-clover, goat's rue, June grass, little bluestem, flowering spurge, frostweed, false Solomon's-seals, spiderwort, and wild lupine. Some oak barrens remnants also contain patches of heath-like vegetation, with bracken fern, blueberries, bearberry, and sweet fern locally common or even dominant. Canopy closure and density of the canopy and shrub layers can be highly variable depending on fire intensity and frequency.

Pine Barrens

This community typically is characterized by scattered jack pine or, less commonly, red pines, sometimes mixed with scrubby Hill's, bur, or northern pin oaks, interspersed with openings containing shrubs such as hazelnuts, sand cherry, and prairie willow as well as prairie grasses and forbs. "Heath" species such as blueberries, bearberry, and sweet fern often occur in the ground layer. Other characteristic plants include June grass, little bluestem, silky and azure asters, lupine, blazing-stars, and western sunflower. Pines may now be infrequent or even absent

in some stands due to past logging, altered fire regimes, and lack of a seed source, and oak sprouts and shrubs may now be the dominant woody species. As with oak barrens, structure can be highly variable in pine barrens depending on the fire regime, ranging from scattered, large, well-spaced trees in sites receiving frequent, low-intensity fires, to dense stands of even-aged jack pine that develop after stand-replacing crown fires.

Ecological Landscape Opportunities

Ecological Landscape	Opportunity*	
	Oak Barrens	Pine Barrens
Central Sand Hills	I	I
Central Sand Plains	M	M
Northeast Sands		M
Northwest Sands	M	M
Northern Highland		P
Southwest Savanna	P	
Western Coulee and Ridges	M	I

*M = Major; major opportunity exists in this Landscape; many significant occurrences are recorded, or restorations likely to be successful.

I = Important; several occurrences important to maintaining the community in the state occur in this Landscape.

P = Present; community is present in the Landscape but better opportunity exists elsewhere.

Rare Species

Many Species of Greatest Conservation Need (SGCN) are associated with oak barrens and pine barrens habitats based on the findings in Wisconsin's 2015 Wildlife Action Plan. To learn more, visit the Barrens communities page and click on a barrens type.

Threats

- Oak and pine barrens historically were maintained by fire and are threatened by the lack of it. Fire suppression results in ecological simplification through changes such as encroachment of trees and shrubs and resulting increases in canopy cover, which lead to decreased light availability to the ground layer, declines in light-demanding ground layer plants, and build-up of dense thatch (including Pennsylvania sedge in some sites).
- Fragmentation from land use changes, including conversion to agriculture, pine plantations, development, and roads, or succession to forest due to fire suppression, leads to smaller, isolated sites and creates barriers to species movement. This threatens species that need large blocks of habitat (e.g., sharp-tailed grouse), decreases genetic exchange, makes some patches inaccessible to pollinators, facilitates the spread of invasive plants, and can make application of prescribed fire more difficult.
- Oak and pine barrens are threatened by a variety of non-native invasive plants, including buckthorns, Eurasian honeysuckles, leafy spurge, cypress spurge, orange hawkweed, spotted knapweed, Canada bluegrass, Kentucky bluegrass, sheep sorrel, and black locust.
- In some sites, the native Pennsylvania sedge can come to dominate the understory in dense sods.
- The easily erodible sandy soils on which barrens occur are sensitive to disturbance from activities such as heavy foot traffic or motorized vehicle use. Soil disturbance destroys existing vegetation, increases erosion, and often facilitates the spread of invasive plants.

- Barrens communities are thought to have moderately low vulnerability to climate change, as they are already adapted to high temperatures and drought conditions. However, some species such as jack pine, which is at the southern end of its range in Wisconsin, may be adversely affected by more frequent drought and increases in pests and diseases associated with substantial warming.

Management Techniques

- Prescribed fire
- Intermediate treatments
- Mowing/brushing
- Pesticide treatments

Management Prescriptions

- Wherever possible, manage oak and pine barrens within a complex of interconnected, related habitats (e.g., surrogate grasslands, prairie, dry oak or pine forests, floodplain forest, wetlands, etc.), including a lowland-to-upland continuum, striving for a shifting mosaic of successional stages and structures.
- Manage and restore oak and pine barrens with fire, using large burn units wherever possible to allow for variable fire intensity, timber management (variable density thinning), and ground layer enhancement (direct seeding or planting) in stands that have lost light-demanding ground layer plants due to protracted shading or past site preparation techniques.
- Use non-commercial and commercial timber management to achieve structural, density, and other canopy tree objectives.
- Expand the size of barrens patches and connect remnants wherever possible.
- In oak or pine barrens remnants which have not been burned for many decades, do not encourage white pine where it occurs if the goal is to promote native understory plants, as white pine is a long-lived species that can attain great size and casts deep shade as it grows.
- Encourage jack pine or red pine in former pine barrens now dominated by oaks.
- Whenever feasible, plant a diversity of native species from local seed sources when conducting barrens restorations.
- Follow all applicable Grassland and Savanna Management protocols to minimize negative impacts of management practices on rare/sensitive species.
- Develop recreational uses away from sensitive areas. Protect barrens from high-impact recreational activities such as motorized trails.