



Prairiehill Farm

rebuilding an historic landscape



Prairiehill

Farm is located on the southern end of the Central Sand Hills Ecological Landscape, which covers Marquette County and most of Green Lake County. This region occurs at the eastern edge of the old Glacial Lake Wisconsin and is characterized by a series of glacial moraines that were later partially covered by glacial outwash. A distinctive landform feature of southern Marquette County is a series of drumlins and hills that are predominantly aligned east west and underlain by sandstone and dolomite. These hills are bounded by ancient stream-cut valleys that today contain small shallow ponds, streams, and extensive wetlands.



the landscape." (from: J. W. Hoyt's Natural Resources in Wisconsin 1860).

Today only remnants of the historic oak openings remain and they are considered a globally endangered ecosystem. Extensive wetlands were associated with the oak openings in southern Marquette County. On Prairiehill Farm, poorly-drained glacial depressions, springs, and seepages associated with the headwaters of French Creek create a mosaic of wetland communities including shrub-carr, sedge meadows, and vernal pools. Many seeps and springs often flow year round and in some areas have saturated deep muck soils and formed fens.

Oak Openings

Prior to European settlement, burr oak openings (savanna) were the dominant upland vegetation community on Prairiehill Farm and adjacent areas of southern Marquette and northern Columbia Counties. The character of this landscape was eloquently captured in journals from the original land survey in 1858, "*The Burr Oak Openings... are, moreover, the most beautiful portions of the varied and picturesque surface of the country. Grouped here and there, like so many old orchards, on the summit of a gentle swell of land, or on the border of marsh, prairie, or lake, there is nothing in the whole catalogue of American sylvia that equals these Burr Oaks for their charming, homestead-like expressions they give to*



Fire Replaced by the Plow and Cattle

In the late 1800's settlers removed most of the scattered oaks and hickories and used teams of oxen to remove large fieldstone boulders deposited by the glaciers. These boulders were placed in rows along the edges of what would become grain fields and pasture. Later, oxen were also used to dig shallow ditches to drain small seasonal wetlands that periodically interfered with spring planting.

A house, barn, granary, and other outbuildings were constructed near the south end of the farm on a knoll sheltered by large bur oaks. Here a small family farming operation persisted through the great depression, periodic droughts, and harsh winters.

For almost 80 years Prairiehill farm grew dairy cattle, horses, pigs, chickens, barley, oats and corn. However, few



grew as rapidly as the mortgages and by the mid-1950's descendants of the original settlers moved off the farm. Fifteen years later they sold the land. Neighboring tenant farmers continued to graze and crop the land until 1983 when it was purchased by the Bennett's.

More than a century of farming had erased the ground cover of the historic oak openings. Hilltop meadows of pasque flower, blazing star, leadplant, little bluestem, and prairie drop seed were replaced by an overgrazed mix of non-native cool season grasses, red cedar, and biennial weeds like bull



thistle. Mesic areas on the lower portions of the hills that once supported Indian grass, cord grass and prairie dock lost most native plants to the plow. The remaining bur oaks with their low wide-spreading limbs were engulfed by an understory of fire intolerant and shade tolerant trees and shrubs such as eastern red cedar, box elder, black locust, black cherry, and European buckthorn. Many seasonal wetlands that once were meadows of tussock sedge and cord grass became monotypes of nonnative reed canary grass.

Emerging from Rock and Soil

Though most of the historical oak openings have been degraded, there are still opportunities for



restoration of this community. On Prairiehill Farm much of the north face of the hill was only grazed because it was too steep and rocky for cultivation. Fortunately, some native plant species associated with oak openings can persist through cycles of cattle grazing and canopy closure. Once cattle were removed in 1984, remnant native grasses and forbs began to appear in the former pastureland. Big bluestem, Indian grass, and needle grass first appeared along stone fence lines.

Here they persisted out of reach of cattle and protected from the plow. Some native forbs persisted though a century of grazing. The most successful were those with small nonsucculent leaves such as thimbleweed, and those that grow during the cool season and are dormant in summer, such as prairie violet.



Removal of red cedar and black cherry along with the addition of prescribed fire in 1988 hastened the spread of native plants from stone fence lines and other refugia. Fire may also have stimulated

germination in the seed bank. After 25 years, 78 species of remnant native forbs and grasses have been identified. In



addition to restoration, reconstruction of savanna on 35 acres of former cropland began in 1996, and we began reclaiming the sedge meadow in 2000. Practices used to reestablish forbs and grasses on former cropland include herbicide applications, broadcast and no-till drill seeding of local genotypes, mowing, and burning. In some plantings over 80 forbs and grasses were seeded. Collectively, 55 acres of restored and reconstructed savanna are maintained in eight management units.

Management by Mimicking Natural Processes

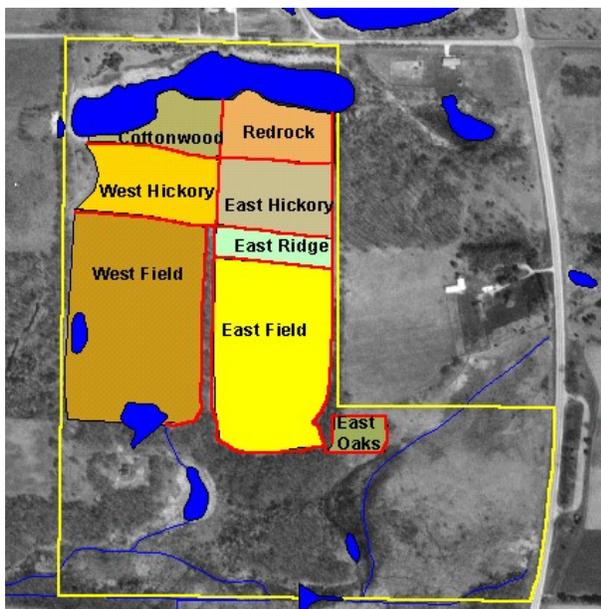
Two primary processes promoted the persistence of oak openings and wet prairie communities in southern Marquette County. The rapid permeability and instability of the sandy-loam soils discouraged the development of natural surface drainage. This combined with the impermeability of the underlying glacial till maintained a high water table in the swales throughout the year. During late winter and spring, groundwater levels would often be above the surface, with depths of several feet not uncommon. In late summer and fall, levels would drop and the swales would dry. This extreme oscillation favored herbaceous vegetation and kept the growth of trees and shrubs to a minimum.



Fire was the second primary process involved in maintaining the oak opening communities. On the steeper hillsides and ridges, the oak openings and woodlands experienced periodic fires that generally favored the growth of the herbaceous vegetation. Trees remained as part of the vegetative community in the uplands not only because of the better drainage, but also likely as a result of a variable fire frequency, weather conditions and soils. The wet prairies, although primarily influenced by groundwater, were undoubtedly effected by fire during dry periods.

On Prairiehill Farm management units have been defined based on soils, moisture, slope, exposure, and planting history. Multiple smaller units provide the flexibility to apply management as conditions require. Actions taken to maintain restored and reconstructed oak openings and wetlands include:

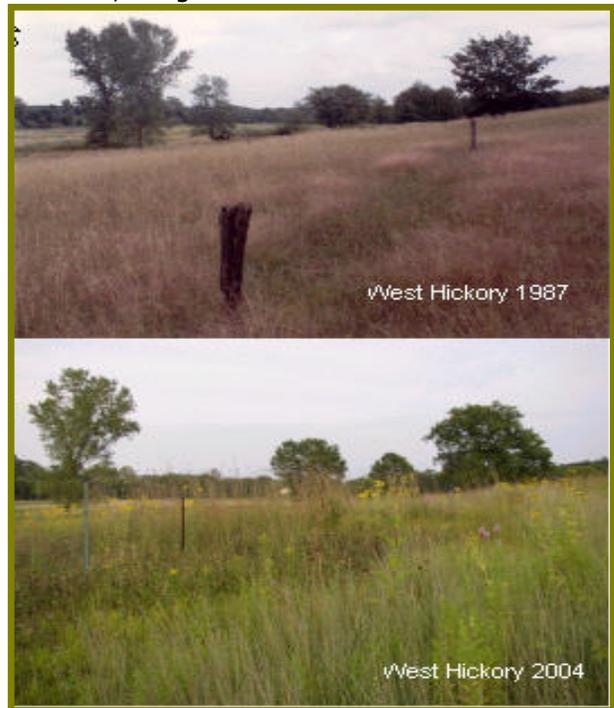
- Prescribed burning to enhance native prairie species, control non-natives and control woody succession.
- Selective mowing or grazing to enhance native prairie species, control non-natives and control woody succession.
- Control of exotic species by hand removal and herbicide application.
- Reintroduction of local genotype grasses and forbs through inter-seeding after fall burns and in "micro-gaps" created by disturbance.
- Selective cutting of trees and shrubs with herbicide applications to control woody plants where needed.



- Re-establishment of oaks and hickories to achieve a savanna canopy structure.
- Blockage of surface drainage ditches that alter wetland hydrology

An Ecological Experiment

Restoring a savanna or prairie is a long-term project; whether it is one acre or a thousand acres. Some refer to prairie restoration as prairie *simulation*, as it is ecologically impossible to recreate something as complex as a prairie on a small scale. To actually do so would require many thousands of acres and the reintroduction of hundreds of species. However, small areas such as Prairiehill Farm are important in creating new interest in the natural history of the prairie ecosystem. The greater the diversity of plants we restore, the greater the return of all forms of life



associated with the prairie.

The success and reward of a restoration is proportional to the effort and time spent. Routine observations are essential in determining the success of initial plantings, effects of burning, and in identifying existing or emerging problems- such as the invasion and establishment of a non-native species. Restorationists should view their projects as ecological experiments and use adaptive management strategies.

