Dry Prairie (Global Rank G3G4; State Rank S3)

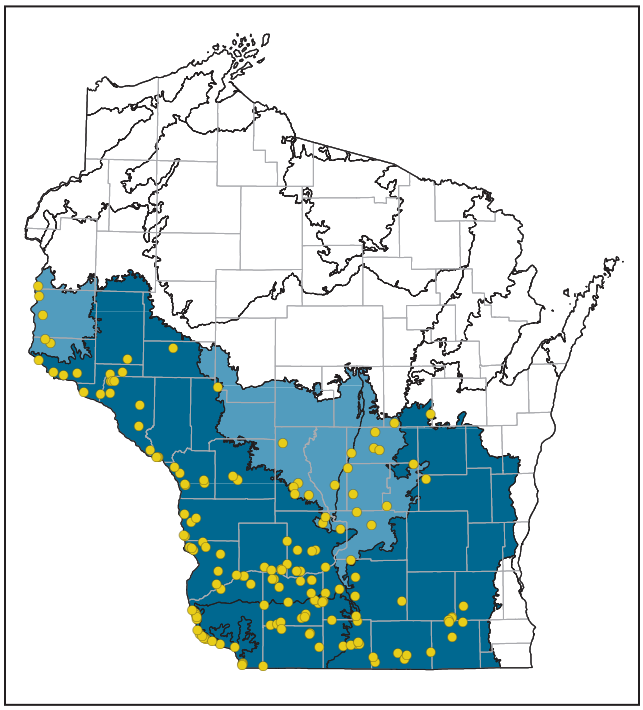
Overview: Distribution, Abundance, Environmental Setting, Ecological Processes

Dry Prairie (also known as "goat prairie," "dry lime prairie," or "bluff prairie") is a native grassland community that is especially well represented on steep southwest-facing slopes in the Driftless Area of southwestern Wisconsin and neighboring states. The soils are often derived from loess of varying depth, though dolomite or sandstone bedrock may occur at or just beneath the surface. Along some of the major river valleys of western and southwestern Wisconsin bedrock outcroppings are prominent features that may form impressive cliffs tens of meters in height. These provide habitat for specialized plants as well as hunting, basking, and denning sites for herptiles. Rock fragments often occur on the prairie surface, in some areas aggregating into accumulations of talus. The severe environmental conditions on the steep, rocky, exposed bluffs are among the factors that have played a role in maintaining remnants of this formerly much more extensive prairie community despite many decades of fire suppression and the widespread agricultural and residential development throughout southern Wisconsin. Other prairie communities, such as those on sites with deep, productive soils and level or more subdued topography, have now been almost eliminated from the state's landscapes.

In the glaciated parts of Wisconsin, Dry Prairie occurs on gravelly, or sometimes sandy, knolls in the Kettle Moraine region of southeastern Wisconsin and along and near the St. Croix River on the Minnesota-Wisconsin border. More intensive vegetation sampling of Dry Prairies is needed in these areas as the occurrences may warrant recognition as subtypes. Irrespective of unanswered classification questions, Dry Prairies outside of the Driftless Area should be evaluated and included in state and regional prairie conservation plans.

Historically, Dry Prairie occurred within a vegetation mosaic that included other prairie communities, oak savanna, oak woodland, and oak forest. All of these communities are adapted to and somewhat dependent on periodic fire. Effective conservation of the entire suite of native plants and animals associated with Dry Prairie will require restoration of some of these adjoining plant communities, many of which are now severely overgrown with shrubs and sapling trees, or they've been converted to other land uses. The transition from open prairie to adjoining wooded habitats (often this is now dense forest rather than semi-open savanna or oak woodland) is often abrupt, and this may not provide for the needs of species requiring multiple habitats to complete their life cycles or allow for these dynamic entities to expand, contract, or shift their ranges as environmental conditions change.

Patch sizes for Dry Prairie are limited by physiographic factors, woody encroachment, and development. Typical stands sizes are small to moderate (single acres to tens of acres), and the prairie patches become increasingly isolated as bluffs are developed (often for residential use) and related infrastructure is installed. The deep draws and ravines separating the prairies are typically heavily wooded, creating barriers to dispersal for some organisms.



Locations of Dry Prairie in Wisconsin. The deeper hues shading the ecological landscape polygons indicate geographic areas of greatest abundance. An absence of color indicates that the community has not (yet) been documented in that ecological landscape. The dots indicate locations where a significant occurrence of this community is present, has been documented, and the data incorporated into the Natural Heritage Inventory database.

Community Description: Composition and Structure

The dominant grasses are of short to medium stature, usually less than one meter in height, and include little bluestem (*Schizachyrium scoparium*), side-oats grama (*Bouteloua curtipendula*), hairy grama (*B. hirsuta*), and prairie dropseed (*Sporobolus heterolepis*). Prairie satin grass (*Muhlenbergia cuspidata*) is abundant in some Dry Prairies on the Mississippi River bluffs along the state's western edge. Several panic grasses (*Dicanthelium* spp.) are widespread in and characteristic of dry prairie communities, though these are seldom, if ever, among the dominant graminoids. When present, tall grasses such as big blue-stem (*Andropogon gerardii*), yellow Indian grass (*Sorghastrum nutans*), and needle grass (*Stipa spartea*) tend to occupy slightly more moist habitats, either on the lower slopes or in draws.

Among the common or characteristic shrubs and forbs are lead-plant (*Amorpha canescens*), American pasqueflower

(*Anemone patens*), bird's-foot violet (*Viola pedata*), silky aster (*Symphyotrichum sericeum*), heath aster (*S. ericoides*), flowering spurge (*Euphorbia corollata*), purple prairie-clover (*Dalea purpurea*), cylindrical blazing-star (*Liatris cylindracea*), false boneset (*Kuhnia eupatorioides*), prairie coreopsis (*Coreopsis palmata*), upland white goldenrod (*Solidago ptarmicoides*), and gray goldenrod (*Solidago nemoralis*).

A number of rare plants and animals are strongly associated with the Dry Prairie community, which provides critical habitat for some of these species, especially among the invertebrates and herptiles. Rare herptiles include the six-lined racerunner (*Aspidoscelis sexlineata*), prairie ringnecked snake (*Diadophis punctate arnyi*), North American racer (*Coluber constrictor*), and timber rattlesnake (*Crotalus horridus*). Among the invertebrates, rare butterflies, moths, leafhoppers, and land snails have been documented in these habitats, including the globally rare ottoe skipper butterfly (*Hesperia ottoe*).

Rare or otherwise noteworthy vascular plants include Wilcox's panic grass (*Dichanthelium wilcoxianum*), ground-plum (*Astragalus crassicarpus*), prairie-turnip (*Pediomelum esculentum*), pale purple coneflower (*Echinacea pallida*), Carolina anemone (*Anemone caroliniana*), and silver bladder-pod (*Lesquerella ludoviciana*).

Conservation and Management Considerations

Brush encroachment due to successional changes in the absence of periodic fire and increased patch isolation as residential and agricultural uses increasingly dominate the adjoining lands above and below the steeper and rockier slopes are

Southwest-facing bluffs above the Mississippi River support an impressive series of dry prairies, one of the largest such concentrations in the Upper Midwest. Remnant oak forest, oak woodland, and oak savanna add ecological value to this exceptional natural features complex. Rush Creek State Natural Area, Crawford County, Western Coulees and Ridges Ecological landscape. Photo by Eric Epstein, Wisconsin DNR.

This series of fine dry prairies occupies south-facing bedrock bluffs not far from the Rush River. Wisconsin has exceptional representation of bluff (or "goat") prairies, which provide key habitat for numerous native plants, invertebrates, and herptiles. Photo by Eric Epstein, Wisconsin DNR.

The Hogback is a striking Driftless Area landform, a long curvilinear ridge with steep slopes rising from level croplands that now occupy an abandoned meander of the Kickapoo River. The knife-edged ridge is highly unusual in that it supports prairie vegetation on both its west and east slopes. This diverse prairie is inhabited by rare plants and animals. Shrub thickets and a potentially restorable oak savanna complement the prairie by providing habitat for additional species of conservation concern. Hogback Prairie State Natural Area, Crawford County, Western Coulees and Ridges Ecological Landscape. Photo by Thomas Meyer, Wisconsin DNR.

The upper, west-facing slopes of Battle Bluff support native prairie vegetation with very little encroachment of woody species. Battle Bluff State Natural Area, Vernon County, Western Coulees and Ridges Ecological Landscape. Photo by Eric Epstein, Wisconsin DNR.

the greatest current threats. Appropriate management actions for Dry Prairie communities include the use of prescribed fire, mechanical removal of woody vegetation (shrubs, saplings, and small trees), and judicious application of herbicides to control unwanted plants, especially nonnative invasive species such as leafy spurge (*Euphorbia esula*) and spotted knapweed (*Centaurea biebersteinii*). Comprehensive planning and good communications among managers and with nearby landowners are essential to determine how, how often, when, and exactly where to use prescribed fire, ultimately the single most important management tool for restoration and maintenance of this prairie community. Paradoxically, not every species dependent on or strongly associated with dry prairie as a primary habitat (e.g., certain invertebrates) is adapted to survive the direct impacts of fire. Because of the small size and isolation of many of our best remnants, an investment of extra care in conservation design and implementation of management activities is warranted, especially when rare species are present. Controversies can be resolved (or at least clarified) via research and adaptive management, to the benefit of all stakeholders interested in the conservation of prairie ecosystems.

Other management issues include grazing, tree planting on or around prairie openings, and residential construction (wherein the prairie is likely to be destroyed and replaced with a monotypic lawn). The loss of sensitive species from isolated prairies (due to rarity, small population size, absence of a key pollinator, competition, unfavorably changing habitat conditions, and distance from a source population, etc.) is a significant threat at some sites, and this will only be effectively addressed by planning and monitoring, followed by appropriate management adjustments and actions.

A number of the largest and least disturbed Dry Prairie sites in the Driftless Area have been identified and designated for protection. Many are now under conservation management by public agencies, NGOs, and private individuals. Expansion and connection of patches of open prairie is possible at some locations and should be a management priority whenever possible. Where the opportunities exist, there is a great need to manage surrounding areas to restore and promote other terrestrial fire-dependent communities such as Sand Prairie, Dry-mesic Prairie, and oak-dominated savannas, woodlands, and forests.

From a global perspective, Wisconsin has an especially important role to play in the conservation of the Dry Prairie community. No other state in the Upper Midwest has equivalent conservation opportunities for this community and its associated vegetation mosaic. Most of the dry bluff prairies of the Upper Midwest occur within the Driftless Area, almost three-fourths of which is within Wisconsin. Southeastern Wisconsin's glaciated southern Kettle Moraine region contains a significant concentration of xeric gravel prairies embedded within a matrix of overgrown oak savanna. More detailed floristic studies are needed to determine whether or not these prairies should be recognized as distinct community types. Until then, conservationists and managers of public lands supporting Dry Prairie occurrences should consider their restoration and management wherever they occur.

Additional Information

For information on similar communities, see the descriptions for Sand Prairie, Dry-mesic Prairie, Dry Cliff, and Bedrock Glade. In the U.S. National Vegetation Classification, Dry Prairie corresponds most closely to CEGL002245 Little Bluestem - Sideoats Grama Bedrock Bluff Herbaceous Vegetation (Faber-Langendoen 2001).

Also see:
Anderson (1954)
Foote (1966)
Kraszewski and Waller (2008)
Steele and Hartman (2015a)
Steele and Hartman (2015b)
Theler (1997)
Thomson (1940)

FROM: Epstein, E.E. Natural communities, aquatic features, and selected habitats of Wisconsin. Chapter 7 *in The ecological landscapes of Wisconsin: An assessment of ecological resources and a guide to planning sustainable management.* Wisconsin Department of Natural Resources, PUB-SS-1131H 2017, Madison.

For a list of terms used, please visit the **Glossary.**

For a reference list, please see the **Literature Cited.**