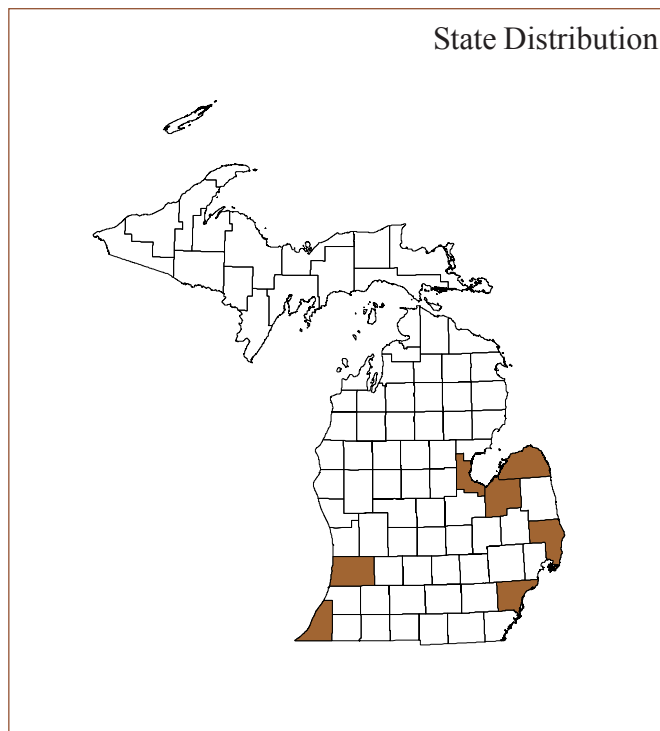


Photos by Dennis A. Albert



Range: Lakeplain wet-mesic prairies occur along the glacial lakeplains of the Great Lakes, in southeastern Wisconsin, northeastern Illinois, northern Indiana, southern Michigan, and northwestern Ohio, as well as in southern Ontario, Canada. In Michigan, lakeplain wet-mesic prairies are found in three regions: the southeast counties along Lake Erie, the Detroit River, and Lake St. Clair; the Saginaw Bay Shoreline; and in Berrien County in the southwest.

Global and State Rank: G1?/S1

Rank Justification: Lakeplain wet-mesic prairies are globally imperiled: Michigan's lakeplain wet-mesic prairies have been reduced in number and size so that today less than 1% of the original community remains. Similar losses of lakeplain prairie have occurred throughout its range. A total of 25 lakeplain wet-mesic prairies have been located in Michigan, ranging from 2-146 acres (0.5-59 hectares) in size and totaling 641 acres (259 hectares). Nineteen of these prairie remnants, or 40% of the state's lakeplain wet-mesic prairie acreage, occur entirely on private, unprotected lands. The largest concentrations of prairie remnants are in southwest Wayne County, on and near the St. Clair River Delta in St. Clair County, and along the Saginaw Bay shoreline in Tuscola County. Because of their proximity to the Detroit metropolitan area, prairie remnants in Wayne County and the St. Clair River Delta are experiencing extreme development pressure.

Landscape Context: Sediments of pro-glacial lakes

formed Michigan's glacial lakeplains at the margins of melting lobes of the Wisconsin ice sheet. In southeast Lower Michigan glacial lake deposits of clay are up to 100 meters thick over Paleozoic bedrock, with deposits thickest at their inland extremes and thinnest along the Lake St. Clair and Lake Erie shorelines (Albert 1995). Poorly drained mineral soils characterize most of the clay plain. These clay plains extend inland 30 to 40 miles (50 to 66 km) along the margins of Lake Erie, Lake Michigan, Lake St. Clair, and Saginaw Bay (Lake Huron). Within the clay lakeplains several broad sand channels formed where glacial meltwater streams carried sand into shallow pro-glacial lakes. These sand channels can be several miles wide, but the sand in them is typically only one to three meters thick. A series of sand beach ridges and dunes are found throughout these lakeplains. The soils of the beach ridges are often excessively drained, whereas those in adjacent swales are poorly drained. A large glacial delta with both clay and sand deposits is located at the mouth of the St. Clair River.

Lakeplain wet-mesic prairie is most commonly associated with inland portions of Michigan's lakeplains, but is also found along low beach ridges near the present Saginaw Bay shoreline. More specifically, lakeplain wet-mesic prairie occurs on several glacial features of the lakeplain, including level, sandy outwash, sandy lakeplains, and deposits of dune sand on silt or clay glacial lakeplains. The soils are sands, sandy loams, loams, or silty clays with poor to moderate water-retaining capacity. Lakeplain prairies most commonly



occur on sand lakeplain with soils of medium to fine-textured sands that are slightly acid to moderately alkaline (pH 6-8). The prairies, which experience seasonal flooding and typically include small pockets that remain wet throughout the year, are among the most diverse plant communities in Michigan, with as many as 200 plant species found within a single prairie remnant.

Patch size characteristics for this community are variable. *Circa* 1800 patch sizes of lakeplain prairie mosaics (including wet, wet-mesic, and mesic sand prairies) in Michigan varied from <100 acres to over 15,000 acres (40 to 6000 hectares) (Comer et al. 1995b).

Historically, these prairies occurred in complex mosaics with lakeplain oak openings, pin oak-swamp white oak sand flatwoods, and elm-ash-maple swamps, all typical of poorly drained lakeplain. At the base of old beach ridges, lakeplain wet-mesic prairie presently occurs as a transition zone between lakeplain wet prairie and mesic sand prairie (Comer et al. 1995a).

Natural Processes: Many factors influence the development and maintenance of prairies on Michigan's lakeplain. Hubbard (1888) speculated that the extensive wet prairies of Wayne and Monroe counties were the result of beaver activity prior to their localized extirpation by the fur trade. His view was based on communications with Native Americans and the prevalence of abandoned beaver dams on the flat lakeplain landscape. Other important factors probably include both soil moisture regimes and periodic wildfires. The combination of 1-3 meters of highly permeable sand over clay sets up a characteristic hydrological regime with spring flooding followed by drought conditions during the growing season. This characteristic water level fluctuation is common to nearly all extant examples of Michigan's lakeplain prairies, and is possibly the most significant physical process in their establishment and maintenance (Minc 1995, Albert et al. 1996). Such extreme variation in the soil moisture regime prevents woody vegetation from becoming established (Hayes 1964; Roberts et al. 1977). In addition to the dramatic seasonal fluctuations in surface and ground water levels, Great Lakes water level cycles also produce fluctuations in the water table of these prairies. Wet-mesic prairies originally occupied the position on the landscape between emergent marsh and adjacent uplands. Based on the original surveyors' notes from the Saginaw Bay shoreline, the boundary between prairie and marsh was not static, but moved inland or lakeward across the landscape, depending on the stage of the Great Lakes water-level cycle.

The combination of accumulation of organic material within these wetlands and drought conditions during the growing season made lakeplain prairies prone to wildfires, which limited the encroachment of woody vegetation. However, it remains unclear whether lightning strikes or Native American activities had a more significant role in the maintenance of lakeplain prairie (Hayes 1964; Faber-Langendoen & Maycock 1987). It is clear, however, that Native Americans utilized dune ridges on the lakeplain for settlements and trails (Jones & Knapp 1972; Comer et al. 1995a). As elsewhere in the state, it is quite likely that fires periodically resulted from this use, spreading to adjacent savanna and grassland. One indication of the significance of fire on the lakeplain is the fact that many of the historical oak savannas located along the beach ridges have become closed-canopy oak forests during the last century of fire suppression.

Vegetation Description: The dominant tallgrass-prairie species of this community typically grow 1-2 meters high. Trees and shrubs are uncommon and bare ground is scarce. *Andropogon gerardii* (big bluestem), *Carex* (sedge) spp., *Panicum virgatum* (switch grass), *Schizachyrium scoparium* (little bluestem), and *Sorghastrum nutans* (Indian grass) are the most abundant species. *Solidago ohioensis* (Ohio goldenrod) is found in both fens and Great Lakes interdunal wetlands as well as this community. *Pycnanthemum virginianum* (common mountain mint) is common in this community but may also occur in woodlands. In addition to the species listed above, other diagnostic species include: *Pedicularis lanceolata* (swamp-betony), *Solidago riddellii* (Riddell's goldenrod), and *Vernonia* (ironweed) spp.

TWINSPAN analyses based on quantitative sampling at Allegan State Game Area in southwestern Michigan, Fish Point on Saginaw Bay, and Algonac State Park near the St. Clair River delta in southeastern Michigan indicate that there are regional differences in this community at the Subsection level (Albert 1995, Minc 1995, Albert et al. 1996). These differences demonstrate the need for future range-wide quantitative comparisons of this plant community. The Allegan County sites were recently reclassified as wet-mesic sand prairie based on differences in floristic composition, diversity, and substrate (Kost et al. 2007).

Michigan Indicator Species: *Sorghastrum nutans*, *Liatris spicata* (marsh blazing star), *Aletris farinosa* (colic root), and *Coreopsis tripteris* (tall coreopsis) are good indicators of functioning lakeplain wet-mesic prairie.

Other Noteworthy Species: Rare animals associated with the lakeplain wet-mesic prairie include: *Elaphe*



vulina gloydii (Eastern fox snake), *Erynnis baptisiae* (wild indigo dusky wing), *Ixobrychus exilis* (least bittern), *Papaipema maritima* (maritime sunflower borer), *Papaipema sciata* (culver's root borer), *Papaipema silphii* (Silphium borer moth), *Prosapia ignipectus* (red-legged spittlebug), *Rallus elegans* (King rail), *Spartiniphaga inops* (Spartina moth). In addition to those listed above, several insect species found in lakeplain wet-mesic prairie are of conservation concern because of their reliance on remnant prairie sites or particular host plants within these sites (Comer et al. 1995b).

Rare plants associated with lakeplain wet-mesic prairie include: *Agalinis gattingeri* (Gattinger's gerardia), *Agalinis skinneriana* (Skinner's gerardia), *Angelica venenosa* (hairy angelica), *Aristida longespica* (three-awned grass), *Asclepias hirtella* (tall green milkweed), *A. sullivantii* (Sullivant's milkweed), *Astragalus neglectus* (Cooper's milk-vetch), *Baptisia leucophaea* (creamy wild indigo), *Cacalia plantaginea* (prairie Indian-plantain), *Carex festucacea* (fescue sedge), *Conohea multifida* (conohea), *Cyperus flavescens* (yellow nut-grass), *Cypripedium candidum* (white lady's-slipper), *Fimbristylis puberula* (chestnut sedge), *Hemicarpha micrantha* (dwarf-bulrush), *Hypericum gentianoides* (gentian-leaved St. John's-wort), *Juncus biflorus* (two-flowered rush), *Juncus brachycarpus* (short-fruited rush), *Lechea minor* (least pinweed), *Ludwigia alternifolia* (seedbox), *Lycopodium appressum* (appressed bog clubmoss), *Panicum leibergii* (Leiberg's panic-grass), *Platanthera ciliaris* (yellow fringed orchid), *Platanthera leucophaea* (prairie fringed orchid), *Polygala cruciata* (cross-leaved milkwort), *Pycnanthemum verticillatum* (whorled mountain-mint), *Rotala ramosior* (tooth-cup), *Scirpus clintonii* (Clinton's bulrush), *Scleria pauciflora* (few-flowered nut-rush), *Scleria triglomerata* (tall nut-rush), *Tradescantia virginiana* (Virginia spiderwort), and *Triplasis purpurea* (sand grass).

Conservation/Management: Lakeplain prairies have been lost and degraded via conversion to agriculture, residential and industrial development, alterations of ground water hydrology, and fire suppression. The construction of extensive drainage networks to promote agriculture and residential development has lowered the water table in most of the historical range of lakeplain prairies. That, and the suppression of natural and cultural fires has allowed the community to succeed to shrub and forest communities. Of nearly 160,000 acres (64,000 ha) of lakeplain prairie in Michigan circa 1800 less than 0.5% remain today (Comer et al. 1995a and b).

Research Needs: *Inventory status:* Lakeplain wet-mesic prairie is a moderately well inventoried

community throughout its range. Additional data on many sites are needed to fully evaluate condition, size, and landscape context criteria for quality ranking. Current data are sufficient to prioritize site management and acquisition objectives.

Regional distribution: Variation in the characteristic plant and animal species between coastal and inland sites needs further description and assessment for refinement of community classification. The differences in characteristic plant and animal species between ecoregion sections and subsections needs further study across the entire range of this community (Minc 1995, Albert et al. 1996).

Site design issues: To adequately preserve a prairie remnant the hydrological regimes must remain intact. This will require protecting the lands surrounding the remnant from hydrological alterations.

Stewardship issues: The ability to restore these systems given typical alterations needs long-term research, including determining when and how restoration actions should be undertaken.

Similar Communities: Lakeplain wet prairie, lakeplain oak openings, wet-mesic sand prairie, mesic sand prairie, wet-mesic prairie, wet prairie, southern wet meadow.

Other Classifications:

The Nature Conservancy National Classification:

CODE: (V.A.5.N.a.)

Tall Sod Temperate Grassland

ALLIANCE: *Andropogon gerardii*-*Calamagrostis canadensis* Herbaceous Alliance

ASSOCIATION: *Andropogon gerardii*-*Calamagrostis canadensis*-*Pycnanthemum virginianum*-*Solidago ohioensis* Herbaceous Vegetation

COMMON NAME: Lakeplain Wet-Mesic Tallgrass Prairie

Related abstracts: Lakeplain wet prairie, lakeplain oak openings, southern wet meadow, appressed bog clubmoss, eastern prairie fringed-orchid, purple milkweed, Sullivant's milkweed, blazing star borer, culver's root borer, red-legged spittlebug.

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