



Photo by Joshua G. Cohen



**Range:** Lakeplain wet prairies occur on the glacial lakeplains of the Great Lakes in southeastern Wisconsin, northeastern Illinois, northern Indiana, southern Michigan and northern Ohio; and in southern Ontario, Canada. Michigan's lakeplain wet prairies occur along the shoreline of Lake Huron in Saginaw Bay, within the St. Clair River Delta, and near Lake Erie.

**Global and State Rank:** G2/S1

**Rank Justification:** Lakeplain wet prairies are a globally imperiled natural community with major reductions in acreage in all of the states and provinces mentioned above. In Michigan the size and number of lakeplain wet prairies have been reduced so that today less than 1% of the original community remains. A total of 15 lakeplain wet prairies have been located in Michigan, ranging in size from 8 to 265 acres (3 to 107 hectares) and totaling 613 acres (248 hectares).

**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 Lake Huron's

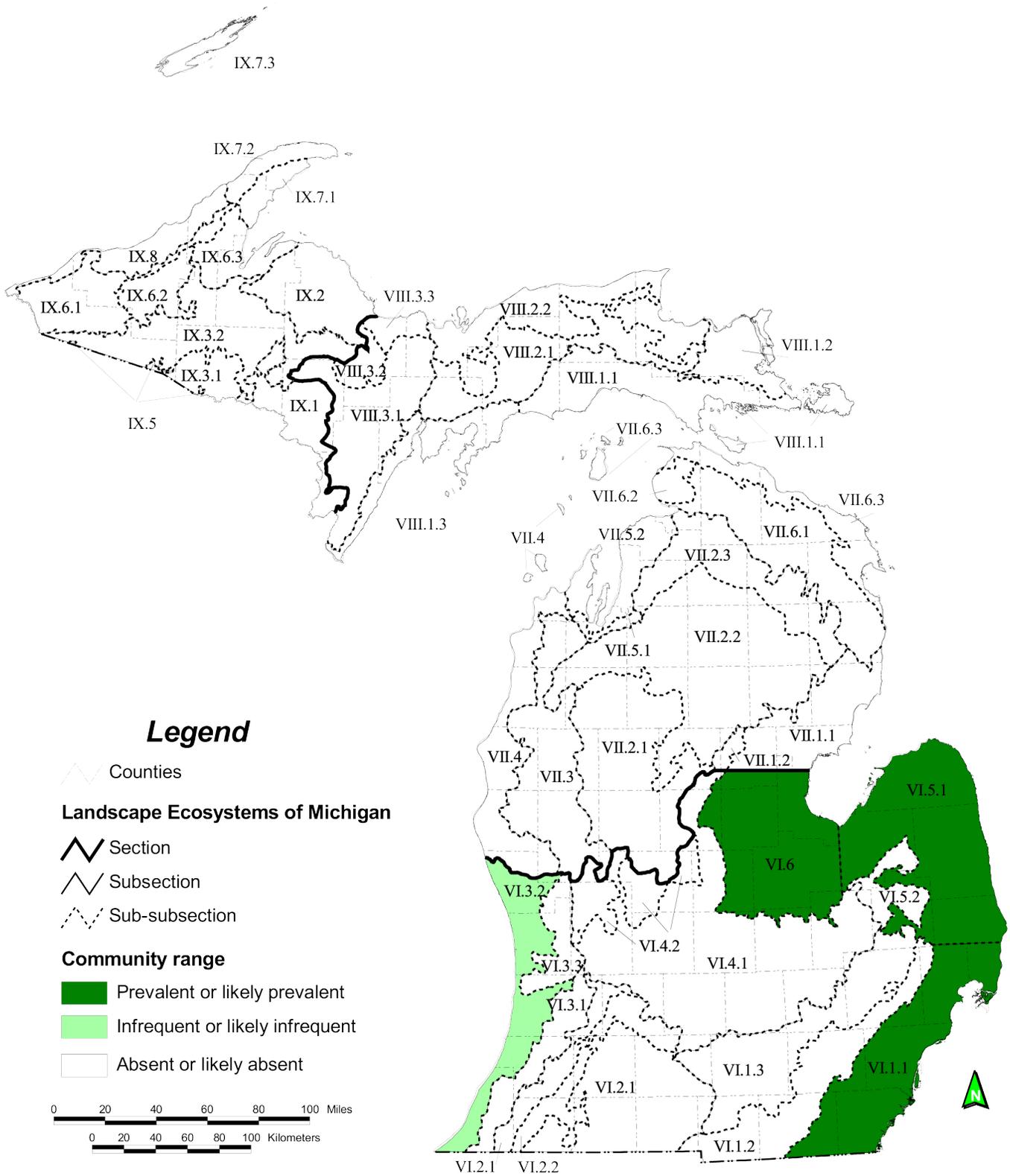
Saginaw Bay. Within the clay lakeplains several broad sand channels formed where glacial meltwater streams carried sand into shallow pro-glacial lakes. These sand channels can be several miles wide, but the sand in them is typically only one to three meters thick. A series of sand beach ridges and dunes 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 prairie occurs on level, sandy glacial lakeplains and on deposits of dune sand in clay glacial lakeplains. The soils are medium to fine textured, moderately alkaline (pH 6-8) sands, sandy loams, or silty clays with poor to moderate water retaining capacity. Lakeplain prairies typically experience seasonal flooding and include small pockets that remain wet throughout the year. Lakeplain prairies are among the most diverse plant communities in Michigan, with as many as 200 plant species found within a single prairie remnant.

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. Lakeplain wet prairie often occupies a transition zone between emergent marsh and lakeplain wet-mesic prairie (Comer et al. 1995b).

Patch size characteristics for this community are variable. *Circa* 1800 patch sizes of lakeplain prairie mosaics (including wet, wet-mesic, and mesic sand prairies)





Ecoregional map of Michigan (Albert 1995) depicting historical distribution of lakeplain wet prairie (Albert et al. 2008)



in Michigan varied from <100 acres to over 15,000 acres (40 to 6000 hectares) (Comer et al. 1995b).

**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 prairies originally occupied the position on the landscape between emergent marsh and adjacent uplands (Kost et al. 2007). 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 vegetation of this community typically includes tallgrass prairie species up to 1 meter high. Trees are uncommon and bare ground is scarce. Characteristic plant species include: *Cal-*

*magrostis canadensis* (blue-joint grass), *Spartina pectinata* (cordgrass), *Juncus balticus* (rush), *Carex stricta* (sedge), *Carex aquatilis* (sedge), *Cladium mariscoides* (twig-rush), and *Potentilla fruticosa* (shrubby cinquefoil). 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.

**Michigan Indicator Species:** *Calamagrostis canadensis*, *Spartina pectinata*, *Juncus balticus*, *Carex stricta*, *Carex aquatilis*, *Carex pellita* (sedge), *Cladium mariscoides*, *Potentilla fruticosa*, and *Asclepias incarnata* (swamp milkweed).

**Other Noteworthy Species:** Rare animals associated with lakeplain wet prairie include: *Pantherophis gloydi* (eastern fox snake, state threatened), *Erynnis baptisiae* (wild indigo dusky wing, state special concern), *Ixobrychus exilis* (least bittern, state threatened), *Papaipema sciata* (culvers root borer, state special concern), *Papaipema silphii* (Silphium borer moth, state threatened), *Prosapia ignipectus* (red-legged spittlebug, state special concern), and *Rallus elegans* (King rail, state endangered).

Rare plants associated with lakeplain wet and wet-mesic prairie include: *Agalinis gattereri*, (Gatterer's gerardia, state endangered), *Agalinis skinneriana* (Skinner's gerardia, state endangered), *Angelica venenosa* (hairy angelica, state special concern), *Aristida longespica* (three-awned grass, state threatened), *Asclepias hirtella* (tall green milkweed, state threatened), *A. sullivantii* (Sullivant's milkweed, state threatened), *Astragalus neglectus* (Cooper's milk-vetch, state special concern), *Baptisia leucophaea* (creamy wild indigo, state endangered), *Cacalia plantaginea* (prairie Indian-plantain, state special concern), *Carex festucacea* (fescue sedge, state special concern), *Cypripedium candidum* (white lady's-slipper, state threatened), *Dichanthelium leibergii* (Leiberg's panic grass, state threatened), *Fimbristylis puberula* (chestnut sedge, state threatened), *Hemicarpha micrantha* (dwarf-bulrush, state special concern), *Hypericum gentianoides* (gentian-leaved St. John's-wort, state special concern), *Juncus brachycarpus* (short-fruited rush, state threatened), *Juncus vaseyi* (Vasey's rush, state threatened), *Lechea minor* (least pinweed, presumed extirpated from Michigan), *Leucospora multifida* (conobea, state special concern), *Lycopodiella subappressa* (northern appressed clubmoss, state special concern), *Platanthera ciliaris* (yellow-fringed orchid, state endangered), *Platanthera leucophaea* (prairie white-fringed orchid, state endangered), *Polygala cruciata* (cross-leaved milkwort, state special concern), *Pycnanthemum verticillatum* (whorled mountain-mint, state special concern), *Scirpus clintonii* (Clinton's bulrush, state special concern), *Scleria pauci-*



*flora* (few-flowered nut-rush, state endangered), *Scleria triglomerata* (tall nut-rush, state special concern), *Tradescantia virginiana* (Virginia spiderwort, state special concern), and *Triplasis purpurea* (sand grass, state special concern).



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Lakeplain wet prairie remnants are high priority conservation targets since they support a diverse array of rare plant and animal species.

**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 allow 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.

**Research Needs:** *Inventory status:* Lakeplain wet prairie is a moderately well inventoried community throughout its range. Additional data on some sites are needed to fully evaluate condition, size, and landscape context criteria for quality ranking. Current data are sufficient to prioritize site acquisition and management 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-mesic prairie, lakeplain oak openings, wet prairie, wet-mesic prairie, wet-mesic sand prairie, southern wet meadow, and emergent marsh.

#### Other Classifications:

##### The Nature Conservancy National Classification:

CODE: (V.A.5.N.j.) Temporarily Flooded Temperate or Subpolar Grassland

ALLIANCE: *Spartina pectinata* Herbaceous Alliance

ASSOCIATION: *Spartina pectinata-Carex spp.-Calamagrostis canadensis* Lakeplain Herbaceous Vegetation

COMMON NAME: Lakeplain Wet Prairie

**Related abstracts:** Lakeplain wet-mesic 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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Lakeplain wet prairie, Bay County. Photo by Joshua G. Cohen.

